

**WHEELCHAIR SKILLS PROGRAM (WSP)[®]
VERSION 4.1**

WHEELCHAIR SKILLS TRAINING PROGRAM (WSTP)[®] MANUAL

This manual and related materials can be downloaded from:

www.wheelchairskillsprogram.ca

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1. INTRODUCTION TO THE WSTP

A General Introduction to the Wheelchair Skills Program (WSP) can be found in a separate document, posted on the web-site. The WSP includes the Wheelchair Skills Test (WST), the Wheelchair Skills Training Program (WSTP) and related materials. This Manual focuses on the WSTP.

The WSTP is a standardized training method that addresses a set of representative wheelchair skills. Research evidence regarding the safety and efficacy of the WSTP can be found in the Evidence section and List of Published Papers on the web-site. There are also some excellent resources available in manuals, textbooks and websites about various ways to perform specific wheelchair skills. Examples include work by P. Axelson, I. Denison, L. Harvey and MF Somers. Some on-line resources can be found on the Related Sites page of our WSP website. However, despite good progress, there has been relatively little scientific study to date on the optimum methods of either performing or teaching most wheelchair skills.

Nevertheless, based on the evidence that does exist, we strongly hold two convictions about wheelchair skills training that underlie the WSTP. First, for any motor skill being attempted by a specific person in a specific setting, there is a better and worse way of performing the skill. Second, when learning to perform a motor skill or to perform it better, there is a better and worse way to do so.

The goals of the WSP are to increase the likelihood that a wheelchair user or caregiver who needs and wants to improve his/her ability to safely and effectively use a wheelchair will have an opportunity to do so, to provide an evidence-based means for wheelchair skills training to occur and to provide learning resources to those who wish to use them.

Wheelchair skills are not ends in themselves, they are means to an end. In terms of the World Health Organization's International Classification of Function (2001), wheelchair skills are "activities". The ability to perform them represents "capacity" and their use in everyday life represents "performance". The purpose of these activities is to overcome barriers in the environment and to thereby permit the wheelchair user to fulfill his/her desired role in society ("participation").

Other potential benefits of wheelchair-skills training for wheelchair users and caregivers include fewer acute and overuse injuries, improved sense of wellbeing (through self-esteem, self-efficacy, confidence and personal control), improved development (of children) and having fun.

In addition to or instead of learning wheelchair skills, there may be alternative ways to accomplish the learner's goals (e.g. by changing wheelchairs, by accepting the assistance of a caregiver or by

eliminating accessibility barriers). Alternatively, if the goal is not a feasible one, the most appropriate strategy may be to assist the learner in adjusting his/her expectations to a more realistic level.

2. GENERAL BACKGROUND ON MOTOR SKILLS LEARNING

Education can include one or more of three domains – knowledge, skills and attitudes. All three are relevant to wheelchair skills training. However, in this Manual, we will focus primarily on motor skills. A motor skill is one that is voluntary, observable, that has been learned and that has a goal. Motor skills have been classified on the basis of the size of the muscle groups involved (gross versus fine), on the basis of whether they are discrete tasks or more continuous ones, and on the basis of how stable the environment is (open versus closed).

In the context of the WSP, there are three components of the education process – objectives, curriculum and evaluation. These are conceptually linked in the “circle of education”. Evaluation provides a baseline and a means of identifying goals and objectives. The curriculum is used to accomplish the objectives. This is followed by re-evaluation, to determine if the objectives have been fully met. If not, the objectives are reviewed and, if appropriate, the cycle continues.

The issues presented in Section 3 are based on the extensive motor-skills-learning literature and on our own experience with the WSP. The motor skills literature is extensive, with over 300 English-language papers published per year. Section 3 is not intended to be a treatise for researchers. It is our attempt to synthesize the aspects of this literature that are most relevant to the learning of wheelchair skills. We have attempted to express these principles in language that the average educated, but not necessarily professional, trainer and learner might understand. For those seeking a more scholarly and thorough source, we suggest Richard A. Magill’s excellent textbook (*Motor Learning and Control: Concepts and Applications*, 8th Edition, McGraw-Hill, New York, 2007). Although there is a great deal of scientific evidence underlying these principles, the principles themselves are fairly simple. We strongly believe that trainers and/or learners who understand and apply the principles summarized in Section 3 will be more effective than those who do not.

In addition to the general principles summarized in Section 3, more specific “training tips” are included with the individual skills later in Section 7. These have been derived from a number of excellent sources in the rehabilitation and wheelchair literature, as well as from our own experience.

3. SPECIFIC ISSUES OF IMPORTANCE FOR MOTOR SKILLS LEARNING

3.1. The Learning Process

In the course of learning a new motor skill, the learner progresses through stages. Early in the process, success may be partial, inconsistent or only possible in a familiar setting. As learning progresses, preliminary success is eventually achieved (skill acquisition), consistency within training sessions improves, success carries over into subsequent sessions (skill retention) and the learner is able to use the skill in more diverse settings (skill transfer). Ultimately, the skill may become autonomous, requiring little or no conscious effort. The time course of motor learning includes an initial period of rapid improvement, sometimes followed by a plateau that may be followed by additional significant gains. The shape of the motor-learning curve is not a straight line and may be punctuated by abrupt transitions from novice to skilled coordination patterns.

There is a distinction between aspects of the learning process that are in the form of facts and ideas (sometimes called the “declarative”, “cognitive” or “explicit” system) versus those that relate to the actual performance of the skill (sometimes called the “procedural”, “motor skill” or “implicit” system). Each can be acquired without the other. If both are acquired, this need not be in a fixed order. The two can assist or interfere with each other. Attempting to consciously control motor actions can disrupt optimal performance. Skills learned implicitly through a discovery approach appear to be more robust under pressure.

People who have acquired expertise in performing a motor skill have some characteristics in common. They have greater awareness of their situations and better ability to anticipate changes in the environment. They are better able to exclude intrusions on their attention and to remain focused on the task. Their motor performances are less affected by stress and fatigue.

3.2. Safety

Wheelchair users and caregivers are at risk of acute or chronic injuries, for instance due to tip-over accidents or poor ergonomic technique. The trainer should provide feedback to learners when the learner uses potentially unsafe methods. Indeed, if concerned about the possibility of acute injury, the trainer should interrupt a skill attempt. For many of the skills, the rear anti-tip devices need to be repositioned or removed. While the rear anti-tip devices are inactivated, the trainer needs to be particularly attentive to the risk of a rear tip-over. At the end of the session, the trainer should restore the rear anti-tip devices to their original positions, unless the learner has progressed to the stage where they can be abandoned.

The goal of wheelchair skills training is for the learner to be able to perform skills safely and effectively. If there are two or more ways for a learner to perform a skill and one is considerably

safer to perform than the other, the trainer should encourage the learner to use the safer technique. For some learners and some skills that cannot be performed in a consistently safe manner, the most successful outcome of training will be if the learner recognizes that the skill should not be attempted without assistance. The Wheelchair Skills Test has been designed to reward such decisions by learners – although individual skills can only be passed if performed safely, it is possible to fail a skill in a safe or unsafe manner.

3.3. Spotters

We strongly recommend careful attention to spotting during practice sessions. Any person serving as a spotter during training should meet the criteria described in the Spotter Manual and position him/herself as indicated in the individual skill sections of that Manual.

3.4. Trainers

For some wheelchair users and caregivers who do not have ready access to a trainer, it is possible to learn the skills by self-training. However, a good trainer can be an important element in learning wheelchair skills. The trainer should be knowledgeable about wheelchair skills and how to teach them. The personal characteristics of the trainer are also important; the trainer should be credible, friendly, supportive, non-judgemental, interested and honest. The trainer should be familiar with the structure and operation of the specific wheelchair used by the learner.

The trainer may be a rehabilitation clinician (e.g. an occupational therapist or physical therapist) who is regularly involved in wheelchair prescription and training, or someone specifically trained for the purpose. Because practice outside formal training sessions can be useful, members of the rehabilitation team (e.g. members of the nursing profession, personal care workers, recreation therapists, volunteers, physicians) other than the primary trainer can be of assistance. Good team communication among team members about a learner's progress can help to ensure that the input from multiple team members is complementary rather than conflicting.

Both experts and non-experts can play important roles in the training process. Wheelchair-using or caregiver peers may possess or be able to acquire the necessary knowledge, skills and attitudes to function as trainers. The trainer should be as familiar as possible with relevant elements of the WSTP, including the general principles and the specific elements. The trainer should feel free to refer to the WSTP Manual whenever necessary. Those interested in becoming WSTP trainers should study the WSTP Manual and related materials and observe how a skilled trainer performs. Ideally, the WSTP should only be used by trainers who have been trained and certified in its administration. However, good results should be possible by careful attention to the WSTP Manual, because it has been designed to be reasonably self-explanatory and to reflect normal clinical practices.

3.5. Assessment of Wheelchair Skills

As noted earlier, evaluation is part of the circle of education. Periods of formal evaluation (e.g. using the WST before and after training, and at follow-up) can be useful. However, predicting future performance on the basis of early attempts is of limited use. The trainer should not prejudge the outcome of training. Ongoing assessment by the trainer is also important. What the trainer can do to facilitate the learning process varies continuously.

There are a variety of parameters that provide evidence of learning due to practice or experience. The WST represents only one intermediate level of assessment. Other, more detailed, parameters include improved consistency, improved adaptability to other settings, improved economy of movement and improved ability to detect and self-correct errors. Instrumented wheels can be used to record additional detail (e.g. force profiles). Examples of parameters at a level less detailed than the WST are hours per day of wheelchair use and distance covered per day (e.g. using dataloggers). We suggest that a training log be used by the trainer and/or learner to track the training process.

3.6. Set Achievable Goals

From the baseline WST assessment, skills may be identified that were not performed as safely and/or as effectively as they might have been. For each of these identified skills, a decision needs to be made about whether improvement in the skill is a goal of the learner. Goal pursuit and performance are related to the learner's beliefs about him/herself and the task (self-efficacy). The learner may need some help in coming to this decision, because he/she may not initially recognize the functional benefits of acquiring a new skill. Additionally, a decision needs to be made as to whether it is feasible for the person to learn this skill. This is a judgement call and requires a good understanding of the learner's health and circumstances. If in doubt, we recommend that the person be given an opportunity to learn the skill. If progress is not being made, a learner can decide to abandon that skill. The trainer can assist the learner in coming to this decision. Involving the learner in the goal-setting process can have a positive effect on motivation. However, the trainer has the right to refuse to provide training on any skill that he/she does not believe to be safe and feasible.

3.7. Individualize the Training Process

Motor-learning principles generally apply almost equally well to elite athletes and to those who have severe disabilities. However, there is usually benefit to tailoring the training process to the learner. Training can sometimes take the form of a problem-solving exercise, attempting to answer the question "For this learner, with this wheelchair, in this context, what would be the safest and most effective way to perform this task?"

The inability to perform a skill may be due to a variety of limiting factors, alone or in combination. Limiting factors may be intrinsic (e.g. impairments such as cognitive limitations, weakness, pain,

shortness of breath, limited range of motion, spasticity, poor coordination or movement disorders) or extrinsic (e.g. a faulty wheelchair part, poor seating support or poor lighting). The trainer should attempt to identify limiting factors and seek to have any remediable limiting factors addressed.

Motor-skills learning can be affected by personal characteristics, such as gender, age, handedness and health conditions. A trainer who understands these differences will be able to reassure learners who might be progressing more slowly than others. The training process may need to be adapted to the individual. With respect to sex, males learn some skills faster than females. With respect to age, although plasticity is better early in life and the young learn motor skills more rapidly and with less practice, aged people can acquire new motor skills well.

Neurological conditions may affect motor-skills learning. For people with stroke, the post-stroke brain has heightened sensitivity to rehabilitation early but this phenomenon declines somewhat with time. Rehabilitation training, whether early or late, improves functional outcomes. The extent of improvement is related to the intensity of training. Explicit information disrupts skill acquisition even more than usual in people who have had strokes affecting the basal ganglia. For people with language impairments, it may be helpful to use nonverbal cues and feedback rather than verbal ones. People with Alzheimer's disease can learn and retain new motor skills. Implicit-learning strategies and demonstration appear to be particularly useful in this setting. People with Parkinson's disease can also learn new motor skills but do not retain them as well as people with Alzheimer's disease. Rhythmic auditory cues can be helpful for them. Although less helpful for people with normal brains, paying conscious attention to motor tasks can be useful for people with Parkinson's disease. Consistent practice conditions may work better than variable ones for people with Parkinson's disease or Alzheimer's disease.

3.8. Determine Who the Learner(s) Will Be

A skill that may not be feasible for a wheelchair user to perform alone may be possible with the assistance of a bystander or caregiver. The training can be directed at the wheelchair user, the caregiver, or the two functioning together. Other types of learners are clinicians, or others serving as spotters, testers or trainers.

There are some general considerations for caregivers as the targets of training. The caregiver should be cautioned to avoid applying excessive force to the wheelchair user through a flexible backrest or removable part, and to avoid sudden movements. The caregiver should always provide the wheelchair user with cues concerning what he/she intends to do before attempting a skill. When the caregiver is successfully trained, the caregiver can serve as a spotter, so the caregiver should be instructed in how to perform in this capacity. The caregiver may also serve as a motivator and trainer (e.g. during practice between formal training sessions with the primary trainer).

There are ways for caregivers to relate well to wheelchair users. For instance, the caregiver should seek permission before taking any actions, should speak clearly, should address the wheelchair user from the front and at eye level whenever possible, and should treat the wheelchair as an item of the wheelchair user's personal property. In addition to these general points, caregiver issues related to specific skills are dealt with later, when those skills are discussed.

3.9. Structure of Training

The essential elements for learning are only that there should be a learner and a task that has yet to be mastered. Beyond these basic requirements, there are a variety of ways in which the safety, effectiveness or efficiency of training can be enhanced. Training can take place anywhere (e.g. in the hospital, community or the subject's own environment). Training can take place in an ad-hoc format, seizing teaching opportunities as they present themselves (e.g. during community outings). However, in the clinical setting, it can be helpful to provide more structure (e.g. scheduled sessions, lesson plans). Lesson-plan templates for initial and subsequent sessions can be found in Section 4 of the Manual.

3.10. Training in Pairs or Groups

To permit an individualized approach, we recommend that the ratio of trainers to learners be 1:1 or 1:2, although larger groups have also been successfully trained. Training in pairs or groups is practical, cost-effective and has educational merit. Such training can permit group discussions and problem-solving. Learners can serve as models for each other, both for how and how not to perform a skill. Whenever possible, it is desirable to select groups on the basis of roughly similar skill level. Learners should be reminded that skill capability is affected by a number of factors (e.g. age, sex, impairments and wheelchair type), so they should not compare their progress with that of others. For individuals with low self-efficacy, collaborative training with a more experienced partner aids skill acquisition.

3.11. Motivation

Motor-skills learning is enhanced if the learner is motivated to learn. The trainer can help to motivate the learner by making the learning meaningful and rewarding. Game-based exercises can help to maintain interest. Working in cooperation or competition with other learners can both enhance motivation.

Helping the learner to understand the skill can be helpful, such as by use of memory aids (e.g. relating hand placement on the wheelchair hand-rims to the hands of a clock), providing verbal labels for segments of a skill and organizing a way of thinking about the components of the skill. Learning is enhanced by instructions that portray the task as a learnable skill versus one that is based on

inherent ability.

Whenever possible, the trainer should explain how the learner will benefit (e.g. improved safety, improved performance) by learning a new skill. In addition to such long-term benefits to training, there may be short-term benefits, such as the social interaction during the training sessions, the pleasure that some people get from challenging themselves or improving on a test. Without creating anxiety, the trainer should let the learner know that he/she will be assessed at the end of the training period, because this has a known positive effect on skill acquisition. Encouragement and positive feedback from the trainer or fellow learners can be powerful incentives as well.

3.12. Demonstration

Demonstration is one of the most powerful instructional methods in motor skills learning. The demonstrator may be the trainer, a model or a peer. It may be in-person or on a video. The Videos section of the WSP website contains numerous video clips that can be used. The demonstrator should ideally be skilled, but this is not mandatory. If the model is at a similar level to the learner (e.g. in a group setting), the learner can learn from the feedback provided to the demonstrator. The demonstration should occur before practice begins. It may be repeated as often as needed. The trainer should verbally describe important elements of the skill or provide attention-directing cues, as part of the demonstration. The trainer should focus on what to do rather than what not to do, at least until the learner has had an opportunity to try the skill several times.

3.13. Verbal Instructions

Instructions are generally provided before practice, as distinct from feedback that is provided afterwards. Providing explicit instructions before task practice can be detrimental so instructions should be used with caution. Learners have a limited capacity to attend – the trainer should not overwhelm the learner with the quantity of information. Instructions are more likely to be of help for advanced learners (e.g. instructions regarding anticipation and decision making). The length of time between the instructions and actual practice should be minimized.

As to the content of instructions, some general examples follow. Speed and accuracy are inversely related. If both are desirable, the learner will do better to start with accuracy and build speed later. The trainer may provide a framework, an organization or a way of thinking about a skill (e.g. segments of a skill, or use of the hands of a clock to refer to the position of the hands on the rear wheel). The trainer may provide instructions about what to look for in the environment that might affect performance (e.g. a lip at the bottom of a ramp). Analogy learning has been found to be helpful, as it is akin to implicit learning and unconscious movement control.

The trainer may provide verbal cues – short, precise words or phrases that direct attention or prompt movements. Preferably, these should be given in combination with a demonstration. The trainer should limit the number of cues to those that are most critical. It can be helpful to have the learner verbalize the cues prior to attempting the skill and during the attempt. For instance, when using the momentum method to ascend a curb (see later, in skills section), the cues we use are “push, coast, pop and lean”.

3.14. Focus of Attention

Intention interferes with performance at all skill levels. Early in training, the trainer may need to have the learner focus on specific actions or processes (e.g. “lean forward”), if a crucial error has been identified. However, the research literature has suggested that, when most individuals engaged in a motor learning task concentrate on movements themselves, their conscious intervention in the control processes results in poor performance and learning. People with Parkinsonism may be an exception to this general rule.

As the skill becomes more automatic, more advanced learners tend to do better if they focus on the overall goal or outcome of the skill performance (e.g. “get up the incline onto the platform”). This phenomenon is better documented in adults than for children. Although automatic performance is ideal, even experts may find it necessary from time to time to focus attention on aspects of the task that require it.

3.15. Imagery

There is evidence that imagery or mental practice can be helpful in the acquisition of motor skills. Imagery can be assigned as homework. Imagery can focus on what the learner would see during the performance of a skill, with internal or external perspectives (i.e. seeing through one’s own eyes versus seeing oneself as though watching another person). Alternatively, imagery can focus on what the person might feel (e.g. limb position, external forces) during a skill performance. Imagery can be used for motivational purposes (e.g. visualizing performing with confidence and ease). Imagery can be used in advance, to prepare to perform a skill, or after the attempt, to reinforce a well-performed trial. Imagery is not as effective as physical practice but it is better than no practice. Used in combination with physical practice, imagery is almost as effective as physical practice alone, so it may be a useful strategy when there are factors prohibiting physical practice (e.g. bad weather, lack of spotter availability, a sore shoulder). Imagery has a greater effect on closed skills (ones that are always the same) than open ones. Imagery is less useful for a novel task than a familiar one.

3.16. Feedback

Implicit learning through intrinsic feedback (e.g. from what the learner can see, hear or feel) is useful and may be all that is needed. Feedback can be augmented in a variety of ways (e.g. by watching

oneself in a mirror, by watching a video of one's performance, by receiving biofeedback or by receiving feedback from a trainer). Augmented feedback is generally an effective tool for enhancing learning (e.g. by better participation, faster skill acquisition). It may even be essential for some situations. However, augmented feedback is not always needed and it can hinder learning if the learner becomes dependent on it. The ultimate goal of skills learning is for the performer to be able to perform the skill without augmented feedback.

3.17. Feedback Content

The trainer should be supportive and encouraging, even to the extent of slightly exaggerating how well the learner is doing. However, the trainer should be accurate with respect to feedback content. It is counterproductive to tell a learner that his/her performance was successful if it was not. People learn at least as well from their failures as from their successes.

When learning wheelchair skills, feedback from the trainer about the success or failure of an attempt at a skill ("knowledge of results" [KR]) is usually unnecessary, for two reasons. First, the result is usually self-evident. Second, if the learner is failing repeatedly, he/she may get discouraged by repeated statements about failure. However, if a learner performs in an unsafe manner and does not appear to be aware of it, the trainer should point this out.

Another form of feedback is the provision of information about *how* the skill was performed ("knowledge of performance" [KP]). Ideally, such feedback should be directed at what the trainer suggests the learner should try differently ("prescriptive KP"), in order to achieve a safer or more effective result. The trainer should identify the most critical error and suggest what might be done to correct this problem. Pointing out errors is more effective than noting what the learner is doing correctly (although the latter is important for motivation). It can be useful to have learners attempt skills in inappropriate ways (e.g. rolling through gravel while leaning forward, causing the casters to sink into the gravel), to help them better understand why a suggestion is being made. Qualitative feedback is fine early (e.g. "you need to pop your casters higher"). Later, quantitative feedback (e.g. "you need to pop your casters about 2cm higher") may be better. Feedback can be more effective if it directs the performer's attention away from his or her own movements and to the effects of those movements. As part of the feedback process, it can be useful to ask the learner about his/her perceptions about the problem and intended solutions.

3.18. Timing of Feedback

When providing feedback, the trainer needs to exercise judgment and to be attuned to the chemistry of the training session. The trainer should offer feedback statements no more often than after every second attempt. The trainer should let the learner know that the absence of feedback means that the performance was adequate for the current stage of learning. This gives the learner an opportunity to

problem-solve on his/her own. It also decreases repetitive feedback statements, especially in the case of more advanced skills when it can take time for the learner to overcome a problem. A common error is for the trainer to spend too much time talking and not enough time having the learner practice.

The feedback schedule is especially important for wheelchair users who have cognitive or behavioral impairments. A self-controlled feedback schedule (i.e. letting the learner ask for feedback) may be appropriate for some people. The trainer should gradually reduce the frequency of feedback statements as time goes on. The weaning of the feedback schedule may need to be more gradual for children. As the fading process leads to less and less frequent feedback, the trainer should summarize a series of attempts rather than focusing only on the most recent attempt.

Trainers should be aware of the principles of behavior modification, which have similarities to the principles of motor learning. Positive reinforcement (e.g. encouraging remarks) increases the likelihood of a behavior (or skill) being performed, whereas negative reinforcement (or no reinforcement) has the opposite effect. Initially, the tolerance for error should be broad, but the “bandwidth” of acceptable performance is gradually narrowed as learning proceeds. Behaviorists refer to this as “shaping” a behavior. Intermittent positive reinforcement, at irregular intervals, is the ideal reinforcement schedule for sustaining behaviors.

Feedback can be provided during the skill attempt. This is more practical for continuous skills, but there is a danger that this may interfere with the learner attending to intrinsic feedback. Providing the feedback after the skill is usually preferable. The trainer should wait a few seconds before providing feedback to allow intrinsic processes to work first. Before beginning the next trial, the trainer should allow the learner some time to plan the next attempt. Any augmented feedback should be followed by an opportunity to practice.

3.19. Specificity of Practice

If a learner wants to improve his/her ability to perform a task, the task itself should be practiced. Cross-training may help to develop fitness, but is of limited use for the development of motor skills. Practice needs to be as specific as possible with respect to the task itself and the context in which it is to be performed. During practice, the learner should match the desired final setting. However, if the goal is for the learner to be able to conduct the task in diverse settings, then that should be practiced.

