Professional Ski Instructors of America

ROCKY MOUNTAIN

American Association of Snowboard Instructors

Cross Country Level 3

Certification Workbook Edited July 2019

Name:
E-Mail address:
Cell phone (optional):
Ski School /Club:

Welcome!

This Certification workbook is designed to help you develop technical knowledge, teaching performance, and skiing ability on your path to become a Level 3 Certified Cross-Country Instructor. This workbook is divided into two parts:

Part 1 - This section is designed to help you to develop your understanding and demonstrate your technical, and teaching knowledge.

Please answer all of your questions in the workbook to the best of your knowledge before attending a Level 3 prep clinic. During the prep clinic, we will be going over any questions you may have, as well as reviewing the answers to the workbook. You will need to hand in this completed workbook on the first day of your exam.

Part 2-Movement Analysis (MA) Model-This section will cover the Rocky Mountain MA model/format to be used as a tool while doing MA during Prep clinics and exams. This section will first explain the MA model, and then it will give you practice doing MA during a teaching/learning cycle scenario.

Booklets: At the pre-clinic and/or exam you will be issued a user-friendly on hill version of the level 3 scorecard (https://www.psia-rm.org/education/cross-country/)

called a booklet.These booklets are copies of the exam scorecards used by the examiners at the certification.

In these Booklets you will write developmental suggestions for each item on the scorecards based on verbal comments from the Cross-Country Education Staff Members during the prep clinic and/or during the Certification Event. XC Education Staff Members may review your written comments as well.

You should be able to perform each of the skiing maneuvers listed on the Skiing section of the level 3 scorecard before coming to the Prep clinic or certification. The Level 3 prep clinic is designed to help you refine the skills and maneuvers that you already possess to meet the Level 3 Cross Country Ski Instructor standards. To obtain Level 3 certification, a level 3 instructor

- skis both classic and skate at an expert level
- is able to effectively coach advanced students
- is verified by the Cross-Country Education Staff at the Level 3 standard in Skiing, Technical Knowledge and Teaching.

Note: Please remember the Learner's Responsibility Code: ***I am responsible for my own learning!*** That means that you are expected to take responsibility for your own learning, Make sure you learn what you need to learn, ask questions to get the answers you need, and use this Workbook to track your learning and what you need to work on.

Useful references include; the *PSIA Cross Country Technical Manual*, Snowsports Teaching manual, *PSIA-RM XC Guidebook*, and PSIA-RM web pages (www.psia-rm.org), *The Complete Encyclopedia of Skiing (Bob Barnes)* and your fellow instructors. *The Master Skier* magazine and www.fasterskier.com

provide articles and discussions on the latest racing techniques and are of special interest to advanced skiers. Be an active learner!

Part 1:

Technical Knowledge:

1.In your own words explain each of the fundamental movements from the technical model.

2. What, in your opinion, are key elements of Fundamental Body Position for cross country skiing?

3. What is the difference between the “real” and “ideal” description of a skier?

4. What are the 4 XC skiing Fundamentals?

Skiing

1. What are some Fundamental Movements (from the Sports Performance Pyramid) that you are working on in your own skiing?

2. How can you improve your one-ski balance with each stride/skate?

3. What aspects of fundamental body position do you find to be consistently important in cross country skiing?

4. In your opinion what distinguishes the classic skiing of a Level 3 XC instructor from that of a Level 2 XC instructor? Are you skiing at the Level 2 or Level 3 standard? (Please refer to the XC National certification Standards for this question). Explain your answer.

5. What fundamental movements do you use to turn your skis?

6. Describe the fundamental movements of the hip, knee and ankle joints during push-off.

7. What is the difference between a skill/ phase and a movement?

8. What is the timing difference between V1 and V2 Alternate skating?

9. Why is it important to engage abdominal muscles first in poling and how could you show this to your student?

Equipment:

1. How do you apply klister to a ski? How do you get if off?

2.Describe layering harder over softer kick waxes and softer over harder kick waxes. When would you use these waxing techniques?

3. Do you recommend wax-able or pattern-based skis for your advanced classic students? In terms that your client can understand, explain your answer, keeping their goals in mind.

