Landslide lesson plan

In this lesson, students create a model to develop their understanding of landscape conditions and the impact of landslides on the environment.

Students investigate examples of landslide events in the past and the effects of these events on local communities. Students explore earthquake frequency around the world and identify protective actions to prepare for and respond to a landslide.

Australian Curriculum: Science, Geography
UPPER PRIMARY / LOWER SECONDARY

ITEMS
- Teacher lesson plan  - Student assignments
- About landslides     - Real life stories
- Landslides Be prepared - Related links
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Landslide lesson plan

Objectives

Participating in this lesson will enable students to:

- describe the features of a landslide and why landslides occur
- investigate and gather historical evidence to demonstrate the effects of landslides on communities
- identify appropriate protective actions to prepare for and respond to landslide activities.

REQUIRED RESOURCES

- An open box with the front missing, or a clear box
- Dirt
- Model homes, trees, and other objects
- Newspapers or tarpaulin
- ‘My landslide project’ activity sheet

Learning areas

YEAR 6 SCIENCE

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
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<tbody>
<tr>
<td>ACSSU096</td>
<td>Sudden geological changes and extreme weather events can affect Earth’s surface</td>
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<tr>
<td>ACSHE098</td>
<td>Science involves testing predictions by gathering data and using evidence to develop explanations of events and phenomena and reflects historical and cultural contributions</td>
</tr>
<tr>
<td>ACSHE100</td>
<td>Scientific knowledge is used to solve problems and inform personal and community decisions</td>
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YEAR 8 GEOGRAPHY

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
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<tbody>
<tr>
<td>ACH6K042</td>
<td>Causes, impacts and responses to a geomorphological hazard</td>
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<tr>
<td>ACH6S055</td>
<td>Develop geographically significant questions and plan an inquiry</td>
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<tr>
<td>ACH6S056</td>
<td>Evaluate sources for their reliability and usefulness and select, collect and record relevant geographical data and information</td>
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<td>ACH6S057</td>
<td>Represent data in a range of appropriate forms</td>
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<td>ACH6S058</td>
<td>Represent spatial distribution of different types of geographical phenomena</td>
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<td>ACH6S059</td>
<td>Interpret geographical data and other information using qualitative and quantitative methods</td>
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<tr>
<td>ACH6S060</td>
<td>Apply geographical concepts to draw conclusions</td>
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<tr>
<td>ACH6S061</td>
<td>Present findings, arguments and ideas in a range of communication forms selected to suit a particular audience and purpose</td>
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<tr>
<td>ACH6S062</td>
<td>Reflect on their learning to propose individual and collective action in response to a contemporary geographical challenge</td>
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Lesson steps

Get the facts

Students should complete the student activity ‘My landslide project’ and pay particular attention to:

- the effects landslides can have on life and the environment
- how they occur and the damage they cause
- the format and tone of articles, focusing on those written about disasters.

Take time to investigate!

The following activity will allow students to try and replicate a landslide and analyse it. This activity is best performed in groups.

Making a landslide activity

Students will attempt to replicate a landslide using a model. This will be demonstrated to the class and various questions can be answered and discussions generated. This may be difficult for young children to replicate; therefore, they could create the aftermath of the disaster, discussing the causes of this type of landslide, what could be buried under the rubble and a range of other considerations.

You will need to:

- Divide the class into groups.
- Encourage students to brainstorm about their landslide – what will be the cause of their landslide (storms, landfill, erosion)? what will be the effects of the disaster if there were homes or buildings involved? what are possible environmental impacts?
- Allow students time to create their models and test them.
- Ask students to create a series of questions to ask their peers before and after their demonstration (similar to a visual comprehension exercise).
Some materials students will require:

- an open box with the front missing (so the class can see the landslide happening), or a clear box
- dirt
- model homes (e.g. made of cardboard or wood), trees (e.g. made of toothpicks and cellophane) and other objects that add to the surrounding or are suitable for the model.

Tip: You may want to line the floor with newspaper or a tarpaulin in case any dirt or water spills on to the floor.

My landslide project

Provide students with ‘My landslide project’ activity sheet. Students are to complete the following steps in this project, following the instructions on the project sheet:

1. Your task.

2. Create a page or a slideshow.

Students present their project to the class and teacher.
About landslides

The earth’s land moves at least a few centimetres a year. There are times when it can move metres, even kilometres at a time. This is when there is a landslide, avalanche or mudslide.

Landslides are the movement of large amounts of earth such as rock, soil, sand, mud or the combination of any of these.

The earth’s land is dynamic and is always moving. It moves very slowly and is calculated to be moving about a few centimetres each year. This is one reason why we have landslides. Some other factors in causing landslides include:

- volcanoes
- earthquakes
- other vibrations in the earth due to machinery, blasting, construction and mining
- erosion as a result of loss of vegetation, rivers, floods or the ocean’s waves
- avalanches that can be caused by significant changes to the amount of moisture that seeps into the land
- moisture levels can change in the earth from agriculture, the farming and irrigation of fields, or the melting of snow and ice.