3.20. Amount of Practice

For motor skills to be learned well, they need to be practiced. If a learner is switching from an old to a new coordination pattern, it may take 200 or more practice trials to achieve the change. During the transition, there may be numerous errors, which the learner may find frustrating and discouraging.

The amount of practice needed may be much greater (up to 50-fold) for people with injury or disease of the brain.

The “over-learning” strategy has a positive effect on skill retention. This involves continuing to practice (by 50-200%) beyond the amount needed for initial success. This can be done right away or during additional practice sessions later. However, more practice is not always better – “practice does not make perfect, perfect practice does”. Also, there may be a point of diminishing returns. More than 4-6 hours of practice a day is unlikely to be productive. If errors begin to occur due to fatigue or frustration, it is probably wise to take a break. For simple tasks, continued practice may cause performance to diminish. The literature on wheelchair-skills training suggests that substantial improvements can be made on a group of skills with as little as 2-3 hours of formal training spread over several sessions, but that the ideal is probably higher (e.g. 10-12 hours) if the situation allows.

Although it is not necessary to be an expert to perform a skill in a safe and useful manner, to achieve true expertise at a skill (as a professional athlete, musician or an assembly-line worker may exhibit) may require several hours per day of deliberate practice, for periods of 10 or more years. There is some evidence to support that millions of repetitions and 10,000 hours of practice may be required for true expertise.

3.21. Facilitate Retention

Although a learner may be able to acquire a skill during a practice session, it is not uncommon for the learner to fail to perform the skill adequately at the next session. This is a failure of skill “retention”. The objective of wheelchair-skills training is long-term retention (i.e. months and years). For practical purposes, successful performance after such brief intervals as 3 days may need to be accepted as evidence of at least short-term retention, but long-term retention is the target.

There are conditions within and following a practice session that affect whether training on a new skill will be retained. To improve the likelihood of “consolidation”, the trainer (and other members of the rehabilitation team) should avoid the introduction of other new skills during the 4-6 hour period thereafter. Ideally, the learner should sleep before the next training session. Although not always practical, a 90-minute nap immediately post-training reduces the susceptibility to interference and results in earlier consolidation. At the subsequent session, the learner may even perform better than at the previous session, without any intervening physical practice. This is sometimes referred to as “off-line learning”. Sleep affects some types of skills more than others (sequence-specific skills less so). Sleep is of most benefit to skills that were the most difficult before sleep. Learning by observation is enhanced by an early sleep window. Anticipated rewards can enhance off-line learning during sleep.

Consolidation is a process with different components – learning the movement and learning the goal of the movement, processed differently. Memory progresses over time from a fragile state, one that is susceptible to interference, to a stabilized state. During subsequent practice, the consolidated memory can become unstable and susceptible to improvement (“reconsolidation”) or deterioration.

3.22. Variability of Practice

Most wheelchair skills are of little use if they can only be performed in highly controlled settings. The purpose of wheelchair skills training is for the learner to use the skill in his/her life (skill transfer). Once a skill is initially acquired, the learner should practice it in different contexts to promote transfer to everyday situations. Diversification may include alterations of the environment (e.g. surface, lighting conditions, time of day), variations in how the skill is performed (e.g. faster, slower, while multi-tasking) or variations in the learner’s state (e.g. with fatigue, anxiety).

To enhance skill retention and transfer, random practice of a group of skills that have already been acquired is generally better than consistent (“blocked”) practice. However, there will be more errors during random practice. The two approaches are not mutually exclusive, as it may be reasonable to begin with consistent practice and to progress to greater variability. The approach may vary depending upon the personal characteristics of the learner (e.g. children and the elderly do better with less variability and fewer distractions).

3.23. Distribution of Practice

Practice may be condensed (“massed”) or spread over several sessions (“distributed”). Our experience at a rehabilitation centre is primarily with brief individual and/or group sessions at regular intervals (e.g. 15-30 minutes, 1-5 times a week for 2-4 weeks), with practice encouraged between sessions. One alternative model is to conduct training in and around the learner’s home. Another model for learners living in the community is to hold periodic group training courses (e.g. for 1-2 hours, weekly, for several weeks). Another alternative is a skill “camp” (e.g. all day for 1-5 days) in a central location or on a circuit basis. The single-training-session format is commonly used for workshops when training trainers. However, the use of such an approach can cause even highly motivated learners to lose focus and become fatigued. In addition to such problems, this approach may lead to poor retention and consolidation. Each of these models has advantages and disadvantages. The research literature suggests that, for the types of skills that wheelchair users and caregivers need, it is generally less effective to carry out a large amount of training in a condensed manner than it is to spread the training out over a longer period that permits rest and consolidation of what has been learned. However, too much time between practice sessions can allow the learning to decay if the skill has not yet been acquired and consolidated. Beyond this, there is little research evidence to suggest that one of the models noted above is vastly superior to another, so the choice of model(s) can be based on local considerations.

Whenever feasible, we recommend that wheelchair-skills training be spread over a series of brief sessions instead of one long one. Brief practice periods are less likely to conflict with other therapy sessions (e.g. for inpatients) or to fatigue the learners. For wheelchair users who are elderly, who are unfit or who have a number of co-morbidities, even a brief session can be fatiguing or cause overuse injury. We have found it practical to use sessions of 15-30 minutes in duration. Such sessions include a warm-up, some time on skills already acquired but requiring further practice, a period during which instruction is received on the principal new skill that is the focus of the session, and a cool-down activity. Depending upon the setting (e.g. inpatient vs community), sessions can be scheduled at intervals of 1-7 days. Regardless of the way in which learners receive assistance from trainers, when the learner has demonstrated the ability to do so safely, the trainer should encourage the learner to practice between formal sessions.

3.24. Whole versus Part Practice

For skills that consist of a sequence of sub-skills, initially it can be helpful to break the skill down into its components. For instance, the stationary wheelie skill can be broken down into three phases – takeoff (getting onto two wheels), maintaining balance on two wheels and landing (returning to the condition of having all four wheels on the ground). The goal, of course, is to build up to the point where the whole skill can be practiced as a unit.

There are some variations on this strategy. For instance, the learner can combine whole- and part-skill practice by focusing attention on different aspects of the skill even though performing the entire skill. If the skill is to be segmented, a progressive approach, from start to finish, is generally preferred because it eventually becomes whole-skill practice. However, the order in which the segments are practiced is not critical.

3.25. Simplification and Progression

For many wheelchair skills, it is possible to begin with a simpler and less difficult version of the skill. The learner can master it before progressing to the ultimate skill level that is the goal of training. For many wheelchair skills, the simpler version may be useful itself, even if the more difficult levels cannot be learned. For instance, getting the wheelchair up a 5cm level change is a useful skill and also a step toward getting up a full 15cm curb. Another example is to learn the wheelie balance in a high-rolling-resistance setting before progressing to a low-rolling-resistance one. This strategy for learning the stationary wheelie has the advantage of reducing the amount of forward-backward movement of the rear wheels needed to maintain balance. This reduces attentional demand. It also eliminates a degree of freedom (forward-backward movement of the rear wheels). Reducing the degrees of freedom is a strategy that has been observed to be used by beginners learning non-wheelchair skills.

Other examples of simplification and progression are adding speed to a task, doing the task in a more challenging environment, adding a second task, reducing the amount of assistance provided by an assistant and reducing the proximity of the spotter. Specific examples of simplification and progression can be found later in the training-tips sections for individual skills. Some of these strategies are similar to those used to increase the variability of practice, with the goal of skill transfer.

In many cases, more difficult skills will build on methods learned in performing the simpler skills. For instance, the ability to get over a threshold requires most of the techniques needed when later learning to get up a curb. The order of individual skills presented in Section 7 reflects this.

Although a learner can perform a wheelchair skill with any safe and effective method, different methods may be more suitable for some individuals or some situations. For instance, for the moving-turns skills as performed by a user of a manual wheelchair who propels the wheelchair with two hands, the basic method is to push harder on the hand-rim of the rear wheel on the outside of the turn. However, for the wheelchair user with good arm function and a wall leading to an opening into which the person wishes to turn, the turn can be accomplished more readily, with less reduction in speed and with less demand on the shoulders if the wheelchair user performs a “drag turn”. To do so, he/she drags the arm along the wall to carry out the turn.

4. LESSON PLANS

Before each WSTP session, the trainer should have a plan for how the session will be conducted. Below we provide a sample lesson plan. This is not intended to be restrictive.

4.1. Intake Session (40 minutes)*

A. Welcome (2 minutes)

- Explain purpose of this and subsequent sessions
- Obtain informed consent to proceed

B. Perform an intake assessment (30 minutes)

- Document demographic, clinical and wheelchair-experience data**
- Identify any contraindications for testing or training
- Document wheelchair specifications**
- Perform Wheelchair Skills Test**

C. Goal setting (5 minutes)

- From the intake assessment and discussion with the learner, identify and record a set of relevant and potentially achievable training goals

D. Closing (2 minutes)

- Describe the nature of subsequent sessions
- Schedule the next session
- Assign homework
- Answer any questions that the learner may have
- Provide strong encouragement

F. Documentation (1 minute)

- Complete any final documentation of the session

* Times are rough guidelines only

** Forms available on website (www.wheelchairskillsprogram.ca)

4.2. Subsequent Sessions (25 minutes)**A. Welcome (2 minutes)**

- Check status: Any new health concerns since the last session? Any after-effects from last session? Any practice since last session?
- Review the goals and planned activities for this session
- Questions and answers

B. Practice skills that have already been acquired but that need work (10 minutes)

- Random order, but begin with less stressful ones until the learner is warmed up
- Variety of settings
- Trainer role: provide structure, safety, minimal feedback
- This portion of the session can also serve to provide conditioning, if the sessions are scheduled often enough to serve in that capacity (i.e. at least 3 times a week)
- Games can be a fun way to carry out this stage of the session

C. Practice a skill that has not been acquired yet (10 minutes)

- Trainer role: provide structure, safety, instructions, demonstration and feedback

D. Closing (2 minutes)

- Questions and answers
- Plan next session content
- Assign homework
- Schedule next session

E. Documentation (1 minute)

- Complete any final documentation of the session

5.0 SKILL GROUPS

There are a great many individual skills that a wheelchair user and caregiver may be required to carry out during everyday activities. A broad (but not all-inclusive) set of such skills will be described in more detail in the later sections. Most of these skills can be grouped, as described below, although some of these groupings only apply to manual wheelchairs.

5.1. How to operate the parts of the wheelchair

Wheelchairs vary widely in their components and how they work. It is important that wheelchair users and caregivers learn about the structures and operating idiosyncrasies of the wheelchairs they use. This includes normal daily operations, transportation and storage of the wheelchair, as well as regular maintenance duties.

5.2. Understanding the dimensions of the wheelchair

The dimensions of the occupied wheelchair are important to be familiar with, for instance when judging the width of an opening or how much space is needed in which to turn around.

5.3. Getting into, out of and repositioning oneself with respect to the wheelchair

This includes transferring between the wheelchair and various other surfaces, un-weighting pressure-sensitive body parts and changing position in the wheelchair.

5.4. Moving the wheelchair around on smooth level surfaces

Although the method of propulsion may vary, depending upon the impairments of the wheelchair user (e.g. using two hands vs one hand and one foot), basic propulsion includes being able to propel the wheelchair forwards and backwards, being able to turn in place or while moving, and being able to maneuver the wheelchair into position (e.g. to pick something up off the ground, getting close enough to a bed to make a transfer, or negotiating doors).

5.5. Using the environment

Although the environment is often a barrier to activities, there are times when it can be an asset. For example, when turning around a solid object, placing a hand on the object can allow the wheelchair to swing around the object without slowing down, rather than the usual approach of slowing down and turning using the hand-rims. Other examples are when the wheelchair user uses the hand rails on a ramp to pull himself or herself up the ramp or uses a doorframe to guide passage through a door.

5.6. Skills that require leaning in the wheelchair

The wheelchair user's position in the wheelchair has a dramatic effect on the amount of weight that is on the front vs rear wheels because the wheelchair users trunk and upper body contribute a

considerable proportion of the combined center of gravity of the wheelchair and wheelchair user. This will affect the stability of the wheelchair in a predictable way. For instance, when ascending an incline, there is a risk of the wheelchair tipping over backwards. To prevent this, the wheelchair user should lean forwards enough to keep the front wheels on the surface.

In addition to stability, the balance of weight between the front and back wheels has a profound effect on rolling resistance. Wheels with large diameters have lower rolling resistance, whereas small-diameter wheels will tend to dig into soft surfaces. When crossing soft surfaces (e.g. carpet, gravel, grass), the wheelchair user should keep his/her weight primarily on the rear wheels. When crossing side slopes, the tendency for the wheelchair to turn downhill can be reduced by leaning away from the swivel casters.

Leaning towards one side can also affect the lateral stability of the wheelchair. Also, if one wheel is spinning due to a lack of traction, this can often be corrected by leaning toward the spinning wheel.

5.7. Skills that require popping the front wheels briefly off the surface

As a natural extension of 5.6, there are some obstacles that require that the smaller (usually front) wheels clear the obstacle. Examples include negotiating gravel, potholes, vertical obstacles (e.g. door thresholds) and getting up level changes (e.g. curbs). These skills are most appropriate for manual wheelchairs.

5.8. Skills for which balancing on the rear wheels is necessary

The full wheelie position can be used to deal with situations like those described in sections 5.6 and 5.7 that require the front wheels to be un-weighted. However, there are some desirable skills that cannot be carried out without the ability to keep the front wheels off the surface. These skills include the stationary wheelie (e.g. to reduce sitting pressures and improve neck comfort), turning around in a tight space, the forward descent of steep inclines and the forward descent of large level changes (e.g. a 15cm curb). These skills require the ability to perform a stationary wheelie, to turn around in the wheelie position, and to move forward or backwards in the wheelie position. These skills are usually impossible in powered wheelchairs.

5.9. Working with a helper

Most wheelchair users have at least some skills that they cannot perform independently or that they find stressful. In such situations, the wheelchair user can benefit from the assistance of a helper. This may be in the form of minimal assistance (e.g. someone standing nearby to prevent a tip), the caregiver doing the task completely (e.g. ascending a curb) or the caregiver working in combination with the wheelchair user. The helper may be a regular one (e.g. friend or family member) or a passerby who can be recruited to help under the wheelchair user's direction.

6.0. TABLES OF INDIVIDUAL SKILLS

In this section, tables are shown of the skills included in each of the four versions of the WSP, based on whether the learner is a wheelchair user or a caregiver and whether the wheelchair is manual or powered. In addition to these core sets of skills, many other skills exist but these are beyond the scope of this Manual.

Table 4: WST 4.1 Master List of Individual Skills

#	Skill Level	Individual Skills	Manual WC		Powered WC	
			WCU	CG	WCU	CG
1.	Indoor	Moves controller away and back	X	X	✓	✓
2.	Indoor	Turns controller on and off	X	X	✓	✓
3.	Community	Selects drive modes and speeds	X	X	✓	✓
4.	Indoor	Controls tilt function	X	✓	✓	✓
5.	Indoor	Controls recline function	X	✓	✓	✓
6.	Indoor	Disengages and engages motors	X	X	✓	✓
7.	Indoor	Operates battery charger	X	X	✓	✓
8.	Indoor	Rolls forward 10m	✓	✓	✓	✓
9.	Community	Rolls forward 10m in 30s	✓	✓	✓	✓
10.	Indoor	Rolls backward 5m	✓	✓	✓	✓
11.	Indoor	Turns 90° while moving forward ^{L&R}	✓	✓	✓	✓
12.	Indoor	Turns 90° while moving backward ^{L&R}	✓	✓	✓	✓
13.	Indoor	Turns 180° in place ^{L&R}	✓	✓	✓	✓
14.	Indoor	Maneuvers sideways ^{L&R}	✓	✓	✓	✓
15.	Indoor	Gets through hinged door in both directions	✓	✓	✓	✓
16.	Indoor	Reaches 1.5m high object	✓	X	✓	X
17.	Indoor	Picks object from floor	✓	X	✓	X
18.	Indoor	Relieves weight from buttocks	✓	X	✓	X
19.	Indoor	Transfers from WC to bench and back	✓	✓	✓	✓
20.	Community	Folds and unfolds wheelchair	✓	✓	X	X
21.	Community	Rolls 100m	✓	✓	✓	✓
22.	Community	Avoids moving obstacles ^{L&R}	✓	✓	✓	✓
23.	Community	Ascends 5° incline	✓	✓	✓	✓
24.	Community	Descends 5° incline	✓	✓	✓	✓
25.	Advanced	Ascends 10° incline	✓	✓	✓	✓
26.	Advanced	Descends 10° incline	✓	✓	✓	✓
27.	Community	Rolls 2m across 5° side-slope ^{L&R}	✓	✓	✓	✓
28.	Community	Rolls 2m on soft surface	✓	✓	✓	✓
29.	Community	Gets over 15cm pot-hole	✓	✓	✓	✓
30.	Community	Gets over 2cm threshold	✓	✓	✓	✓
31.	Community	Ascends 5cm level change	✓	✓	✓	✓
32.	Community	Descends 5cm level change	✓	✓	✓	✓

33.	Advanced	Ascends 15cm curb	✓	✓	X	X
34.	Advanced	Descends 15cm curb	✓	✓	X	X
35.	Advanced	Performs 30s stationary wheelie	✓	✓	X	X
36.	Advanced	Turns 180° in place in wheelie position L&R	✓	✓	X	X
37.	Advanced	Gets from ground into wheelchair	✓	✓	✓	✓
38.	Advanced	Ascends stairs	✓	✓	X	X
39.	Advanced	Descends stairs	✓	✓	X	X

Abbreviations and symbols: WC = wheelchair, WCU = wheelchair user, CG = caregiver,
 ✓ = included, X = not included, ^{L&R} = includes performance on both left and right

Table 5. WSTP-M/WCU: Individual Skills for Manual Wheelchairs Operated by Wheelchair Users.

Version #	Master #*	Individual Skills
1.	8	Rolls forward 10m
2.	9	Rolls forward 10m in 30s
3.	10	Rolls backward 5m
4.	11	Turns 90° while moving forward ^{L&R}
5.	12	Turns 90° while moving backward ^{L&R}
6.	13	Turns 180° in place ^{L&R}
7.	14	Maneuvers sideways ^{L&R}
8.	15	Gets through hinged door in both directions
9.	16	Reaches 1.5m high object
10.	17	Picks object from floor
11.	18	Relieves weight from buttocks
12.	19	Transfers from WC to bench and back
13.	20	Folds and unfolds wheelchair
14.	21	Rolls 100m
15.	22	Avoids moving obstacles ^{L&R}
16.	23	Ascends 5° incline
17.	24	Descends 5° incline
18.	25	Ascends 10° incline
19.	26	Descends 10° incline
20.	27	Rolls 2m across 5° side-slope ^{L&R}
21.	28	Rolls 2m on soft surface
22.	29	Gets over 15cm pot-hole
23.	30	Gets over 2cm threshold
24.	31	Ascends 5cm level change
25.	32	Descends 5cm level change
26.	33	Ascends 15cm curb
27.	34	Descends 15cm curb
28.	35	Performs 30s stationary wheelie
29.	36	Turns 180° in place in wheelie position ^{L&R}
30.	37	Gets from ground into wheelchair
31.	38	Ascends stairs
32.	39	Descends stairs

The Master # corresponds to Table 4. Abbreviations and symbols as for Table 4.

Table 6. WSTP-M/CG: Individual Skills for Manual Wheelchairs Operated by Caregivers.

Version#	Master #*	Individual Skills
1.	4	Controls tilt function
2.	5	Controls recline function
3.	8	Rolls forward 10m
4.	9	Rolls forward 10m in 30s
5.	10	Rolls backward 5m
6.	11	Turns 90° while moving forward ^{L&R}
7.	12	Turns 90° while moving backward ^{L&R}
8.	13	Turns 180° in place ^{L&R}
9.	14	Maneuvers sideways ^{L&R}
10.	15	Gets through hinged door in both directions
11.	19	Transfers from WC to bench and back
12.	20	Folds and unfolds wheelchair
13.	21	Rolls 100m
14.	22	Avoids moving obstacles ^{L&R}
15.	23	Ascends 5° incline
16.	24	Descends 5° incline
17.	25	Ascends 10° incline
18.	26	Descends 10° incline
19.	27	Rolls 2m across 5° side-slope ^{L&R}
20.	28	Rolls 2m on soft surface
21.	29	Gets over 15cm pot-hole
22.	30	Gets over 2cm threshold
23.	31	Ascends 5cm level change
24.	32	Descends 5cm level change
25.	33	Ascends 15cm curb
26.	34	Descends 15cm curb
27.	35	Performs 30s stationary wheelie
28.	36	Turns 180° in place in wheelie position ^{L&R}
29.	37	Gets from ground into wheelchair
30.	38	Ascends stairs
31.	39	Descends stairs

The Master # corresponds to Table 4. Abbreviations and symbols as for Table 4.

Table 7. WSTP-P/WCU: Individual Skills for Powered Wheelchairs Operated by Wheelchair Users.

Version #	Master #*	Individual Skills
1.	1	Moves controller away and back
2.	2	Turns controller on and off
3.	3	Selects drive modes and speeds
4.	4	Controls tilt function
5.	5	Controls recline function
6.	6	Disengages and engages motors
7.	7	Operates battery charger
8.	8	Rolls forward 10m
9.	9	Rolls forward 10m in 30s
10.	10	Rolls backward 5m
11.	11	Turns 90° while moving forward ^{L&R}
12.	12	Turns 90° while moving backward ^{L&R}
13.	13	Turns 180° in place ^{L&R}
14.	14	Maneuvers sideways ^{L&R}
15.	15	Gets through hinged door in both directions
16.	16	Reaches 1.5m high object
17.	17	Picks object from floor
18.	18	Relieves weight from buttocks
19.	19	Transfers from WC to bench and back
20.	21	Rolls 100m
21.	22	Avoids moving obstacles ^{L&R}
22.	23	Ascends 5° incline
23.	24	Descends 5° incline
24.	25	Ascends 10° incline
25.	26	Descends 10° incline
26.	27	Rolls 2m across 5° side-slope ^{L&R}
27.	28	Rolls 2m on soft surface
28.	29	Gets over 15cm pot-hole
29.	30	Gets over 2cm threshold
30.	31	Ascends 5cm level change
31.	32	Descends 5cm level change
32.	37	Gets from ground into wheelchair

The Master # corresponds to Table 4. Abbreviations and symbols as for Table 4.

Table 8. WSTP-P/CG: Individual Skills for Powered Wheelchairs Operated by Caregivers.

Version #	Master #*	Individual Skills
1.	1	Moves controller away and back
2.	2	Turns controller on and off
3.	3	Selects drive modes and speeds
4.	4	Controls tilt function
5.	5	Controls recline function
6.	6	Disengages and engages motors
7.	7	Operates battery charger
8.	8	Rolls forward 10m
9.	9	Rolls forward 10m in 30s
10.	10	Rolls backward 5m
11.	11	Turns 90° while moving forward ^{L&R}
12.	12	Turns 90° while moving backward ^{L&R}
13.	13	Turns 180° in place ^{L&R}
14.	14	Maneuvers sideways ^{L&R}
15.	15	Gets through hinged door in both directions
16.	19	Transfers from WC to bench and back
17.	21	Rolls 100m
18.	22	Avoids moving obstacles ^{L&R}
19.	23	Ascends 5° incline
20.	24	Descends 5° incline
21.	25	Ascends 10° incline
22.	26	Descends 10° incline
23.	27	Rolls 2m across 5° side-slope ^{L&R}
24.	28	Rolls 2m on soft surface
25.	29	Gets over 15cm pot-hole
26.	30	Gets over 2cm threshold
27.	31	Ascends 5cm level change
28.	32	Descends 5cm level change
29.	37	Gets from ground into wheelchair

The Master # corresponds to Table 4. Abbreviations and symbols as for Table 4.