4. How would you help a client get fitted for a pair of higher performance waxable skis? Please include how you might help them find their wax pocket.

5. When (ie., what snow types, temps, etc.) would you use finer vs courser structure on a ski base? Describe how, when, and why you would use it.

Teaching :

1. How do you incorporate the skiers' Responsibility Code/safety awareness to keep this topic fresh and creative in your lesson (besides telling them about it).

2. When do you use each of the primary teaching styles in your lessons .

a.

b.

c.

d.

e.

3. Give 2 exercises/ drills that will help an advanced skier to improve :

Weight transfer in the various skating techniques

1.

2.

Push-off in diagonal stride on a steep hill.

1.

2.

Glide in skating.

1.

2.

4. Give 2 exercises/drills that improve a skier's hips coming forward in the glide/weight transfer phase of Double Pole?

5. An advanced skiing student asks you to teach him how to do parrerall turns to negotiate corners on Nordic trails. He already uses wedge turns. Describe your approach and a progression for teaching Basic Parallel turns on Cross Country skis.

6. Explain the difference between teaching and coaching.

Part 2

Movement Analysis (MA) Model

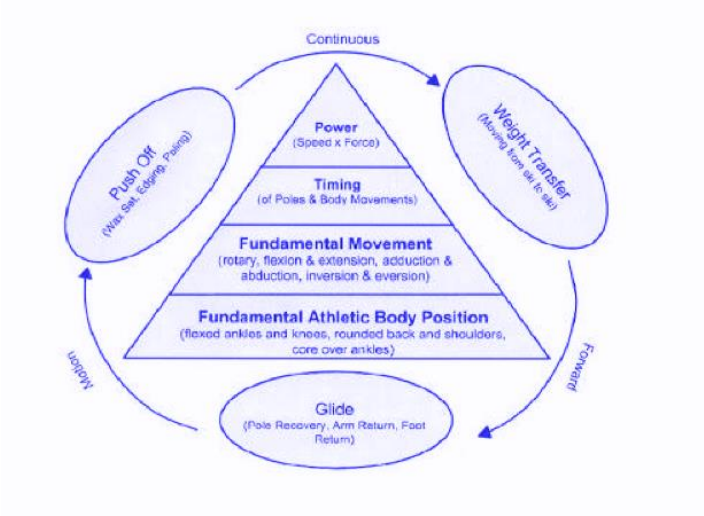
The next section will cover Movement Analysis, both the fundamentals of MA as well as the PSIA-RM MA format that candidates will be asked to use during certifications.

To be able to perform MA you must understand and be able to apply the following:

- The PSIA XC Technical Model
- The PSIA XC skills: Push-off, Weight Transfer, and Glide
- The National Cross Country Certification Skiing Standards Classic and Skate

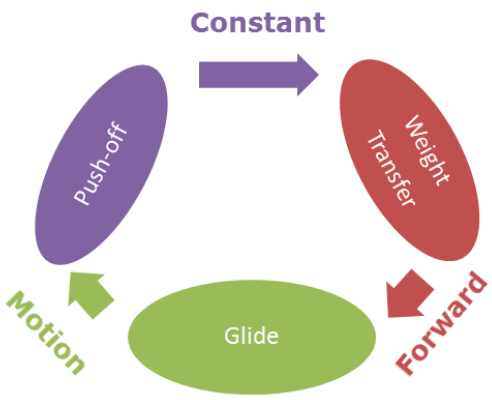
Below are the Basics of the XC Technical Model and XC skills as well as the XC National Skiing Certification Standards for your reference. (For more details on the Technical Model and Skills, please refer to the XC Technical Manual.)

