Introduction to Avalanche Safety
Introduction to Avalanche Safety

ACKNOWLEDGEMENTS:
The “Introduction to Avalanche Safety” course is the intermediary step between basic avalanche awareness and the Level 1 course as defined by the American Avalanche Associations “U.S. Avalanche Education Progression.” This course can be presented over one or two days. The Lesson Plans within this document presents the course over a one-day time frame.

AIARE received assistance in the development of these materials from the following organizations:

- The Hans Saari Memorial Fund
- The JT Lambert Foundation
- Friends of the Gallatin National Forest Avalanche Center
- The National Avalanche Center

The cooperation between all of these organizations made this project a reality. This is the first version of this program and we look forward to your feedback on how we can make it more effective.

TARGET PARTICIPANT:
This course is meant to target riders frequenting avalanche terrain via lift access from ski areas and easily accessible backcountry trail heads and highway passes. This terrain is also known as “near county,” “slack country” or terrain that sees high local use. These users are typically young, relatively inexperienced and their travel is limited to day trips.

Because course participants may or may not come prepared with avalanche beacons, probes and shovels, travel in avalanche terrain is not recommended for this course. Furthermore, knowingly taking such participants into avalanche terrain may raise liability issues for you, your ski area and/or employer.

GOALS:
- Introduce riders to the risks associated with backcountry travel accessed via lift service and easily accessible roadside trailheads.
• Review the history of avalanche activity in terrain the participant is likely to travel through.
• Introduce and learn basic avalanche safety practices common to backcountry travelers.

LEARNING OUTCOMES:
• Participants learn to identify where in local terrain avalanches have previously occurred and may occur given the right conditions. The terrain is related to avalanche potential and human consequence.
• Participants are made aware of local information resources including avalanche bulletins, avalanche signs, ski area closure signs, and local experts.
• Participants are introduced to the importance of a trip plan when mitigating the risks associated with travel in avalanche terrain. Participants are informed where to take a formal avalanche course that can increase their levels of preparation, planning, and mitigation of the risks associated with avalanches in their local terrain.
• Participants are introduced to “red flags” and “obvious clues” in identifying conditions that contribute to the formation of avalanches.
• Participants are given a demonstration of companion rescue techniques and an introduction to companion rescue equipment.

METHODS:
1) **Outdoor session: Introduce and begin to become familiar with local avalanche terrain. Discuss and identify “red flags” and “obvious clues”.**

Display travel techniques with the guidance of an “expert.”
• While remaining inbounds, in controlled terrain, or avoiding avalanche terrain out of bounds, field groups identify and evaluate the characteristics of avalanche terrain.
• Field groups practice Travel Techniques as appropriate for a variety of terrain choices. Some courses may go “near” but not “in” avalanche terrain.)
• Instructors (or other professionals) perform a “companion rescue demonstration” for the students. The goal is to establish a positive
reference experience for the students to remember for future rescue practice.

2) **Indoor Session: Reinforce what was learned in the field today.**
- Instructor utilizes a *local case study* that is regionally relevant and addresses concerns discussed in this course. Instructors need to develop these case studies themselves.
  - Utilize personal images of local terrain to illustrate points.
- Case Study discussions. This creates interactive time between participants and instructors where many of the learning outcomes can be addressed:
  - Element of risk associated with backcountry travel.
  - Obvious clues and red flags— in this case, clues missed by the party in the case study.
  - Avalanche terrain and travel techniques as well can be touched on through photos of the case study.
  - Avalanche bulletin and other local information sources – discuss availability and interpretation.
  - Rescue equipment can be displayed & discussed.
- Close with the DVD
  - Placement in the course of the DVD is up to the individual instructor. You may find it works better at the start than the finish.

**INSTRUCTOR QUALIFICATIONS:**
- Knowledgeable, entertaining and familiar with area.
- American Avalanche Association suggests Member Affiliate or higher.
Introduction to Avalanche Safety

Pre-course checklist

Pre-course Student Contact
- Set course expectations for the student.
- Appropriate waivers signed by participants.
- Gear requirements.
- Time & location details.
- Other expenses (food, lift tickets, etc...)

Classroom Venue
- Time how long it takes to get from the class to the field and vice versa. Determine your field session access routes and how best to manage these transitions.
- Ensure classroom is set up prior to the course.
- Consider the furniture layout and how it will impact the students’ experience.
- AV set up & check. (Ensure you have backup options in place!)
- Whiteboard / flipchart & markers. (Make sure they aren’t dried up!)

