

# Movement Analysis Training Worksheet: Level 3

Directions: Watch the video of a skier in the link provided. Complete the tables for the 5 assessment criteria (AC) below based on your analysis of this skier’s movements. Afterward, compare your answers with those written in the answer key.

Reference Material: Alpine Technical Manual, National Standards, Teaching Snowsports Manual

Level 3 Movement Analysis Criteria

<b>L3 Movement Analysis (MA) Expectations:</b>	<b>Successful candidates consistently demonstrate their ability to: (AC)</b>
<p>A L3 instructor will be able to articulate accurate cause and effect relationships of all the skiing fundamentals through all turn phases, resulting in an effective prescription for change for skiers through the advanced zone.</p>	<ol style="list-style-type: none"> <li>1. Accurately describe detailed ski and body performance relative to the skiing fundamentals in blended relationships in multiple turn phases, and from turn to turn</li> <li>2. Link ski and body performance to describe blended cause and effect relationships</li> <li>3. Evaluate the described performances and compare to more ideal</li> <li>4. Prescribe specific change to effect blending of fundamentals, utilizing DIRT to create a change in desired outcome.</li> <li>5. Evaluate equipment-based cause and effect relationships relative to the student and their objectives in all skier ability zones</li> </ol>

## Alpine Fundamentals

1. Control the relationship of the Center of Mass to the base of support to direct pressure along the length of the skis (Pressure Control Skill--fore-aft).
2. Control pressure from ski to ski and direct pressure toward the outside ski (Pressure Control Skill--foot-to-foot).
3. Control edge angles through a combination of inclination and angulation (Edge Control Skill).
4. Control the skis rotation (turning, pivoting, steering) with leg rotation, separate from the upper body (Rotational Control Skill).
5. Regulate the magnitude of pressure created through ski/snow interaction (Pressure Control Skill--up-and-down).

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Video Link: Skier 1: <https://youtu.be/NyshEcU970M>

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AC 1: *Accurately describe detailed ski and body performance relative to the skiing fundamentals in blended relationships in multiple turn phases, and from turn to turn.*

Instructions: In the box below, describe the body performance and ski performance of the foot to foot pressure control fundamental in all three phases of the turn.

Primary Fundamental	Turn Phase	Body Performance	Ski Performance	Turn to Turn
2. Pressure Control—foot to foot.	Initiation			
	Shaping			
	Finish			

AC 2: Link ski and body performance to describe blended cause and effect relationships.

Instructions Step 1: Describe the body performance and ski performance of edge control as the secondary fundamental in all three phases of the turn.

Secondary Fundamental	Turn Phase	Body Performance (Cause)	Ski Performance (Effect)	Turn to turn
3. Edge Control	Initiation			
	Shaping			
	Finish			

Instructions Step 2: Describe how the primary fundamental body performance and ski performance is affecting the secondary fundamental.

Fundamental(s)	Primary Fundamental Performance (Cause)	Secondary Fundamental Performance (Effect)
2. Pressure control—foot to foot. 3. Edge Control and		

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AC 3: Evaluate the described performances and compare to more ideal.

Intended Outcome	Body Performance:	Ski Performance:	Describe More Ideal Performance
Direct pressure to the outside ski.			

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AC 4: Prescribe specific change to effect blending of fundamentals, utilizing DIRT to create a change in desired outcome.

Fundamental(s)	Body Performance: Prescription for change	Ski Performance:	Desired Outcome
2. Pressure Control—foot to foot.			

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AC 5: Evaluate equipment-based cause and effect relationships relative to the student and their objectives in all skier ability zones.

Here you are observing skies and describing the impact of ski design for a given task or snow condition.

Ski design	Ability Zone	Regarding the primary fundamental, is there an effect from the skis or boots that are promoting possible inefficiencies?	How is body performance compensating for that?	Outcome

# Answer Key

**AC 1:** *Accurately describe detailed ski and body performance relative to the skiing fundamentals in blended relationships in multiple turn phases, and from turn to turn.*

Instructions: In the box below, describe the body performance and ski performance of foot to foot pressure control fundamental in all three phases of the turn.

Primary Fundamental	Turn Phase	Body Performance	Ski Performance	Turn to Turn
2. Pressure Control—foot to foot.	Initiation	Ankles, knees and hips of both legs are slightly extending vertically.	Some pressure is directed towards the new outside ski.	Equivalent in both left and right turns.
	Shaping	Ankles, knees, and hips reach maximum extension at the beginning of the shaping phase. Ankles, knees, and hips then begin to flex equally through the remainder of the shaping phase.	Slightly more pressure is directed towards the outside ski.	Equivalent in both left and right turns.
	Finish	Ankles, knees, and hips flex equally, reaching their maximum flexion prior to the end of this phase.	Slightly more pressure is directed towards the outside ski.	Equivalent in both left and right turns.

