Avalanches

Why I chose this topic and who would be interested in our research?

We chose this topic because we both like to ski and snowboard and we go every weekend. One day we would like to go backcountry skiing and snowboarding, so we want to become experts in avalanches. People who would be interested in our topic are people that ski or snowboard and are interested in backcountry skiing.

This is also a topic that is important for anyone who travels in the mountains in the winter. These could be people who drive, snowmobile, hike or snowshoe in the mountains, so this knowledge could save you from getting caught in an avalanche.

Problem: How do I know if a mountain face of snow will avalanche?

Not a lot of people know how dangerous avalanches are so if we want to become experts in the topic by learning how avalanches start , we can alert and teach people the dangers of avalanches.

We will be answering the following questions:

- Why do avalanches happen?
- Are there certain conditions that make them occur more often?
- What kind of slopes do avalanches happen on?
- What steps do I take to protect myself and others in the backcountry?

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The **snowpack** is what avalanche experts study to indicate if an avalanche will occur

When travelling in the backcountry people should look for avalanches that may have happened recently, shooting cracks in the snow or something called whumpfing.

Recent avalanches indicate that the snowpack is unstable.

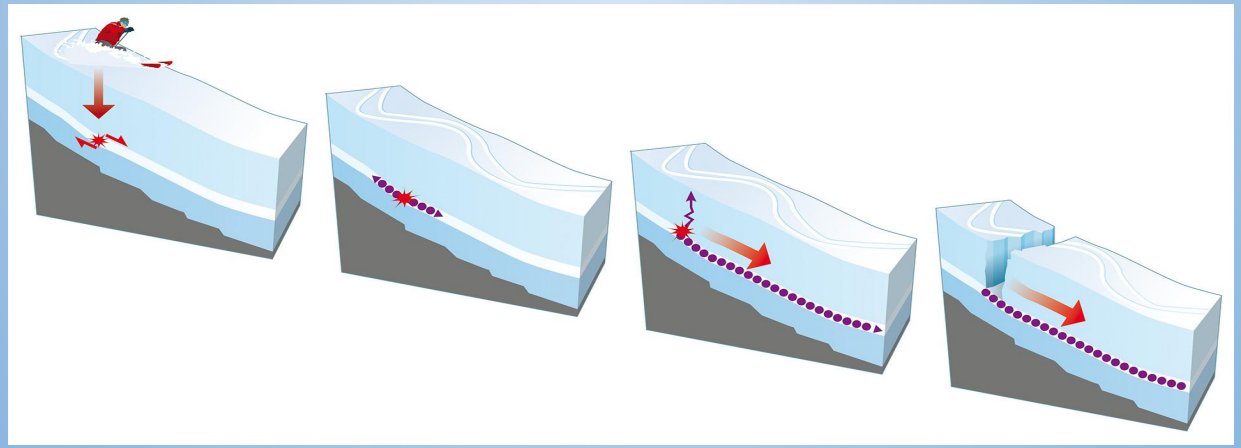
Shooting cracks while walking or skiing in the snow is a sign of a weak layer under the snow.

Whumpfing is a term used by outdoorsmen that while walking in the snow a sound like “whumpf” also is a sign that a weak layer is under the top layer of the snow.

Research Question: Science and safety behind avalanches

Why do avalanches happen?

As you can see in this photo, the little white line on the bottom is the WEAK layer of snow. A weak layer of snow happens when crystals form on the top layer of the snow and a really cold night makes the surface like little marbles. When it snows on top of that weak layer, the new snow if it is heavy enough will crack like the last picture in the photo. This is called an avalanche.