The PSIA XC Technical Model



The graphic above represents the PSIA XC Technical Model. At the center of the model is the Sports Performance Pyramid, a performance model for all sports that highlights the essential elements of body position, movements, timing, and power. A coach, instructor or athlete can learn or teach any sport by breaking down the sport into movements, the coordination of those movements, and applying speed and force to those movements. The three cross country skills of push-off, weight transfer, and glide surround the pyramid, each of which have subskills (noted in parenthesis within the diagram) The circular connection and blending of the three skills embodies the desired outcome of efficient skiing: continuous forward motion

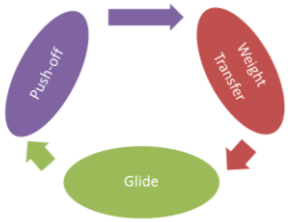
XC Skills



The Cross Country Skills surround the Sports Performance Pyramid to show the interaction of the Pyramid with the Skills of Cross Country Skiing . The Sports Performance Pyramid may be applied to any of the three Cross Country Skills in order to understand, teach and analyze that skill. The three skills (represented in the three ovals) are:

- **Push-off,** referring to using the skis and poles to propel the skis and skier forward.
- **Weight transfer,** referring to transferring weight completely from one ski to the other as the skier moves forward in classic and skate skiing. It can also refer to fore-aft weight transfer during double pole.
- **Glide,** referring to controlling pressure between the ski base and the snow to maximize glide while recovering from and preparing for push-off.

National Cross Country Certification Skiing Standards Classic and Skate

	Level I – Beginner/Novice Zone *The candidate is able to…*	**Level II – Intermediate Zone** *The candidate is able to…*	**Level III – Advanced Zone** *The candidate is able to…* 
Fundamental Athletic Body Position for **Push-Off**, **Weight Transfer** and **Glide** 	Ski with a rounded back and athletic stance.	Ski with a rounded back, hips over the base of support, shin and torso angle matching.	Ski with a rounded back, hips in front of, over and behind the base of support depending on the phase, with shin and torso angle matching.*

Highlighted to correspond to the example in the text below.

Classic Skiing Standards

	Level I – Beginner/Novice Zone *The candidate is able to..*	**Level II – Intermediate Zone** *The candidate is able to…*	**Level III – Advanced Zone** *The candidate is able to…*
Push off			
Power	Pole with the arm showing follow through. Demonstrate some flexion and extension in the lower body to set the wax pocket.	Pole with arms and abs showing follow through and pole release. Ski with flexion and extension in the lower and upper body to maintain propulsion.	Pole with arms and abs and lower body showing follow through and pole release. Ski with flexion and extension in upper and lower body to enhance propulsion.
Timing	Engage poles then core muscles.	Engage core muscles and poles simultaneously.	Engage core muscles before poles engage.
Fundamental Movements	Compress the ski with body weight to create grip. Ski with core compression/extension with some control of tipping, hinging,	Compress the ski with flexion and extension to create grip. Ski with core	Compress the ski with two cycles of flexion and extension to create grip. Ski with core

	and twisting.	compression/extension with more control of tipping, hinging & twisting.	compression/extension with minimal tipping, hinging & twisting.
	Level I – Beginner/Novice Zone *The candidate is able to..*	**Level II – Intermediate Zone** **T***he candidate is able to...*	**Level III – Advanced Zone** *The candidate is able to…*
			
Power	Ski at a slow speed and one intensity.	Ski with varying speeds and intensities in some techniques.	Demonstrate mastery of applying power at varying speed and intensities on all terrain and techniques.
Timing	Show some coordination of flexing and extending movements in the arms and lower body.	Show coordinated flexing and extending movements in the legs, core and arms.	Show coordinated flexing and extending in all joints during all techniques when skiing all terrain with minimal inefficiency.
Fundamental Movements	Transfer weight from ski to ski using leg extension, okay to land behind the heel of the gliding foot.	Transfer weight as the feet pass using leg and core extension, okay to land beside the gliding foot.	Transfer weight after the feet pass, using leg extension, core and rear arm extension.
			
Power	Pendulum (swing) the leg forward at least as far as the heel of the gliding foot.	Pendulum (swing) the leg forward (leg drive) for power as seen by glide on flats and slight uphills.	Pendulum (swing) the leg forward for power as seen by uphill glide.
Timing	Coordinated leg and arm recovery movements.	Coordinated leg, arm and hip recovery movements.	Coordinated leg, arm, and hip recovery movements demonstrating continuous motion.