Field Venue
- Risk Management Plan approved by management in place.
- Waivers signed and collected prior to leaving for field.
- Permits & Insurance.
- Terrain Viewing area (NO travel in unmitigated avalanche terrain, travel only inside controlled ski area boundaries – if leaving controlled areas, then do not take students into avalanche terrain!).
- Travel Technique demo terrain.
- Rescue Demo site.
- Set up rescue scenario prior to the course.
Materials
- Student Handouts
  - NAC Brochures
- “Stay Alive” DVD

Risk Management
- Emergency Phone List
- Emergency Response Plan
- Radios
- Communication Plan

Agenda
- Time Plan
- Last-Minute Changes to Agenda
- Activity Plan
## Field Session

<table>
<thead>
<tr>
<th>Time &amp; Session</th>
<th>Learning Outcomes</th>
<th>Activity</th>
<th>?’s</th>
</tr>
</thead>
</table>
| **08:00 to 8:15**  
**Introduction** | • Know Course Goals.  
• Know Day’s plan / logistics.  
• Know who you’re traveling with. | **Take time to start the day in an organized fashion:**  
• Introduce Instructors and Students.  
• Describe the day’s agenda and logistics plan.  
• Disperse into field groups.  
• Fun icebreaker within groups.  
• Instructors double check student gear (including pack, transceiver, shovel, probe, food & water, extra clothes). | |
| **8:15 to 8:30**  
**Gathering Relevant Information** | Understand what information riders should gather prior to travel in backcountry avalanche terrain. | **Q&A session:**  
• Introduce what you as the instructor gathered.  
• Provide a brief synopsis of information in the bulletin.  
• Link to topics that will be discussed later in classroom sessions.  
• This discussion serves as a model for thoughtful investigation of conditions prior to heading out in the field.  
• Consider that you are laying the framework for good habits  
• Make it understood that everyone should gather info prior to heading out – “winging it” is dangerous.  
• Use this session to solicit feedback on how best to target this audience – what media outlets work? | Where at the local ski area is the bulletin posted?  
Is it available by phone? Internet? E-mail? Text msg? Posted at trailheads? Gear shops?  
How are the avalanche professionals in the area most successful in getting this info in your hands? What works for you?  
What info does it take to make you stop and think about leaving the ski area? |
<table>
<thead>
<tr>
<th>Time</th>
<th>Activity</th>
<th>Description</th>
</tr>
</thead>
</table>
| 08:30 to 10:00 | **Local Incident History Tour**                                                                                                                                                                           | 1) Learn the significant avalanche events that have occurred in the area.  
2) Understand the risk of travel in avalanche terrain.  
3) Relate consequence to terrain features.                                                                                       |
|              | **Groups travel from viewpoint to viewpoint – Instructor describe avalanche events that have occurred in the terrain currently being viewed.**        | - Use and define avalanche terminology.  
- Use a “storied” or dramatic approach to describe the event to ensure it comes across as relevant.  
- Describe the development of the conditions that lead up to the event in terms of weather, snowpack and human factors in layperson’s terms.  
- Relate the event to terrain use patterns and discuss how these patterns vary with the conditions.  
- What conditions lead to the formation and release of the avalanche?  
- Where did the avalanche run?  
- Relate to the event consequences.  
- Prior to moving from viewpoint to viewpoint, summarize the event by identifying the red flags.          |
|              |                                                                                                                                             | - Ask the students to relate the event consequences to the terrain in specific terms (e.g. they were carried over that cliff, into those trees, or into that terrain trap (gully)) |
| 10:00 to 11:15 | **Avalanche Terrain**                                                                                                                                                                                   |  
Link the previous discussion of local avalanche events to terrain considerations.                                                                                                                      |  
**Gather students at a new viewpoint looking at avalanche terrain.**  
- Discuss basic red flag values for terrain: slope inclines (relate to ski-ability), discuss basic wind loading patterns and how to identify wind-loaded terrain at a distance  
- Relate aspect and terrain shape to radiation affects                                                                                     |  
What makes this avalanche terrain?  
Why might avalanches run here but not there?  
Where might avalanches run in this terrain?  
How could you get from A to B avoiding avalanche terrain? |
|              |                                                                                                                                             |                                                                                                                                             |
Discuss variation of snow depth as it relates to terrain shape, elevation and aspect.

Anticipate consequences of being caught at various positions in the terrain – link to next session on terrain use.

What lines would be riskier than others? Less consequential than others? Why?

<table>
<thead>
<tr>
<th>Time</th>
<th>Activity</th>
</tr>
</thead>
</table>
| 11:15 to 12:30 | **Near-country Terrain Use**
                   
Discuss and understand basic travel techniques, including common local (site specific) terrain use patterns.

Students should understand how they can improve upon common terrain use practices.

Understand travel techniques as secondary to terrain selection. In other words, travel techniques never trump terrain selection. If the snowpack is unstable, riding it one at a time is not an acceptable risk mitigation technique. If the snowpack is unstable suitable terrain for the conditions must be selected, i.e., lower-angle terrain.