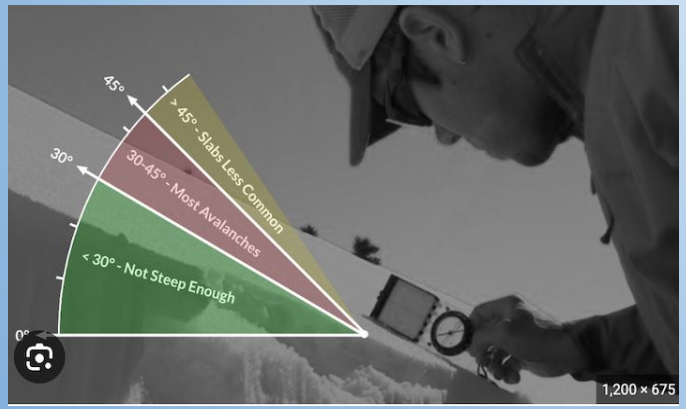


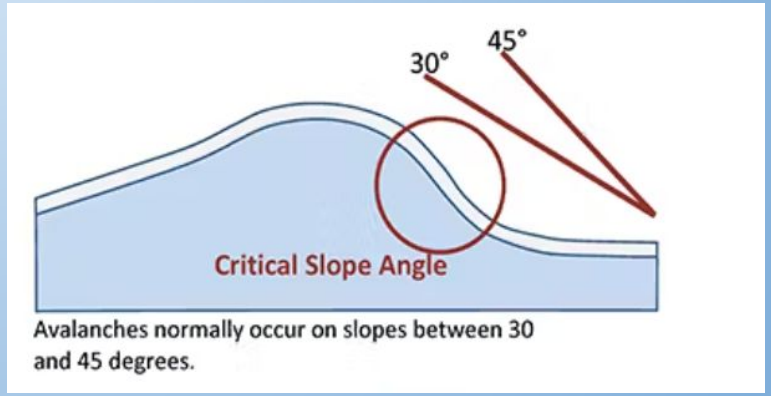
What is avalanche terrain?

Any area that is larger than 10 m by 10m like the size of a tennis court could have a snow pack that is dangerous to a person.

Most avalanches happen on slopes that are 30-45 degrees, about the steepness of a black diamond run at a ski hill.

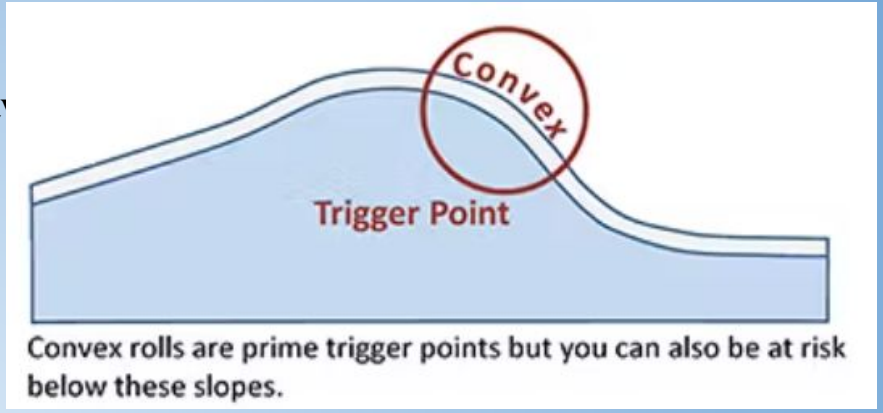
In this photo, the person is using an inclinometer which is an instrument that measure the slope to ground. Most avalanches happen at a 30-45 degree angle. n.





Convex Slopes

Convex roles on a slope are trigger points—places where av
are likely to start. You can also be at risk when you are
directly under these convex rolls.



Convex rolls are prime trigger points but you can also be at risk below these slopes.

Cornices

A cornice avalanche happens when wind hits the top of the mountain and makes a big snow wave. Then pressure pushes the cornice and then makes it break and turns into an avalanche. When falling it may trigger avalanches and can be very dangerous if you are below it.

Slab avalanche

For a slab avalanche to occur, the slab needs to be more sticky than the weak layer and have sufficient tensile strength to help drive a fracture across the slope.
Imagine stacking a textbook on a layer of potato chips, that is the weak layer cracking.

Gullie avalanche

Some avalanche paths run through narrow gullies.

What are the conditions that increase avalanche risk?