Fundamental Movements	Balance and glide on one ski using ankle flex on green terrain as indicated by the ski tail off the snow.	Balance and glide on one ski using ankle flex, eversion, inversion, leg flexion and extension some of the time on different terrain and at different speeds as indicated by the ski tail off the snow.	Balance and glide on one ski using ankle flex, eversion and inversion, leg and upper body flexion and extension all the time on any terrain as indicated by the ski tail off the snow.*

Skate Skiing Standards

	Level I – Beginner/Novice Zone *The candidate is able to…*	**Level II – Intermediate Zone** *The candidate is able to…*	**Level III – Advanced Zone** *The candidate is able to…*
Push off			
Power	Generate power through leg flexion and extension. Pole with the arms.	Generate power through active leg flexion and extension. Pole with the arms and abs showing follow-through and pole release.	Generate power explosive leg flexion and extension. Pole with core compression, arms and lower body showing follow through and pole release.
Timing	Engage poles then core muscles.	Engage core muscles and pole simultaneously.	Engage core muscles before

	Demonstrate double poles, V1, diagonal skate.	Demonstrate timing of and transitions between all techniques.	poles engage. Demonstrate timing for all techniques at all speeds and transitions with complete efficiency.
Fundamental Movements	Adequately edge the ski with extension and abduction. Ski with core compression/extension with some control of tipping, hinging, and twisting.	Progressively and adequately edge the ski with extension and abduction. Ski with core compression/extension with more control of tipping, hinging & twisting.	Progressively and adequately edge a constantly gliding ski with extension and abduction. Ski with core compression/extension with minimal tipping, hinging &
	Level I – Beginner/Novice Zone *The candidate is able to..*	**Level II – Intermediate Zone** **T***he candidate is able to…*	**Level III – Advanced Zone** *The candidate is able to…*
			
Power	Ski at a slow speed and one intensity.	Ski at varying speeds and intensities in all techniques through intermediate terrain.	Ski at varying speeds and intensities in all techniques in all terrain.
Timing	Show coordination of flexing and extending movements in the arms and lower body.	Show coordinated flexing and extending movements in the legs, core and arms.	Show coordinated flexing and extending in all joints during all techniques when skiing all terrain

			with minimal inefficiency.
Fundamental Movements	Weight transfer achieved through leg extension.	Transfer weight through arm and leg extension.	Transfer weight through arm, leg and upper body extension
			

	Level I – Beginner/Novice Zone *The candidate is able to…*	**Level II – Intermediate Zone** **T***he candidate is able to…*	**Level III – Advanced Zone** *The candidate is able to…*
			
Power	Generate power through leg flexion and extension. Pole with the arms.	Generate power through active leg flexion and extension. Pole with the arms and abs showing follow-through and pole release.	Generate power explosive leg flexion and extension. Pole with core compression, arms and lower body showing follow through and pole release.
Timing	Engage poles then core muscles. Demonstrate double poles, V1, diagonal skate.	Engage core muscles and pole simultaneously. Demonstrate timing of and transitions between all techniques.	Engage core muscles before poles engage. Demonstrate timing for all techniques at all speeds and transitions with complete

			efficiency.
Fundamental Movements	Adequately edge the ski with extension and abduction. Ski with core compression/extension with some control of tipping, hinging, and twisting.	Progressively and adequately edge the ski with extension and abduction. Ski with core compression/extension with more control of tipping, hinging & twisting.	Progressively and adequately edge a constantly gliding ski with extension and abduction. Ski with core compression/extension with minimal tipping, hinging &
	Level I – Beginner/Novice Zone *The candidate is able to..*	**Level II – Intermediate Zone T***he candidate is able to…*	**Level III – Advanced Zone** *The candidate is able to…*
			
Power	Ski at a slow speed and one intensity.	Ski at varying speeds and intensities in all techniques through intermediate terrain.	Ski at varying speeds and intensities in all techniques in all terrain.
Timing	Show coordination of flexing and extending movements in the arms and lower body.	Show coordinated flexing and extending movements in the legs, core and arms.	Show coordinated flexing and extending in all joints during all techniques when skiing all terrain with minimal inefficiency.
Fundamental Movements	Weight transfer achieved through leg extension.	Transfer weight through arm and leg extension.	Transfer weight through arm, leg and upper body extension