AC 2: *Link ski and body performance to describe blended cause and effect relationships.*

Instructions Step 1: Describe the body performance and ski performance of the edge control as the secondary fundamental in all three phases of the turn.

Secondary Fundamental	Turn Phase	Body Performance	Ski Performance	Turn to turn
3. Edge Control	Initiation	He tips from the waist bringing the shoulders and head into the turn while his hips remain over his feet. .	Occasional sequential edge change. Edge angels are changing and remain low.	Sequential edge change seen more on the left turn..
	Shaping	Shoulders remain to the inside of the turn until about the fall line. After the fall line, ankles, knees, and hips start to move to the inside of the turn creating angulation.	Edge angles increase through the shaping phase. The rate of the increase is quickest after the fall line.	Upper body remains inclined on the turn to the left until the fall line. On the right turn the ankles, knees, and hips create angulation slightly before the fall line.
	Finish	Ankles, knees and hips continue to move to the inside of the turn creating more angulation until just before the end of the turn. Then the angulation starts to decrease as the shoulders start to move down the hill.	Highest edge angle is achieved prior to the end of turn. Then both skis begin to flatten.	On the left turn the skis edge angle is increased quicker.

**AC 2:** Link ski and body performance to describe blended cause and effect relationships.

Step 2: Describe how the primary fundamental body performance and ski performance is affecting the secondary fundamental.

Fundamental(s)	Primary Skill Performance (Cause)	Secondary Skill Performance (Effect)
2. Pressure control—foot to foot. 3. Edge Control	The equal extension of his ankles, knees, and hips of both legs moves his CM more vertically, limiting his ability to direct pressure to the outside ski at the turn initiation. This is causing the maximum pressure to the outside ski to be developed in the finish phase of the turn.	Because of the vertical extension the shoulders are being tipped to the inside of the turn at initiation. Maximum edge angle is occurring in the finishing phase of the turn.

**AC 3:** Evaluate the described performances and compare to more ideal.

Intended Outcome	Body Performance:	Ski Performance:	Describe More Ideal Performance
Direct pressure to the outside ski with maximum edge angles and pressure developing in the shaping phase.	Shoulders move into the new turn while the hips remain aligned vertically over the feet. Ankles, knees, and hips of both legs extend the same amount moving the CM in a vertical plane. Angulation from ankles, knees, and hips is not created until after leaving the fall line.	Maximum pressure to the outside ski and highest edge angles are created at the end of the turn. The turn initiation has occasional sequential edge change, relatively low edge angles, and limited pressure to the outside ski.	At the turn initiation, the shoulders and the hips would move into the new turn together while the outside ankle, knee and hip are extending more than the inside ankle, knee, and hip. This will allow for maximum pressure to be directed to the outside ski and highest edge angle to be created during the shaping phase. This would also allow for more ski performance to be used in the first half of the turn.



**AC 4:** *Prescribe specific change to effect blending of fundamentals, utilizing DIRT to create a change in desired outcome.*

Fundamental(s)	Body Performance: Prescription for change	Ski Performance:	Desired Outcome
2. Pressure Control—foot to foot.	Focus on gradually extending ankle, knee, and hip of the outside leg, while gradually flexing inside ankle, knee, and hip. Partner up and standing on the side of the hill, practice lengthening outside leg while shortening inside leg. Have the partner provide support while performing this exercise. Ensure the movement is directional and not lateral. Take this movement into medium radius turns with some speed. Play with DIRT to manipulate turn shape and size.	This will direct more pressure to the outside ski with earlier and higher edge engagement starting at initiation. This will allow for maxim edge angle and pressure to the outside ski during the shaping phase.	Pressure on outside ski increases at initiation of turn, resulting in an earlier bend of the skis and helps shape the rest of the turn.

**AC 5:** *Evaluate equipment-based cause and effect relationships relative to the student and their objectives in all skier ability zones.*

Here you are observing skies and describing the impact of ski design for a given task or snow condition.

Ski design	Ability Zone	Regarding the primary fundamental, is there an effect from the skis or boots that are promoting possible inefficiencies?	How is body performance compensating for that?	Outcome
Slalom-radius skis	advanced	Appropriate equipment for the task (short turns on groomed run). No noticeable boot canting issues.	Lack of forward pressure at initiation of turn and lack of pressure on outside ski at shaping phase of the turn prevents skier from maximizing the ski design to shape the turn.	Turn shape is more steered and skidded. Ski sidecut is not engaged until the finish phase of the turn.