Movement Analysis Training Worksheet: Level 3

Directions: Watch the video of a skier in the link provided. Complete the tables in 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

L3 Movement Analysis (MA) Expectations:	**Successful candidates consistently demonstrate their ability to: (AC)**
● 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.	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. 2. Link ski and body performance to describe blended cause and effect relationships 3. Evaluate the described performances and compare to more ideal 4. Prescribe specific change to effect blending of fundamentals, utilizing DIRT to create a change in desired outcome. 5. Evaluate equipment-based cause and effect relationships relative to the student and their objectives in all skier ability zones

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).

Video Link: Skier 2 (Variable Terrain):
https://www.youtube.com/watch?v=ZyjI3jJBXaY&list=PL3kUc6Las57ILy0ZE47Eig7GhwvXGfxCV&index=6Variable Terrain 7 - PSIA - MA - Movement Analysis

---

Assessment 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 pressure control fore-aft, fundamental in all three phases of the turn.

Primary Fundamental	Turn Phase	Body Performance	Ski Performance	Turn to Turn
1. Pressure Control--fore-aft	Initiation			
	Shaping			
	Finish			

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

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

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

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

Fundamental(s)	Primary Fundamental Performance (Cause)	Secondary Fundamental Performance (Effect)
1.Pressure Control--fore-aft 4. Rotational Control		

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

Intended Outcome	Body Performance:	Ski Performance:	Describe More Ideal Performance
Rotate skis by rotating legs against a stable upper body			

Assessment 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

Assessment 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

Assessment 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 pressure control fore-aft, fundamental in all three phases of the turn.

Primary Fundamental	Turn Phase	Body Performance (Cause)	Ski Performance (Effect)	Turn to turn
1. Pressure Control--fore-aft	Initiation	Ankles stay extended, knees and hips extending to maximum extension by the end of initiation. This results in CM moving towards heels.	Pressure is aft moving towards heels, causing the skis to bend from the tails.	Similar movements and position of the CM in both left and right turns. Variations are caused by inability to control ski performance as snow and terrain change.
	Shaping	Ankles remain extended, hips and knees begin flexing and reach the most flexed position by end of shaping phase. CM moves farther aft of BOS.	Pressure is moving further aft, causing the skis to bend from the tails.	Similar movements and position of the CM in both left and right turns. Variations are caused by inability to control ski performance as snow and terrain change.
	Finish	Ankles remain extended, hips and knees remain in flexed position. CM remains aft of BOS.	Pressure remains aft, causing the skis to bend from the tails.	Similar movements and position of the CM in both left and right turns. Variations are caused by inability to control ski performance as snow and terrain change.

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

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

Secondary Fundamental	Turn Phase	Body Performance	Ski Performance	Turn to Turn
4. Rotational Control	Initiation	Upper body rotates to initiate turn	Outside ski rotates into the turn before inside ski resulting in an up stem.	Shoulders involved in both left and right turns. Variations are caused by inability to control ski performance as snow and terrain change.
	Shaping	Legs catch up with the upper body. Inside leg rotates quicker than the outside leg.	Inside ski catches up with outside ski bring skies to a parallel relationship.	Similar turn to turn. Variations are caused by inability to control ski performance as snow and terrain change.
	Finish	Legs and upper body are square with each other.	Both skis rotate simultaneously keeping a parallel relationship.	Similar turn to turn. Variations are caused by inability to control ski performance as snow and terrain change.

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

Fundamental(s)	Primary Fundamental Performance (Cause)	Secondary Fundamental Performance (Effect)
1.Pressure Control-fore-aft 4. Rotational Control	Because the ankles are extended and the knees over flexed, the CM is behind the feet at the finish of the turn.	The position of the CM limits the skier's ability to rotate the skis from the legs at the initiation of the turn. Therefore he rotates the shoulders to provide a stronger rotary force at initiation.

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

Intended Outcome	Body Performance:	Ski Performance:	Describe More Ideal Performance
CM of over the BOS. Rotate skis by rotating legs against a stable upper body	Because the ankles are extended and the knees and hips are flexing and extending the CM remains aft of his BOS. This aft position limits his ability to turn his legs separate from his upper body. This was seen with the upper body used to initiate the turn and the upper body square with the feet at turn completion.	At initiation, outside ski rotates before inside ski, and inside ski rotation increases during the shaping phase to bring the skis back to parallel. A Z shape turn was seen.	Flexing and extending the ankles to bring the CM over the BOS will allow the skier to learn how to rotate the legs against a stable hip and upper body. This will result in skis remaining parallel through all 3 phases of the turn and create a round turn. It will also allow for greater range of motion to manage changing snow conditions and terrain.

Assessment 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
1.CM over BOS 4. Rotational Control	With skis off, extend the ankle and flex the knees and hips to feel the weight over the heels of the boot. Ask the skier to rotate their legs to feel the limited range of motion. From a centered position, repeat the rotation of the legs and feel the greater range of motion. Next have the skier walk through a turn with their hands on their hips to increase the awareness of upper body versus leg rotation while remaining in a centered stance. Take these movement patterns into turns.	Skis remain parallel through all 3 phases of the turn. A rounder turn shape. Ability to manage pressure along the length of the entire ski.	Ability to control the turn shape and size as conditions and terrain change. This will lead to the ability to manage other fundamentals in a blended fashion to increase accuracy and flow on more terrain.

Assessment 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?
All-Mtn skis appropriate for the crud conditions and terrain.	Advanced	The boots may or may not be causing inefficiencies. Boots that are too soft can cause people to stay aft since they are not getting the necessary forward support. Boots that are too stiff may also make it challenging to get forward. Although it is hard to tell much about his skis from the video, if he is on a rockered ski, that can encourage a centered to aft position.	If the boots are too soft, flexing his ankles may feel insecure causing him to rely on the siffer back part of the boot. If the boots are too stiff, it may be difficult for him to flex his ankles. If he is on a rockered ski, consider working more from a centered position rather than a forward position.