Heavy Snowfall

- **If 30 cm of snowfall over 48 hours then avalanche risk increases.**

Wind

- **If there is a consistent wind then the wind can take snow and move it to other slopes which creates a heavy load that could avalanche. Lines on the snow like the picture indicate that.**

Warming

- **If the temperature rises a lot or rain occurs the slopes could avalanche** more.

What are terrain traps?

Terrain traps are features that increase the consequences of being caught in an avalanche. Terrain traps that increase the risk of injury include trees, rocks, cliffs, and open water. Terrain traps that increase burial depth include gullies, flat sections, and crevasses.

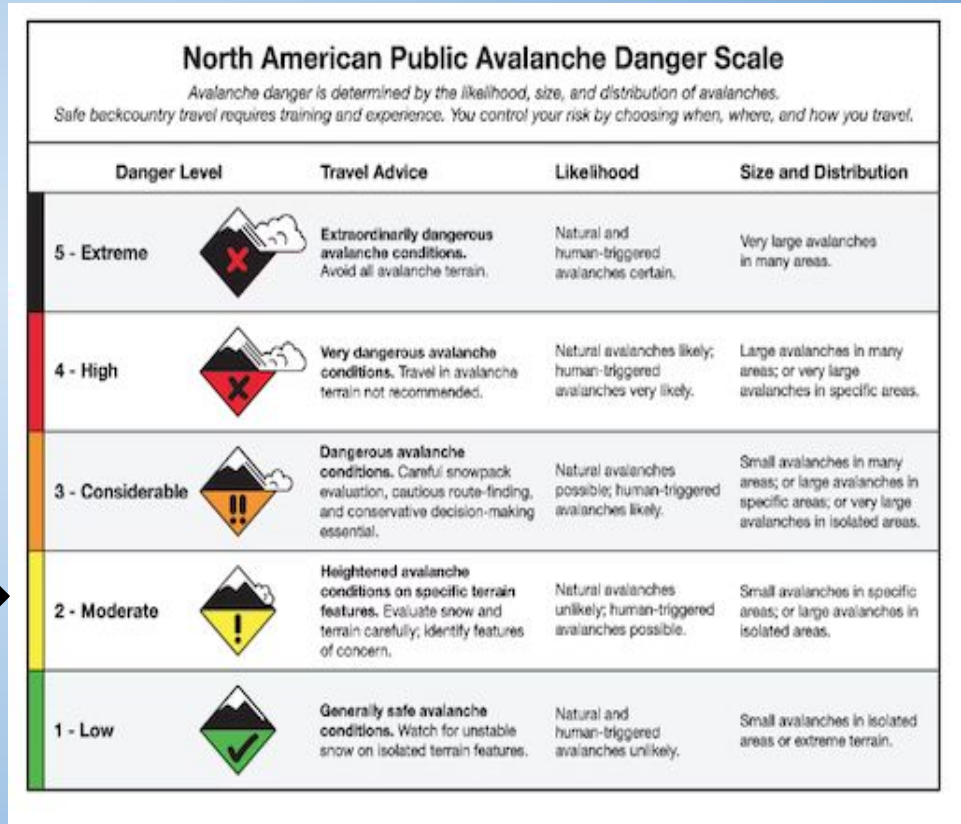
How do I protect myself and my friends in the winter backcountry?

Learn as much as you can about avalanche terrain and safety.

Check the bulletins

Avalanche Canada creates avalanche bulletins that tells backcountry users the snow conditions. This is the first step in any trip planning when adventuring in the mountains.

Take an avalanche course.



North American Public Avalanche Danger Scale

Avalanche danger is determined by the likelihood, size, and distribution of avalanches.
Safe backcountry travel requires training and experience. You control your risk by choosing when, where, and how you travel.