7. INDIVIDUAL SKILLS

This section is organized by individual skills. For a description of the rationale for the skill, any suggested equipment and set-up, the starting position for the subject, spotter position, evaluation criteria and special considerations, see the corresponding individual-skill section of the WST Manual. In this WSTP Manual, only a brief description of the skill will be provided. The emphasis is, instead, on training tips. The training tips are based on a number of excellent textbook chapters, manuals and on-line sources, as well as papers from the scientific literature and our own experiences. There is considerable variability among wheelchairs, both with respect to their components and ways in which they may be modified for individual users. The training tips may need to be altered in light of these differences.

For each skill, the following headings are used:

- Versions applicable: For which of the four versions of the WSP (Table 4) this skill is applicable.
- Description: A brief general description of the skill.
- Training tips:
 - General training tips
 - Training tips for manual wheelchairs operated by wheelchair users. Wherever appropriate, this section includes separate tips for wheelchair users using two-hand propulsion and those more appropriate for people using one hand and one leg (“hemiplegic” propulsion), recognizing that other methods may also be used by some people.
 - Training tips for manual wheelchairs operated by caregivers
 - Training tips for powered wheelchairs operated by wheelchair users
 - Training tips for powered wheelchairs operated by caregivers

7.1 Moves controller away and back	
Versions applicable	<ul style="list-style-type: none"> • WST-M/WCU X WST-M/CG X • WST-P/WCU ✓ WST-P/CG ✓
Description	<ul style="list-style-type: none"> • The subject moves the controller (e.g. joystick) away from its usual operating position and then returns it to its original position.
General training tips	<ul style="list-style-type: none"> • Adjustment tips: <ul style="list-style-type: none"> • The screw that facilitates locking the controller, can be backed off to make the unlocking and locking require less force. • Adding a loop to the controller may allow users with limited hand function to independently move the controller. • Progression: start with moving the controller away then moving the controller back. • Variations: mounts can vary (e.g. midline flip up, swing away, permanent mounting).
Training tips for manual wheelchairs operated by wheelchair users	<ul style="list-style-type: none"> • Not applicable.
Training tips for manual wheelchairs operated by caregivers	<ul style="list-style-type: none"> • Not applicable.
Training tips for powered wheelchairs operated by wheelchair users	<ul style="list-style-type: none"> • The power should be turned off while this skill is being practiced. • Use a large, gross motor movement to move the controller. Using the side of the arm or hand along with shoulder movement may allow for swinging the controller independently. • The controller should be moved sufficiently out of the way that it would not interfere with approach to a table or during a transfer. • When moving the controller out of the way, it should not be placed in a position that would make it impossible to restore it to its original position.
Training tips for powered wheelchairs operated by caregivers	<ul style="list-style-type: none"> • As for powered wheelchairs operated by wheelchair users.

7.2 Turns controller on and off	
Versions applicable	<ul style="list-style-type: none"> • WST-M/WCU X WST-M/CG X • WST-P/WCU ✓ WST-P/CG ✓
Description	<ul style="list-style-type: none"> • The subject turns the controller on and off.
General training tips	<ul style="list-style-type: none"> • Adjustment tips: <ul style="list-style-type: none"> • A longer lever for the on/off switch will reduce the strength required. • Location of on/off switch can vary greatly with different controllers and may have an impact on independence. • Variations: <ul style="list-style-type: none"> • Alternative switches can be used for on/off functions (e.g. toggle, depression switch, auxiliary switch). • Alternative locations (e.g. head, foot, thigh) can be used for on/off switch to improve access.
Training tips for manual wheelchairs operated by wheelchair users	<ul style="list-style-type: none"> • Not applicable.
Training tips for manual wheelchairs operated by caregivers	<ul style="list-style-type: none"> • Not applicable.
Training tips for powered wheelchairs operated by wheelchair users	<ul style="list-style-type: none"> • Rolling the hand onto and off of the on/off switch may reduce the need for accuracy. • Using larger movements and body parts may allow users to switch toggle levers on and off independently, if fine motor control is not available. • When the wheelchair is not being used for position changes or mobility, the power should be turned off. This is for safety reasons and to better maintain the battery charge.
Training tips for powered wheelchairs operated by caregivers	<ul style="list-style-type: none"> • As for powered wheelchairs operated by wheelchair users. • On/off switches may be located on an attendant control unit. Depending on the control method used by the wheelchair user, it may be necessary to turn the controller on before the attendant control can be operated.

7.3 Selects drive modes and speeds	
Versions applicable	<ul style="list-style-type: none"> • WST-M/WCU X WST-M/CG X • WST-P/WCU ✓ WST-P/CG ✓
Description	<ul style="list-style-type: none"> • The subject operates the controller to switch between drive modes and/or speeds.
General training tips	<ul style="list-style-type: none"> • The type of mode switch used will have an impact on success for some users. • In some wheelchairs, the mode and speed controls are separate. • Adjustment tips: <ul style="list-style-type: none"> • Through programming, reduce the number of steps to get to the most commonly used drive modes or speeds. • Select a controller with the easiest access for cognitive and physical function (e.g. three vs. five drive modes, toggle vs. dial for speed control).
Training tips for manual wheelchairs operated by wheelchair users	<ul style="list-style-type: none"> • Not applicable.
Training tips for manual wheelchairs operated by caregivers	<ul style="list-style-type: none"> • Not applicable.
Training tips for powered wheelchairs operated by wheelchair users	<ul style="list-style-type: none"> • The wheelchair user should be able to see or hear an indication of the mode and speed status.
Training tips for powered wheelchairs operated by caregivers	<ul style="list-style-type: none"> • As for powered wheelchairs operated by wheelchair users.

7.4 Controls tilt function	
Versions applicable	<ul style="list-style-type: none"> • WST-M/WCU X WST-M/CG ✓ • WST-P/WCU ✓ WST-P/CG ✓
Description	<ul style="list-style-type: none"> • The subject tilts the wheelchair back from the upright position and then restores the wheelchair to the upright position. In a tilt, the angle between the wheelchair seat and back remain the same, but the angle from the horizon changes. • Tilt can be used to alter sitting pressures, to affect balance and stability (e.g. to prevent rear tip-over or falling forward from the wheelchair when striking an obstacle), to enhance transfers, facilitate bladder management, reduce spasticity or reduce edema.
General training tips	<ul style="list-style-type: none"> • Not all wheelchairs have a tilt function. • For the purpose of pressure redistribution or preparation for a transfer using a mechanical lift, the greater the extent of tilt the better. • For wheelchair users with limited trunk balance, to reduce the likelihood of falling forward, 5-10° of tilt is usually adequate at rest or when driving. • Depending upon the tilting mechanism, the extent of forward and rear stability may differ with the wheelchair upright vs. tilted back. This should be taken into consideration when in a situation where reduced stability could be unsafe (e.g. proceeding forward up an incline in the tilted position) or when it might be helpful to alter the weight distribution between the front and rear wheels (e.g. to increase traction or reduce the tendency for smaller-diameter wheels to sink into a soft surface). • Progression: adjusting to tilt may involve starting at a small amount and progressing to full tilt.
Training tips for manual wheelchairs operated by wheelchair users	<ul style="list-style-type: none"> • Not applicable.
Training tips for manual wheelchairs operated by caregivers	<ul style="list-style-type: none"> • When first tilting a chair, the caregiver should be aware of the force that may be required to ‘catch’ the person depending upon the type of tilting system. The set-up and mechanics of the tilt influence the amount of weight supported by the caregiver.
Training tips for	<ul style="list-style-type: none"> • Adjustment tip: For powered wheelchairs, programming should be

<p>Training tips for powered wheelchairs operated by wheelchair users</p>	<p>considered to allow the wheelchair user to get into a tilted position with as few steps as possible (e.g. using a preset position of 45° of tilt).</p> <ul style="list-style-type: none"> • If the rate of tilt can be programmed, it is advisable to begin with a slow rate and progress to a faster one. This will provide more time in which to ensure that the wheelchair user is adjusting to the new position and that there are no body or wheelchair parts that are at risk of being pinched. • For safety, some powered wheelchairs will prevent the wheelchair from being driven while tilted past a set amount. • If the wheelchair allows both tilt and recline, it is advisable to recover to the upright from the recline position before recovering from the tilt position.
<p>Training tips for powered wheelchairs operated by caregivers</p>	<ul style="list-style-type: none"> • As for powered wheelchairs operated by wheelchair users.

7.5 Controls recline function	
Versions applicable	<ul style="list-style-type: none"> • WST-M/WCU X WST-M/CG ✓ • WST-P/WCU ✓ WST-P/CG ✓
Description	<ul style="list-style-type: none"> • The subject reclines the wheelchair from the upright position and then restores the wheelchair to the upright position. Recline occurs when the seat-to-back angle increases as the back of the seating system moves away from the seat. • Recline can be used to alter sitting pressures, to affect balance and stability (e.g. to prevent rear tip-over or falling forward from the wheelchair when striking an obstacle), to enhance transfers, facilitate bladder management, reduce spasticity or reduce edema.
General training tips	<ul style="list-style-type: none"> • Not all wheelchairs have a recline function. • In many wheelchairs, moving from an upright to a reclined position may cause shear forces between the wheelchair user and the backrest. • For the purpose of pressure redistribution, the greater the extent of recline the better. • Recline and tilt may be used in combination. • Depending upon the reclining mechanism, the extent of forward and rear stability may differ with the wheelchair upright vs. reclined. This should be taken into consideration when in a situation where reduced stability could be unsafe (e.g. proceeding forward up an incline in the reclined position) or when it might be helpful to alter the weight distribution between the front and rear wheels (e.g. to increase traction or reduce the tendency for smaller-diameter wheels to sink into a soft surface). • Progression: adjusting to recline may involve starting at a small amount and progressing to full recline.
Training tips for manual wheelchairs operated by wheelchair users	<ul style="list-style-type: none"> • Not applicable.
Training tips for manual wheelchairs operated by caregivers	<ul style="list-style-type: none"> • When first reclining a wheelchair, the caregiver should be aware of the force that may be required to ‘catch’ the person depending upon the type of reclining system. The set-up and mechanics of the recline influence the amount of weight supported by the caregiver.
Training tips for	<ul style="list-style-type: none"> • Adjustment tip: For powered wheelchairs, programming should be

<p>powered wheelchairs operated by wheelchair users</p>	<p>considered to allow the wheelchair user to get into a reclined position with as few steps as possible (e.g. using a preset position of 15° of recline).</p> <ul style="list-style-type: none"> • If the rate of recline can be programmed, it is advisable to begin with a slow rate and progress to a faster one. This will provide more time in which to ensure that there are no body or wheelchair parts that are at risk of being pinched. • Be careful to ensure that the wheelchair user has access to the controller when in the reclined position. • If the wheelchair allows both tilt and recline, it is advisable to recover to the upright from the recline position before recovering from the tilt position.
<p>Training tips for powered wheelchairs operated by caregivers</p>	<ul style="list-style-type: none"> • As for powered wheelchairs operated by wheelchair users.

7.6 Disengages and engages motors	
Versions applicable	<ul style="list-style-type: none"> • WST-M/WCU X WST-M/CG X • WST-P/WCU ✓ WST-P/CG ✓
Description	<ul style="list-style-type: none"> • The subject disengages and engages the motors. The disengaged setting is used when moving the chair if it is turned off or if the batteries have lost all charge.
General training tips	<ul style="list-style-type: none"> • As the mechanics of this task vary between models and manufacturers, ensure that the proper lever is being moved along the appropriate plane and focus on safe ergonomic principles when moving the lever. Depending on the type of chair, rolling the chair slightly when disengaging the motors may ease the lever into the disengaged position. • Variations: Various makes and models have different methods of disengaging the motors.
Training tips for manual wheelchairs operated by wheelchair users	<ul style="list-style-type: none"> • Not applicable.
Training tips for manual wheelchairs operated by caregivers	<ul style="list-style-type: none"> • Not applicable.
Training tips for powered wheelchairs operated by wheelchair users	<ul style="list-style-type: none"> • The power should be turned off while this skill is being practiced. • Depending on the method of disengaging motors, some chairs will be more difficult than others to push when disengaged.
Training tips for powered wheelchairs operated by caregivers	<ul style="list-style-type: none"> • Good ergonomic principles should be used when engaging and disengaging the motors. The caregiver’s knees should be bent and the back straight.

7.7 Operates battery charger	
Versions applicable	<ul style="list-style-type: none"> • WST-M/WCU X WST-M/CG X • WST-P/WCU ✓ WST-P/CG ✓
Description	<ul style="list-style-type: none"> • The subject operates the battery charger.
General training tips	<ul style="list-style-type: none"> • The battery charger is usually a separate equipment item, left where the wheelchair is stored overnight. • Some powered wheelchairs have on-board chargers that allow greater flexibility to users but leave the user without a chair if the charger needs to go to the supplier for repairs. • The charger port is usually near the controller or at the back of the wheelchair, under the seat. • Avoid using the battery charger in a wet environment or where liquids may be spilled on it. • Both the wheelchair and charger should be turned off when being connected to each other and the power source. Then the power on the charger (if not automatic) should be turned on. • The length of time required to charge a battery can vary due to the type of charger and size of battery. • If the battery charger is capable of charging different batteries (e.g. 6 v 12 volt), ensure that the appropriate setting is used. • Variations: Based on the type of wheelchair.
Training tips for manual wheelchairs operated by wheelchair users	<ul style="list-style-type: none"> • Not applicable.
Training tips for manual wheelchairs operated by caregivers	<ul style="list-style-type: none"> • Not applicable.
Training tips for powered wheelchairs operated by wheelchair users	<ul style="list-style-type: none"> • Manufacturers recommend that the battery not be charged in a room with people present, because there is a risk of explosion with some batteries. This recommendation is difficult to comply with for a wheelchair user acting alone, unless the wheelchair user has a second means of mobility.
Training tips for powered wheelchairs operated by caregivers	<ul style="list-style-type: none"> • As for powered wheelchairs operated by wheelchair users.

7.8 Rolls forward 10m	
Versions applicable	<ul style="list-style-type: none"> • WST-M/WCU ✓ WST-M/CG ✓ • WST-P/WCU ✓ WST-P/CG ✓
Description	<ul style="list-style-type: none"> • The subject moves the wheelchair 10m forwards on a smooth level surface.
General training tips	<ul style="list-style-type: none"> • Adjustment tip: position of axle and weight over drive wheel have a great impact. • When first attempting to move forward, the direction in which any swivel casters are pointing can lead to some initial resistance or lateral deviations. The person handling the wheelchair can reposition the casters in the appropriate direction before setting out. To do so, the wheelchair should be moved short distances in a manner that causes the casters to swivel (e.g. forward, then left, than backward, then right). • Progression: Remember that speed and accuracy are inversely related. It is advisable to begin movement skills with adequate accuracy before increasing the speed.
Training tips for manual wheelchairs operated by wheelchair users	<p>Two-Hand-Propulsion Pattern</p> <ul style="list-style-type: none"> • To propel the wheelchair straight forwards, the wheelchair user should grasp the hand-rims and push evenly with both hands. He/she should not wrap the thumbs around the hand-rims, but point them forward. • The wheelchair user should lean forward as the arms are extended, to get more contact time between the hands and the hand-rims and to reduce the chance of a rear tip. • The wheelchair user should avoid jerky accelerations that could cause him/her to tip over backwards. • Strokes should be smooth, with the hands comfortably grasping the hand-rims, initially matching the speed of the moving wheels. • If the subject strays too close to a wall, it is acceptable for the subject to avoid injuring his/her fingers by pushing off the wall to correct direction. To do so, the wall should be contacted well ahead of the rear wheels. • To minimize shoulder strain, the wheelchair user should try to push with long, slow strokes, allowing the wheelchair to

	<p>coast where possible. Hand positions can be illustrated by having the wheelchair user imagine the right rear wheel as the face of a clock; the initial and final contact positions for the wheel might then be referred to as 11:00 and 2:00 o'clock.</p> <ul style="list-style-type: none"> • A recovery path for the hands below the hand-rims is commonly recommended for wheelchair users propelling on smooth level surfaces. To reinforce this, the trainer can ask the wheelchair user to touch the middle fingers on the axles during each recovery phase. Wheelchair users with weak and insensitive hands may prefer to slide the hands back along the hand-rims, rather than letting go at the end of the propulsive stroke, but this may cause some braking to occur. • To maintain a straight direction or to stop, the rate of slowing can be controlled by how hard the hand-rims are gripped. The hand-rims should run through the wheelchair user's hands. If the wheelchair user stops too quickly, he/she may fall forward out of the wheelchair or tip over forwards. To prevent this, the wheelchair user should lean back whenever he/she is required to stop quickly. • Progression: As preliminary wheelchair-control work, with all four wheels on the ground, propel the wheelchair forward in a straight line, coast and stop. The purpose of this learning exercise is to get the learner familiar with hand position, and with letting the hand-rims slide through the fingers. Use single thrusts only, of progressively increasing vigor. See how far the learner can go on a single push. The hands start at the 10-11:00 o'clock position. Initially, ask the wheelchair user to lean forward to prevent a rear tip with the stronger pushes. To control the direction during the coast, the fingers create friction on the hand-rims, but without gripping tightly. During the coast and stop, the hands are in the 1:00 o'clock position. Experiment with both how gradually or rapidly the wheelchair can be brought to a stop. Experiment with different speeds. • Variations: <ul style="list-style-type: none"> • As a game, the wheelchair user can see how far he/she
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	<p>can coast after 1-2 pushes. The distance can be extended if the wheelchair user keeps his/her weight back on the rear wheels, or if he/she swings the outstretched arms to either side.</p> <ul style="list-style-type: none"> • A person With Hemiplegia <ul style="list-style-type: none"> • The wheelchair user should propel the wheelchair with the sound-side arm and leg. • To avoid moving to the weaker side, the wheelchair user should use the sound-side foot to help steer the wheelchair. • The wheelchair user should use the foot to help stop. • The height of the seat should be low enough to allow the full foot to be on the ground when it is directly below the knee. • The wheelchair user should wear shoes that provide both protection for the foot and good traction. • To use the foot to propel forward, the wheelchair user should straighten the leg, push down on the floor with the heel, and then pull the wheelchair forward with the foot.
<p>Training tips for manual wheelchairs operated by caregivers</p>	<ul style="list-style-type: none"> • The caregiver should keep the wheelchair close to his/her body. • The caregiver should avoid starting or stopping suddenly, because this may startle the wheelchair user or cause him/her to lose trunk balance.
<p>Training tips for powered wheelchairs operated by wheelchair users</p>	<ul style="list-style-type: none"> • This is the first powered wheelchair skill involving movement of the wheelchair in a drive mode. For this skill and later moving skills, when it is possible to program the wheelchair modes (e.g. with respect to speed, torque and deceleration), the trainer may wish to use a mode that is safest and most likely to be effective when training begins. • Although the vast majority of manual wheelchairs are rear-wheel-drive ones, powered wheelchairs may be rear-, front- or mid-wheel-drive. The configuration will affect the path of the wheelchair and the ease with which the wheelchair can be kept moving in a straight line. For instance, a front-wheel-drive wheelchair tends to be more difficult to keep moving in a straight line; some wheelchairs have

	<p>built-in compensation for this problem.</p> <ul style="list-style-type: none"> • When set in the slowest speed, there may be a time lag between when a joystick is moved and when the action occurs. This can lead to overcorrection while steering the wheelchair. This illustrates the importance to success of proper programming. Non -proportional drives are just as dependent on proper programming as proportional drives, if not more so. Set-up of non-proportional drives can be graded to include more or less cognitive and physical loads depending on the user’s needs and abilities. • If the wheelchair user is over-correcting when driving, changing the contact point with the joystick (e.g. from finger tips to web-space) may improve the fluidity of the driving. • If the wheelchair user’s hand slips off the joystick or control is poor, a different shape for the joystick may be appropriate (e.g. U-shape v ball-shape). • Practice Suggestions: <ul style="list-style-type: none"> ○ Practice emergency stops (hand off joystick for user). ○ Practice moving the joystick, in wide open spaces or within a space with moveable barriers. ○ Begin at responsive but low torque settings.
<p>Training tips for powered wheelchairs operated by caregivers</p>	<ul style="list-style-type: none"> • As for powered wheelchairs operated by wheelchair users. • For this and other moving skills, the caregiver may operate the wheelchair by using the same joystick that the wheelchair user does. Where space permits, this should be done with the caregiver standing beside the wheelchair and facing forward. In some situations (e.g. going through a narrow opening), the caregiver may need to stand in front of the wheelchair. The caregiver in this situation should be careful not to drive the wheelchair over his/her own feet. Standing behind the wheelchair and leaning forward to reach the joystick is not recommended. Some wheelchairs permit the wheelchair to be operated from behind the wheelchair, which is the preferred position. • When the caregiver is first learning to handle a powered wheelchair, it is preferable to do so with the wheelchair unoccupied, to avoid injury to the wheelchair user.

7.9 Rolls forward 10m in 30s	
Versions applicable	<ul style="list-style-type: none"> • WST-M/WCU ✓ WST-M/CG ✓ • WST-P/WCU ✓ WST-P/CG ✓
Description	<ul style="list-style-type: none"> • The subject propels the wheelchair 10 meters forwards on a smooth level surface within 30 seconds. • Note: this skill is usually dealt with together with the “rolls forward 10m” skill one (#7.8).
General training tips	<ul style="list-style-type: none"> • As for skill #7.8. • Variations: real street crossing. 1st example of community integration.
Training tips for manual wheelchairs operated by wheelchair users	<ul style="list-style-type: none"> • As for skill #7.8.
Training tips for manual wheelchairs operated by caregivers	<ul style="list-style-type: none"> • As for skill #7.8.
Training tips for powered wheelchairs operated by wheelchair users	<ul style="list-style-type: none"> • As for skill #7.8. • It may be necessary to adjust the setting/drive mode of the wheelchair to meet the time requirement.
Training tips for powered wheelchairs operated by caregivers	<ul style="list-style-type: none"> • As for powered wheelchairs operated by wheelchair users.

7.10 Rolls backward 5m	
Versions applicable	<ul style="list-style-type: none"> • WST-M/WCU ✓ WST-M/CG ✓ • WST-P/WCU ✓ WST-P/CG ✓
Description	<ul style="list-style-type: none"> • The subject moves the wheelchair 5 m backwards on a smooth level surface.
General training tips	<ul style="list-style-type: none"> • If the backing-up trial immediately follows rolling forward, then the casters will be trailing backwards. As the backing up begins, there may be some initial resistance and directional instability as the casters move into the forward-trailing position. The casters can more easily be repositioned by moving them in a circular path. • The subject should proceed slowly and look over the shoulder to avoid obstacles and collisions. • Slowing down will also make it easier for the subject to steer. Directional stability is more difficult to maintain when backing up a rear-wheel-drive wheelchair. This may lead to a sinuous path, with a series of deviations and over-corrections.
Training tips for manual wheelchairs operated by wheelchair users	<ul style="list-style-type: none"> • Two-Hand-Propulsion Pattern <ul style="list-style-type: none"> • To propel the wheelchair straight backward, the wheelchair user should grasp the hand-rims and pull evenly. • To avoid tipping over backwards when stopping, the wheelchair user should avoid grabbing the wheels suddenly, or should lean forward. • Variations: <ul style="list-style-type: none"> ○ One hand at a time → both hands. ○ For a person with weak arm muscles, the wheelchair user can place both hands on the backs of the wheels (about 11:00 o'clock, using the clock analogy) with the arms straight and the shoulders shrugged. Then, the wheelchair user should use the body weight to push down on the wheels. • A Person with Hemiplegia <ul style="list-style-type: none"> • As for rolling forward above, except the sequence is to first flex the leg, push down on the floor with the foot enough to ensure good traction, then push the wheelchair backwards by straightening the leg.