In a safe terrain area (either not in avalanche terrain, or in controlled avalanche terrain) backlink to earlier discussions of local avalanche events and avalanche terrain.

- Compare and contrast frequent terrain use patterns with what might be ideal and how these patterns should vary based upon the conditions.
- Link to the bulletin as the best source to gain an expert opinion on the Danger Rating.
- Following an instructor demonstration, in safe terrain, give each student a leadership role at communicating with and managing a group during the application of travel techniques.
- **Underscore that these techniques are only relevant only if used in the context of appropriate terrain choices and that applying these techniques in the wrong terrain or in the wrong manner can have severe (or fatal) consequences.**

How close do you have to be to maintain communication, line of sight?

What tools can we use to improve our group’s communication? What risks may come with using these tools?

What group size might be ideal, why?

What are some common group management errors? How could we correct these problems?

<table>
<thead>
<tr>
<th>12:30 to 1:00</th>
<th>Lunch</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Time</td>
<td>Activity</td>
</tr>
<tr>
<td>--------------</td>
<td>---------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>1:00 to 2:00</td>
<td><strong>Companion Rescue Demos</strong>&lt;br&gt;Student gains a reference example of what a well executed rescue looks like.&lt;br&gt;Understand the need for focused rescue (not just beacon) training and practice for competency and as a prerequisite to travel in avalanche terrain. &lt;br&gt;&lt;br&gt;<strong>Instructors or helpers demonstrate several complete companion rescues including the following components:</strong>&lt;br&gt;⇒ Assign leadership&lt;br&gt;⇒ Assess safety&lt;br&gt;⇒ Head count&lt;br&gt;⇒ Organize resources and search plan&lt;br&gt;⇒ Systematic search&lt;br&gt;⇒ Clear communication during search&lt;br&gt;⇒ Locate victim – emphasizing teamwork&lt;br&gt;⇒ Excavate victim&lt;br&gt;⇒ Basic First Aid&lt;br&gt;<strong>Goal is to provide a perfect reference example of how to enact a small party avalanche rescue - if this is not practical to do perfectly in the field, substitute this field session with a video in the classroom.</strong></td>
</tr>
<tr>
<td>2:00 to 2:30</td>
<td><strong>Transition to classroom</strong></td>
</tr>
</tbody>
</table>

**Notes:**
# Classroom Sessions

<table>
<thead>
<tr>
<th>Optional Rescue Demo video</th>
<th>Student gains a perfect reference example of what a well-executed rescue looks like</th>
<th>Watch a recently produced video/DVD showing an avalanche rescue (available for free from most transceiver manufacturers and other sources)</th>
</tr>
</thead>
<tbody>
<tr>
<td>02:30 to 3:15 Case Study</td>
<td>Link the terrain factors from a particularly relevant incident described in the morning exercises to the complexities of Human Factors.</td>
<td>Using a local Case Study as the context, introduce risk statistics, risk factors, human factors and reinforce avalanche terminology from the field session. Ideally, this case study is locally relevant w/ terrain that was viewed earlier in the day.</td>
</tr>
</tbody>
</table>
|                            | Understand that emotions often drive the decision making process in the backcountry. | • Reference or describe the incident again as necessary.  
• Use the red flags to introduce the complexity of human factors in the decision making process.  
• In small groups facilitated by their field group leader, discuss the human factor challenges faced leading up to the incident.  
• Encourage the participants to begin each trip with a question of “whats the avalanche danger today?” Encourage them to use this question as way to promote “logical” decision making processes. |
|                            | If we understand this we can begin to interject bits of logic into our decision making process. | What steps might have been implemented to derail this chain of events?  
What factors kept this accident from being worse?  
What is the student’s take home point from the event and how can they apply the lessons to their own decisions? |

