



Introduction

The development of general physical fitness is a necessary component for elite ski and snowboard athletes. Establishing efficient fundamental movement patterns, learning motor control in a variety of situations and positions, and developing general strength, power, and capacity are critical psychophysiological qualities. These capacities will contribute directly to long-term sporting success, in particular an athlete's fitness level will either support or inhibit technical skill development, by greatly affecting their ability to tolerate the respective training volumes required across different phases of development. The assessment and quantification of these qualities by using SkillsQuest-Fitness (SQ-F) can help to identify potential performance deficits, as well as track long-term performance trends. As U.S. Ski and Snowboard builds normative data for each gender, sport, and phase of development, SQ-F will help to identify target areas for later development and success as elite athletes.

The U.S. Ski and Snowboard framework of athlete development focuses on the appropriate application of stage-specific variables through the developmental stages. The early focus in an athlete's career should be to build the fundamental qualities and skills that will be necessary for higher levels of ski and snowboard competition. Without adequate levels of general fitness and fundamental skills, later "sport-specialized" or "high-performance" training will be limited in effect, as there will be a limited foundation for progressing to any sports-specific training strategies.

SQ-F will provide information of the current status of the athlete across multiple physical domains.

SkillsQuest-Fitness Test	Physical Fitness Component(s) Assessed
20m Shuttle Run	Aerobic Fitness
Standing Long Jump	Lower Body Power
Standing Triple Jump	Lower Body Power/Coordination
20m Sprint	Acceleration/Coordination
Strict Pull Up/Bar Hang	Upper Body Strength/Strength Endurance
Single Leg Squats (R & L)	Lower Body Strength/Mobility
90 Degree Push Up (Tempo)	Upper Body Strength/Strength Endurance
60s Box Jumps/Hurdle Jumps	Anaerobic Fitness/Lower Body Power Endurance

A coach can use the data gathered from each test in SQ-F to more accurately determine an athlete's "starting point" in the developmental and physical fitness stages and track subsequent progress through re-evaluation. This will allow the construction of an appropriate training program that serves the needs of the athlete, both in the context of their sport or event as well as within the athlete's capabilities.

The effective administration of each test is detailed within this manual. A coach or administrator should consider the following when administering each test:

- Rationale
- Equipment needed (calibration and maintenance required for accuracy)
- Methodology/execution protocols
- Preparation (warm-up)
- Scoring and recording
- Recovery time

Through the consistent administration of the tests and the consideration of their components, both validity and reliability of SQ-F will be improved. Effective and appropriate test administration and recording is crucial for reporting accurate data that will benefit both athletes and coaches.

When implemented and interpreted correctly, SQ-F will be an important assessment of the overall process of athlete development. By identifying an athlete's existing abilities in the following tests, the appropriate foundations can be built upon. This will promote greater effectiveness of the sport-specific and high-performance strategies to come, which will subsequently support and enhance performance throughout the athlete's career.

Composite Score

From a practical standpoint, the information given from the eight SQ-F tests individually will be the primary drivers of any specific training program intervention or performance target/deficit mediation. Looking at a test result in isolation will provide valuable information on an athlete's current fitness status in that specific "capacity", which can lead to a more informed training prescription from coaches. However, US Ski & Snowboard understands the value of providing the illustration of an athlete's "Overall Fitness" level, and the power of a single or "Composite" fitness score. This composite score encompasses all the components of fitness measured in SQ-F and can give an indication of the athlete's overall level of athletic output.

US Ski & Snowboard has developed a composite scoring system where each "absolute" test score will render a specific point total. The points total for each individual test will then be combined together to provide an Overall Score (similar to Track and Field - Decathlon). Because not all fitness components are of equal importance to skiing and snowboarding, U.S. Ski & Snowboard has developed a weighting

U.S. Ski and Snowboard SkillsQuest-Fitness

system that maximizes the points scored in fitness tests that are more important to skiing and snowboarding performance and training needs, and minimizes the points scored in fitness tests that are likely less relevant to skiing and snowboarding specifically, but have important relevance to overall fitness. Every test will contribute to the overall points total.

The following scoring system is used for all athletes (both male and female, regardless of age):

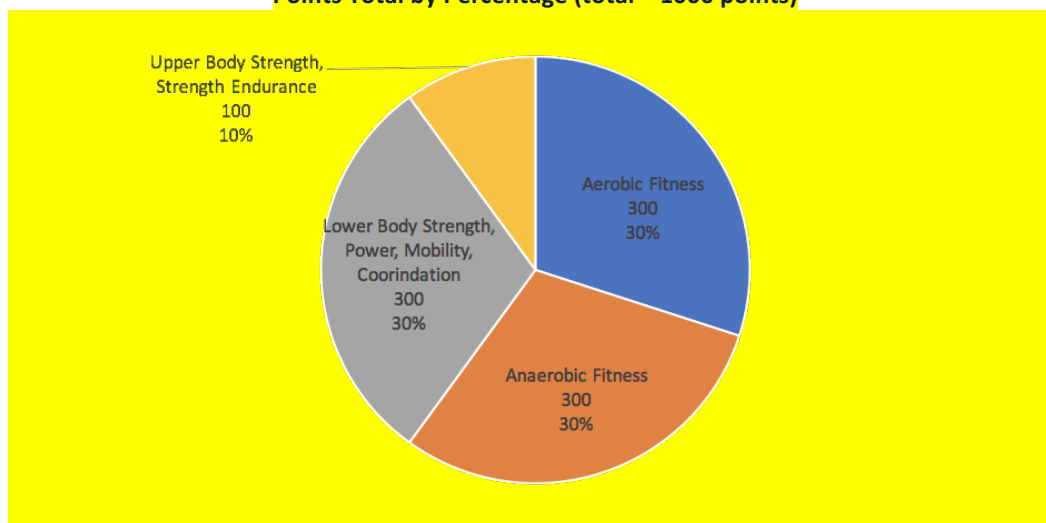
SkillsQuest-Fitness Test	Points**	Max SQ-F Score**
20m Shuttle Run	300 Points / 30%	Level 15.4 / 65ml.kg.min*
Standing Long Jump	100 Points / 10 %	330cm
Standing Triple Jump	100 Points / 10%	990cm
20m Sprint	50 Points / 5%	2.8s
Strict Pull Up***	50 Points / 5 %	20
Single Leg Squats (R & L)	25 Points / 2.5% (per leg)	15
90 Degree Push Up (Tempo)	50 Points / 5 %	50
60s Box Jumps***	300 Points / 30%	90
Total	1000 Points / 100%	

*Ski & Snowboard adjusts the Est. VO2max established from the 20m Shuttle Run test up by 3.15% for each 500m above sea level that the test takes place (Wehrin & Hallén, 2006). No other tests are adjusted for altitude).

