

Movement Analysis

Outcomes of Movement Analysis

The instructor is able to:

- Describe the basic movement patterns in skiers through level 9.
- Determine cause and effect relationships, based on balance, skill blending, tactics, skill deficiencies and proficiencies, equipment and other factors (mental state) related to the phases of a turn in skiers through level 9.
- Prescribe and justify what a student should work on by prioritizing skills and addressing student needs/desires through level 9.
- Develop a lesson plan based on skill development, including exercise lines/tasks, and student profile considerations that target skier's needs and change their performance.

The key to the model at level 3 is that it requires a more in depth knowledge and understanding of sophisticated movement patterns, turning forces, skills applications and options for terrain/snow conditions, tactical and equipment considerations along with student profile concerns that are impeding the students' performance.

Movement Analysis Model

Step 1: Student Profile. Describe who the skier is. "The skier is ..."

- A. What is the relative level of skier in ATS, levels 1-9?
- B. What is the skier's attitude/approach relative to the terrain, snow conditions and current situation?
 - Aggressive
 - Comfortable/Capable
 - Intimidated
 - Clues to mental state of readiness
 - Motivations
 - Needs and Desires (Maslov's Hierarchy of Needs)
- C. Ages and Genders
 - Physical considerations? (i.e. Physiology, physical fitness) men, women kids, seniors, impaired, etc.
 - Mental considerations? (Levels of mental development/knowledge) Blooms Taxonomy of Learning.
- D. What type of turn is being made?
 - Open parallel
 - Dynamic parallel
 - Step turns (divergent, parallel, convergent)

Step 2: Observation and Description. Describe movement patterns and target cause and effect relationships.

Determine and comment on skier's movement patterns, skills application, cause and effect relationships and tactical considerations. Example: Because of _____, the result is _____ .

What is happening:

Fundamentals

- Stance and alignment, hand position, upper body discipline, pole use.
- Balance (Fore, aft and lateral)
- Equipment concerns effecting fundamentals.

Skills

Rotary	Rotation Counter rotation Rotary push off Fulcrum Heel thrust Combinations.
Edging	Inclination Angulation Combinations
Pressure Control	Flexing/Extending movements Foot to foot movements

When it is happening:

What is happening during each phase of the turn?

- Initiation
- Control
- Finish and linkage.

How it is happening:

Bio-Mechanics and Movement Patterns	Body movements used to achieve specific movement patterns and skills applications.
Tactics and Equipment	Tactical decisions, ski equipment design and tuning.
Turn Shape and Flow of Movements	How all of these elements are affecting turn shape and the quality and flow of movements.

Why it is happening:

Attitudes/needs/desires What does the guest want? See step 1.

Step 3: Prescribe what the skier should work on by prioritizing skill needs and addressing student profile considerations.

- Target areas by looking at fundamental sources (causes) of the movement patterns and the results (effect) of those movements, as well as illuminating other peripheral sources (More complex skill use and application combinations, mental/physical considerations, tactics, equipment, etc.).
- What is/are the most essential skills that need to be developed? Why? Secondary skills? Why?
- What are student profile considerations that need to be addressed? Why?

Step 4: Prepare a lesson plan utilizing the previous steps in this model, the concept of skills development and student profile considerations.

- What is the overall goal/outcome of the lesson?
- What is the progression and development of skills?
 - a) Exercise lines
 - b) Drills/tasks
 - c) Terrain selection
 - d) Student profile considerations
- How will you go about delivering the wants/needs package of this guest? See step 1.

ATS Levels

1. Introduction to walking, sliding, slipping.
2. Wedge turns.
3. Linked wedge turns.
4. Wedge Christie I turns.
5. Wedge Christie II turns.
6. Open stance parallel turns.
7. Linked open stance parallel turns.
8. Dynamic parallel turns.
9. Bumps, crud, steep and all advanced terrain skiing.

ATS Learning Model

1. Introduce the learning segment
2. Assess the student.
3. Determine goals and planning objectives.
4. Present the information.
5. Guided practice.
6. Check for understanding.
7. Summarize the learning segment.

Teaching Styles

1. **Command**

The teacher controls lesson. The teacher is the center of attention. The teacher makes all the decisions, and tells student if they are right or wrong.

2. **Task**

Teacher outlines the parameters of a task. Teacher explains and demonstrates the task within the given boundaries. Students are free to execute and practice the task within the given boundaries. Teacher may move about and give feedback or variations of the task depending on the student's individual needs.

3. **Reciprocal**

Teacher establishes pairs. Roles "doer" and "watcher" are clearly defined. Task is explained and demonstrated. The teacher explains boundaries, time frame and evaluation criteria. Students perform and evaluate each other doing the task. Teacher is free to watch and give feedback.

4. **Guided Discover**

Teacher uses a series of questions or experiences to guide students to an answer. Each step builds upon the previous step. Teacher leads the group to make the discovery. There is only one right answer.

5. **Problem Solving**

Teacher poses a problem to the students. Students may work independently or as a team. Teacher sets framework to find an answer to the problem. A time limit and work area are designated. The problem may have more than one solution and the teacher accepts all answers.

Learning Styles

Visual Learners: Learn by watching and imitation.