Training tips for manual wheelchairs operated by caregivers	<ul style="list-style-type: none">• The caregiver should keep the wheelchair close to his/her body.• The caregiver should avoid starting or stopping suddenly, because this may startle the wheelchair user or cause him/her to lose trunk balance.
Training tips for powered wheelchairs operated by wheelchair users	<ul style="list-style-type: none">• If the wheelchair is fitted with a rear-view mirror, this eliminates the need to turn around to see where the wheelchair is going.
Training tips for powered wheelchairs operated by caregivers	<ul style="list-style-type: none">• As for powered wheelchairs operated by wheelchair users.

7.11 Turns 90° while moving forward^{L&R}	
Versions applicable	<ul style="list-style-type: none"> • WST-M/WCU ✓ WST-M/CG ✓ • WST-P/WCU ✓ WST-P/CG ✓
Description	<ul style="list-style-type: none"> • The subject turns the wheelchair 90° to the left and right while moving forwards.
General training tips	<ul style="list-style-type: none"> • When turning around an object (e.g. a corner wall) that the wheelchair is close to, the turn should not begin until the axles of the drive wheels (whether rear, mid or front) have reached the object. • When turning the wheelchair in the vicinity of fixed objects, it is important to avoid catching a foot on the object to avoid injury to the foot or a twisting injury to the lower leg. • If the leading wheels are the drive wheels, the trailing (castered) wheels will swing wide of the path and may strike the wall on the far side. • When beginning training, learners may break a turn down into its parts, that is driving straight, turning, then driving straight again, rather than following a smooth curved path. • The footrests can be moved out of the way in tight spaces. • Progression: <ul style="list-style-type: none"> ○ Start with loose (large-radius) turns and progress to tight (small radius) ones. ○ Start with small changes of direction (e.g. around widely spaced pylons) and progress to larger ones.
Training tips for manual wheelchairs operated by wheelchair users	<p>Two-Hand-Propulsion Method</p> <ul style="list-style-type: none"> • When ready to turn, the wheelchair user should slow down the inside wheel, while pushing harder on the outside wheel. • Variations: <ul style="list-style-type: none"> • While coasting in a straight line, experiment with the effect that rotating the outstretched arms from side to side has on direction – swinging the arms to one side causes the wheelchair to turn in the other side. • The fixed environment can be used to assist with turning. In the “drag” turn, the wheelchair user

	<p>drags a hand, in a rear position, along the wall to turn toward the wall and around a corner. In the “push-off” turn, the wheelchair user uses a hand, in a forward position, to push away from the wall. Timing, intensity, direction and hand position of the forces applied to the wall are important features of success.</p> <ul style="list-style-type: none"> • The skill may be performed in the wheelie position. • A Person with Hemiplegia <ul style="list-style-type: none"> • It is easier to turn away from the sound side than toward it. • The wheelchair user should use the foot to help steer.
<p>Training tips for manual wheelchairs operated by caregivers</p>	<ul style="list-style-type: none"> • The caregiver should push harder with the push-handle on the outside of the turn and pull back slightly on the inside handle. • The caregiver should be careful to avoid having the wheelchair user’s hands or feet hit any barriers. • The wheelie position can be used to turn in tight spaces.
<p>Training tips for powered wheelchairs operated by wheelchair users</p>	<ul style="list-style-type: none"> • Regardless of drive wheel configuration, note the position of the axle so that one can gauge where the ground contact is with tire. When this point arrives at the corner, the chair can be turned. • Knowing the widest point of the chair (e.g. armrests) and the furthest points at the front and back of the chair (e.g. push-handles and footplates) will reduce collision with barriers.
<p>Training tips for powered wheelchairs operated by caregivers</p>	<ul style="list-style-type: none"> • As for powered wheelchairs operated by wheelchair users.

7.12 Turns 90° while moving backward^{L&R}	
Versions applicable	<ul style="list-style-type: none"> • WST-M/WCU ✓ WST-M/CG ✓ • WST-P/WCU ✓ WST-P/CG ✓
Description	<ul style="list-style-type: none"> • The subject turns the wheelchair 90° to the left and right while moving backwards.
General training tips	<ul style="list-style-type: none"> • As for skill #7.11. • With wheelchairs that have front casters, the feet will swing wide during the turns. If they strike a wall on the side away from the turn, this may require the wheelchair to be repositioned closer to the side being turned toward.
Training tips for manual wheelchairs operated by wheelchair users	<ul style="list-style-type: none"> • As for skill #7.11.
Training tips for manual wheelchairs operated by caregivers	<ul style="list-style-type: none"> • As for skill #7.11.
Training tips for powered wheelchairs operated by wheelchair users	<ul style="list-style-type: none"> • As for skill #7.11.
Training tips for powered wheelchairs operated by caregivers	<ul style="list-style-type: none"> • As for skill #7.11. • As for powered wheelchairs operated by wheelchair users.

7.13 Turns 180° in place^{L&R}	
Versions applicable	<ul style="list-style-type: none"> • WST-M/WCU ✓ WST-M/CG ✓ • WST-P/WCU ✓ WST-P/CG ✓
Description	<ul style="list-style-type: none"> • The subject turns the wheelchair around to face in the opposite direction, while remaining within a square space with 1.5 meter sides. This is done towards the left and the right.
General training tips	<ul style="list-style-type: none"> • It may be helpful for the subject to shuttle forwards and backwards to stay inside the designated space, turning part of the way with each cycle. The larger the chair, the more likely that this will be necessary. • The footrests for most wheelchairs increase the overall length of the wheelchairs, so a larger turning circle is required. If in close quarters, it may be helpful to remove the footrests, if this can be done without risking injury to the feet. • Progression: <ul style="list-style-type: none"> ○ Start with small angular changes of the wheelchair and progress to larger ones. ○ Start at a slow speed, focussing on accuracy (staying within the designated boundaries). Increase the speed within the limits of accuracy.
Training tips for manual wheelchairs operated by wheelchair users	<p>Two-Hand-Propulsion Method</p> <ul style="list-style-type: none"> • To make the turn more tightly, the wheelchair user should pull back on one wheel, while pushing forward on the other. In such a case, the vertical axis of rotation for the turn is midway between the drive wheels. It may take a few cycles to complete the 180° turn. • The “snap turn” is a more advanced version of the turn in place. To perform it, the wheelchair user positions one hand well forward and the other well back. Then, in a single uninterrupted motion, the wheelchair user “snaps” the wheelchair around, letting the hand-rims slide through the fingers until the wheelchair reaches the desired angle. Depending upon the rolling resistance of the surface, the wheelchair may continue to spin in a circle until wheel or hand-rim friction brings the wheelchair to a stop. • Progression:

	<ul style="list-style-type: none"> • Begin with small arcs of the hands on the wheels and progress to larger ones. • Variations: <ul style="list-style-type: none"> • The skill may be performed in the wheelie position. • When turning around in confined spaces, it can be helpful for the wheelchair user to push or pull on external objects rather than using the hand-rims. <p>A Person with Hemiplegia</p> <ul style="list-style-type: none"> • To turn to the side away from the stronger hand, the wheelchair user should push forward on the hand-rim. • To turn toward the stronger hand the wheelchair user should pull back on the hand-rim. • The wheelchair user may use the feet. • The wheelchair user may reach across to the opposite wheel with the stronger hand.
<p>Training tips for manual wheelchairs operated by caregivers</p>	<ul style="list-style-type: none"> • To turn in a tight space, the caregiver should pull back on one push-handle, while pushing forward on the other. • The caregiver should stand close to the back of the wheelchair if space is limited. If a knapsack prevents this, it can be removed and placed in the wheelchair user’s lap. • This skill can be performed in the wheelie position.
<p>Training tips for powered wheelchairs operated by wheelchair users</p>	<ul style="list-style-type: none"> • The closer the drive wheels are to the wheelchair user’s center of gravity, the easier it is to turn in place by simply moving the joystick straight to the left or right. The vertical axis of rotation for such a turn is midway between the drive wheels. If the drive wheels are farther forward or back, a series of to-and-fro motions may be needed to stay within the designated boundaries. • Adjustment tip: adjusting the speed, acceleration and deceleration for turning will affect the overall turning of the chair. • The drive wheel and seating configurations have an impact on the turning radius of the system.
<p>Training tips for powered wheelchairs operated by caregivers</p>	<ul style="list-style-type: none"> • As for powered wheelchairs operated by wheelchair users.

7.14 Maneuvers sideways ^{L&R}	
Versions applicable	<ul style="list-style-type: none"> • WST-M/WCU ✓ WST-M/CG ✓ • WST-P/WCU ✓ WST-P/CG ✓
Description	<ul style="list-style-type: none"> • The subject maneuvers the wheelchair sideways parallel to an object (e.g. bed or wall). The skill is performed towards both the left and right sides.
General training tips	<ul style="list-style-type: none"> • If the space available is limited, the subject may need to shuttle the wheelchair forward and backward to get into the desired position, moving more to one side with each cycle. • Progression: <ul style="list-style-type: none"> ○ Start with lots of fore-aft room in which to maneuver, and gradually decrease the space available. ○ Start with small sideways steps, progress to larger ones. ○ Start at a slow speed, focussing on accuracy (staying within the designated boundaries). Increase the speed within the limits of accuracy. • Variations: <ul style="list-style-type: none"> ○ The trainer may use the analogy of parking a car, if the subject has had such experience. To do so, the learner should position the wheelchair ahead of the target position and parallel to it. The learner should then back the rear end of the wheelchair toward the target before straightening the wheelchair out. ○ Pull into a tight parking space, beginning by facing the opening.
Training tips for manual wheelchairs operated by wheelchair users	<ul style="list-style-type: none"> • Two-handed propulsion <ul style="list-style-type: none"> • As for the general tips above. • Variations: <ul style="list-style-type: none"> ○ An alternative for the wheelchair user with good upper-body strength and co-ordination is to use the “bunny-hop” method. To do so, the wheelchair user hops to the side by pulling up on the rear wheels and shifting the body weight in the desired direction. This is most useful when space is very limited. Initially, the wheelchair user can get used to just hopping up and down, with no sideways movement.

	<ul style="list-style-type: none"> • A Person With Hemiplegia <ul style="list-style-type: none"> • The wheelchair user should use the sound-side foot to steer and the sound-side arm to provide the power.
Training tips for manual wheelchairs operated by caregivers	<ul style="list-style-type: none"> • The caregiver should not try to lift the occupied wheelchair sideways. • The caregiver should be careful that the wheelchair user’s arm or hand is not caught between the barrier and the rear wheel.
Training tips for powered wheelchairs operated by wheelchair users	<ul style="list-style-type: none"> • The user needs to be aware of the widest and longest points of the chair. The length should be minimized through set up. Mirrors can be used to provide visual understanding of the size of the chair.
Training tips for powered wheelchairs operated by caregivers	<ul style="list-style-type: none"> • As for powered wheelchairs operated by wheelchair users.

7.15 Gets through hinged door in both directions	
Versions applicable	<ul style="list-style-type: none"> • WST-M/WCU ✓ WST-M/CG ✓ • WST-P/WCU ✓ WST-P/CG ✓
Description	<ul style="list-style-type: none"> • The learner opens, passes through and closes a hinged door that opens away from the subject, then repeats the task in the opposite direction (with the door opening toward the learner).
General training tips	<ul style="list-style-type: none"> • Much of what follows is based on a hinged door that does not close on its own. • Judging the width of doorways can require practice. It is common for a wheelchair user to injure the backs of his/her hands by bumping or scraping them between the door frame and the wheelchair. • Although the footrests can be useful to help push doors open or closed, this method should not be used on glass doors that might break. Also, the feet often extend out beyond the footplates, so care needs to be exerted to avoid injury to the toes. • The learner should use the door handle, or the open edge of the door to close the door. The learner should not put the fingers between the door and door-frame on the hinged side because they may get pinched when the door closes. • The wheelchair user should make sure the wheelchair is out of the way before closing the door. . If the door swings freely, a push on the door will be all that is needed. The wheelchair user can back up to close the door using the rear wheel to push on the door. Alternatively, the wheelchair user may turn around to close it. • Adjustment tip: for doors in the wheelchair users' own environments, door handles or bars can be placed in the middle of the door to make closing easier. • Progression: <ul style="list-style-type: none"> ○ Start with a door that does not close on its own and progress to one that does. The trainer can reduce or add resistance to door opening by applying forces through his/her hand. • Variations: <ul style="list-style-type: none"> ○ There are many variations in the ways doors open and close, alone or in sequence with other doors. Also a variety of door handles exist. A game that provides opportunities to practice

	<p>these variations is to have a door scavenger hunt, seeing how many different combinations and permutations can be successfully managed in a period of time.</p> <ul style="list-style-type: none"> ○ For doors that close themselves, the person handling the wheelchair can position the rear wheel in a way that prevents the door closing.
<p>Training tips for manual wheelchairs operated by wheelchair users</p>	<ul style="list-style-type: none"> • Two-handed propulsion: <ul style="list-style-type: none"> • The door-frame can be used to help propel the wheelchair user through the door (the “slingshot” method). To do so, the wheelchair user reaches forward and places one hand on the door frame and the other on the door. Then, by pulling with both hands, the wheelchair is moved through the opening. This has the advantage of keeping the hands from being injured. <p>A person with hemiplegia:</p> <ul style="list-style-type: none"> • Using one hand to cross over from one wheel to the other can be helpful to keep the wheelchair straight while getting through a door. <ul style="list-style-type: none"> • Door that Opens Away From You <ul style="list-style-type: none"> • To open the door more easily, the wheelchair user should turn sideways in front of it. This allows the wheelchair user to get closer to the door and to resist the tendency of the wheelchair to roll backward when the door is pushed. • The wheelchair user can hold onto the door-frame with one hand, as the door is pushed with the other. This is more likely to be necessary if the door resists opening. • Door that Opens Towards You <ul style="list-style-type: none"> • The wheelchair user should position the wheelchair to the side of the door before opening it. • The wheelchair user should push on the door-frame with one hand (farthest from the hinge) to open the door more easily with the other (closest to the hinge). • To close the door after passing through it, there are several options (if the door does not close fully by itself): <ul style="list-style-type: none"> • The wheelchair user may gently swing the door

	<p>closed behind him/her, moving the wheelchair quickly through the door and out of the way.</p> <ul style="list-style-type: none"> • The wheelchair user may turn around once through the doorway and reach forward and pull the door towards him/her using the other hand to push on the door-frame. • The wheelchair user may go through the door backwards, pulling the door with him/her. • The wheelchair user may keep one hand on the door handle and use the other to push both wheels, one at a time. • Reaching over the back of the wheelchair is effective, but there is the risk of a rear tip. <ul style="list-style-type: none"> • Variations: <ul style="list-style-type: none"> • If there is a threshold or level change in the door opening, it may be helpful to use the door frame to help provide the forces needed to proceed. • For a doorway that is too narrow for the wheelchair to pass through it, an option is for the wheelchair user to transfer from the wheelchair on one side to a regular chair on the other, fold the wheelchair to get it through the door and then transfer back into it. Other alternatives include removing both rear wheels and resting on the rear anti-tip devices or transport wheels to get through the door. For wheelchairs that fold from side to side, some wheelchair users can partially fold the wheelchair and sit on an armrest.
<p>Training tips for manual wheelchairs operated by caregivers</p>	<ul style="list-style-type: none"> • General: <ul style="list-style-type: none"> • Before pushing a wheelchair through any type of door or narrow space, the caregiver should make sure that the wheelchair user's hands or elbows are not extending beyond the sides of the wheelchair where they could be injured. • The caregiver should keep part of his/her body between the door and the wheelchair user. • For a narrow doorway, one option is for the caregiver to remove one rear wheel. With the wheelchair user leaning the other way and the caregiver supporting the

	<p>push-handle, it may be possible to get through the door on 3 wheels.</p> <ul style="list-style-type: none"> • Door that opens away: <ul style="list-style-type: none"> • The caregiver should open the door, grasp the push handles at the rear of the wheelchair and pull the wheelchair backwards through the doorway. • The caregiver should use his/her body to prevent the door from closing on the wheelchair. • When the wheelchair and caregiver are completely out of the way, the caregiver should close the door. • Door that opens toward: <ul style="list-style-type: none"> • The caregiver should leave enough room to open the door without it striking the wheelchair or wheelchair user. • If there is room, the caregiver should angle the wheelchair away from the door on the side that will open. • The caregiver should open the door and use his/her body to keep it open while he/she orients the wheelchair and pushes it forwards through the door forwards or backwards.
<p>Training tips for powered wheelchairs operated by wheelchair users</p>	<ul style="list-style-type: none"> • As for manual wheelchairs operated by caregivers. • Using footplates to open doors should be done with caution as it can injure the feet and footplates as well as mark the doors.
<p>Training tips for powered wheelchairs operated by caregivers</p>	<ul style="list-style-type: none"> • As for manual wheelchairs operated by caregivers. • This can be an awkward task, because the caregiver's position is dictated by both the need to have access to the joystick and the door.

7.16 Reaches 1.5m high object	
Versions applicable	<ul style="list-style-type: none"> • WST-M/WCU ✓ WST-M/CG X • WST-P/WCU ✓ WST-P/CG X
Description	<ul style="list-style-type: none"> • The subject reaches up to touch an object 1.5m above the floor.
General training tips	<ul style="list-style-type: none"> • The wheelchair should be positioned to take advantage of the subject’s reach, strength and balance. • Reaching and leaning reduce stability, putting the wheelchair user at risk of falling out of the wheelchair or tipping the wheelchair over. • The subject may use a reaching aid, but should carry it with him/her. • If the wheelchair user chooses to lean forward to accomplish the task, he/she should make sure the casters are trailing forward to decrease the likelihood of tipping forwards. Note: When the casters are trailing forwards, they lie ahead of the portion of the wheelchair frame to which they are attached, as is the case when the wheelchair is rolled backwards. • To be safer when leaning or bending over forwards, the wheelchair user should move the footrests out of the way and place the feet on the floor. • If standing up, the wheelchair user should first apply the brakes and clear the footrests out of the way. • The wheelchair user should keep one hand on the wheelchair to keep from falling. • For a person with weak trunk muscles, to avoid falling in the direction he/she is leaning, he/she should hook the opposite arm behind the push handle or armrest. • To help right him/herself in the chair after reaching for the object, the wheelchair user should use the armrest or wheel to pull him/herself upright. • If the armrest on the side to which the wheelchair user wishes to reach is moved out of the way, it allows the wheelchair user to bend further sideways. • It is sometimes easier to approach the target backwards, but the wheelchair user needs to be careful not to reach too far and tip over backwards. • It is permissible to stand up, if the wheelchair user can do so. However, it is best to apply the brakes and move the footrests

	<p>out of the way. If the wheelchair user stand up on the footrests, a forward tip is likely.</p> <ul style="list-style-type: none"> • If the wheelchair user is reaching for an unbreakable object from a high shelf, he/she can use an improvised reaching aid (e.g. a rolled up magazine or a cane) to help to move the object off the shelf and catch it. • The wheelchair user should avoid reaching across the body if there would be danger involved if the object dropped into the lap. • Adjustment tip: <ul style="list-style-type: none"> ○ Caster locks can be helpful to prevent sliding when shifting weight in chair (e.g. to reach). ○ Chair height and a shorter wheel base will also have an impact on the wheelchair user’s ability to reach objects.
<p>Training tips for manual wheelchairs operated by wheelchair users</p>	<ul style="list-style-type: none"> • As for general tips.
<p>Training tips for manual wheelchairs operated by caregivers</p>	<ul style="list-style-type: none"> • Not applicable.
<p>Training tips for powered wheelchairs operated by wheelchair users</p>	<ul style="list-style-type: none"> • As for general tips. • If the wheelchair can be repositioned (e.g. with respect to tilt, recline or seat height), this may be helpful.
<p>Training tips for powered wheelchairs operated by caregivers</p>	<ul style="list-style-type: none"> • Not applicable.

7.17 Picks object from floor	
Versions applicable	<ul style="list-style-type: none"> • WST-M/WCU ✓ WST-M/CG X • WST-P/WCU ✓ WST-P/CG X
Description	<ul style="list-style-type: none"> • The learner picks a small object up from the floor.
General training tips	<ul style="list-style-type: none"> • See some of the general training tips for the Reaches-1.5m-high-object skill, which will not be repeated here. • The wheelchair user should use one hand on the chair or thigh and the other to pick up the object. • Turning the object on its side may help, to get a better grip. • To make it easier to pick up the object, the wheelchair user may want to pull the object up against the wheelchair so that it does not move. • For a wheelchair user with weak trunk muscles, to reach the ground, he/she should move the arms to the thighs one at a time, and then to the feet, placing the chest on the thighs. • Variations: <ul style="list-style-type: none"> ○ If the wheelchair user holds the object against the wheel and rolls the wheel forward, both hands can be used to grasp the object when it rotates to the top of the wheel. This can be done on the move.
Training tips for manual wheelchairs operated by wheelchair users	<ul style="list-style-type: none"> • As for general tips.
Training tips for manual wheelchairs operated by caregivers	<ul style="list-style-type: none"> • Not highly applicable. To pick a dropped object off the ground, the caregiver may maneuver the wheelchair so that he/she can keep one hand on the wheelchair, for balance and control. Then, the caregiver can crouch and pick up the object with the other hand.
Training tips for powered wheelchairs operated by wheelchair users	<ul style="list-style-type: none"> • If the wheelchair can be repositioned (e.g. with respect to tilt, recline or seat height), this may be helpful. • There is a danger of unintentionally rolling the drive wheel over the fingers or pinching the fingers between the drive wheel and fender. The safest approach is to first position the wheelchair, shut off the power, then pick up the object.
Training tips for powered wheelchairs operated by caregivers	<ul style="list-style-type: none"> • As for manual wheelchairs operated by caregivers.

7.18 Relieves weight from buttocks	
Versions applicable	<ul style="list-style-type: none"> • WST-M/WCU ✓ WST-M/CG X • WST-P/WCU ✓ WST-P/CG X
Description	<ul style="list-style-type: none"> • The subject relieves weight from both buttocks, although not necessarily at the same time.
General training tips	<ul style="list-style-type: none"> • It is generally suggested that the wheelchair user relieve pressure from buttocks every 15-20 minutes and for prolonged periods (i.e. at least 2 minutes). • For preservation of upper extremities it is recommended that the forward leaning method be used. The trunk can be rested on the thighs and further unweighting can occur by grabbing the footrests and pulling upwards. If using the forward lean method, casters should be forward trailing to increase forward stability. Getting back upright from the forward-bent position can be a challenge for some wheelchair users. The hands can be walked up the thighs until an armrest or the backrest can be reached to allow the person to pull him/herself the rest of the way. • Variations: <ul style="list-style-type: none"> ○ Side leaning can also be effective, for those who cannot lean forward and recover or in situations when the wheelchair user might find it inconvenient to lean forward. The armrests or rear wheels can be used to push or pull on. ○ Shifting the weight onto one buttock can also be effective. ○ Push-ups, tilt and recline are alternative methods that may be adequate for some wheelchair users, but these methods are not as effective in relieving pressure as the options mentioned earlier.
Training tips for manual wheelchairs operated by wheelchair users	<ul style="list-style-type: none"> • As for general tips. • A wheelie can be used to achieve tilt. It can be sustained by balance, by using the no-hands wheelie rest (with brakes locked and leaning against a wall or curb) or by resting on rear anti-tip devices if they permit sufficient rear tilt.
Training tips for manual wheelchairs operated by caregivers	<ul style="list-style-type: none"> • Not applicable unless the wheelchair has tilt and/or recline features.
Training tips for powered	<ul style="list-style-type: none"> • Tilting or reclining the wheelchair can be used for the purposes of

wheelchairs operated by wheelchair users	pressure redistribution.
Training tips for powered wheelchairs operated by caregivers	<ul style="list-style-type: none"> • Not applicable unless the wheelchair has tilt and/or recline features.