**Score to Points Conversions

***Bar Hang and Hurdle Jump tests are for younger athletes and are not included as part of the scoring system.

Points Total by Percentage (total = 1000 points)



Contents

Logistics and Test Administration _____ pp.5-7

Anthropometry Data Collection _____ p. 8

SkillsQuest-Fitness General Warm-up _____ p. 9

Test Protocols

1. 20m Shuttle Run _____ p. 10

2. Standing Long Jump and Triple Jump _____ p. 11

3. 20m Sprint _____ p. 12

4. Strict Tempo Pull-Up/Bar Hang _____ p. 13

5. Single Leg Tempo Squat '15 in 15' _____ p. 14

6. 90 Degree Tempo Push-Up _____ p. 15

7. Repeated Jumps _____ p. 16

References and Recording

References _____ p. 17

Scoring Sheets _____ pp. 18-26

Data collection and results _____ pp. 27-32

Equipment List:

- Scale
- Flat non-slip surface, recommended minimum 30m long, 30m wide
- Stack of cones (minimum 10)
- Measuring tape (cm)
- **Timing system**
- U.S. Ski & Snowboard Push Up audio file **or metronome**,
- U.S. Ski & Snowboard (or) AIS 20m Shuttle Beep Test audio file
- Audio device (iPhone, Tablet, Computer)
- Up to three (3) Portable (or) In-built speaker systems to play audio files
- Pull-up bar
- 1 (or more) pair(s) of 6x18 inch hurdles (6 inches high, 18 inches wide or 15x45 centimeters)
- **At least one (1) stable Box 40cm (height) x**

Logistics and Test Administration

SkillsQuest-Fitness test battery is designed to be implemented from start to finish in its entirety. National Team testing, as well as any nationally “validated” testing will be run in this way to ensure consistency and standardization. This will help to promote the collection of valid data, systematic analyses of the data, as well as accurate tracking of performance improvement.

Planning and set-up are critical components to running successful SkillsQuest-Fitness testing projects. The setting of athlete group size, organization of space, number of support staff/coaches involved, and timing and scheduling of large groups of athletes for effective management and scoring are all critical considerations that should accompany the planning process.

The ideal logistical preparation will allow for a 1:1 ratio of “scorer” to “athlete being scored” ratio. This becomes more challenging with multiple-athlete tests such as the 20m Shuttle run, where multiple athletes are completing the test at the same time and will require careful planning. But in general, if two athletes are participating in the test at one time, there should be two scorers, or one for each athlete. The goal is to avoid one scorer having to observe more than one athlete at a time, leading to ineffective scoring and evaluation. In a group setting (with more athletes per group than testers), athletes should rotate through test performance sequentially, allowing the tester to score each athlete individually. For example, a group of ten athletes and only one tester will require more time than a group of ten athletes with two testers at each testing station, as two athletes can perform the tests at a time.

The exception to this rule is the 20m Shuttle test, in which all athletes of a group can, and should, perform the shuttle at the same time, with multiple testers/scorers available for assessment (see examples in the “Equipment and Space” section.) The 20m Shuttle can be thought of as the “rate-limiting step” or “funnel” for multiple athlete group testing – as it will be the longest test performed, including the recovery time. More will be explained about this in the test protocols section.

Athlete Group Size and Flow

Athlete group size should be kept manageable within the constraints of staff, space, and time. The ideal group size will depend on the above factors, but in general, within U.S. Ski & Snowboard we maintain an athlete group size of less than or equal to 10 athletes. For National Validated testing, this number is cut to 8 athletes per group to ensure scoring accuracy and group management.

It is common that multiple groups of athletes will need to be accommodated for large scale testing. Proper organization of space, timing, and staff allocation/station judging is critical to ensuring valid scoring in tests. It is recommended that staggered group starts be used, with each station being scored by an adequate number of coaches to athletes performing the test. Below you will find an example layout of testing flow and staffing requirements for running multiple groups of athletes through the tests (*Image X*).

SkillsQuest-Fitness Testing Example Structure and Flow Layout (5 groups*)						
		Group 1	Group 2	Group 3	Group 4	Group 5
Height & Weight	Staff A	8:50	9:10	9:20	9:40	10:00
Warm Up	Staff B	9:00	9:20	9:40	10:00	10:20
20m Shuttle Test	Staff C, D, E, F (min)	9:15	9:35	9:55	10:15	10:35
	<i>(see 20m shuttle layout for staffing numbers)</i>					
Standing Long Jump	Staff G	9:45	10:05	10:25	10:45	11:05
Standing Triple Jump	Staff G	9:55	10:15	10:35	10:55	11:15
20m Sprint	Staff H	10:00	10:20	10:40	11:00	11:20
Strict Tempo Pull Ups**	Staff I	10:15	10:35	10:55	11:15	11:35
SL Tempo Squat 15/15**	Staff J	10:25	10:45	11:05	11:25	11:45
90 Degree Tempo Push Up**	Staff K	10:35	10:55	11:15	11:35	11:55
60 sec Box Jump**	Staff L	10:45	11:05	11:25	11:45	12:05
*Ideally 8-10 athletes tested per group, unless greater staff numbers are available for support						
**These tests require a 1 : 1 athlete to tester ratio - (i.e. if two athletes are testing simultaneously, two testers are required)						

(Image X)