Danger Level	Travel Advice	Likelihood	Size and Distribution
5 - Extreme	**Extraordinarily dangerous avalanche conditions.** Avoid all avalanche terrain.	Natural and human-triggered avalanches certain.	Very large avalanches in many areas.
4 - High	**Very dangerous avalanche conditions.** Travel in avalanche terrain not recommended.	Natural avalanches likely; human-triggered avalanches very likely.	Large avalanches in many areas; or very large avalanches in specific areas.
3 - Considerable	**Dangerous avalanche conditions.** Careful snowpack evaluation, cautious route-finding, and conservative decision-making essential.	Natural avalanches possible; human-triggered avalanches likely.	Small avalanches in many areas; or large avalanches in specific areas; or very large avalanches in isolated areas.
2 - Moderate	**Heightened avalanche conditions on specific terrain features.** Evaluate snow and terrain carefully; identify features of concern.	Natural avalanches unlikely; human-triggered avalanches possible.	Small avalanches in specific areas; or large avalanches in isolated areas.
1 - Low	**Generally safe avalanche conditions.** Watch for unstable snow on isolated terrain features.	Natural and human-triggered avalanches unlikely.	Small avalanches in isolated areas or extreme terrain.

Experts we Interviewed/researched:

Chris Stethem

Chris Stethem is a retired avalanche protection consultant living in Canmore Alberta. A graduate in Geography from Queen's University. Chris spent the 1970s overseeing the avalanche program at Whistler, BC.

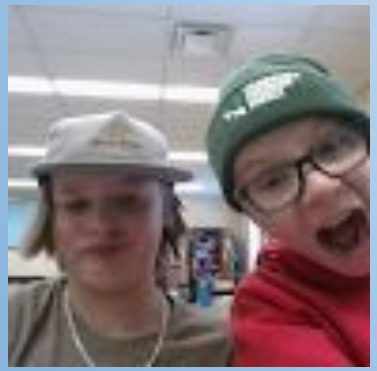
Clair israelson

In 1971, Parks Canada needed to implement avalanche safety programs for railways, highways and ski areas. soon he was in charge of avalanche control and mountain rescue operations in the Lake Louise district of Banff National Park.

Conclusion

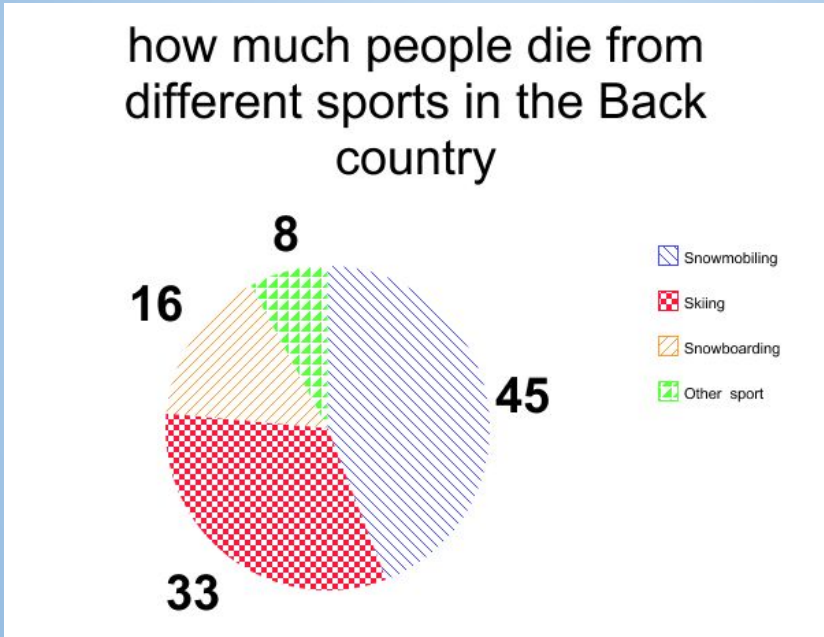
Are conclusion for the science and safety behind avalanches is...

- Safety: For safety we can get people to take avalanche course, research in avalanche conditions and have the right gear like transmitter, avalanche shovel and if you want to have it a parachute backpack.



Percent of avalanche deaths for activities

This is the percent of avalanche deaths for activities



Bibliography: Where are got my information

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https://avalanche.ca/

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