7.19 Transfers from wheelchair to bench and back	
Versions applicable	<ul style="list-style-type: none"> • WST-M/WCU ✓ WST-M/CG ✓ • WST-P/WCU ✓ WST-P/CG ✓
Description	<ul style="list-style-type: none"> • The wheelchair user transfers from the wheelchair to another surface and back again. The subject positions the wheelchair, removes and restores wheelchair components as necessary to complete the transfer.
General training tips	<ul style="list-style-type: none"> • There are a number transfer techniques and surfaces to which a wheelchair user may wish to transfer. The methods described here are representative, but by no means comprehensive. Which type of transfer will be most suitable for a wheelchair user and/or caregiver will depend on a number of factors. An experienced clinician should make this determination. A thorough discussion of these options is beyond the scope of the WSP Manual. • The first decision is to choose a side to transfer toward. Wheelchair users with hemiplegia using standing-pivot transfers tend to transfer to their stronger sides. People using sideways transfers tend to lead with their weaker or more painful arms. • If possible, the learner should position the wheelchair so that the casters are trailing in the direction of the transfer to reduce the likelihood of the wheelchair tipping in that direction. To achieve this position, the subject should finish the wheelchair positioning with a slight movement away from the direction of the transfer. • The subject should be careful to avoid catching his/her catheter or other collection devices when transferring. • Prior to the actual transfer, the subject should lock the brakes (if any). If the rear wheel moves with the brake locked, the brake may need to be adjusted or the tire may need to be pumped up, if it is pneumatic. • Adjust the height of the starting and target surfaces, to the extent possible, such that the target surface is slightly lower. • Progression: <ul style="list-style-type: none"> ○ Once the basic transfer is mastered, it should be practiced with different target surfaces, at different relative heights.
Training tips for manual wheelchairs operated by	<p>Brakes:</p> <ul style="list-style-type: none"> • A wheelchair user with weak trunk muscles can avoid

<p>wheelchair users</p>	<p>falling forward during brake handling, by hooking an arm around a push handle or holding onto an armrest or wheel.</p> <ul style="list-style-type: none"> • If strength is a limiting factor, the wheelchair user may use brake extensions. • To apply a push-to-lock brake, the wheelchair user should grasp the handle of the brake and push it towards the front of the wheelchair until firmly in place. • To apply a pull-to-lock brake, the wheelchair user should pull the handle backward until firmly in place. • Retractable brakes are ones that can be positioned completely out of the way when they are not in use, so the wheelchair user does not scrape his/her hands on them during wheelchair propulsion. They are most often found on rigid-frame ultralight wheelchairs. To apply a retractable scissor brake, the subject should pull the handle in the appropriate direction until firmly in place. • To release brakes, the subject should reverse the action used to apply them. For a retractable scissor brake, the subject should fold the brake fully out of the way. <p>Armrests:</p> <ul style="list-style-type: none"> • Generally, it is easier to reposition the armrests than it is to remove them completely. • To move the armrests away: <ul style="list-style-type: none"> • For a flip-up armrest, the subject should unlock the front of the armrest from the receptacle and lift the front of the armrest so that it flips behind the chair back. • For a swing-away armrest, the subject should lift the armrest up slightly to disengage it and then swing it to the rear far enough to clear the backrest posts. • To completely remove an armrest, the subject should unlock whatever locks are necessary. There may be ones at both the front and back of the armrest. The subject should lift the armrest straight up so that the armrest is detached from the chair. If the armrest is height-adjustable, the wheelchair user should be careful not to just remove the elevating arm pad.
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	<ul style="list-style-type: none"> • For a wheelchair with a tray (e.g. for a person with hemiplegia), the subject should first flip the tray away or slide it forwards to detach it. • To restore the armrests: <ul style="list-style-type: none"> • Note that it is easy, with some armrest designs, to reverse left and right. To avoid this, the learner should be encouraged to follow a routine with respect to where the armrests are placed when removed. • The wheelchair user should reverse the process for moving the armrests away. • The wheelchair user should make sure the armrest posts are lined up with the receptacles before locking them. • The subject should check to make sure the armrests are locked in place by pulling up on them. <p>Footrests:</p> <ul style="list-style-type: none"> • Note that people who need to propel their wheelchairs with their feet are effectively restrained if they cannot move the footrests out of the way. • The subject should clear the footrests, whenever possible. It may be easier to do so before moving the wheelchair into its final position. • Before moving the footrests out of the way, the wheelchair user should first remove the feet from the footrests. Later, after restoring the footrests, the wheelchair user should put the feet back on the footrests. • A person with weak hands may need to use both hands or an extended wrist under the knee to lift the leg. • If one leg is stronger, it may be used to assist in lifting the weaker leg. • To move a swing-away footrest out of the way, the wheelchair user should unlock the footrest. Locking mechanisms vary from wheelchair to wheelchair. The wheelchair user should swing the footrest completely out of the way. To replace the footrest, the subject should push the footrest back towards the front of the wheelchair until it
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	<p>clicks into place. The subject should check that it is locked in place by pulling on it.</p> <ul style="list-style-type: none"> • To completely remove the footrests, the wheelchair user may need to first swing the footrest away. The wheelchair user should then pull up on the footrest. The wheelchair user should pay attention to how the footrest was attached to the chair to simplify restoring it later. To replace the footrest, the wheelchair user may need to start in the swung-out position, line up the post or pins with the hole(s) and put the footrest back in place. The wheelchair user should then swing the footrest back to the front. • Some wheelchairs do not allow the footrests to be swung away or removed, but it may be possible to flip the foot-plates up. The wheelchair user should pull the foot-plates up until they are fully vertical. To do so on some wheelchairs, it may be necessary to push the heel loops (if any) forward. To replace the footrests, the wheelchair user should push the foot-plates down. The wheelchair user should push the heel loops back into place, if they were displaced earlier. • To raise an elevating footrest, the wheelchair user should grasp it near the end and lift it to the desired position. This requires less force if the leg is not on the leg-rest. To lower the footrest, the wheelchair user should support its weight, and hold the position lock open while lowering the footrest. The position lock is often located at the top of the leg-rest (near the knee). • For a wheelchair user with weak trunk muscles, to reach the footrests, the arms can be moved to the thighs one at a time, and then to the feet, until the chest is resting on the thighs. To get back into the upright position, the stronger arm can be hooked over the push handle or armrest and the body pulled up through elbow flexion and wrist extension. <ul style="list-style-type: none"> • Transfer Out of Wheelchair <ul style="list-style-type: none"> • Standing Pivot Transfer <ul style="list-style-type: none"> • This is one of the most common types of transfer to or from a wheelchair. The person stands fully upright from the original surface, pivots in place
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	<p>until his/her buttocks face the target surface, then sits down.</p> <ul style="list-style-type: none"> • The wheelchair user should angle the chair with its near side about 30° from the bench. • The wheelchair user should leave the armrests in place. • The wheelchair user should try to flex the knees and the feet under the body, in preparation for the sit-to-stand phase of the transfer. During the transfer, the hips should be flexed (“get the nose over the toes”). • If the wheelchair user is having trouble getting started, he/she should try to move forward on the seat before beginning the transfer with the feet under the body. • To avoid the need for turning through a greater arc than necessary when pivoting, the wheelchair user should turn the back towards the bench rather than away from it. • The wheelchair user should use the armrest to help maintain balance while transferring. <ul style="list-style-type: none"> • Crouching Transfer <ul style="list-style-type: none"> • This transfer is like the standing-pivot transfer, except that the knees and hips are not fully extended. • The wheelchair user may need to move the armrest out of the way on the bench side. • The wheelchair user may need to remove the brake extension (if any) on the bench side. • The wheelchair user should stay low, and not try to stand all the way up. However, the buttocks need to be high enough to clear the rear wheel. • The hips and the head move in opposite directions. • Sideways Transfer <ul style="list-style-type: none"> • The wheelchair user should move the armrest out of the way on the bench side. • The wheelchair user should remove the brake
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	<p>extension (if any) on the bench side.</p> <ul style="list-style-type: none"> • The feet should be supported on the footrests (if not easily removed) or the floor. • To get the sliding board (if using one) under the body, the wheelchair user should lean away from it. • The wheelchair user should push down on the sliding board and wheelchair to unweight the buttocks. • The wheelchair user should avoid fully extending the fingers and wrists. This avoids overstretching the joints and tendons, which may be of importance for people with spinal cord injury who use a tenodesis effect (whereby active wrist extension causes passive finger flexion if the tendons are of appropriate length). Keeping the wrists in a neutral position also functionally lengthens the arms, making it easier to get the buttocks off the sitting surface. • The wheelchair user should keep the leading hand far enough away from the body to allow room for the body to move. • The wheelchair user should shift sideways, in a single large step or several smaller ones, towards the transfer bench. • The hips and the head move in opposite directions. • The wheelchair user should move forward enough on the seat, so that the skin is not dragged over the rear wheel. • Once fully supported by the bench, the wheelchair user should remove the sliding board. The wheelchair user should lean away from it, to do so. <p>Forward Transfer</p> <ul style="list-style-type: none"> • When transferring straight-on (e.g. for a person with amputations of both legs), the wheelchair user should pull the wheelchair as close as possible to the transfer bench. • A sliding board may be used.
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	<ul style="list-style-type: none"> • Transfer Into Wheelchair <ul style="list-style-type: none"> •General <ul style="list-style-type: none"> • This is the same as the transfer out of wheelchair except as noted below. • Once the wheelchair user is back in the wheelchair, the subject should restore the footrests fully and put the feet back on them. • The wheelchair user should make sure that removed or repositioned wheelchair parts (e.g. armrests, footrests, cushion, seat belt) are in the same position it was before he/she left the wheelchair. • Persons with Hemiplegia <ul style="list-style-type: none"> • If the wheelchair user must transfer back into the wheelchair with the strong side leading, he/she will need to move the wheelchair to the other side.
<p>Training tips for manual wheelchairs operated by caregivers</p>	<ul style="list-style-type: none"> • General <ul style="list-style-type: none"> • This section only deals with transfers for wheelchair users who require minimal assistance to perform the final movement between the wheelchair and the bench. If the caregiver must perform the majority of the effort, or if a mechanical lift is needed, additional training by experienced rehabilitation professionals is needed. This is outside the scope of this Manual. • The caregiver should be attentive to the position of the wheelchair user’s arms to avoid injuring them during the transfer. • If the wheelchair user is able to give direction then the caregiver should assist in ways such as off loading weight during or guiding the trunk. • The caregiver should inquire as to whether the wheelchair user has ever experienced falls or need falls and if so in which direction. This may help the caregiver to know how best to provide assistance. • Care should be paid to good back care for the caregiver: <ul style="list-style-type: none"> ▪ Feet shoulder width apart.

	<ul style="list-style-type: none"> ▪ Avoid bending and twisting at the same time. ▪ Avoid bending the back, use the knees. ▪ Keep the wheelchair user close to the caregiver (vs arms straight). ▪ Get the wheelchair user involved as much as possible. ▪ Use aids (e.g. transfer belt, sliding board, and mechanical lift) as needed. ▪ Use two people, if help is needed. Coordinate your efforts with the wheelchair user and any other caregiver (e.g. “on the count of 3...”). ▪ Clear the path between the starting and finishing surfaces. ▪ Get the wheelchair close to the other surface. ▪ Ensure the wheelchair brakes are on, footrests cleared away. ▪ Apply the brakes of any other wheeled surface (e.g. bed). ▪ No wheelchair user’s arms around neck. ▪ If the wheelchair user is falling, it may be necessary to lower him/her to the floor. <ul style="list-style-type: none"> • Standing Pivot and Crouching Pivot Transfers <ul style="list-style-type: none"> • To assist the wheelchair user in getting from sitting to standing, the caregiver should stand or sit in front of the wheelchair or stand to one side. • The caregiver should apply an assisting force to the wheelchair user’s body, near the hips. The caregiver should not pull on the wheelchair user’s arms. • The caregiver may use a transfer belt around the wheelchair user’s waist. • The caregiver should bend his/her knees and keep the rest of his/her body straight to avoid injury to the back. • The caregiver may need to use his/her knees to keep the wheelchair user’s knees from buckling, by blocking them. • The wheelchair user should not hold the caregiver around the neck.
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	<ul style="list-style-type: none"> • Once standing, the caregiver should ask the wheelchair user to pivot, turning the back, in the shortest possible route, towards the bench. • Sideways transfers: <ul style="list-style-type: none"> • May be necessary to do in steps. • Transfer into the wheelchair: <ul style="list-style-type: none"> • The caregiver may simply reverse whatever procedure was used to get the wheelchair user out of the wheelchair. • Alternatively, the caregiver may move the wheelchair to the other side, if this is necessary and if there is room. To move the wheelchair away from the bench and reposition it, the caregiver may leave the brakes on. Using the push handles at the rear of the wheelchair, the caregiver should lift the rear wheels slightly off the floor and push or pull the wheelchair on the casters (the “wheelbarrow” method). This will save time, avoid strain on the back and ensure that the brakes are applied when the wheelchair user transfers back into the wheelchair.
<p>Training tips for powered wheelchairs operated by wheelchair users</p>	<ul style="list-style-type: none"> • Positioning controls (i.e. tilt, recline, seat height) may be useful while preparing the wheelchair for the transfer. • The power should be turned off while this skill is being practiced. • The controller may need to be moved out of the way.
<p>Training tips for powered wheelchairs operated by caregivers</p>	<ul style="list-style-type: none"> • As for powered wheelchairs operated by wheelchair users. • If a mechanical lift is being used, it can be helpful to put the seat in the tilted position to assist in ensuring that the wheelchair user is properly positioned in the sling. This position allows the person’s buttocks to be aided to the back of the seat by gravity reducing the amount of shearing involved in repositioning. • If a mechanical lift is being used, after the wheelchair user has been lifted sufficiently, it may be easier to drive the wheelchair out from under the wheelchair user rather than moving the lift.

7.20 Folds and unfolds wheelchair	
Versions applicable	<ul style="list-style-type: none"> • WST-M/WCU ✓ WST-M/CG ✓ • WST-P/WCU X WST-P/CG X
Description	<ul style="list-style-type: none"> • The learner folds the unoccupied wheelchair, and then unfolds it. This includes removal of the rear wheels, if they can be removed without tools. • Note: This skill is usually dealt with in combination with the transfer skill, while the wheelchair user is seated on the transfer bench.
General training tips	<ul style="list-style-type: none"> • The purpose of this skill is to reduce the dimensions and weight of the wheelchair to make it easier to store or transport.
Training tips for manual wheelchairs operated by wheelchair users	<ul style="list-style-type: none"> • Fold Wheelchair <ul style="list-style-type: none"> • The wheelchair user should remove anything that may prevent folding (such as the cushion, rigid seat, backrest or knapsack). The wheelchair user should pay attention to each item as he/she removes it, to ensure that he/she will be able to reassemble the chair later. • To lift the seat out, the subject may need to release any restraining devices. • If the rear wheels can be removed without tools, they should be. Usually, there is a release mechanism at the center of the axle, a button or lever that needs to be depressed. If the wheel does not come off easily, check to be sure the brake is not on. • To fold a cross-braced wheelchair (one that becomes narrower from side to side when folded), the wheelchair user should first flip the foot-plates up, swing them away or remove them. • To close the chair more easily, the subject should position the wheelchair so that he/she is on one side of it. The subject should then tip the chair slightly towards him/herself so that the rear wheel on the side away from him/her is off the ground. This eliminates the friction of the far-side rear wheel on the ground and allows gravity to assist in folding the wheelchair. The subject should then pull the seat or seat rails upwards, with one or both hands, to fold the chair. For a

	<p>person with hemiplegia, to fold the chair, the wheelchair user should put the stronger arm under the middle of the seat and lift up.</p> <ul style="list-style-type: none"> • For a rigid-frame wheelchair with a fold-down back, although the wheelchair cannot be completely folded, the wheelchair user can make the chair easier to transport by folding down the back. The subject may need to release any restraining devices before he/she can do so. • Unfold Wheelchair <ul style="list-style-type: none"> • The subject should be careful not to tangle the seatbelt under the seat. • If the sliding mechanism is not too sticky, all that is necessary is for the wheelchair user to lift the rear wheels off the ground and separate the push-handles. • The wheelchair user usually needs to push the seat rails back down into the starting position. The wheelchair user should keep the fingers on top of the rail to prevent them from being pinched. • The wheelchair user should remember to put the cushion back on the seat properly before transferring back into the chair. • Progression: put folded wheelchair up on the transfer bench → into vehicle.
<p>Training tips for manual wheelchairs operated by caregivers</p>	<ul style="list-style-type: none"> • As for manual wheelchair operated by wheelchair users.
<p>Training tips for powered wheelchairs operated by wheelchair users</p>	<ul style="list-style-type: none"> • Not applicable.
<p>Training tips for powered wheelchairs operated by caregivers</p>	<ul style="list-style-type: none"> • Not applicable.

7.21 Rolls 100m	
Versions applicable	<ul style="list-style-type: none"> • WST-M/WCU ✓ WST-M/CG ✓ • WST-P/WCU ✓ WST-P/CG ✓
Description	<ul style="list-style-type: none"> • The subject moves the wheelchair 100m on a smooth level surface.
General training tips	<ul style="list-style-type: none"> • As for skill #7.8 (rolls forward 10m). •
Training tips for manual wheelchairs operated by wheelchair users	<ul style="list-style-type: none"> • As for skill #7.8. • Attention can be paid to the type of push stroke. As with 7.8, for those using two-hand propulsion, training should focus on long push strokes and maintaining direction. • To maintain direction, the wheelchair user can push harder on the hand-rim away from the direction in which he/she wishes to turn, he/she can apply friction to the hand-rim on the side toward which he/she wishes to turn, or he/she can use any nearby wall to push or drag on. • Endurance may be a limiting factor if the wheelchair user is deconditioned. • Variations: <ul style="list-style-type: none"> ○ If the wheelchair user prefers to do so, he/she can perform this skill in the backwards direction.
Training tips for manual wheelchairs operated by caregivers	<ul style="list-style-type: none"> • As for skill #7.8.
Training tips for powered wheelchairs operated by wheelchair users	<ul style="list-style-type: none"> • As for skill #7.8. • For longer distances, the controller setting can be adjusted to one that permits more speed and less sensitivity. Also, the deceleration rate should be reduced so that a sudden stop does not cause the wheelchair user to fall or tip forward.
Training tips for powered wheelchairs operated by caregivers	<ul style="list-style-type: none"> • As for skill #5.8. • As for powered wheelchairs operated by wheelchair users.

5.22 Avoids moving obstacles ^{L&R}	
Versions applicable	<ul style="list-style-type: none"> • WST-M/WCU ✓ WST-M/CG ✓ • WST-P/WCU ✓ WST-P/CG ✓
Description	<ul style="list-style-type: none"> • While moving, the learner avoids obstacles approaching from different directions.
General training tips	<ul style="list-style-type: none"> • The person operating the wheelchair should be alert to the moving environment while the wheelchair is moving. • Progression: <ul style="list-style-type: none"> ○ Start with a single obstacle moving slowly at a consistent speed, seen well in advance, to ones moving more rapidly and unpredictably, with less warning (e.g. actual pedestrian traffic in a crowded setting). ○ Start with obstacles approaching from right angles, to ones coming from different angles, including overtaking and being overtaken. ○ Start slowly and progressively increase the speed of propulsion. • Variations: <ul style="list-style-type: none"> ○ Different moving obstacles can be used (e.g. a rolled ball, a swinging pendulum).
Training tips for manual wheelchairs operated by wheelchair users	<ul style="list-style-type: none"> • Practice both quick stops (leaning back and grabbing both hand-rims firmly) and swerves (leaning toward the direction of turn and grabbing one hand-rim firmly).
Training tips for manual wheelchairs operated by caregivers	<ul style="list-style-type: none"> • Adjustment tip: secure push handles are important for this skill and the similar skill of stopping part way down a steep grade. The handles must be secure on the push cane to prevent the chair and wheelchair user from being left out of control. • Sudden changes in speed or direction can cause the wheelchair occupant to fall forward or to the side. The caregiver should use good spotting techniques, reaching forward or to the side with a hand to stabilize the wheelchair occupant.
Training tips for powered wheelchairs operated by wheelchair users	<ul style="list-style-type: none"> • Adjusting the deceleration setting at top speeds is important for this skill. The lower the deceleration rate, the more planning is required to avoid the obstacle.
Training tips for powered wheelchairs operated by	<ul style="list-style-type: none"> • As for powered wheelchairs operated by wheelchair users.

caregivers	
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7.23 Ascends 5° incline	
Versions applicable	<ul style="list-style-type: none"> • WST-M/WCU ✓ WST-M/CG ✓ • WST-P/WCU ✓ WST-P/CG ✓
Description	<ul style="list-style-type: none"> • The subject moves the wheelchair up a 5° incline.
General training tips	<ul style="list-style-type: none"> • A heavy knapsack will reduce rear stability. It can be moved to the lap. • On inclines, if the drive wheels are uphill, they become relatively unweighted. This can cause loss of traction, so propulsion, braking and directional control may become problems. • Progression: <ul style="list-style-type: none"> ○ Stationary → running start. ○ 5° to 7.5° to 10°. • Variations: <ul style="list-style-type: none"> ○ Grassy inclines, cobblestone or loose rock. ○ Straight → stopping → steering.
Training tips for manual wheelchairs operated by wheelchair users	<ul style="list-style-type: none"> • Two-hand propulsion <ul style="list-style-type: none"> • When negotiating the incline-floor transition, during either ascent or descent, with all wheels on the surface, the wheelchair user should be careful not to catch the unsupported feet, as this could lead to a hyper-flexion injury of the knee. • When getting the casters onto the bottom of an incline, it may be necessary to transiently tip the wheelchair. • Some wheelchair users use a rocking action to get the casters over the initial lip. • The subject may need to adjust the height of the rear anti-tip devices so they do not catch during the transition. If they do, this can cause rear-wheel “float” whereby the rear wheels are not in contact with the surface and thereby unable to be used for propulsion or braking. • The wheelchair user should lean forward as he/she goes up the ramp to apply more force to the hand-rims and to avoid tipping backwards. The need for forward lean increases as the slope increases. • Shorter propulsive strokes are used than on the level, both because the wheelchair user is leaning forward and to avoid

	<p>rolling backwards between strokes. If the brakes are not of the retractable type, the backs of the thumbs can be injured if the wheelchair user is not careful. The recovery path of the hands at the end of the propulsive stroke may be more like an arc than a loop for this skill.</p> <ul style="list-style-type: none"> • If the subject gets tired part of the way up the incline, he/she should put on the brakes or, if there is sufficient room to do so, turn the wheelchair to the side and rest. • If the wheelchair starts to roll backward, instead of grasping both hand-rims (which might cause a rear tip), the wheelchair user can grab one. As the other wheel rolls backward, this will turn the wheelchair across the slope. • The wheelchair may be equipped with “grade aids” (or “hill holders”). These are attachments that, when activated, allow the rear wheels to roll forward but not backwards. The wheelchair user may apply them before he/she starts up the incline. This will allow the subject to rest on the incline without rolling back. • Variations: <ul style="list-style-type: none"> ○ As a learning exercise, it may be helpful to have the wheelchair user try to ascend the incline (with a spotter) without leaning forwards. ○ Momentum can be used to ascend short inclines by approaching at speed, but the initial lip needs to be taken into consideration. If the wheelchair user strikes the floor-ramp transition too quickly, he/she may tip the wheelchair forward or fall forward out of the wheelchair. This can be prevented by popping the casters over the lip. ○ Use hand rails if available. ○ If a ramp is wide enough, the wheelchair user can cut back and forth across the incline (slalom), to decrease the apparent slope. This may allow the wheelchair user to carry items on his/her lap or allow for successful completion when the user is unable to lean forward to prevent tipping. Pylons can be set up to provide a path for the wheelchair user to follow.
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	<ul style="list-style-type: none"> • A Person With Hemiplegia <ul style="list-style-type: none"> • It is usually easier for a wheelchair user with hemiplegia to go up the ramp backwards. Whenever rolling resistance is encountered (including when ascending inclines), foot propellers find it easier to push backwards than to pull forward with the feet.
<p>Training tips for manual wheelchairs operated by caregivers</p>	<ul style="list-style-type: none"> • As for manual wheelchairs operated by wheelchair users. • To push the wheelchair forwards up an incline, the caregiver should bend the knees and lean towards the wheelchair. The caregiver should not use the knee to apply pressure to the backrest.
<p>Training tips for powered wheelchairs operated by wheelchair users</p>	<ul style="list-style-type: none"> • Powered wheelchair users fear slipping and tipping on inclines. • Most powered wheelchairs can handle 5 degrees with ease, at least from the perspective of having enough power to manage the slope. Depending upon the wheelchair’s characteristics (front, mid or rear-wheel drive, acceleration settings, etc) and the user characteristics (poor trunk control, low self-efficacy), even the 5 degree incline can be challenging. Even if not, it builds confidence. • Altering the position of the wheelchair seat (i.e. with respect to tilt, recline, seat height) may be helpful to improve stability or alter the weight distribution on the wheels (e.g. for more traction). • Begin training with the controller in a low sensitivity setting but ensure that the programming provides adequate power and torque for success.
<p>Training tips for powered wheelchairs operated by caregivers</p>	<ul style="list-style-type: none"> • As for powered wheelchairs operated by wheelchair users. • If the space is narrow and the caregiver must operate the wheelchair from in front, the caregiver should be careful not to run over his/her toes.