Power	Use the projection of the core to accelerate the new glide ski.	Coordinate core projection with arm return to accelerate the new glide ski.	Coordinate the projection of core and hips with arm return to accelerate the new glide ski.
Timing	Coordinated leg and arm recovery movements.	Coordinated leg, arm and hip recovery movements.	Coordinated leg, arm, and hip recovery movements demonstrating continuous motion.
Fundamental Movements	Balance and glide on one ski using eversion and inversion on green terrain.	Balance and glide on one ski using eversion, inversion, leg flexion and extension some of the time on different terrain and different speeds.	Balance and glide on one ski using eversion and inversion, leg and upper body flexion and extension all the time, *demonstrating mastery of balance on all terrain, speeds

*_Highlighted to correspond to the example in yellow on page 39._

How the Movement Analysis Works:

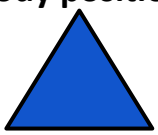
A successful instructor must be skilled in Movement Analysis because students want feedback, and analyzing movement provides the basis for the instructor's ongoing lesson plan A general, but very effective strategy for movement analysis involves 3 basic steps:

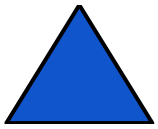
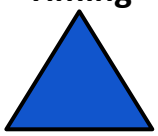
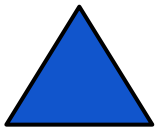
1. Observe and describe "**the real"** (what you actually see in student's skiing)
2. Determine cause and effect relationships
3. Prescribe change toward **"the ideal"** (more effective way of skiing for the student)

Let's take an example and go through the MA process. Below is a picture of a Norwegian racer from back

in the day. We will use the Movement Analysis Grid below to describe his skiing. Since it is just one photograph we will assume that he is in the Glide Phase of the Skiing Cycle.

Movement Analysis Grid

Elements ↓	Push off	Weight Transfer	Glide
Skis and poles 			The tail of the left ski is off snow, the right ski is flat. lots of separation between skis fore and aft. More pressure on the tail of the right ski than the tip. Poles tips are not in the snow;left pole shaft is moved across the front of the body; right pole shaft is behind and parallel to body.
Fundamental Body position 			Hips are behind the gliding heel front ski, ankle extended and knee extended, hip joint is flexed and, spine is straight
Fundamental Movements			left arm swing (adduction) across body. More flexion in hips than ankle and knee. Upper body rotated more than lower body.

			
Timing 			Skier is at the end of the glide phase, just before wax is set and pole planted, when the back ski will drive forward
Power 			Relaxation now after push off from left ski and left arm driving forward and across, setting up for push off of right ski and driving through of left leg and right arm.

*open/extended and closed/flexed can be used interchangeably

By completing the above Movement Analysis Grid, we have isolated and **described** the movements of the skier and the movements of the skis and poles. Now we are ready to

Determine Cause and Effect relationships. Body movements cause the skis and poles to respond in certain ways. The body movements that we observe are the cause and they produce effects in how the skis/poles move. In our example we saw that the skier has the tail of one ski off the ground and that there is quite a bit of ski separation. This indicates that skier has transferred weight to the gliding ski. Looking at the Body Position, we see that the hips are behind the base of support, the skier is closed at the hip joint with a left arm swing across the body, and the spine is straight. Putting these observations together indicates that the skier has achieved weight transfer mostly by a dramatic arm swing and by transferring weight to the heel of the front foot. Comparing with the Ideal of Modern Skiing, the PSIA National Standard for classic skiing at Level lll, the descriptor for Body position in Glide Phase is (refer to page 17),

> *Ski with a rounded back, hips in front of, over, and behind the base of support depending on the phase, with shin and torso angle matching.*

The descriptor for Fundamental Movements in the Glide phase of classic skiing says,

> *Balance and glide on one ski using eversion and inversion, leg and upper body flexion and extension all the time*

Thus, the Real/ Ideal comparison suggests the **Prescription for Change would be (ideal)**:

- Open(extend) the hip joint, and close (flex) the right ankle more. This will move the center of mass over the base of support, which is the right foot on the right ski. Moving

the center of mass over the base of support will cause the ski tail to be lifted slightly higher.