Equipment and Space

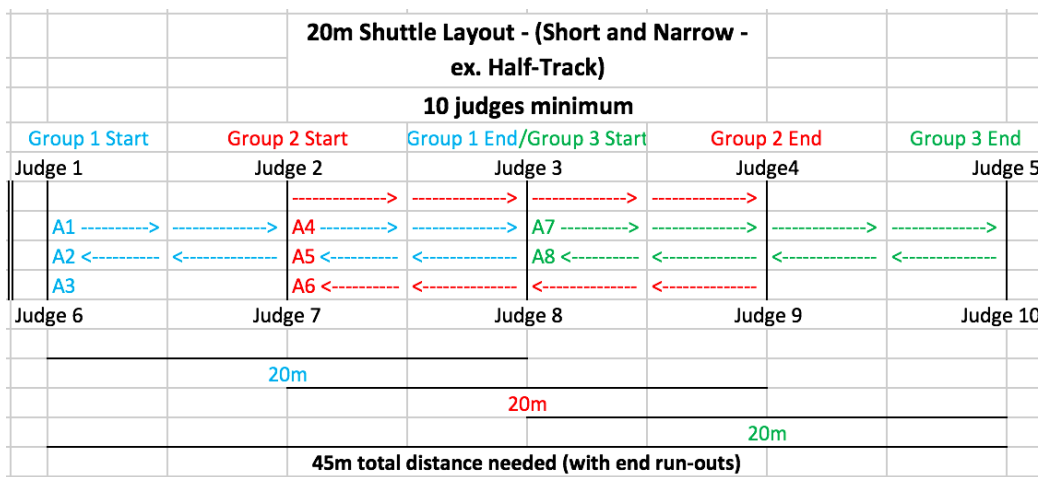
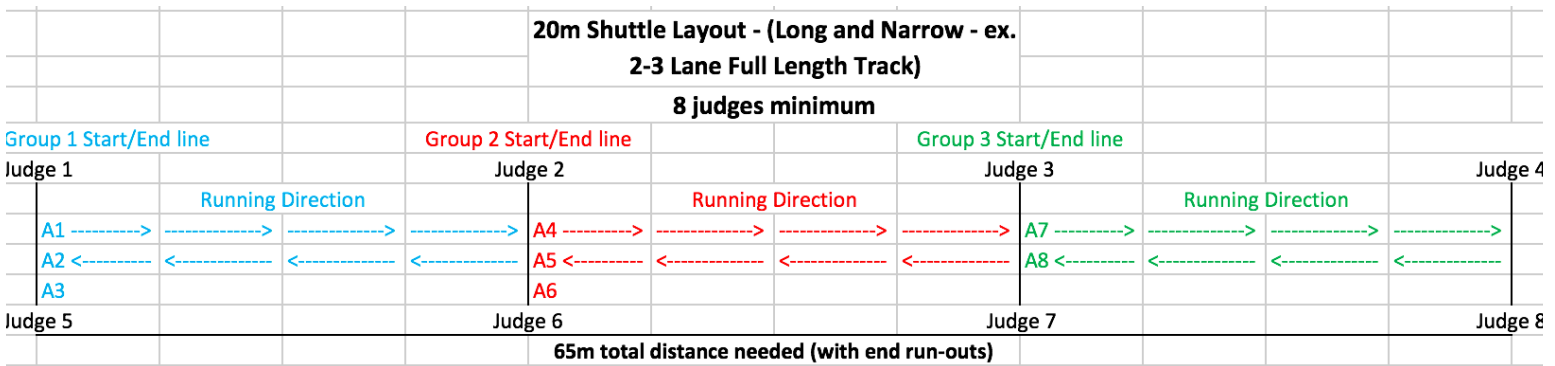
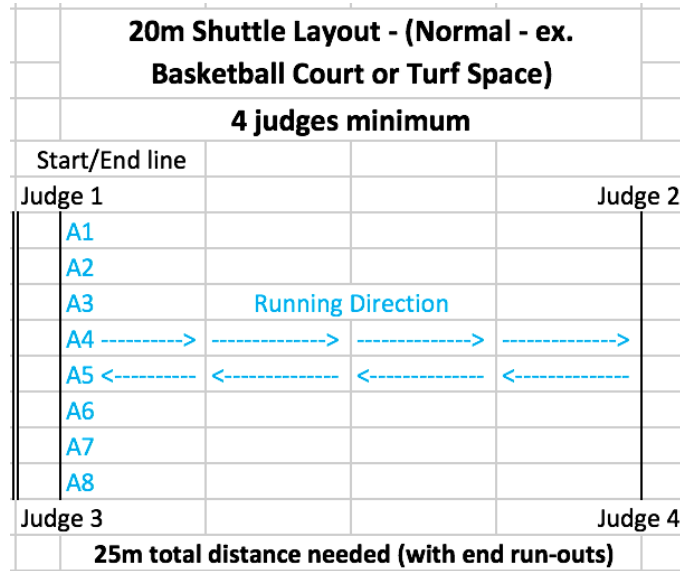
The SQ-F battery will require some fundamental equipment (listed in the previous section) to ensure the tests are run appropriately. It is imperative that each test be administered according to the directions (laid out in the Test Protocols section) and utilizing the listed equipment for valid data and accurate evaluation and scoring (for example – using a laser timer instead of a stop watch for the 20m sprint test). Failure to use improper equipment will lead to a disqualification of any scores submitted.

When administering the tests an effort should be made to access a facility that provides adequate space for not only test performance, but entry/registration, circulation and transition of athletes and test administrators, test flow, and flexible/adjustable logistics. Planning should account for easy access and maneuverability of testing equipment (such as boxes, timing gates, and pull up bars), travel/circulation pathways, and allowing for multiple athletes to perform tests at the same time in a safe environment.

The most space intensive tests involve the running tests (the 20m Shuttle Beep Test and 20m Sprint Tests). It is recommended that an area of at least 25m x 25m (length x width) is available for the 20m Shuttle Beep Test, and at least 30m x 6m (length x width) for the 20m Sprint. An indoor basketball gym

or turf training area is an ideal example of adequate space that can be managed for both tests. Below are a few illustrations of different layouts for the 20m shuttle run depending on the size and shape of the space available (*Image Y*).