7.24 Descends 5° incline	
Versions applicable	<ul style="list-style-type: none"> • WST-M/WCU ✓ WST-M/CG ✓ • WST-P/WCU ✓ WST-P/CG ✓
Description	<ul style="list-style-type: none"> • The learner gets the wheelchair down a 5° incline.
General training tips	<ul style="list-style-type: none"> • Some similarities to incline ascent (see 7.23 above). • Smooth straight control down the incline is the basic method. • Dangers include wheelchair runaway and, if the wheelchair strikes the ramp-floor transition too quickly, the wheelchair user may tip the wheelchair forward or fall forward out of the wheelchair. • Variations: <ul style="list-style-type: none"> ○ Starting and stopping on the incline. ○ Steering (slalom) can be reinforced as a game, using pylons to steer around. ○ Another challenging variation on this is to perform 360° turns using only friction and downhill turning tendency to effect the turns.
Training tips for manual wheelchairs operated by wheelchair users	<ul style="list-style-type: none"> • Two-hand propulsion <ul style="list-style-type: none"> • Forwards <ul style="list-style-type: none"> • The wheelchair user should keep his/her weight back, to maintain good traction on the rear wheels. • The wheelchair user should not go too quickly, should stay in control and should be prepared to stop at anytime. • To slow down or steer, the wheelchair user should hold the hands still and let the hand-rims slide through his/her grip. If the wheelchair is allowed to descend too rapidly, the hands of the wheelchair user may get injured due to friction burns or lacerations due to hand-rim irregularities. Gloves help. • There is the potential for thumb injury on the brakes if the wheelchair user grabs the wheels when moving too quickly. • If the wheelchair starts to roll too quickly, instead of grasping both hand-rims to stop, the wheelchair user can grab one, turning across the slope. • Variations:

	<ul style="list-style-type: none"> ○ Wheelie method (see section 7.26 for details). ○ Slalom. If a ramp is wide enough, the wheelchair user can slalom down it by letting the hand-rim of one wheel at a time slide through the fingers. By descending using the slalom method, the apparent slope of the incline is lessened. ○ Partially applied brakes. Caution must be used when using wheel locks as moving brakes. Equal and graded pressure must be used. This is not a commonly recommended method but some users do use it effectively, often in conjunction with the slalom method to prevent burning his/her hands. <ul style="list-style-type: none"> ● Backwards <ul style="list-style-type: none"> ● If the wheelchair user has weak trunk muscles, he/she may feel more comfortable descending the incline backwards. ● If, on a steeper incline, the subject experiences loss of traction due to the unweighting of the uphill wheels, the backwards approach may be used. ● When going downhill backwards, the wheelchair user should lean uphill to reduce the chance of tipping over backwards. ● As with any time the wheelchair is propelled backwards, it is important to proceed slowly with frequent shoulder checks and to avoid stopping suddenly to prevent rear tips. ● Hemiplegia: <ul style="list-style-type: none"> ● The wheelchair user can proceed forward down the incline, using the foot to slow down. ● Caution that the foot does not get caught under the chair at the incline-floor transition.
<p>Training tips for manual wheelchairs operated by</p>	<ul style="list-style-type: none"> ● The basic method is in the forward direction with all four wheels on the incline. The caregiver holds the push-handles firmly and

<p>caregivers</p>	<p>allows the wheelchair to roll down the ramp while controlling the speed. The caregiver avoids sudden stops and slow down as he/she reaches the bottom transition to level ground.</p> <ul style="list-style-type: none"> • Variations: <ul style="list-style-type: none"> • The forward descent can be performed in the wheelie position. This is useful on steep inclines, to prevent the wheelchair user from falling forwards. However, this method may require the caregiver to bend too far forwards, which may strain the back. • Another method is to descend backwards. This ensures that the wheelchair does not run away from the caregiver and that the wheelchair user does not fall forward. The caregiver should be sure to look over the shoulder for obstacles. • As a combined wheelchair-user and caregiver method, the wheelchair user can descend forwards, holding onto a hand-rim with one hand and putting the other hand on the low back of the caregiver walking beside the wheelchair.
<p>Training tips for powered wheelchairs operated by wheelchair users</p>	<ul style="list-style-type: none"> • Altering the position of the wheelchair seat (i.e. with respect to tilt, recline, seat height) may be helpful to improve stability or alter the weight distribution on the wheels (e.g. for more traction). • Begin training with the controller in a low sensitivity setting but ensure that the programming provides adequate power and torque for success.
<p>Training tips for powered wheelchairs operated by caregivers</p>	<ul style="list-style-type: none"> • As for powered wheelchairs operated by wheelchair users. • If the space is narrow and the caregiver must operate the wheelchair from in front, the caregiver should be careful not to run over his/her toes.

7.25 Ascends 10° incline	
Versions applicable	<ul style="list-style-type: none"> • WST-M/WCU ✓ WST-M/CG ✓ • WST-P/WCU ✓ WST-P/CG ✓
Description	<ul style="list-style-type: none"> • The learner gets the wheelchair up a 10° incline.
General training tips	<ul style="list-style-type: none"> • As for skill #7.23.
Training tips for manual wheelchairs operated by wheelchair users	<ul style="list-style-type: none"> • As for skill #7.23. • For very steep inclines, some wheelchair users will go up backwards in the wheelie position. This requires a lot of skill and strength.
Training tips for manual wheelchairs operated by caregivers	<ul style="list-style-type: none"> • As for skill #7.23.
Training tips for powered wheelchairs operated by wheelchair users	<ul style="list-style-type: none"> • As for skill #7.23.
Training tips for powered wheelchairs operated by caregivers	<ul style="list-style-type: none"> • As for skill #7.23.

7.26 Descends 10° incline	
Versions applicable	<ul style="list-style-type: none"> • WST-M/WCU ✓ WST-M/CG ✓ • WST-P/WCU ✓ WST-P/CG ✓
Description	<ul style="list-style-type: none"> • The learner gets the wheelchair down a 10° incline.
General training tips	<ul style="list-style-type: none"> • As for skill #7.24.
Training tips for manual wheelchairs operated by wheelchair users	<ul style="list-style-type: none"> • As for skill #7.24. • Wheelie Descent <ul style="list-style-type: none"> • This is the preferred method for the descent of a steep incline. • Achieve the wheelie position on the level at the top of the incline, as described in section 7.35. • Then move forward onto the incline. To move forward on the level above the incline in the wheelie position, the wheelchair user should allow the wheelchair to begin to fall (dip) slightly in the direction in which he/she wishes to move, and then roll the rear wheels in the same direction to catch up. This is like the reactive balance strategy described in the stationary wheelie skill, but the imbalance is intentional. • To initiate the dip, the wheelchair user can move the head or lean slightly in the direction he/she wishes to move. Alternatively, the wheelchair user can initiate the dip by pushing the wheels slightly in the opposite direction. • The wheelchair user should be encouraged to take his/her time to achieve control and to move slowly. • The wheelchair user should grip the wheels lightly, giving a light push on the wheels and letting the hand-rims slide through the fingers. • In catching up to the center of gravity after the dip, there is no need for the wheelchair user to catch up completely. By undershooting slightly, the wheelchair user can initiate the next dip. • Once on the incline, facing downhill, the wheelchair user should let the hand-rims run through the hands to control the speed, direction and the wheelchair pitch angle. Letting the hand-rims run more quickly through the hands will allow the wheelchair to pitch farther back. Slowing the rate at which the

	<p>hand-rims slide through the fingers will cause the wheelchair to pitch forward.</p> <ul style="list-style-type: none"> • The subject should have the casters touch down shortly after the rear wheels reach the level surface. • Variations: <ul style="list-style-type: none"> • Handrails • wheelie down → stop half way in wheelie → 360° in wheelie then continue down • An advanced exercise is for the wheelchair user to practice achieving wheelie take-off while on the incline. This is useful when an unexpected obstacle is encountered. If the wheelchair user is facing downhill, more force is needed for takeoff and the wheelchair may accelerate rapidly downhill. On steep or slippery inclines, or if the wheelchair has too much rear stability, there may not be enough rear-wheel traction to allow wheelie take-off while facing downhill. In such situations, the wheelchair can be turned so that it is facing across the hill. This will place more weight on the rear wheels and avoid runaway. Once in the wheelie position, a wheelie turn-in-place will allow the wheelchair user to proceed down the incline.
<p>Training tips for manual wheelchairs operated by caregivers</p>	<ul style="list-style-type: none"> • As for skill #7.24.
<p>Training tips for powered wheelchairs operated by wheelchair users</p>	<ul style="list-style-type: none"> • As for skill #7.24.
<p>Training tips for powered wheelchairs operated by caregivers</p>	<ul style="list-style-type: none"> • As for skill #7.24.

7.27 Rolls 2m across 5° side-slope^{L&R}	
Versions applicable	<ul style="list-style-type: none"> • WST-M/WCU ✓ WST-M/CG ✓ • WST-P/WCU ✓ WST-P/CG ✓
Description	<ul style="list-style-type: none"> • The subject propels the wheelchair across a side slope without turning downhill significantly.
General training tips	<ul style="list-style-type: none"> • Downhill-turning tendency will tend to pull the caster wheels downhill. • The extent of downhill-turning tendency is directly proportional to how far the combined center of gravity of the wheelchair and occupant is in front of or behind the drive wheels. The person operating the wheelchair can take steps to minimize this distance by repositioning the wheelchair user (e.g. by leaning, tilting or reclining).
Training tips for manual wheelchairs operated by wheelchair users	<ul style="list-style-type: none"> • The wheelchair user should lean backwards to keep the weight away from the casters. • A useful learning experience to demonstrate the downhill-turning tendency is to have the wheelchair user lean forward, to illustrate how the downhill-turning tendency increases. • Two-hand propulsion <ul style="list-style-type: none"> ○ To avoid turning downhill, the wheelchair user should push harder on the downhill wheel. ○ On steep cross-slopes, problems (e.g. loss of uphill-wheel traction, lateral tip-over, folding of the wheelchair) may arise due to the lack of weight on the uphill wheel. These problems can be minimized by leaning uphill. ○ Variations: <ul style="list-style-type: none"> ▪ In the wheelie position facing across a slope, there is no downhill-turning tendency, because the center of gravity is between the rear wheels. • Person with hemiplegia <ul style="list-style-type: none"> ○ When learning the skill it may be less frustrating to cross with the sound side downhill first due to the downhill-turning tendency. Some users may choose to go backwards to help manage the downhill-turning tendency.

<p>Training tips for manual wheelchairs operated by caregivers</p>	<ul style="list-style-type: none"> • To resist the downhill-turning tendency while pushing the wheelchair across a side slope, the caregiver needs to push harder on the downhill push-handle and pull back on the uphill push-handle. • For a steeper slope, the caregiver may choose to use the wheelie position. • If the wheelchair user is in a tilt-in-space or reclining wheelchair, tilting or reclining the wheelchair can be used to get the center of gravity farther back.
<p>Training tips for powered wheelchairs operated by wheelchair users</p>	<ul style="list-style-type: none"> • Many chairs are now equipped with automatic correction of downhill-turning tendency on cross slopes. • The wheelchair user should aim slightly uphill. • If the wheelchair user is in a tilt-in-space or reclining wheelchair, tilting or reclining the wheelchair can be used to get the center of gravity farther back.
<p>Training tips for powered wheelchairs operated by caregivers</p>	<ul style="list-style-type: none"> • As for powered wheelchairs operated by wheelchair users.

7.28 Rolls 2m on soft surface	
Versions applicable	<ul style="list-style-type: none"> • WST-M/WCU ✓ WST-M/CG ✓ • WST-P/WCU ✓ WST-P/CG ✓
Description	<ul style="list-style-type: none"> • The learner propels the wheelchair 2m on a soft surface.
General training tips	<ul style="list-style-type: none"> • As rolling resistance is the challenge here, reducing the weight on the small wheels (caster) and increasing the weight and therefore traction on the drive wheels is the focus. • Variations: <ul style="list-style-type: none"> ○ A variety of surfaces (e.g. sand, thick carpet, foam, a gym mat, gravel) provide similar, but not identical experiences.
Training tips for manual wheelchairs operated by wheelchair users	<ul style="list-style-type: none"> • General <ul style="list-style-type: none"> • This is the first of several skills during which it may be necessary to reposition the rear anti-tip devices to allow the wheelchair to be tipped backwards sufficiently to perform a partial or full wheelie. To reposition most rear anti-tip devices, the subject will need to press the button or release mechanism on the wheelchair frame that locks the anti-tip device in place. The subject should note the position of the anti-tip devices, so that he/she will be able to restore them later. Then, the subject can either reposition the anti-tip devices so that they face upwards or remove them altogether. To restore the anti-tip devices, the subject should simply reverse the steps. Note: Whenever the rear anti-tip devices have been inactivated, the wheelchair user is at increased risk of a rear tip. The spotter should be vigilant to spot the wheelchair user closely until he/she becomes used to this new condition. • Even if left in place, the wheelchair user should not rely on the rear anti-tip devices to prevent rear tipping because they might sink into a soft surface. • Because there is more rolling resistance, more force is required by the wheelchair user. There is a risk of overuse injury. • Although leaning forward slightly may help the wheelchair user to apply more force, and to prevent the additional force from causing a rear tip, keeping the weight on the rear wheels will improve traction and keep the front wheels from digging in. As a learning exercise, the wheelchair user should try the skill

	<p>while leaning forward and backward to different extents, to find the optimum position for him/her and the wheelchair.</p> <ul style="list-style-type: none"> • If one rear wheel is spinning, the wheelchair user should lean in the direction of the slipping wheel to increase the traction. • Forwards approach <ul style="list-style-type: none"> • The forward approach is preferred because the wheelchair user can see where he/she is going. • The wheelchair user should use long slow strokes to keep the wheels from slipping in loose surfaces. • This is the first in a series of skills for which transient wheelies are useful or necessary. • Partial wheelies are a good option for the wheelchair user, lifting the casters off the surface during each push, but letting them touch down as the hands recover for the next push. • Variations: <ul style="list-style-type: none"> • If using the full wheelie position (a good option, but one that requires more skill), the wheelchair user needs a strong forward ‘dip’ to get going. If the casters touch the surface during the ‘dip’, the wheelchair user can lean forward slightly. This allows the casters to lift off further during the wheelie and provides better clearance during the ‘dip’. • Person with hemiplegia <ul style="list-style-type: none"> • It is easier to get started in the backwards direction, because there is less rolling resistance with the large rear wheels than the smaller casters. • When pushing backwards with the foot, the casters become slightly unweighted which makes it easier to move them.
<p>Training tips for manual wheelchairs operated by caregivers</p>	<ul style="list-style-type: none"> • It may be necessary for the caregiver to lean forward to apply the extra force needed. • The caregiver should not use the knee against the backrest of the wheelchair to apply more force, because this may be uncomfortable for the wheelchair user (if the backrest is flexible) or dislodge a rigid removable backrest. • The caregiver may find it easier to pull the wheelchair backward.

	<ul style="list-style-type: none"> • The caregiver may find it easier to tip the wheelchair back into the full wheelie position, so that all of the weight is on the rear wheels. The caregiver should be sure to find the wheelie balance point before starting. The caregiver may need to reposition the rear anti-tip devices or remove them. The wheelchair can be pushed forward or pulled backwards.
<p>Training tips for powered wheelchairs operated by wheelchair users</p>	<ul style="list-style-type: none"> • If possible and necessary, adjust the controller setting to one that provides more torque. • Positional control (e.g. tilt, recline) can alter the weight distribution between the wheels. It is easier to proceed on a soft surface if more of the weight is on wheels with larger diameter. Clearance for feet can also be positively affected by this change.
<p>Training tips for powered wheelchairs operated by caregivers</p>	<ul style="list-style-type: none"> • As for powered wheelchairs operated by wheelchair users.

7.29 Gets over 15cm pot-hole	
Versions applicable	<ul style="list-style-type: none"> • WST-M/WCU ✓ WST-M/CG ✓ • WST-P/WCU ✓ WST-P/CG ✓
Description	<ul style="list-style-type: none"> • The learner gets the wheelchair over a pot-hole that is 15cm across (in the line of progression) and at least as wide as the wheelchair.
General training tips	<ul style="list-style-type: none"> • If a pot-hole is not readily available, one can be easily simulated. For instance, two gym mats can be put close together, with whatever space between them the trainer wishes. Another alternative is to simply draw two lines on the floor or ground and ask the wheelchair user not to allow the casters to touch the surface between the lines. • The best approach is to proceed at a slow speed but a steady pace. Avoid stopping, if possible. • If the casters drop into the pot-hole and turn sideways (a common problem if the wheelchair is moved forwards and backwards repeatedly in an attempt to get the casters out of the pothole), it can be very difficult to proceed. • Progression: from 15cm to 30cm. • Variations: <ul style="list-style-type: none"> ○ As long as 3 wheels are supported at any time, the wheelchair will remain upright. That being the case, an oblique approach to a pothole, so that only one wheel is unsupported at a time, may be a useful.
Training tips for manual wheelchairs operated by wheelchair users	<ul style="list-style-type: none"> • The risks occur in sequence. When the wheelchair user pops the casters from the surface, there is the risk of a rear tip. If the casters drop into the pot-hole, there is the risk of a forward tip or fall. • Forward Approach, Stationary Method <ul style="list-style-type: none"> • The wheelchair user should approach the obstacle and stop with the casters near it. • This method is comprised of two steps: “pop” and “lean”. They can be verbalized as they are performed, as cues. • The wheelchair user should pop the casters from the floor, just high enough to clear the pot-hole. To do so, the wheelchair user can push quickly forward on the hand-rims. Alternatively, the wheelchair user can use

	<p>his/her foot/feet to pop the casters.</p> <ul style="list-style-type: none"> • While popping the casters, the wheelchair user should simultaneously roll the wheelchair forward so that the casters land back on the floor beyond the pot-hole. • After the rear wheels drop into the pot-hole, the wheelchair user should lean forward and power the rear wheels out of the pot-hole. <ul style="list-style-type: none"> • Forward Approach, Momentum Method <ul style="list-style-type: none"> • This method is comprised of four steps: “push”, “coast”, “pop” and “lean”. As before, they can be verbalized as they are performed. • The wheelchair user should approach the pot-hole squarely. • The wheelchair user should initially approach at a slow speed. It is simpler to pop the casters when moving slowly. Also, if the wheelchair user fails to pop the casters for long enough to clear the pot-hole, the sudden stop will be less jarring. Speed can be added later. • The wheelchair user should not lean forward to look at the feet when he/she approaches the obstacle, because that will increase the weight on the casters. In timing the ‘pop’, help the wheelchair user understand where the casters are (often below the knees, not under the feet). A mirror can be used to provide augmented feedback. • To pop the front wheels while the wheelchair user moves forward, the wheelchair user briefly coasts and place the hands in the power-stroke ready position, to be in the right position when he/she is at the proper distance from the pot-hole. The power-stroke ready position is when the hands are ready to grasp the hand-rims, behind top dead centre (11:00 o’clock on the right wheel, using the clock analogy). Then, the wheelchair user should accelerate the chair even faster than it is coasting, by using a powerful stroke. • Once the casters have cleared the pot-hole and the rear wheels drop into it, the wheelchair user should lean
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	<p>forward and propel the rear wheels to bring the rear wheels over.</p> <ul style="list-style-type: none"> • Progression: <ul style="list-style-type: none"> • Segmentation: Progress through the skill starting with the stationary approach (2 phases: pop & lean) → then moving to momentum method (4 phases: push, coast, pop & lean). • To practice getting the timing correct, the wheelchair user may practice propelling the wheelchair forward and transiently popping the casters at a predetermined point on the floor. The horizontal distance over which the casters need to be off the floor can be gradually increased. • Most rear wheels will drop fully into the pot-holes that are > 25cm across. Therefore, it is recommended that the full wheelie not be used for the 30cm-across pot-hole, to reduce the likelihood of the wheelchair user sustaining a rear tip. Momentum can be used to carry the rear wheels out of the pot-hole, but this may be jarring to the wheelchair user. If the wheelchair user moves forward more slowly, this will allow the rear-wheel drop to occur with minimal jarring. To get the rear wheels out of the pot-hole, the wheelchair user should lean forward and power out of it. Some rocking may be needed. • Variations: <ul style="list-style-type: none"> • The hands-free version of the skill (achieving caster lift-off by backwards trunk movement) is useful because the wheels may be spinning too quickly for the hands to catch up with (e.g. coming down a hill). The wheelchair user can flex the hips, keeping the body upright. Although leaning back into the backrest will also pop the casters off the ground, there is an increased risk of the wheelchair user tipping over backwards and the body will not be well positioned for the forward lean needed during the second half of this skill.
<p>Training tips for manual wheelchairs operated by caregivers</p>	<ul style="list-style-type: none"> • The caregiver may proceed in the forward direction, using the transient or full wheelie position. • The caregiver should always let the wheelchair user know before he/she tips the wheelchair backwards.