All these elements are contributing factors in destabilising the earth. Landslide can occur when land is destabilised, particularly on sloping or mountainous terrain, or land with even a slight gradient.
Landslides vary in size

Landslides can vary in size. They can be as small as the movement of a single boulder in a minor rock fall or as big as thousands of tonnes of earth and debris that fall to the bottom of a slope or a cliff.

How a landslide occurs

The image shows how this movement in the land can cause a landslide.

Effects of landslides

Landslides can happen in different places and have different effects on people, buildings, animals and landscape. Landslides can affect and endanger homes and lives.

Did you know?

- Landslides are quick. In Canada, one landslide caused a riverbank to move 680 m in less than an hour.
- In Australia, the worst recorded landslide was in Tasmania, when 35 houses were destroyed in two adjacent landslides in the 1960s.
Melting ice in the northern hemisphere can cause ice dams that block rivers and force water to burst through shorelines. When the pressure of the water is too strong, sudden outburst floods surge downstream with blocks of ice five to seven metres tall.

In the USA, between 25 and 50 people are killed in landslides each year.

The May 1980 eruption of the Mount St. Helens, USA volcano caused the largest landslide in history – a rock slide debris avalanche large enough to fill 250 million trucks.
Landslides: Be prepared

There are several steps that you can take to ensure that you are in a safe place should a landslide occur.

Here are some steps to take to protect yourself from a landslide:

- Before occupying a home, consult local emergency services about the history of landslides or unstable areas in your community, especially if your home will be on or at the foot of a slope.
- If the trees are tilting down the slope, it is highly likely that the ground is unstable, and you should avoid walking or living in that area.
- In steep areas, look for signs of unstable ground. You can determine this by observing the positioning of the trees, water seepage and breaks in the ground.

If you are inside during a landslide:

Shelter in the safest area of the house or shelter under a strong table and if possible use mattresses for extra protection.
If you are outside during a landslide:

If a landslide seems imminent or occurs, try your best to move out of its path, away from embankments, power lines and poles.

Keep clear of areas that have loose rocks, edges of cliffs that have been weathered or the base of a cliff where loose rocks are likely to fall.

**Building on stable ground**

Local governments have also begun taking steps in ensuring that the land is stable before construction takes place. New technologies are beginning to emerge to promote the stability of rock and sediments to minimise the frequency and severity of a rock fall or landslide.
My landslide project

Causes of landslides

There are many reasons for the cause of a landslide.

Landslides can be caused by:

- significant changes of moisture in the ground
- the quick melting of snow and ice
- a lack of vegetation
- an earthquake or other vibrations
- the land succumbing to the earth’s gravitational pull once the slope or sediments have become unstable.

1 Your task

Select one cause of landslides and research the various worldwide landslides that have occurred in history. Below are some questions to help you research and develop your project. You can present it in a way that suits you.

Present the final project to your class and teacher:
2 Create a page or a slideshow

Select a landslide case and research it:

- Where did this happen (consider supplying a map)?
- What caused the landslide/mudslide/avalanche/rock fall?
- Were there any injuries or fatalities?
- What was the extent of damage?
- What solutions did the community/council/government/country take on to minimise another incident such as this?
- What are some recommendations you could suggest?

You are encouraged to use images and various sources to back up your work. Ensure that you reference them.

You can present this project as a web page or website, a powerpoint presentation, a poster or even a model.

Present your landslide to your class and teacher.
Real life landslide stories

Landslides occur all over the world. They can cause extensive damage to communities and most often, result in fatalities.

Below are just a few incidents of this disaster:

**Java Island, Indonesia**

**DATE:**
December 2007

On 26 December 2007, Java Island was caught in a flash flood as torrential monsoon rains poured. The lack of trees and vegetation resulted in several devastating landslides. Over 100 people died in the landslides.

Continuous rains caused further landslides later that month, leaving people homeless and evacuating villages.
The El Berrinche Landslide, Tegucigalpa, Honduras

**DATE:**
October 1998

Early morning on 29 October 1998, Honduras was struck with Hurricane Mitch, one of the worst hurricanes recorded in history. It brought with it heavy and intense rains over the country and nearby Nicaragua.

The heavy rains resulted in over 200 landslides around the country due to weathered bedrock, resulting in over 9000 deaths. Thousands more were left homeless and at risk due to the risk of disease spreading.

Thredbo, New South Wales, Australia

**DATE:**
July 1997

Late at night on 30 July 1997, Australia’s worst recorded landslide occurred in the New South Wales Alps.

Approximately 1000 tonnes of debris, made up of trees, snow and earth slid down the mountainside increasing in momentum until it collided with various lodges and the Thredbo Ski Village.

All major emergency services worked together on the rescue operation by securing damaged water, gas and oil lines. Rescuers used thermal imaging and seismic devices to locate people trapped below the rubble.

After 55 hours of searching, they were able to find a survivor who had been affected by hypothermia and had endured 3 nights in minus temperatures.

The landslide caused millions of dollars in damages, and claimed 18 lives.
Related links

What is a landslide? (Geoscience Australia)

Indonesian landslide and floods (ABC News)

Pleas for trees as landslide toll rises

Research reports – Landslides (Geoscience Australia)