Example Shuttle Run Layouts



Anthropometry – (Height and Weight)

Rationale for Inclusion:

To monitor the timing and duration of important growth and maturation events that may influence training abilities.

Equipment:

- Measuring tape (use of stadiometer is encouraged if accessible)
- Scale
- Ruler

Calibration:

Follow the scale/stadiometer manufacturer's calibration protocols prior to use.

Methodology:

- Measurement should be taken prior to activity, before food ingestion and in the morning hours.

Height:

- Measuring tape is secured with the "0 cm" anchored to the floor and then fastened to the wall with the measurement values in ascending order.
- Athlete is instructed to stand with their back to the wall, with the feet together.
- Heels, butt and upper back should be in contact with the wall, head should remain in a neutral position.
- Height is measured with a ruler or flat object placed level on top of the athlete's head aligned with the corresponding mark on the measuring tape.
- Record height to nearest millimeter (e.g. 164.50 cm).

Weight:

- Scale is zeroed and calibrated following the manufacturer's guidelines.
- Athlete removes shoes, phone/accessories and any heavy clothing (shorts and t-shirt are preferred) before stepping on the scale.
- Observe and record the athlete's weight from the scale following the manufacturer's guidelines.
- Record weight to the nearest tenth of a kilogram (e.g. 65.5 kg).

SkillsQuest-Fitness General Warm-Up

Rationale for Inclusion:

To ensure consistency across the preparation of all athletes participating in SkillsQuest-Fitness, enhance subsequent test performances and limit the risk of injury to those athletes performing the tests.

Equipment:

Flat non-slip surface, (i.e. ground or flooring) recommended minimum 30m long, width of the area is determined by how many athletes are warming up at the same time. Use the same surface for testing if possible.

- Ensure athlete is wearing proper testing footwear (athletic shoes)
- Cyclical/low-impact cardiovascular training piece (stationary bike, rower, treadmill, track, gym, or turf-space)
- Four or more cones to mark off warm-up area
- Stopwatch

Methodology:

- Begin athlete preparation with general warm-up; 5-15 minute rest between tests is recommended.
- 1.) 5 minutes of low intensity active movement; walking, riding, rowing or other low-impact exercise
- 2.) Trunk Circuit:
 - 30s Plank on forearms – isometric Hold
 - 30s Lateral plank – isometric Hold – each side
 - 30s Hip bridge - isometric Hold
- 3.) Dynamic Flexibility/Mobility:
 - Deep forward lunge stretch – 4 each leg
 - Hand walk/inch worm – 4 reps
 - Lateral lunge stretch – 4 each leg
 - Crossover lunge stretch – 4 each leg
 - Standing leg cradle – 4 each leg
 - Bear crawl forward and backward – 10m each
 - Body weight deep squat – hands behind head – 8 reps
 - Plank with shoulder tap – 8 reps each arm
- 4.) Movement Initiation:
 - High knees march to run – forward – 10m
 - High knees march to run – backward – 10m
 - Lateral shuffle – high – 10m each way
 - Lateral shuffle – low – 10m each way
 - Grapevine – 10m each way
 - Forward A-skip – 10m
 - Forward B-skip – 10m
 - Lateral A-skip – 10m each way
 - Forward power skip – 20m

1. Australian Institute of Sport 20m Shuttle-Run

Rationale for Inclusion:

Measurement of aerobic capacity (13).

Equipment:

Flat non-slip surface (i.e. ground or floor), recommended minimum 30m long, surface width is determined by how many athletes are running at the same time. Use the same surface and environment for all tests if possible.

- Shuttle-run app or [audio file](#)
- Smart phone or MP3 player
- Speakers (loud enough to hear the audio for the full length of the test)
- Marker or tape to clearly mark the turning points
- Tape measure 20m or longer to determine the turning points

Calibration/Maintenance:

Follow the calibration instructions prior to every test and modify the running distance according to the table provided.

Test should be conducted on the same surface (ideally flat, non-slip) and in the same environment (ideally in climate controlled area) consistently, to ensure accurate comparisons between testing sessions.

Methodology:

Follow the audio directions for the correct protocol.

- Mark out two lines, 20m apart on a non-slip surface – preferably an indoor court surface.
- Check that the athlete has good footwear and that the surface/footwear is not excessively slick.
- The test starts with a countdown beep. The athlete runs along the 20m track and gets to the line in synchrony with the beep. The athlete then turns and runs back, getting back to the start line in synchrony with the next beep. The beeps get closer together as the test progresses, requiring the athlete to run faster. The test is a maximal test and the athlete is encouraged to run in time with the beeps for as long as possible.
- When the athlete can no longer keep in time with the beep and falls behind the beep by more than 1 meter, a verbal warning is given. If they do not make it back in time with the beep on the next lap, the athlete is asked to stop and the score for the stage/level is recorded. The score is the last level that the athlete successfully achieved in time with the beep.
- The athlete may miss the beep multiple times as long as they are back to the opposite line on the next beep. **Missing two consecutive beeps ends the test.**
- It is important that the **athletes run in time with the beep and do not run ahead of it.** This will cause additional fatigue.

Specific Warm-up:

- Athlete should perform 5-10 shuttles of the first level in order to gain familiarity with the procedure and timing of the MP3 audio.

Scoring:

- Record the shuttle level achieved and convert into the associated VO₂ measure using the table included.

Recovery:

- Allow for a 10-15 minute recovery after the 20m Shuttle before beginning the next assessment.

2. Standing Long Jump

3. Standing Triple Jump

(Coaches may use discretion for completing only SLJ or also STJ with younger athletes)

Rationale for Inclusion:

Test lower extremity power and coordination utilizing a simple, safe, and common movement pattern (14). The standing triple jump is included to assess strength-speed, agility, balance, and skill (9, 10, 14-16).

Equipment:

A tape measure or other measuring device as well as a safe jumping and landing surface of approximately 10m.