- Swing left arm forward rather than across helping the center of mass to move in front of the base of support The pole shaft would now be parallel to the torso.

Now the instructor can prioritize movements to be changed and develop exercises which can help meet that goal.

In this example we used the PSIA National Certification Standards of Cross Country skiing as guidelines for identifying effective skiing. We described movements in terms of a specific body part and a specific skill in the Cross Country Skiing Cycle, in this case Glide. The example is offered to show step by step how to do Movement Analysis for instructors. More proficient instructors will be able to address any level of the pyramid with any phase to compose a complete movement analysis picture.

Now it's your turn to practice the MA model within the application of Teaching/Learning Cycle below.

Please Note: *At the Level 3 exam, the candidate should be able to complete the entire MA grid, focusing on the elements that especially increase the skiing efficiency of the student. Once this description is completed on the MA Grid, the candidate will be asked to determine cause and effect relationships and then the prescription for change.*

You will be writing a lesson plan for a 2 hour advanced skate lesson with Larry, using the steps of the Teaching/Learning Cycle listed below. Please develop your lesson through these steps based on your knowledge of Larry and how he skis.

1.**Welcome and Introduce the lesson.** How do you develop Larry's trust? What questions will you ask him to get more information? List the important background information that you learned, as well as why he is taking this lesson.

2.**Assess the student and his movements.**

You can watch a video of Larry skiing at: psia-rm.org> Education> Cross country> Cross Country Movement Analysis Videos > Level 3 skate student-Larry

After watching Larry's video, describe Larry's "real" skiing by completing all of the boxes in the Movement Analysis Grid below.

Movement Analysis Grid-Larry

Elements ↓	Push off	Weight Transfer	Glide
Larry's-Skis and poles 			
Fundamental Body position			
Fundamental Movements			
Timing			
Power			

Level 3 Movement Analysis considers the relationship of all the elements to ski performance in all 3 phases.

3. Determine goals and plan experiences:

A. Determine goals: State below in a cause and effect relationship the most important elements you would like to change in Larry's skiing in all 3 phases.

B. How will these changes cause the skis/poles to move differently/more efficiently?

C. Explain how your cause and effect relationships from above will help Larry reach his goal.

D. Plan experiences**:** Plan the lesson content by filling in the box below. Under Focus choose your lesson objective i.e. Body Position, Movement, Power, Timing and Phase/ Skill.

Focus	**Drill / Explanation / Maneuver**	**Terrain Description**	**Time (i.e. 12 min)**

4. **Create experiences for learning.** How will you present information for Larry's optimum learning?

5. **Guide practice**.

- What will determine your choice of terrain, practice intensity, and practice time?

- **Check for understanding.** How will you know that Larry understands? What questions will you ask?

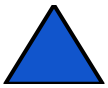
6.**Debrief the Learning Experience.** How will you review the lesson with Larry, as well as get Larry back to ski with you some more?

Level 3 only: For additional MA practice review and analyze Ben in the following classic skier video:psia-rm.org> Education> Cross country> Cross Country Movement Analysis Videos > Level 3 classic student -Ben

Then fill out each box in the Movement Analysis Grid below on Ben.

Movement Analysis Grid-Ben

Elements ↓	Push off	Weight Transfer	Glide
Ben's Skis/poles 			
Fundamental Body position 			
Fundamental Movements 			
Timing 			
Power			



Date revised 7/19

Thank you for participating in the PSIA Level 3 Cross Country certification program. It is our hope that this process has stimulated your thinking and your desire to be the best instructor you can be. Similarly, we are constantly striving to improve our educational programs and materials. Please feel free to contact the addresses below with your feedback and suggestions.

For comments or questions regarding PSIA RM cross country education program contact: Patti Banks, Cross Country Chairperson; patebanks@yahoo.com

- For specific comments or questions regarding this workbook contact XC Education Staff: Dale Drennan; d2skier@sbcglobal.net