	<ul style="list-style-type: none"> • To tip the wheelchair backwards, the caregiver should use the foot on the tipping lever (an extension of the wheelchair frame, to which the rear anti-tip device may be attached) while pulling backwards with the hands on the push handles. • For the full wheelie position, which can more easily be sustained, the caregiver should tip the wheelchair back far enough so that it is balanced over the rear wheels. How far back the chair needs to be tipped will vary depending on the wheelchair user and the wheelchair. If the wheelchair has elevating footrests, it will be easier to tip the wheelchair backward if they are lowered. To land after the wheelie, the caregiver should slowly allow the casters to return to the floor using a foot on the tipping lever to help slow the landing. • Variations: <ul style="list-style-type: none"> • The backward direction may be easier for the caregiver. If this technique is used, the rear wheels of the wheelchair can be lowered into the pothole, then the wheelchair tipped into a wheelie position to be pulled out of the pothole on the rear wheels.
<p>Training tips for powered wheelchairs operated by wheelchair users</p>	<ul style="list-style-type: none"> • Positional control (e.g. tilt, recline) can be used to affect weight distribution and traction. • Smooth continuous forward movement of the joystick is often the most successful method of traversing a pot-hole
<p>Training tips for powered wheelchairs operated by caregivers</p>	<ul style="list-style-type: none"> • As for powered wheelchairs operated by wheelchair users.

7.30 Gets over 2cm threshold	
Versions applicable	<ul style="list-style-type: none"> • WST-M/WCU ✓ WST-M/CG ✓ • WST-P/WCU ✓ WST-P/CG ✓
Description	<ul style="list-style-type: none"> • The learner propels the wheelchair over a 2cm-high threshold.
General training tips	<ul style="list-style-type: none"> • As for 7.29 in many respects. • Before attempting to negotiate a high obstacle, the subject should be aware of how much space exists between the casters and the rear wheels, to avoid getting hung up on the obstacle. If the subject does get hung up, he/she may be able to escape by backing up slightly (which swings the casters from the rear-trailing position to the side- or forward-trailing one, where there is more space). • Progression: <ul style="list-style-type: none"> • Start with low thresholds and progress to higher ones. Obstacles up to 10cm high are quite negotiable in the right wheelchair.
Training tips for manual wheelchairs operated by wheelchair users	<ul style="list-style-type: none"> • See skill 7.29 re the stationary and momentum approaches. The only differences from the pot-hole skill are as follows: <ul style="list-style-type: none"> • A bit more of everything is needed (speed, extent of caster pop and forward lean after the rear wheels hit the obstacle). • For many wheelchairs, the casters are farther back than the footrests, so the footrests may limit forward movement. • Once the rear wheels are on top of the obstacle, the wheelchair user should lean back to decrease the likelihood of a forward tip or falling forward out of the wheelchair. • Backwards Approach <ul style="list-style-type: none"> • The wheelchair user may find it easier to back over a low obstacle. • The wheelchair user should approach the obstacle slowly, because a sudden stop can cause a rear tip. • If the rear anti-tip devices prevent the rear wheels from contacting the obstacle, they need to be removed or repositioned to allow the backwards approach. • As the wheelchair user approaches the obstacle

	<p>backwards, he/she may find it easier if he/she leans forward to slightly unweight the rear wheels.</p> <ul style="list-style-type: none"> • Using the foot on the floor might give the wheelchair user additional power to get over the obstacle. • The wheelchair user should pull the wheelchair straight backward by applying equal force to both wheels. Otherwise, the casters may turn and catch sideways on the obstacle. • Once the rear wheels are over the low obstacle, the wheelchair user should lean back enough to unweight the casters as they reach the obstacle, but not so much as to cause a rear tip.
<p>Training tips for manual wheelchairs operated by caregivers</p>	<ul style="list-style-type: none"> • As for 7.29.
<p>Training tips for powered wheelchairs operated by wheelchair users</p>	<ul style="list-style-type: none"> • Positional control (e.g. tilt, recline) can be used to have an impact on the weight distribution and traction of the chair. • Smooth continuous forward movement of the joystick is often the most successful method of traversing the threshold.
<p>Training tips for powered wheelchairs operated by caregivers</p>	<ul style="list-style-type: none"> • As for powered wheelchairs operated by wheelchair users.

7.31 Ascends 5cm level change	
Versions applicable	<ul style="list-style-type: none"> • WST-M/WCU ✓ WST-M/CG ✓ • WST-P/WCU ✓ WST-P/CG ✓
Description	<ul style="list-style-type: none"> • The learner gets the wheelchair up a 5cm level change.
General training tips	<ul style="list-style-type: none"> • This skill is similar to and builds on the previous ones, specifically the soft surface, pot-hole and threshold skills. • To ascend or descend level changes, it may be necessary to reposition or remove the rear anti-tip devices.
Training tips for manual wheelchairs operated by wheelchair users	<ul style="list-style-type: none"> • This skill is similar to the pot-hole and threshold skills in that it can be approached with stationary and momentum methods. It is different in the following respects: <ul style="list-style-type: none"> • It is slightly more challenging because the pre-tilted position of having one’s casters on top of the curb moves more weight to the back of the chair. This shift of weight is present until the rear wheels are all the way on the curb. • The wheelchair user should pop the casters about 10-15cm away from the level change, to avoid striking them on the vertical section. • In the stationary approach, if the wheelchair user has difficulty getting the rear wheels up, the wheelchair user should roll the wheelchair backwards until the front wheels are almost off the edge of the level change. This has two effects. First, it reverses the caster trail, thereby reducing the extent of rear tip (because the caster stems are no longer vertical). This provides a greater safety margin between the resting position and the rear tip-over threshold, so the wheelchair user can push harder without tipping over. Second, because the rear wheels have been backed slightly away from the edge, a small amount of momentum can be used. Then, the wheelchair user should lean forward and push the rear wheels up onto the upper level. The forward lean should be timed to coincide with when the rear wheels contact the obstacle. • With the momentum method, the wheelchair user should shift his/her weight over the front wheels as or before the rear wheels hit the lip of the level change to ensure the

	<p>casters are on the upper surface.</p> <ul style="list-style-type: none"> • Common errors are popping too soon, not popping high enough and popping too high. • Backwards <ul style="list-style-type: none"> • The wheelchair user might find it easier to attempt to go up the 5cm-high level change backwards. • Variations: <ul style="list-style-type: none"> • Use external environment if available (e.g. door frame or street pole).
<p>Training tips for manual wheelchairs operated by caregivers</p>	<ul style="list-style-type: none"> • Two-hand propulsion <ul style="list-style-type: none"> • To ascend a level change forwards, the caregiver should put the wheelchair into the full or partial wheelie position to get the casters onto the upper level. Then, the caregiver should roll the chair forwards until the rear wheels touch the edge of the level change. After the casters are on the upper level, the caregiver should ask the wheelchair user to lean or shift forward to reduce the weight on the rear wheels. Then, the caregiver should apply a forward and upward force to help the rear wheels roll up onto the upper level. The caregiver should not lift the wheels clear of the surface. The caregiver should stand close to the wheelchair, but he/she should not use the knee against the backrest. • Variations: <ul style="list-style-type: none"> • For a small level change, the caregiver can ascend backwards, if preferred. If the level change is large enough, the caregiver may need to tip the wheelchair into the full wheelie position (to avoid tipping the wheelchair user forward out of the wheelchair) and pull the wheelchair up onto the upper level. The caregiver should step well away from the edge of the level change before lowering the casters. The caregiver should not use this technique for a large level change, because he/she would need to bend forward too far and might injure his/her back. • Caregiver in front, with casters up the curb. Shake hands with the wheelchair user, pull up. Wheelchair user uses free

	<p>hand to push on the hand-rim. Looks more natural than pushing from behind.</p> <ul style="list-style-type: none"> • Person with hemiplegia <ul style="list-style-type: none"> • The wheelchair is backed up until the rear wheels contact the obstacle. Then, leaning forward to slightly unweight the rear wheels, the foot is used to push the rear wheels up the level change. Then the wheelchair user sits upright and pushes down on the foot on the floor or top of the level change to bring the casters up to the upper level.
<p>Training tips for powered wheelchairs operated by wheelchair users</p>	<ul style="list-style-type: none"> • Select a controller setting with slow speed and high torque. • Positional control (i.e. tilt, recline) can be used to alter the weight distribution on the wheels.
<p>Training tips for powered wheelchairs operated by caregivers</p>	<ul style="list-style-type: none"> • As for powered wheelchairs operated by wheelchair users.

7.32 Descends 5cm level change	
Versions applicable	<ul style="list-style-type: none"> • WST-M/WCU ✓ WST-M/CG ✓ • WST-P/WCU ✓ WST-P/CG ✓
Description	<ul style="list-style-type: none"> • The learner gets the wheelchair down a 5cm level change.
General training tips	<ul style="list-style-type: none"> • On a small level change such as this, forward or backwards are both appropriate approaches to take. Learning the backwards approach will be helpful when advancing to higher level changes. • Progression: forward to backwards.
Training tips for manual wheelchairs operated by wheelchair users	<ul style="list-style-type: none"> • Two-hand propulsion <ul style="list-style-type: none"> • The wheelchair user may be able to simply roll forward slowly off the upper level. • If the footrests catch on the ground or there is the danger of a forward tip or fall from the wheelchair, see “descending a 15cm level change” (section 7.34). • Person with hemiplegia <ul style="list-style-type: none"> • Reverse of 7.31.
Training tips for manual wheelchairs operated by caregivers	<ul style="list-style-type: none"> • The caregiver must not attempt to descend the level change backwards with the wheelchair in the wheelie position, because at greater heights this causes severe jarring of the wheelchair and its user. • To descend a level change backwards, the caregiver should turn the wheelchair around so that the rear wheels go off the edge first. The caregiver should stand close behind the wheelchair and on the lower level. The caregiver should align the rear wheels so that they are both on the edge of the upper level. The caregiver then asks the wheelchair user to lean forward to reduce the weight on the rear wheels. Controlling the movement of the chair, the caregiver should slowly and evenly roll the rear wheels down onto the lower level, avoiding any jarring. Once the rear wheels are on the lower level, the caregiver may need to tip the wheelchair back into the wheelie position to avoid the footrests from getting caught on the upper level. Alternatively, the caregiver can turn the chair sideways to prevent the footrests from getting caught. • Variations: <ul style="list-style-type: none"> • To descend a level change, the caregiver may alternatively do

	<p>this in the forward direction. The caregiver should slowly push the wheelchair off the upper level, allowing the casters to gently land on the lower level, followed by the rear wheels. It is dangerous for the caregiver to use this technique for medium or large level changes – the wheelchair user may tip forward out of the wheelchair or the footrests may dig in and prevent a smooth descent.</p> <ul style="list-style-type: none"> • Alternatively, approaching in the forward direction, the caregiver can tip the wheelchair back into the full wheelie position and lower the wheelchair to the lower level. The caregiver should be careful about the extent to which his/her back is flexed. However, this technique has the advantage of allowing continuous progression along a street, with the eyes facing any dangers in traffic.
<p>Training tips for powered wheelchairs operated by wheelchair users</p>	<ul style="list-style-type: none"> • As for 7.31 in many respects.
<p>Training tips for powered wheelchairs operated by caregivers</p>	<ul style="list-style-type: none"> • As for powered wheelchairs operated by wheelchair users. •

7.33 Ascends 15cm curb	
Versions applicable	<ul style="list-style-type: none"> • WST-M/WCU ✓ WST-M/CG ✓ • WST-P/WCU X WST-P/CG X
Description	<ul style="list-style-type: none"> • The learner ascends a 15cm curb in the wheelchair
General training tips	<ul style="list-style-type: none"> • As for 7.31. • The risks of tipping occur in sequence. A rear tip may occur when the casters are popped from the surface. A forward tip or fall can occur if the casters strike the curb. A sideways tip can occur if one wheel ascends the curb but the other does not. • Progression: <ul style="list-style-type: none"> ○ stationary 5cm → 10cm → momentum (4 phases) 5cm → 10cm → 15cm.
Training tips for manual wheelchairs operated by wheelchair users	<ul style="list-style-type: none"> • As for 7.31, for both two-hand and hemiplegic propulsion patterns.
Training tips for manual wheelchairs operated by caregivers	<ul style="list-style-type: none"> • As for 7.31.
Training tips for powered wheelchairs operated by wheelchair users	<ul style="list-style-type: none"> • Not applicable.
Training tips for powered wheelchairs operated by caregivers	<ul style="list-style-type: none"> • Not applicable.

7.34 Descends 15cm curb	
Versions applicable	<ul style="list-style-type: none"> • WST-M/WCU ✓ WST-M/CG ✓ • WST-P/WCU X WST-P/CG X
Description	<ul style="list-style-type: none"> • The learner gets the wheelchair down a 15cm curb.
General training tips	<ul style="list-style-type: none"> • As for 7.32.
Training tips for manual wheelchairs operated by wheelchair users	<ul style="list-style-type: none"> • Two-hand propulsion <ul style="list-style-type: none"> • The forward full-wheelie method is the preferred method for the descent of a large level change, but it requires good wheelie skills. The wheelchair user should get into the wheelie position away from the edge of the level change. The wheelchair user should roll forward, in the wheelie position to the edge, staying as square as possible to the edge. The wheelchair user should place the hands in the 11 o'clock position (clock analogy), so that he/she can firmly grip the hand-rims until the rear wheels drop to the lower level. As slowly as possible, the wheelchair user should lower the rear wheels from the upper to the lower level. The wheelchair user should let the rear wheels hit the lower level before the casters. As soon as the rear wheels touch the ground, the momentum should bring the casters down, but the wheelchair user should lean forward as a precaution. • Variations: <ul style="list-style-type: none"> • The backwards approach is simple and safe. The wheelchair user should line the rear wheels up with the edge of the level change. The wheelchair user should lean as far forward as possible (chest on lap), and reach forward on the hand-rims. The wheelchair user should move backwards very slowly and let the rear wheels roll evenly down off the upper level under control. Resisting the descent will reduce the impact shock. Once the rear wheels are on the lower level, if necessary, the wheelchair user can turn to the left or the right to get the casters off the upper level without getting the footrests stuck. Alternatively, the wheelchair user can use the full-wheelie position to move away from the curb. • The forward, transient-wheelie method is an

	<p>advanced skill. The wheelchair user approaches the curb edge squarely with all four wheels on the surface and pops the casters as they reach the edge. The extent of the caster pop should be sufficient to allow the rear wheels to have landed on the lower level by the time the casters land. This method requires good timing and skill, but is a natural way to maintain forward progression and to watch for traffic. It can be difficult to spot, so two spotters are recommended.</p> <ul style="list-style-type: none"> • Person with hemiplegia <ul style="list-style-type: none"> • As for 7.32.
<p>Training tips for manual wheelchairs operated by caregivers</p>	<ul style="list-style-type: none"> • As for 7.32.
<p>Training tips for powered wheelchairs operated by wheelchair users</p>	<ul style="list-style-type: none"> • Not applicable.
<p>Training tips for powered wheelchairs operated by caregivers</p>	<ul style="list-style-type: none"> • Not applicable.

7.35 Performs 30s stationary wheelie	
Versions applicable	<ul style="list-style-type: none"> • WST-M/WCU ✓ WST-M/CG ✓ • WST-P/WCU X WST-P/CG X
Description	<ul style="list-style-type: none"> • The learner achieves the wheelie position, maintains it for 30 seconds and brings the casters back to the floor.
General training tips	<ul style="list-style-type: none"> • Use a wheelchair that is not overly stable. • Rear anti-tip devices may need to be removed.
Training tips for manual wheelchairs operated by wheelchair users	<ul style="list-style-type: none"> • The description that follows is for people using two hands for propulsion, but people have only the use of one arm can perform wheelies in a similar way. • When learning the wheelie, the main risks are of injury due to a backward tip and striking the head on the floor or injuring an outstretched arm. This skill should not be practiced without a spotter or a rear anti-tip device that permits enough rear tip to achieve the wheelie balance point but prevents a full rear tip. • Most people require a total of 45-60 minutes of practice, spread over 2-3 sessions, to acquire this skill. • Trainer demonstrates wheelie phases, balance strategies. • Take-Off Phase <ul style="list-style-type: none"> • The wheelchair type and set-up influence the ease with which the wheelchair can be tipped backward into the wheelie position. It is easier to achieve wheelie take-off in a wheelchair that is less stable to begin with – e.g. removing the footrests and allowing the feet to dangle, moving the rear axle position forward, raising the rear axle position or switching to a less stable wheelchair. • It may be useful to use simulation. For instance, the trainer may tip the wheelchair back into the balance position, to give the wheelchair user a sense of how far back this is. • If properly timed, the wheelchair user should require little force to achieve take-off. • For the stationary wheelie take-off, many wheelchair users roll backward slowly, then quickly forward. If using this method, the wheelchair user should start with the hands near the top centre of the wheel (i.e., ~12:00 or 1:00 o'clock, using the clock

	<p>analogy). The wheelchair user should try not to pause between rolling back and pushing quickly forward, otherwise he/she may lose momentum and will not tip backwards as easily.</p> <ul style="list-style-type: none"> • The forward-only approach is preferred because it can be used while the wheelchair is moving forwards (as is often the case), but the hands will need to start farther back on the wheels (i.e., 10-11 o'clock) and more force will be needed by the wheelchair user than for the backward-forward method. • The forward motion that is common to both methods can be thought of as an action to get the base of support (the rear wheels) under the centre of gravity (located near the lap). It is better for the wheelchair user to focus on this than on getting the centre of gravity back. • Some wheelchair users may find it easier if they lean back into the backrest to cause or help with the initial rear tip. However, skilled wheelie performers can achieve the wheelie position while maintaining an upright (or even forward-leaning) body position. • Whichever method is used, the wheelchair user should try to induce enough of a rear tip to reach and slightly overshoot the wheelie balance point. Once past the balance point, the wheelchair user then should pull back on the wheels to prevent tipping too far and return to the balance point. • If the wheelchair user is having difficulty getting tipped far enough backward to reach the balance point, he/she should push forward more forcefully to pop the casters higher. A learning exercise is for the wheelchair user to practice popping the casters up onto a 10-15cm-high object. • If the wheelchair user is overshooting the balance point too vigorously, a learning exercise is for him/her to practice popping the casters up onto a small object (~5cm high). • If not getting enough pitch: <ul style="list-style-type: none"> ○ Add a second push forward on the hand-rims before the casters fall back to the floor. ○ Try decelerating while moving backwards (same effect as accelerating while moving forwards, i.e. it creates dynamic instability) ○ backward-forward strategy
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	<ul style="list-style-type: none"> ○ remove footrests, tuck feet under seat ○ place feet on ground and push down ○ start with the casters uphill or on a small level change <ul style="list-style-type: none"> ● Balance Phase <ul style="list-style-type: none"> ● The wheelchair user does not need to use a lot of force. It is preferable for the wheelchair user to keep a light grip on the wheels. ● The wheelchair user should try to relax and remember to breathe. ● During the early learning stage, some wheelchair users might find it useful to isolate the variations of pitch from those of rear-wheel displacement (i.e. using the principle of reducing the degrees of freedom). This can be done by reducing the extent to which the rear wheels can move (e.g. obstacles such as bricks or books on in front of and behind the rear wheels and foam under the wheels). The trainer tips the wheelchair back to the balance point. In this situation, learning exercises include: i) having the wheelchair user experiment with the extent of tip (more and less than the ideal balance point, where the force to maintain position is minimal), ii) leaning forward (which increases the amount of tip to be at the ideal balance point), iii) using only two fingers and a thumb of each hand, iv) sliding the hands backwards and forwards on the hand-rims to find the ideal position, v) holding on with only one hand and vi) closing the eyes. Once these are mastered at the high rolling-resistance level, the sequence can be repeated with medium rolling resistance (e.g., gravel or 10cm of foam), then low resistance (e.g., tile floor). ● Proactive balance strategy: <ul style="list-style-type: none"> ● The wheelchair user should try to move the hands only between the 12:00 and 1:00 o'clock positions. This will allow a safety margin, so that the wheelchair user can react to a loss of balance in either direction. If the wheelchair user wants the wheels to move farther than the intermediate hand position permits, the hand-rims can be allowed to slide through the grip. It may be helpful to time the movement of the rear
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	<p>wheels to the breathing pattern, because breathing has a subtle effect on wheelchair stability.</p> <ul style="list-style-type: none"> • Reactive balance strategy: <ul style="list-style-type: none"> • If the wheelchair user begins to tip too far forward, he/she should roll the rear wheels forward to re-establish balance (“when you fall forward, push forward”). The worst that can happen in this direction is that the wheelchair lands prematurely. • If the wheelchair user imbalances backwards, he/she should roll the rear wheels backwards to re-establish balance (“when you fall back, pull back”). Even if past the point of no return, the preferred strategy, to minimize injury due to striking the back of the head on the ground, is for the wheelchair user to pull back hard on the rear wheels and flex the neck until the back hits the ground. Immediately after hitting the ground, the wheelchair user can use the hands or forearms to prevent the knees from striking the face. Falls will be practiced later, under skill 7.37. • Landing Phase: <ul style="list-style-type: none"> • To land, the wheelchair user pulls back on the wheels, or leans forward to bring the front wheels to the ground gently. • The description above can be summarized in the form of criterion-referenced steps: <ul style="list-style-type: none"> • Step #1: Review relevant earlier wheelchair control work (pushing on level, hand position, letting hand-rims slide through fingers). • Step #2: Transient tip (forward-only push), as used for the soft surface, pot-hole, threshold and level ascent skills. • Step #3: Self-save (pull back on hand-rims, lean forward) from trainer-induced tip. • Step #4: Full take-off (progressive degrees of tip, until overshoot + self-save). • Step #5: Balance strategies in high rolling resistance (RR)
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	<p>setting with trainer-induced initial tip into the balance position.</p> <ul style="list-style-type: none"> • Step #6: Balance strategies in medium RR (e.g. foam, grass, sand). • Step #7: Balance strategies in low RR (tile). • Step #8: Add the take-off phase and perform the balance phase thereafter. May need to return to the medium-RR setting for this. • Step #9: Exercises (change body position, fingertips only, one hand only, eyes closed, reduced spotter proximity). • Step #10: Start wheelie-related skills (roll forward/back).
<p>Training tips for manual wheelchairs operated by caregivers</p>	<ul style="list-style-type: none"> • To achieve a caregiver-induced wheelie, the caregiver should pull back on the push handles, with one foot pushing down on a tipping lever, to tip the wheelchair back to the balance point. • Once in the wheelie balance position, only minimal force is needed by the caregiver to maintain balance. • To lower the wheelchair to the horizontal position, the caregiver should put one foot on the tipping lever at the back of the wheelchair to keep the wheelchair from pitching forward too abruptly.
<p>Training tips for powered wheelchairs operated by wheelchair users</p>	<ul style="list-style-type: none"> • Not applicable.
<p>Training tips for powered wheelchairs operated by caregivers</p>	<ul style="list-style-type: none"> • Not applicable.

7.36 Turns 180° in place in wheelie position^{L&R}	
Versions applicable	<ul style="list-style-type: none"> • WST-M/WCU ✓ WST-M/CG ✓ • WST-P/WCU X WST-P/CG X
Description	<ul style="list-style-type: none"> • In the wheelie position, the learner turns the chair 180° in place, both to the left and right.
General training tips	<ul style="list-style-type: none"> • This skill is a combination of skills 7.13 and 7.35.
Training tips for manual wheelchairs operated by wheelchair users	<ul style="list-style-type: none"> • As for skills 7.13 and 7.35.
Training tips for manual wheelchairs operated by caregivers	<ul style="list-style-type: none"> • As for skills 7.13 and 7.35. • The caregiver should be careful not to let the wheelchair user's elevated feet hit anything.
Training tips for powered wheelchairs operated by wheelchair users	<ul style="list-style-type: none"> • Not applicable.
Training tips for powered wheelchairs operated by caregivers	<ul style="list-style-type: none"> • Not applicable.