Standing Long Jump Protocol:

- Start by taping or otherwise securing a measuring tape or similar measuring device to the ground for ease of testing.
- Stand with the feet under the hips and **toes** at 0cm. Hands can be in a self-selected position.
- Jump as far forward as possible.
- Mark the jump distance at the **heels** of the landing position. If the feet land staggered, measure distance at the heel that traveled the shorter distance. Only measure a repetition that displays a controlled landing (no additional step or fall forward or backward).
- Athletes get two trials, with both trials recorded. The mean of the two trials is calculated and used for further analyses. (Three trials can be performed if necessary)

Scoring:

- **The mean of the two (or three)** jumps will be calculated and recorded to the nearest centimeter (example 267cm).

Warm-up:

This test has a potential for injury and thereby requires a thorough and focused warm-up. Athletes should perform the SkillsQuest-Fitness general warm-up or approximately 5-10 minutes of vigorous exercise including running, skipping, hopping, arm and leg swings and so forth. Pre-test trials should be encouraged with each athlete performing from one to three practice jumps of increasing intensity (for example practice attempts at 50%, 75% and 90% of maximal effort).

Standing Triple Jump Protocol:

- Start by taping or otherwise securing a tape measure or similar measuring device to the ground for ease of testing.
- Stand with the feet under the hips and **toes** at 0cm. Hands can be in a self-selected position
- Jump as far forward as possible.
- As soon as the feet simultaneously land, rebound straight into a second long jump, followed immediately by a third, sticking the final landing without moving the feet.
- Mark the jump distance at the **heels** of the landing position. Only measure a repetition that displays a controlled landing (no additional step or fall forward or backward)
- Athletes get two trials, with both trials recorded. The mean of the two trials is calculated and used for further analyses. (Three trials can be performed if necessary)

Scoring:

- **The mean of the two (or three)** jumps will be calculated and recorded to the nearest centimeter (example 867cm).

4. 20m Sprint

Rationale for Inclusion:

The 20m sprint test is an assessment of the athlete's speed.

Equipment:

Flat non-slip surface, recommended minimum 30m long. Use the same surface from test to test if possible. (This test should be measured by laser timing.)

- Tape measure 20m or longer
- Electronic/beam timing gates
- Marker, chalk, or tape to clearly mark the start & end points

Protocol:

- Check that the athlete has good footwear and that the surface/footwear is not excessively slick.
- Ensure the athlete has fully warmed up including practice attempts at approximately 50% and 75% of maximal effort, or 1-2, 5-10 yard efforts.
- Mark out two lines, 20m apart on a non-slip surface – preferably an indoor court, track, or turf surface, starting close but not against one wall (minimum 2m from the wall for a start position).
- Mark an additional line 100cm (1m) before the 20m start line (this will ensure the timing gate light beam isn't broken by mistake)
- Align electronic timing gates at the 20m start and end lines at a height of at least 1m.
- With a staggered stance where the front toe is on the 100cm (1m) line (before the 20m start line) when ready, the athlete accelerates as fast as he or she can through the timing gates (remember to tell the athlete to continue sprinting all the way through the finish line).
- The test is completed when the athlete breaks both beams sequentially.
- Athletes will perform two trials and both will be recorded. The mean of the two trials is calculated and used for further analyses (Three trials can be performed if necessary).

Scoring:

- The mean of the two (or three) sprints will be calculated and recorded to the nearest hundredth of a second (example 3.41s).

5. Strict Tempo Pull-Up/Bar Hang

Rationale for Inclusion:

Assessment of upper body coordination and bodyweight management in the context of arm and back pulling strength in addition to torso and lower extremity control.

Equipment:

- A pull-up bar high enough for the tallest athletes to hang from without touching the ground with their feet pulled behind them.
- Push-up [audio file](#) (or) Audible Metronome set to 40 BPM
- Speakers to play the [audio file](#)

Strict Pull-Up Protocol:

- Grasp the bar just outside of shoulder width with an overhand grip.
- Begin test from a dead hang – body motionless, arms completely extended, and shoulders, hips, knees and ankles in a line.
- On the first “Up” Command (or **first beep with a metronome**) keeping the shoulders, hips, knees and ankles in line, pull the body up until the height of the chin exceeds the height of the bar.
- Lower the body down to full extension between each rep.
- Begin next pull-up on the next “Up” command (or **every other beep with a metronome**).
- This tempo requires that one correct pull-up be performed every 3 seconds.
- Athlete may lower at self-directed pace, as long as next rep is started on “Up” command and completed before the subsequent “Up” command.
- A “No-Rep” will be given if:
 - The athlete cannot complete the pull-up(s) on tempo (1 every 3 seconds).
 - Any break in the shoulder/hip/knee/ankle line occurs.
 - The athlete fails to pull to proper height.
 - The athlete utilizes a swinging motion to complete the rep.
- Athletes will continue performing pull-ups until they can no longer complete reps within the criteria, on tempo, or until they drop from the pull-up bar.

Scoring:

Record the total number of pull-ups completed within the criteria prior to the athlete failing and/or dropping from the bar.

If the athlete cannot perform a single pull-up, he or she will switch to the bar-hang protocol.

Bar-Hang Protocol – Used if the athlete unable to complete 1 strict pull-up:

- Grasp the bar just outside of shoulder width with an overhand grip.
- Using a box, bench, or other means, jump or be assisted to get the chin over the bar.
- Keeping the lower body motionless, hold the chin over the bar for as long as possible.
- The test concludes when the athlete’s chin drops below the bar.

Scoring:

Record the total time the athlete holds his or her chin over the bar.

6. Single Leg Tempo Squat – '15 in 15'

Rationale for Inclusion:

To assess total body coordination and bodyweight management in the context of single leg strength and control.