| 3:15 to 4:00 Preparing yourself for avalanche terrain | Identify what info needs to be known prior to going into the field:  
• Choosing a capable partner.  
• Gather information on conditions (i.e. Avalanche Danger Rating & Avalanche Bulletin).  
• Identify red flags or obvious clues. | Backlink to how the groups were selected this morning, as well as the complications of human factors with groups you don’t actively choose. Emphasize that a pre-emptive effort to create a cohesive group that communicates well should be a normal step of preparation.  
• Use an approach that hits home for your audience – consider a very brief small group discussion on how to choose appropriate gear for the backcountry. Then ask the students to consider using an even more rigorous process to choose their partners.  
Backlink to the morning introduction about gathering the bulletin and field observations.  
Review the danger scale and local resources.  
• In small groups, have the participants acquire the bulletin and attempt to digest and repeat what they gathered from it. Have instructors verify the components they picked up on and highlight additional critical red flags.  
Review red flags of terrain, weather, snowpack, |
<table>
<thead>
<tr>
<th>4:00-4:30</th>
<th>Making Safe Terrain Choices</th>
<th>Understand that terrain choices directly affect the amount of risk we accept.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Identify simple practical solutions for terrain use. Relate these concepts to specific terrain features from the field session. Consider using photos of the terrain to help illustrate your points.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Wait for better conditions</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Stick to compacted slopes</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Stick to lower angled slopes</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Go with experts who have the experience and training to choose appropriate terrain in a variety of differing conditions – learn how to manage terrain from a mentor (ensure an understanding of the expert halo idea and the risk of “following the leader” vs. being an active group member who learns from others with more experience.)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>4:30 to 5:00</th>
<th>Course Debrief</th>
<th>Know the limitations of this course</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Understand the need for further education for managing the risks of travel in avalanche terrain</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Have a game plan for where to go next</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>What did we accomplish?</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Review the goals of the course and assess how we did.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Can students look at ski lines and see them as avalanche terrain with real consequences?</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>What did we not cover?</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Understand the need for further education, experience and mentoring for safe travel in complex terrain or complex conditions.</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Underscore the risk associated with possessing a little knowledge, especially coupled with motivation and curiosity.</strong> Reiterate that students can’t predict or understand where and how weak layers form, or where and how avalanches will release. Review what we covered today, then provide examples of how those concepts were terrain and situation specific. Provide specific examples – “just because you looked at where avalanches can run, doesn’t mean you can forecast when and where avalanches will run,” … “you looked at a layered snowpack, doesn’t mean you can predict weak layers,” … “travel techniques practiced, but you can’t necessarily travel safely,” … “you’ve watched a well done rescue but you need a lot of practice to do it well.”</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Clearly outline what is not known. Why did we not go in the backcountry today?</strong></td>
</tr>
</tbody>
</table>
**How can you learn more?** Where do we go next, experience, mentoring, knowledge – have students develop a plan for their own education.

- Provide context to what they have learned – the groups did not travel in avalanche terrain because they were not ready to do so.
- To manage risk in avalanche terrain requires preparation (the components of a Level 1):
  1. **Planning:** Acquire, understand and interpret bulletin
  2. **A Decision Making Process:** where one considers the group dynamics/human factors, planning factors, observations to select appropriate terrain, and then using good travel techniques on slope.
  3. Appropriate **Equipment**
  4. **Group** travel and communication
  5. **Companion Rescue** competency
  6. **Gain Experience** by
    - Acquiring more knowledge – take a Level 1 course.
    - Applying the knowledge – w/ experienced, skilled and trained partner.
    - Having decisions modified by an experienced mentor.
    - Keep reading the bulletin on a regular basis.
    - Establish **good habits** – read bulletin, don’t force the timing for a given line, choose good partners, apply travel techniques to reduce your risk, at the end of the day discuss what choices were wise and where did you simply get lucky. **How can you improve on your experience next time?**
    - Apply more caution when conditions are uncertain.
    - Take regular observations.
    - Select partners thoughtfully.
    - Individually, what is your next step, your plan?

| NOTES: |
Introduction to Avalanche Safety

Course Leader Report – Course Materials Feedback
Send this form or other feedback directly to AIARE at info@avtraining.org
211 S. Teller Gunnison, CO 81230

Course Leaders Name:
Location/dates:
Email address:

Number of students attending course:

Lesson Plan comments/suggestions:

DVD comments/suggestions:

Any other comments or suggestions:
Student Self Evaluation Form

Course Date:
Location:

What were the three most important things you learned in this course?

a.

b
c.

Why should we bother to obtain the “avalanche bulletin”?

List some “red flags”:

Course Feedback: We would appreciate your feedback and observations.

In what way was this course beneficial?

At any time during the course did you feel you were in danger?

Do you have any suggestions on how we can improve the course?
<table>
<thead>
<tr>
<th><strong>Time:</strong></th>
<th><strong>Instructor(s):</strong></th>
</tr>
</thead>
</table>

**Back-link:** *(What was discussed prior that will be relevant to this session?)*

**Motivational Strategy:** *(Why does the Participant need to know this?)*

**Learning Outcomes:** *(What do want the Participant to “take home” from this session?)*

<table>
<thead>
<tr>
<th><strong>Instruction:</strong></th>
<th><strong>Activities</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><em>(What will the Instructor do?)</em></td>
<td><em>(What will the Participants do?)</em></td>
</tr>
</tbody>
</table>

**Questions to Check for Understanding** *(Make certain Participants have gotten “the message” by presenting pointed questions they answer and discuss)*

| **Link to Next Lesson:** | *(Next we’ll discuss why)* |

**Sample Lesson Plan**