



Glacial environments

Lesson 3: Living with glaciers

Key idea:

Glaciers can bring opportunities and challenges for people who live close by, or who visit them as tourists.

Starter activity:

What is the difference between a hazard and a resource?

These two important concepts are introduced for the first time using the 'Hazards and resources' PowerPoint presentation. Students will come to understand they are different sides of the same coin. When people can use physical geography to help them, we say that we have found a resource. However, when physical geography harms us, we call it a hazard. As a learning outcome, students will begin to grasp at a fundamental level that hazards and resources are relational concepts. They can then discuss as a class whether various geographical features, including glaciers, can be considered hazards or resources.

Main activity:

How have people and ecosystems adapted to a hazardous life in glacial environments?

During this lesson, students will learn about different ways in which societies – as well as polar ecosystems – have adapted to life in an extreme environment. Glaciers and polar climates bring hazards that can threaten life unless precautionary measures are taken. They should also learn that people rely upon glaciers for their income and basic needs in varied ways; and will come to appreciate the importance of glacial meltwater in supplying drinking water to a very large number of the world's poorer people (and perhaps appreciate the problems and conflicts that could arise if this interaction is threatened as supplies begins to dwindle). The resource potential of glaciers for sports tourism is another important theme to touch on – and the threats that climate change brings (with increased melting).

The 'Living with glaciers' PowerPoint introduces students to some of the hazards and challenges faced by people living in glacial environments, and they can then read through the 'Glacial hazards and resources' Word document and complete the activities which encourage them to explore a number of ways in which people make the most of life in glacial environments, using examples from Iceland, Alaska and elsewhere.

Why are ski resorts under threat?

Finally, students should study the importance of skiing to Alpine economies, and the threats that climate change bring to this. The 'Melting mountains' Word document gives information about the threats, including to Scottish ski resorts. Students can then consider how the Alpine tourism industry might diversify or be 'rebranded' to attract tourists to the region if skiing is no longer an option. This activity encourages them to discuss ideas in a small group and to come up with a poster, leaflet or advertising campaign for their alternative Alpine tourism experience, which can then be shared with the rest of the class.

Plenary

Why are they wrapping the Gurschen glacier in plastic?

A good ending to this lesson involves taking a look at Switzerland, where managers of one top ski resort are taking measures to stop their local glacier from melting. Students can be shown photos of the glacier being wrapped in half-inch thick PVC (see link on module plan, plus the final page of the 'Melting mountains' document) and discuss what they think is happening and the pros and cons of this approach.

Further research

Additional downloads that show glacial hazards and resources at SwissEduc website:

www.swisseduc.ch/glaciers/earth_icy_planet/glaciers13-en.html

An interactive and animated display of glacial hazards (including overflowing lakes) and movie at:

www.pbs.org/wgbh/nova/sciencenow/3210/03.html

Report on rock-falls and collapse of the Matterhorn:

<http://observer.guardian.co.uk/international/story/0,6903,1001674,00.html>

A more detailed version of our report on the Gurschen glacier (with images):

www.geographyinthenews/PVCglacier