Equipment:

- Stable box or platform **at least** 40-50cm tall
- Push-up [audio file](#) (or) Audible Metronome set to 40 BPM
- Speakers to play the [audio file](#)

Single Leg Squat Protocol:

- Start by standing on the top of the box or platform. Adjust so that the standing foot is on the side-edge of the box and the opposite foot is hanging off the side of the box.
- The single leg squats are done to a metronome (see [audio file](#)), with one squat completed every three seconds (1.5s on the way down and 1.5s on the way up), and are continued until all 15 reps are completed or the athlete cannot continue at the required pace.
- Begin downward squatting movement on the first 'Down' Command (push-up Audio File) or first metronome "beep".
- Begin upward squatting movement on the 'Up' Command (push-up Audio File) or second metronome "beep".
- Continue squats on tempo for 15 reps.
- Complete each single leg squat reaching a position where **the crease of the hip is level with the knee or below**, while keeping the other foot off the ground and not touching the box..
- Attempt a total of 15 reps in series, on tempo, with each leg while maintaining proper technique.
- The non-squatting foot may not touch the box or the ground at any time. If it does touch, the rep will not count but the test may continue.
- **Only the reps in which the athlete's hip travels below their knee with the box or deeper are counted in an athlete's score. Any missed reps are not counted out of the reps completed.**
- If an athlete misses two consecutive reps in a row due to lack of depth or missing tempo, the test is ended and the number of reps up to that point is recorded.
- If an athlete loses balance during test to the extent that it interrupts the tempo of the squats, the test is ended and the number of reps up to that point is recorded.

Scoring:

- The total number of satisfactory reps will be recorded for each leg out of 15. When the athlete reaches 15 reps, he or she has reached the test maximum and no further reps will be recorded.
- Scoring is recorded as the number of correct repetitions out of fifteen (e.g. If an athlete squats 11 reps correctly and misses 4 throughout the test, his or her score would be 11/15).

Replace existing images with following pictures (potentially brighten if possible?): keep red lines depicting parallel of thigh related to box-top



7. 90 Degree Tempo Push-Up

Rationale for Inclusion:

The push-up test is designed to assess the strength endurance of the athlete's upper body muscles.

Equipment

- Push-up Audio file (or) Audible Metronome set to 40 BPM
- Speakers to play the [audio file](#)
- Flat non-slip surface
- Assistant

Push Up Protocol:

- The athlete starts in the "up" phase of a push-up position, hands under shoulders, arms straight, fingers pointed forward, and legs straight, parallel and slightly apart (2-4 inches) with toes positioned under the heel.
- Keeping the back and knees straight, the athlete then lowers the body until there is a 90-degree angle formed at the elbow, with the upper arms parallel to the floor. The body should remain straight (shoulder, hips and knees aligned) during each rep.
- The push-ups are done to a metronome (see audio file), with one push-up completed every three seconds (1.5s on the way down and 1.5s on the way up), and are continued until the athlete cannot continue at the required pace.
- The athlete should remain in motion during the entire three second interval (no pausing at top or bottom).
- The assistant counts and records the number of correctly completed 90 degree push-ups.
- A "No-Rep" will be given if:
 - Athlete fails to maintain the cadence
 - Athlete fails to maintain a straight line between the shoulders, hips, and heels
 - Athlete fails to achieve a 90-degree angle with the elbows
 - Athlete fails to extend the arms fully
- Athlete is stopped after the second failed rep

Scoring:

The total number of satisfactory reps will be recorded.

8. 60s Repeated Jumps

(Coaches may use discretion for completing either Box or Hurdle jumps with younger athletes)

60s Repeated Lateral Box Jumps

Rationale for Inclusion:

This test is a measure of muscular strength and anaerobic endurance specific to skiing.

Equipment:

- Flat non-slip surface, preferably same surface and conditions from test to test
- Box: 40cm high – 50cm long – 40cm wide
- Box: 30cm high – 50cm long – 40cm wide
- Stopwatch
- Scoring sheet
- A minimum of 2 spotters

Calibration/Maintenance:

Check the integrity of the boxes prior to each test day.

Methodology:

The test is performed as 60 seconds of maximum jumping.

Box Jump Protocol:

- A 30 or 40cm box is chosen, depending on which is closer to the athlete's kneecap height without being above it.
- Two spotters sit on the floor with feet against the box to ensure stability of the box during the test.
- To start, the athlete stands on top of the box, waiting for a count down from 3 to 1.
- The timer shouts "go" and starts the stopwatch simultaneously
- The athlete jumps to one side of the box and on to the ground
The athlete jumps laterally back and forth over the box, landing on the middle of the box and facing the same way for the entire duration of the test.
- Each time the athlete lands on top of the box, one jump is recorded.
- Athletes feet should be facing forward and in line with the box upon landing

Specific Warm-up:

Athlete should perform 2-3 trials at increasing intensity prior to performing this test, doing 3-4 jumps each time.

Scoring:

The number of jumps are counted and recorded for 60 seconds.

60s Repeated Lateral Hurdle Jumps

Rationale for Inclusion:

This test is a measure of muscular strength and anaerobic endurance specific to skiing.

Equipment:

- Flat non-slip surface, preferably same surface and conditions for all tests
- 2 Hurdles: 6x18 in (6 inches high, 18 inches long) (15x45cm)
- Tape measure 1m or longer to determine the width between hurdles

U.S. Ski and Snowboard SkillsQuest-Fitness

- Stopwatch
- Scoring sheet
- A minimum of 2 spotters

Calibration/Maintenance:

- Check the integrity of the hurdles prior to each test day.

Methodology:

- The test is performed as 60 seconds of maximum jumping.

Hurdle Jump Protocol:

- The two 6x18 inch hurdles are placed parallel to one another 24 inches (61cm) apart
- One spotter stands behind each hurdle (two in total) to ensure they remain upright and in place throughout the test.
- To start, the athlete stands in the middle of the hurdles, waiting for a count down from 3 to 1.
- The timer shouts “go” and starts the stopwatch simultaneously.
- The athlete jumps over one hurdle, and then laterally back and forth over both hurdles in each direction.
- The athlete lands in the middle of the hurdles each time and faces the same way for the entire duration of the test.
- Each time the athlete lands in the middle, between the two hurdles, one jump is recorded.
- If the athlete does not clear the hurdle cleanly, the jump does not count.
- If the hurdle is knocked over or moved by the jumper the spotters should replace the hurdle as soon as possible before the athletes attempts to clear again.