7.37 Gets from ground into wheelchair	
Versions applicable	<ul style="list-style-type: none"> • WST-M/WCU ✓ WST-M/CG ✓ • WST-P/WCU ✓ WST-P/CG ✓
Description	<ul style="list-style-type: none"> • The wheelchair user gets from the ground into the wheelchair.
General training tips	<ul style="list-style-type: none"> • As below.
Training tips for manual wheelchairs operated by wheelchair users	<ul style="list-style-type: none"> • Getting from the wheelchair onto the ground is an opportunity to practice that skill and to practice safe falls (onto a mat): <ul style="list-style-type: none"> • Generally, the wheelchair user should not reach, unless he/she has exceptional flexibility and can prevent the tip/fall with a gentle push on the ground. • Rear falls: the trainer should first lower the wheelchair user onto an elevated mat, with the wheelchair user’s neck flexed and hands pulling on the hand-rims. Failure to hold onto the hand-rims will result in the rear wheels of the wheelchair rolling rapidly forward (“submarining”). Progress to real falls onto an elevated mat. Gradually lower the height of the mat. • Forward falls: the wheelchair user should try to perform a shoulder roll, protecting the head with the hands. • Sideways falls: the wheelchair user should hold onto the up-side armrests. • Out-of-wheelchair approach: <ul style="list-style-type: none"> • Right the wheelchair, lock the brakes and transfer back into it from the front. • Many-step approach: Floor to foot stool to bench to wheelchair seat. Reduce the number of steps with progression. • One can use the seat cushion to increase the height of the floor and to lower the height of the wheelchair seat. • One can approach from a 90-deg angle or straight in front of the wheelchair. Flex the hips and knees fully before starting. Can do in 2 steps, lifting the buttocks onto the footrests first. • Can lift with both arms on the seat at the same time or with one arm on the seat and one on the ground. • Stay-in-wheelchair approach:

	<ul style="list-style-type: none"> • Start on a surface partway between seat height and ground, with the wheelchair on its back (as would be the case after practicing a fall backwards onto an elevated mat). • Pull on rear wheels to get buttocks firmly against the wheelchair seat. • Let the knees bend over the front of the seat. • Lock one brake. • Turn to other side. • Use the forward hand to grab the hand-rim of the rear wheel on the unlocked side as far forward as possible. • Reach the rearmost hand to the floor. • Push firmly with the floor hand and pull with the hand-rim hand. • Push and pull repeatedly, moving the floor-hand hand forward on the floor and the hand-rim hand forward on the hand-rim in a step-wise fashion with each rock until upright.
<p>Training tips for manual wheelchairs operated by caregivers</p>	<ul style="list-style-type: none"> • The caregiver should try to avoid bending and twisting at the same time and should lift with bent knees. • A single caregiver may have difficulty in performing this skill without the help of the wheelchair user and/or a second caregiver. A mechanical lift or a team of people are recommended when lifting from the floor. Without a mechanical lift, maintaining proper ergonomics is challenging. • If the caregiver is large and strong and the wheelchair user is light, the caregiver may be able to safely lift the wheelchair user, with one arm under the arms and one under the bent knees. • If tipping the wheelchair upright from the fully rear-tipped position, locking the brakes will prevent the wheelchair from rolling forward. • If there are two caregivers, they may pick up the wheelchair user together. This can be done in two ways. <ul style="list-style-type: none"> ○ One option is to have one caregiver behind the wheelchair user, holding the wheelchair user’s arms by reaching under the upper arms and grasping the folded forearms. The other caregiver lifts with his/her hands behind the wheelchair user’s knees. ○ The other option is for the two caregivers to be on opposite sides of the wheelchair user, each with one arm under one of

	the wheelchair user's arms and around the back and the other arm under the wheelchair user's bent knees.
Training tips for powered wheelchairs operated by wheelchair users	<ul style="list-style-type: none"> • The power should be turned off while this skill is being practiced.
Training tips for powered wheelchairs operated by caregivers	<ul style="list-style-type: none"> • As for manual wheelchairs operated by caregivers. • As for powered wheelchairs operated by wheelchair users.

7.38 Ascends stairs	
Versions applicable	<ul style="list-style-type: none"> • WST-M/WCU ✓ WST-M/CG ✓ • WST-P/WCU X WST-P/CG X
Description	<ul style="list-style-type: none"> • The wheelchair user and the wheelchair get from the bottom to the top of a set of stairs.
General training tips	<ul style="list-style-type: none"> • Regardless of method, this is a challenging skill. There is a risk of injury due to falling or straining the arms. • When providing training, proper spotting is important. • In describing a set of stairs, one refers to the horizontal and vertical dimensions as the “run” and “rise” respectively. • Progression: <ul style="list-style-type: none"> • Ideally, for training it is useful to have stairs with a variety of runs (start big, gradually get smaller) and rises (start small and get gradually bigger). Can use a curb first, as an example of a single step.
Training tips for manual wheelchairs operated by wheelchair users	<ul style="list-style-type: none"> • Out of wheelchair, on buttocks: <ul style="list-style-type: none"> • Position the wheelchair next to the stairs, in a way similar to how the wheelchair would be positioned for any transfer. Lock the brakes. Clear the footrests. • The wheelchair user transfers from the wheelchair to the 2nd or 3rd step, usually using a standing-pivot or a crouch-pivot method. The stair handrail may be used. • A buttocks protector is a good idea. • The wheelchair may be brought up the stairs by the wheelchair user (as required to pass the WST) or by an assistant. If bringing it himself/herself, he/she should pull the folded wheelchair up by facing it downhill, and tipping it back fully. The wheelchair user should push straight down with one hand on the wheelchair’s push-handles to keep the wheelchair from rolling or sliding down the stairs. • As the wheelchair user moves up each step, he/she should flex the neck and hips and push down with the arms and feet to bring the buttocks up and back onto the next higher step. Then the hands and feet are moved up to the next step.

	<ul style="list-style-type: none"> • At the top of the stairs, a stool is helpful as a half-way step to the wheelchair seat. • In wheelchair: <ul style="list-style-type: none"> • Reposition the rear anti-tip devices to allow the rear wheels to approach the first stair and to later permit the wheelchair to tip backwards into the wheelie position. • The starting position is with the wheelchair user in the wheelchair, with the seat belt (if any) on. • Back up to the lowest step, closest to the handrail on the side of the stronger arm. • The wheelchair user reaches back as far as he/she can with the stronger arm and grabs the handrail with the palm facing up. • By pulling on the handrail, the wheelchair user tilts the wheelchair back past the balance point, using the other hand on the same-side rear wheel to prevent it from rolling forward. • The wheelchair user uses the hand on the handrail to pull while using the other hand to roll the rail-side wheel up the step. • Proceed up one stair at a time. • Variations: <ul style="list-style-type: none"> • If the staircase is curved, there is more “run” on the outside of the curve, so it will be easier on the outside. Make sure the rear wheels are square to each step.
<p>Training tips for manual wheelchairs operated by caregivers</p>	<ul style="list-style-type: none"> • In wheelchair: <ul style="list-style-type: none"> • The starting position is with the wheelchair user in the wheelchair, with the seat belt (if any) on. • Back up to the lowest step, closest to the handrail on the side of the stronger arm. • Wheelchair user with the hands on wheels or handrails, assisting to the extent possible. • To ascend, tip the wheelchair back and roll (not lift) the wheelchair up one step at a time. • If only a single caregiver is available and the wheelchair user

	<p>is able to assist, then the caregiver can provide some of the needed force (e.g. rolling the non-rail-side wheel up the step while the wheelchair user pulls on the handrail with one or both hands).</p> <ul style="list-style-type: none"> • With two caregivers and a wheelchair user who is able to assist, one of the caregivers can be positioned uphill and pull on the push-handles while the other caregiver is below and wheelchair user functions as described above. One caregiver should take the lead in coordinating the timing (e.g. to the count of “ready, set, go” for each step). • Ideally, especially if the wheelchair user cannot physically assist much, there should be three caregivers available. One caregiver positions him/herself above, pulling on push-handles, but not too hard because of the awkward positioning that could injure the back. This caregiver is turned slightly to one side, with one foot on the stair above the wheel and the other on the next higher stair. Two caregivers below. Each uses the inside hand to hold the frame of the wheelchair, not a part that could come off (e.g. footrests). The footrests can be removed for easier access to the frame. The outside hand is used to roll the wheel up onto the next step. It begins at about the 3:00 o’clock position. • Variations: <ul style="list-style-type: none"> ○ Piggy-back style. ○ Fire-fighter’s over-the-shoulder carry, with one strong person. ○ Two-man carry, either front and back or by creating a “seat” of their interlocked hands.
<p>Training tips for powered wheelchairs operated by wheelchair users</p>	<ul style="list-style-type: none"> • Not applicable.
<p>Training tips for powered wheelchairs operated by caregivers</p>	<ul style="list-style-type: none"> • Not applicable.

7.39 Descends stairs	
Versions applicable	<ul style="list-style-type: none"> • WST-M/WCU ✓ WST-M/CG ✓ • WST-P/WCU X WST-P/CG X
Description	<ul style="list-style-type: none"> • The wheelchair user and the wheelchair get from the top to the bottom of a set of stairs.
General training tips	<ul style="list-style-type: none"> • As for 7.38, but in the reverse direction. • Although there is still a potential for injury due to a fall, descent is much less strenuous than ascent. Many wheelchair users who cannot ascend stairs independently can descend them.
Training tips for manual wheelchairs operated by wheelchair users	<ul style="list-style-type: none"> • Out of the wheelchair, on the buttocks: <ul style="list-style-type: none"> • Reverse of ascent procedure (7.38). • In the wheelchair: <ul style="list-style-type: none"> • The safest method is facing up the stairs. The wheelchair user grabs one or both rails with both hands, leans well forward, lowers the rear wheels down one stair, then slides the hands down the rail. The trainer should alert the wheelchair user that this method can be noisy, as the casters and/or footplates bang down each stair. • Variations: <ul style="list-style-type: none"> • Backwards, as above, but using one hand, with the other hand on the non-rail-side hand-rim. • In wheelie, one step at a time. This is possible if there is an adequate horizontal distance (run) on each step. Drop down one step at a time, like doing a wheelie down a curb, pull back to bring the rear wheels against the step before proceeding to the next step. Practice on a single curb first. • In wheelie, continuous method: This method is difficult to spot. It is only recommended for a short flight of stairs and when no handrails are available. Approach the top step at a comfortable speed. Pop the casters at just the right time, just before the casters reach the drop off. Treat the stairs like an incline, with the rear wheels skimming the edges of the steps. If you are going to fall, fall backwards, not forwards. Learn the method on curbs

	before attempting it on stairs. The trick is in popping the casters enough but not too much.
Training tips for manual wheelchairs operated by caregivers	<ul style="list-style-type: none"> • As for 7.38, but in the reverse direction.
Training tips for powered wheelchairs operated by wheelchair users	<ul style="list-style-type: none"> • Not applicable.
Training tips for powered wheelchairs operated by caregivers	<ul style="list-style-type: none"> • Not applicable.

8.0 GAMES

In the earlier section on individual skills, we have referred to some variations and activities that can be used as means of encouraging varied practice and providing motivation for people learning wheelchair skills. In the section that follows, we have provided more detail on some more structured games that are suitable for small groups. Although we recognize the importance of organized sports, with the exception of basketball (which we have provided as an example), we have not provided descriptions of structured wheelchair sports (e.g. wheelchair rugby, track and field), because this would be beyond the scope of this Manual. Depending upon the skill of the participants and the game, spotters may be needed.

8.1 The Line Game	
Minimum number of players	5+
Equipment and set-up	Line grid on floor Name cards
Instructions	Participants propel along the lines on the floor. Many gyms already have court lines outlined on the floor for participants to follow but, if not, a grid can be easily made using tape. When participants meet each other on a line they must turn around and propel in the opposite direction.
Skills reinforced	Rolling forwards and backwards, moving turns, turns in place, spatial awareness
Variations	As an ice breaker, have participants introduce themselves when they meet, and give each other high fives, shake hands or wave. Participants are each given a bingo style sheet with questions in each block such as 'brown eyes', or 'birthday in April' or 'likes to play basketball' etc. When participants meet they must match their new partner with one of the 'bingo' blocks and cross it off. The first person to get five blocks in a row wins. When participants meet, instead of turning around, they propel backwards away from their partner until they can turn off down another line. At which point they can propel forward again.

8.2 Freeze	
Minimum number of players	5+
Equipment and set-up	3 coloured balloons or signs (green, yellow, red)
Instructions	Participants propel wherever they wish in the space provided and at intervals a volunteer or trainer holds up one of the three balloons/signs. Each balloon/sign represents a different instruction. For example red = stop immediately, yellow = Go slowly and green = Go quickly around the room. When the sign is held up participants must immediately follow the new instructions.
Skills reinforced	Rolling Forwards, Moving Turns (all directions), Spatial Awareness, Stopping
Variations	Trainer shouts out instructions or uses a whistle Ask participants to propel backwards The last person to stop is disqualified Use music and encourage participants to go quickly or slowly depending on the speed of the music. When the music stops so must the participants.

8.3 What time is it Mr. Wolf ?	
Minimum number of players	5+
Equipment and set-up	None
Instructions	The participants together shout and ask ‘Mr. Wolf’ what time it is. Mr. Wolf’s response corresponds to how many pushes they can give in an attempt to catch the wolf while his/her back is turned. (Example, if Mr. Wolf says that it is three o’clock each participant can move as far as they are able with three pushes). But if Mr. Wolf says that “it is dinner time” all participants must turn around and propel to the opposite side of the gym without being caught by Mr Wolf.
Skills reinforced	Rolling Forwards, Stopping, turns in place
Variations	

8.4 Red Light, Green Light	
Minimum number of players	4+
Equipment and set-up	None
Instructions	Participants line up at one end of the gym. One participant is chosen as “it” and waits at the opposite end of the gym. “It” turns its back to the rest of the group and calls green light, at which point all participants begin to propel forward. “It” can then call red light at any point and turn around quickly. When red light is called all participants must freeze. If “it” catches anyone moving when he/she turns around that person has to go back to the other end of the gym and start again. The goal is to tag “it” while his/her back is turned to become the new “it”.
Skills reinforced	Rolling Forwards, Stopping, Turns in place
Variations	<ul style="list-style-type: none"> • When “it” calls red light and turns around all participants must turn around to face the opposite direction and then freeze. • For more advanced players, when “it” calls red light all participants must perform a wheelie. The first person to fall out of their wheelie is “it”.

8.5 Follow the Leader	
Minimum number of players	3+
Equipment and set-up	none
Instructions	A leader is chosen who is responsible for leading the group around the space provided (indoor or outdoor). This leader can perform different skills, that the rest of the group tries to copy.
Skills reinforced	Potential to cover all skill groups depending on leader
Variations	Having more than one group going at once is a good way to divide participants up by skill level.

8.6 Trains	
Minimum number of players	6+
Equipment and set-up	flags
Instructions	Participants form 'trains' of three or more people and move around the room. Different trainers stand around the room with a flag or other sign. When a flag is raised by a trainer, the trains must propel towards the person holding the flag. The first train to reach the 'station' wins.
Skills reinforced	Rolling Forwards; Speed Control, Spatial Awareness, Stopping, moving turns
Variations	

8.7 Gears	
Minimum number of players	1+
Equipment and set-up	line markings or pylons Mark off the room into three different areas
Instructions	Participants are then instructed to move as slowly as possible through the first area, at a medium speed through the second area and as quickly as possible in the final area.
Skills reinforced	Rolling Forwards, Speed Control, braking
Variations	

8.8 Cone Slalom	
Minimum number of players	1+
Equipment and set-up	Cones Large balls Start and finish lines
Instructions	Cones are set up with balls sitting on top of them. Participant(s) must propel around cones following arrows as quickly as possible, getting as close to the cones as they can without knocking the ball off of the top.
Skills reinforced	Rolling Forwards, Stopping, Spatial Awareness, Moving turns
Variations	Try different positions for the cones for example Time participant from beginning to end and see if they can beat their personal best times. Try the course backwards

8.9 Orienteering	
Minimum number of players	1+
Equipment and set-up	<ul style="list-style-type: none"> • Plan a route outdoors. Route could include obstacles such as different surfaces, cross slopes, curbs, pot holes, inclines and level changes depending on the skill level of the group. • Photo clue book • A congratulations sign is placed at each landmark, along with instructions to look at the next photo clue in their book.
Instructions	In small groups (twos or threes) participants use photo clues to navigate the route. Each photo shows a landmark that the participants can find (e.g. a tree, a bench etc).
Skills reinforced	Depending on route used any combination of skills could be reinforced. At each station, the participants get a clue as to the next stop.
Variations	<ul style="list-style-type: none"> • When each new clue is found participants can collect objects or cards which could be put together at the end. • Organize different skill level courses so that different routes can be assigned depending on the varying abilities of the groups.

8.10 Go Fish	
Minimum number of players	1+
Equipment and set-up	Various Objects Cones Chairs Mats Tables
Instructions	Objects are placed on the floor, on mats, cones, chairs and tables around the room. The participant moves around the room picking up the objects, which then must be returned to a bucket.
Skills reinforced	Reaching, maneuvering
Variations	<ul style="list-style-type: none"> • For a greater challenge have participants balance a cup of water while they complete the task. • Have participants pick up objects in a certain order. For example picking up the highest objects first or the lowest objects first. Or only objects of a certain colour or shapes. • Shout out an object for participant to return to bucket. • Hide peanuts or a similar sized object around the room, split participants into teams. The team with the most peanuts at the end of a certain time period wins.

8.11 Circle Games	
Minimum number of players	7+
Equipment and set-up	None
Instructions	Participants form a circle. When a participant's name is called by the trainer he or she moves clockwise around the circle until returning to his/her place.
Skills reinforced	Rolling Forwards, Stopping, Spatial Awareness, Speed Control, moving turns
Variations	Cat and Mouse: One participant (the cat) propels around the outside of the circle. As they do so they tag another participant (the mouse) in the circle and the two race in opposite directions around the circle. The last person to return to the original spot is now the 'cat'.

8.12 Relay Race	
Minimum number of players	10+
Equipment and set-up	Batons or balls Cones Cups Bowls
Instructions	Divide participants into groups. Each group lines up at one end of the room. When the trainer shouts ‘go’ or blows a whistle the first participant in each group races to the other end of the hall, makes a turn around a cone and returns to their group, passing the baton or ball to the next participant. The first group finished wins.
Skills reinforced	Potential to cover any combination of skills
Variations	<ul style="list-style-type: none"> • Instead of going around a cone have participants perform a skill learned that day once they reach the opposite end of the room. • Each team starts with one cup and an empty bowl. At the other end of the room a bucket full of water is placed. One at a time the participants must race to the other end of the room fill up their cup and return as much water as they can to their bowl. The game continues until one team has filled their bowl. • Instead of returning to the back of the group when a participant finishes the relay, he/she passes the baton to the next person and then follows behind him/her (as in follow the leader). This continues until the whole group is led by the final participant around the course.

8.13 Shrinking Space	
Minimum number of players	1+
Equipment and set-up	Cones
Instructions	A line of cones is placed close to a wall. Each participant attempts to pass between the cones and the wall without touching either. Each time a participant completes this successfully the cones are moved closer to the wall. This is a good way for participants to learn exactly what gap they can manage in their wheelchair.
Skills reinforced	Rolling Forward or Backwards, Spatial Awareness
Variations	Do it backward See how quickly participants can get through the space by timing them.

8.14 Case Open and Shut	
Minimum number of players	1+
Equipment and set-up	None
Instructions	Participants are given a destination inside the building they are meeting in. The route to this destination must take advantage of many different types and styles of doors. Different clues or pieces of a puzzles are positioned following each door which the participant must collect and return to the room they began in.
Skills reinforced	Opening and Closing a variety of doors.
Variations	

8.15 Stormy Seas	
Minimum number of players	10+
Equipment and set-up	None
Instructions	All of the participants are given a name (e.g. starfish, sharks or octopus) and line up against a wall at one end of the room. One participant (the fisherman) positions himself/herself in the middle of the room and yells out one of the above categories. When their category is called the participants must try to get across the room to the other wall without being caught by the fisherman. If tagged participants stop where they were caught and become seaweed. The seaweed's job is similar to the fisherman's except seaweed cannot move so they must reach from where they are to tag the remaining participants as they pass by. If the fisherman yells stormy seas all participants try to get to the other side of the room no matter their category.
Skills reinforced	Rolling Forwards, Moving Turns, Stopping, Spatial Awareness
Variations	When a participant is caught he/she becomes an 'island' in the sea, creating an additional obstacle for the remaining participants to negotiate.

8.16 Simon Says	
Minimum number of players	3+
Equipment and set-up	None
Instructions	A leader is chosen and instructs the group in certain skills. But the participants should only perform the skill when the leader says “Simon Says” before the instruction. If participants perform a skill when the leader did not say “Simon Says” that participant is out. Last participant in the game wins.
Skills reinforced	Potential to cover all skill groups
Variations	Simon Says Mix Up: Participants must do the opposite of what ‘Simon’ instructs. For example if Simon says turn to the right participants must turn to the left. If they do what Simon says and not the opposite they are out.

8.17 Limbo Mix-up	
Minimum number of players	3+
Equipment and set-up	Obstacles of various heights.
Instructions	Participants form a line and a rope or another obstacle of similar height is placed in front of the line. The participants take turns getting over the obstacle until everyone has completed the task. The obstacle is then replaced with a higher obstacle. Participants are eliminated when they can no longer get over the obstacle, and the game continues until only one participant is left.
Skills reinforced	Getting over obstacles of various heights.
Variations	

8.18 Basketball	
Minimum number of players	6+
Equipment and set-up	Ball Hoops
Instructions	To begin create two teams each with an equal number of participants. Participants are only permitted to carry the basketball for the time it takes them to complete two pushes at which point they must either pass the ball to a team member or bounce it on the ground. Points are scored by getting the ball in the basketball hoop
Skills reinforced	Rolling Forwards, Moving Turns, Turns in Place, Spatial Awareness, Speed Control
Variations	<ul style="list-style-type: none"> • For lower ability groups lay hula-hoops on the ground or use garbage cans instead. • Break the game down into its components. Have participants practice bouncing and throwing the ball with a partner. Or practice how to carry the ball for two pushes and then quickly bounce it. Add a quick turn on the end as a defense skill (push, bounce, fast turn). • Practicing throwing skills by sitting in a circle and passing the ball around. Each time that the ball is passed around the circle without dropping on the floor get participants to make the circle bigger by giving one push backwards. Then try again. • Practice shooting on the net. Change the height of the net to practice on, increasing the height as the participant’s skill improves.

8.19 Ball Chaos	
Minimum number of players	3+
Equipment and set-up	Big Yoga Balls
Instructions	A variation on dodge ball, this game can be played as a team or individually. Place one or more yoga balls on the floor and have participants hit the balls with their hand towards members on the other team. Participants must maneuver around balls to avoid getting hit or block the ball with their hands. If hit by the ball participant is frozen until another member of their team high-fives them.
Skills reinforced	Moving Obstacles, Reaching
Variations	

8.20 Lily Pads	
Minimum number of players	1+
Equipment and set-up	'Lily pads' are placed on different types of surfaces (gravel, grass, pavement, carpet, tile etc).
Instructions	The participants must collect as many lily pads as possible by navigating the different surface types.
Skills reinforced	Different rolling resistances
Variations	

8.21 Horse	
Minimum number of players	2+
Equipment and set-up	None
Instructions	<p>Players are numbered off. Player #1 performs a skill that he/she thinks is possible but that others might find difficult. Starting with Player #2, each player must successfully complete that same skill. If a player is not able to complete the skill, that player is given sequential letters from the word 'HORSE'. Once a player has all the letters to spell HORSE, he/she is disqualified. Once everyone has tried Player #1's skill, Player #2 presents a different skill and the game continues in the same fashion until there is only one player remaining.</p>
Skills reinforced	Any combination of skills
Variations	Words that are longer (e.g. WHEELCHAIR) or shorter (e.g. PIG) can be used.