- Ski good demonstrations that are truly illustrating your point.
- Over exaggeration can destroy the picture of good skiing.
- Target the student's attention to what they should look at, what part of the turn, body, etc.
- Some students visualize the whole picture, some the specific parts. Change focus if needed.
- Let students view from different angles; front, side, back coming and going.
- Use video if available. Guide the students for positive viewing of themselves or role models.

Auditory or Cognitive Learners: These learners need to verbalize and understand skiing.

- Give clear, concise descriptions. Use words or descriptors that make sense to the student.
- Long, drawn out explanations are not necessary. Be precise and get to the point.
- Use metaphors, or words that paint a picture. "It is like a bird walking on egg shells"...
- Give a rationale, a WHY with your descriptions.
- Involve the student. Ask questions; let them be a part of a verbal exchange, not a monologue.

Kinesthetic or Proprioceptive Learners: These learners need to feel their skiing.

- Check your student's equipment. They might not be able to feel things in bad fitting boots.
- Ask students what they are feeling and go from there.
- Be sure to show and describe what to feel for. Integrate the other learning styles.
- If you need to touch the students to position them, etc., ask for permission first.
- Groomed terrain and slower speeds are essential for feelers during initial learning.

Kinesthetic refers to things that act outside the body to create feeling, such as feeling pressure on your leg from the boot.

Proprioceptive refers to feelings within the body, such as tightening or stretching different muscle groups to achieve an end result.

Maslov's Hierarchy of Needs

Physiological needs - the need for food, shelter, and clothing.

Safety and/or security needs - the need for a feeling of well being.

Recognition and/or social needs - the need for recognition and approval.

Self-esteem needs - the need to feel of particular competence and value.

Self-actualization needs - the need for peak experiences that incorporate the student's full potential at all levels.

Skier's Responsibility Code

1. Ski under control and in such a manner that you can stop or avoid other skiers or objects. Excessive speed is dangerous.
2. When skiing downhill or overtaking another skier, you must avoid the skier below you.
3. You must not stop where you obstruct a trail or are not visible from above.
4. When entering a trail or starting downhill, yield to other skiers.
5. All skiers shall use devices to prevent runaway skis.
6. You shall keep off closed trails and posted areas and observe all posted signs.

Generalized Mechanics Based on Stance

Stance	Preparation	Initiation	Control	Finish	Turn Shape
Forward	Stationary platform. Blocking pole plant used to stabilize upper body.	Full body rotation. Rotary push off. Shortening the control phase.	Skis over steered until they find an edge. Edging from knees only. Skis stay under the body. Often use of forward leverage to continue turning at this stage.	Rocking to tail to stop rotation or abstem if center of mass stays forward.	Fish hook shape. Often overturned and no control.
Centered	Moving platform with CM moving toward the new turn. Pole swing guides body through rising stance.	Lower leg rotation with some anticipation. Can use rotation or push off if desired.	Leg steering throughout. Progressive edging, pressure and angulation.	Steering is stopped as body begins to rise toward new turn.	Generally round shapes. Almost any variation is possible, particularly tightening of the arc in the controlling phase.
Back	Platform can be moving. More likely it is stationary with body uphill. Pole timed with the edge set if the turn is countered.	Rotary push off. Counter rotation.	Edging from hip, not knees. Heel thrust to edge. May be inside in the turn.	Edges locked, usually keeping the turn from being finished.	Tighter initiation. Arc opens and turn is not completed.

Bloom's Taxonomy of the Cognitive Domain

Benjamin Bloom developed this system to classify the different levels of cognition students can achieve. Each level builds upon the previous level and leads to more complex thinking skills.

Categories of the Cognitive Domain	Description	General Objectives	Specific Outcomes
Knowledge	Recall - Remembering previously learned material.	Knows common terms and specific facts. Knows methods, procedures and basic concepts.	Student can define terms and identify or label actions. Can select behavior, state or reproduce action.
Comprehension	Translate - grasping the meaning of material. Translation into own words, thoughts and ideas.	Understands principles. Interprets material. Estimates future consequences. Justifies procedures.	Student can explain actions, make estimates and predict outcome. Can paraphrase or generalize what they know about skiing.
Application	Generalize - using learned material in new, concrete situations. Can demonstrate correct procedures in a variety of usages.	Applies concepts in new situations. Constructs charts and graphs. Demonstrates correct usage of methods and procedures.	Student can demonstrate in appropriate ways, make modifications and use material correctly. Can manipulate behavior, relate to situations. Can change and predict behavior and show a variety of uses.
Analysis	Breaking down and discover - breaking down material into component parts so that it may be more easily understood.	Recognizes unstated assumptions. Can make inferences. Can recognize the organizational structure of material.	Student can break down behavior into parts, make diagrams and differentiate relationships. Can select or separate elements and distinguish characteristics.
Synthesis	Compose - putting material together to form a new whole.	Integrates learning from different areas into a plan for solving a problem. Formulates a new way of doing things.	Student can categorize parts into like and unlike elements. Can combine past behaviors to create new ones. Can revise previous action into appropriate action for new situations.
Evaluation	Judge - evaluating the value of material for a given purpose.	Judges logic, consistency and adequacy. Judges value internally (organization) and externally (relevance to purpose).	Student can appraise behavior and conclude its validity. Can compare, contrast and justify behavior. Can interpret and summarize actions, support choices.