Scoring:

- The number of jumps are counted and recorded for 60 seconds.

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Australian Institute of Sport 20m Shuttle-Run VO2 Max

Level	Shuttle	VO2 Max	Level	Shuttle	VO2 Max	Level	Shuttle	VO2 Max	Level	Shuttle	VO2 Max	Level	Shuttle	VO2 Max
4	2	26.8	8	1	40.2	11	1	50.5	14	2	61.1	20	2	81.3
4	3	27.2	8	2	40.5	11	2	50.8	14	4	61.7	20	4	81.3
4	4	27.6	8	3	40.8	11	3	51.1	14	6	62.2	20	6	81.3
4	5	28.0	8	4	41.1	11	4	51.4	14	8	62.7	20	8	81.3
4	6	28.3	8	5	41.5	11	5	52.2	14	10	63.2	20	10	81.3
4	7	28.7	8	6	41.8	11	6	51.9	14	13	64	20	12	81.3
4	8	29.1	8	7	42.1	11	7	52.2	15	2	64.6	20	14	81.3
4	9	29.5	8	8	42.4	11	8	52.5	15	4	65.1	20	16	81.3
5	1	29.9	8	9	42.6	11	9	52.8	15	6	65.6	21	2	81.3
5	2	30.2	8	10	42.8	11	10	53.1	15	8	66.2	21	4	81.3
5	3	30.6	8	11	43.3	11	11	53.4	15	10	66.7	21	6	81.3
5	4	31.0	9	1	43.6	11	12	53.7	15	13	67.5	21	8	81.3
5	5	31.4	9	2	43.9	12	1	54.0	16	2	68	21	10	81.3
5	6	31.8	9	3	44.2	12	2	54.3	16	4	68.5	21	12	81.3
5	7	32.4	9	4	44.5	12	3	54.5	16	6	69	21	14	81.3
5	8	32.7	9	5	44.9	12	4	54.8	16	8	69.5	21	16	81.3
5	9	32.9	9	6	45.2	12	5	55.7	16	10	69.9			
6	1	33.3	9	7	45.5	12	6	55.4	16	12	70.5			
6	2	33.6	9	8	45.8	12	7	55.7	16	14	70.9			
6	3	34.0	9	9	46.3	12	8	56.0	17	2	71.4			
6	4	34.3	9	10	46.6	12	9	56.2	17	4	71.9			
6	5	34.7	9	11	46.8	12	10	56.5	17	6	72.4			
6	6	35.0	10	1	47.1	12	11	56.8	17	8	72.9			
6	7	35.4	10	2	47.4	12	12	57.1	17	10	73.4			
6	8	35.7	10	3	47.7	12	13	57.2	17	12	73.9			
6	9	36.1	10	4	48.0	13	1	57.4	17	14	74.4			
6	10	36.4	10	5	48.4	13	2	57.6	18	2	74.8			
7	1	36.8	10	6	48.8	13	3	57.9	18	4	75.3			
7	2	37.1	10	7	49.0	13	4	58.2	18	6	75.8			
7	3	37.5	10	8	49.3	13	5	58.5	18	8	76.2			
7	4	37.8	10	9	49.8	13	6	58.7	18	10	76.7			
7	5	38.2	10	10	49.8	13	7	59.0	18	12	77.2			
7	6	38.5	10	11	50.2	13	8	59.3	18	15	77.9			
7	7	38.5	10	12	50.4	13	9	59.6	19	2	78.3			
7	8	39.2				13	10	59.8	19	4	78.8			
7	9	39.6				13	11	60.0	19	6	79.2			
7	10	39.9				13	12	60.2	19	8	79.7			
						13	13	60.6	19	10	80.2			
									19	12	80.6			
									19	15	81.3			

Conversion Chart

U.S. Ski and Snowboard SkillsQuest-Fitness

20m Shuttle Run	20m Shuttle Run Points	Long Jump	Long Jump Points	Triple Jump	Triple Jump Points
65	300	330	100	990	100
60	265	300	85	930	88
55	230	270	70	870	76
50	195	240	55	810	64
45	160	210	40	750	52
40	125	180	25	690	40
35	90	150	10	630	28

20m Sprint	20m Sprint Points	Pull Ups	Pull Up Points	SLS - L	SLS - L Points	SLS - R	SLS - R Points
2.8	50	20	50	15	25	15	25
2.9	47.5	15	37.5	14	22.5	14	22.5
3	45	10	25	13	20	13	20
3.1	42.5	5	12.5	12	17.5	12	17.5
3.2	40	4	10	11	15	11	15
3.3	37.5	3	7.5	10	12.5	10	12.5
3.4	35	2	5	5	7.5	5	7.5

Push Ups	Push Up Points	60s Box Jumps	60 Box Jump Points
50	50	90	300
40	40	80	265
30	40	70	230
20	20	60	195
15	15	50	160

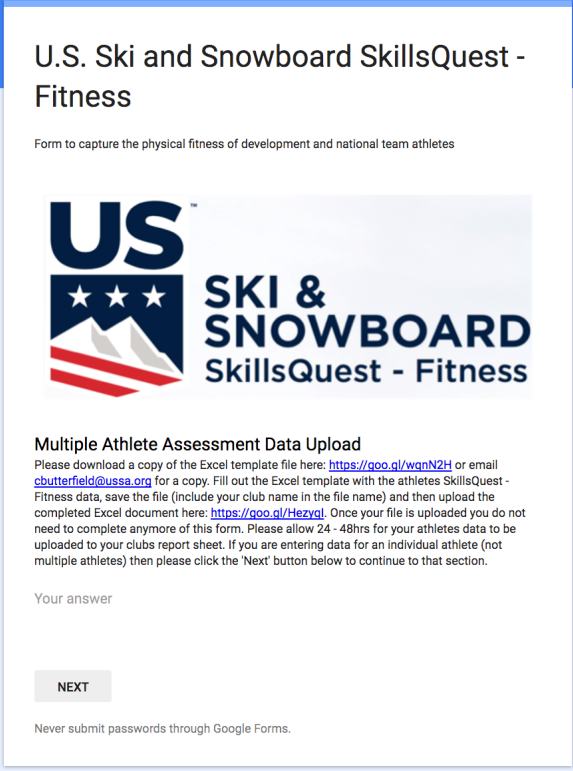
U.S. Ski and Snowboard SkillsQuest-Fitness

10	10	40	125
5	5	30	90

Data Collection and Results


U.S. Ski & Snowboard SkillsQuest-Fitness Dashboard

This is the U.S. Ski and Snowboard SkillsQuest-Fitness Dashboard page (*Figure 1*). From here, you can download the Mass Data Entry form, upload your collected data, or input data for an individual athlete.



U.S. Ski and Snowboard SkillsQuest - Fitness

Form to capture the physical fitness of development and national team athletes



Multiple Athlete Assessment Data Upload

Please download a copy of the Excel template file here: <https://goo.gl/wqnN2H> or email cbutterfeld@ussa.org for a copy. Fill out the Excel template with the athletes SkillsQuest - Fitness data, save the file (include your club name in the file name) and then upload the completed Excel document here: <https://goo.gl/Hezyql>. Once your file is uploaded you do not need to complete anymore of this form. Please allow 24 - 48hrs for your athletes data to be uploaded to your clubs report sheet. If you are entering data for an individual athlete (not multiple athletes) then please click the 'Next' button below to continue to that section.

Your answer

NEXT

Never submit passwords through Google Forms.

(Figure 1)

U.S. Ski and Snowboard SkillsQuest-Fitness

(Figure 3)

Individual Athlete Data Input

By clicking “NEXT” at the bottom of the Dashboard (red arrow), you can input data for an individual athlete (Figure 4). This data will automatically be added to the database once submitted.

**Multiple Athlete Assessment Data Upload**

Please download a copy of the Excel template file here: <https://goo.gl/wqnN2H> or email cbutterfield@ussa.org for a copy. Fill out the Excel template with the athletes SkillsQuest - Fitness data, save the file (include your club name in the file name) and then upload the completed Excel document here: <https://goo.gl/Ht2y9d>. Once your file is uploaded you do not need to complete anymore of this form. Please allow 24 - 48hrs for your athletes data to be uploaded to your clubs report sheet. If you are entering data for an individual athlete (not multiple athletes) then please click the 'Next' button below to continue to that section.

Your answer

NEXT


Never submit passwords through Google Forms.



U.S. Ski and Snowboard SkillsQuest-Fitness

Individual Athlete Entry

Complete if not upload Multiple Athlete Assessment Data via the Excel document



Region *
Choose ▾

Club *
Choose ▾

Altitude of assessment? *
What is the altitude (in meters) of where the assessment is taking place?
Choose ▾

Date of assessment? *
Date
mm/dd/yyyy

Athlete's Name? *
First Name Last Name (if you enter a different name [shortened/nickname etc] from previous tests the report will not graph all the athletes data together)

(Figure 4)

Report Forms

U.S. Ski and Snowboard SkillsQuest-Fitness

When data has been uploaded, you will be given access to multiple report forms to view your athletes' results compared to the U.S. national team and averaged age based norms. These are printable forms.

(Figure 5 – Individual Report Form)

SkillsQuest Fitness - Female Report																
US SKI & SNOWBOARD SkillsQuest - Fitness														US SKI & SNOWBOARD SkillsQuest - Fitness		
Name: <input type="text"/>				Date Start: <input type="text"/>				Date End: <input type="text"/>								
Age Compare: <input type="text"/>				Overall Points Total: <input type="text"/>				Overall Points Gender & Age Group Rank %: <input type="text"/>				Overall Points All Time Women's Rank (not age specific): <input type="text"/>				
<small>** Controls the "Age %" athletes are compared too**</small>				<small>Will only populate if all tests completed</small>				<small>Will only populate if all tests completed</small>				<small>Will only populate if all tests completed</small>				
Date	20 Shuttle Run (Est. VO2max)				Standing Long Jump (cm)				Triple Jump (cm)				20m Sprint (Seconds)			
	You	Altitude Adjusted VO2max*	Age Group Rank %**	USST Avg***	You	Age Group Rank %	Long Jump Points	USST Avg	You	Age Group Rank %	Triple Jump Points	USST Avg	You	Age Group Rank %	20m Sprint Points	USST Avg
				50.4				226				699				3.36
Date	Strict Pull Up (#)				Bar Hang (Seconds)				Single Leg Squat - Left (#)				Single Leg Squat - Right (#)			
	You	Age Group Rank %	Strict Pull Up Points	USST Avg	You	Age Group Rank %	Bar Hang Points	USST Avg	You	Age Group Rank %	SLS - Left Points	USST Avg	You	Age Group Rank %	SLS - Right Points	USST Avg
				7			Not Scored				15					15
Date	90 Degree Push Up (#)				Hurdle Jump (#)				60s Box Jumps (#)				Date	Historical Overall Score		
	You	Age Group Rank %	Push Up Points	USST Avg	You	Age Group Rank %	Hurdle Jump Points	USST Avg	You	Age Group Rank %	Box Jumps Points	USST Avg				
				25			Not Scored				63					
<p>*Altitude adjustments based on Wehrli & Hallén (2006) research that showed a linear decrease of ~3.15% in VO2max for each 500m of altitude</p> <p>**20m Shuttle Run Age Group % and Points based on altitude adjusted VO2max scores</p> <p>***USST Avg for 20m Shuttle Run VO2max scores adjusted for altitude</p> <p>Eur J Appl Physiol. 2006 Mar;96(4):404-12</p>																

Contact Information

In order to access the links to download the necessary sheets and upload data or for any questions, please email Calin Butterfield, U.S. Ski & Snowboard High Performance Coordinator. Please allow for 48 to 72 hours for responses to inquiries, questions and concerns about SkillsQuest-Fitness.

calin.butterfield@usskiandsnowboard.org

Thank you for your participation and commitment!

