

# Erosion and Deposition by Gravity

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## CHAPTER

## 1

# Erosion and Deposition by Gravity

## Lesson Objectives

- Identify causes and effects of landslides and mudslides.
- Explain how slump and creep occur.

## Vocabulary

- creep
- landslide
- mass movement
- mudslide
- slump

## Introduction

Gravity is responsible for erosion by flowing water and glaciers. That's because gravity pulls water and ice downhill. These are ways gravity causes erosion indirectly. But gravity also causes erosion directly. Gravity can pull soil, mud, and rocks down cliffs and hillsides. This type of erosion and deposition is called **mass movement**. It may happen suddenly. Or it may occur very slowly, over many years.

## Landslides and Mudslides

The most destructive types of mass movement are landslides and mudslides. Both occur suddenly.

### Landslides

A **landslide** happens when a large amount of soil and rock suddenly falls down a slope because of gravity. You can see an example in **Figure 1.1**. A landslide can be very destructive. It may bury or carry away entire villages.

A landslide is more likely if the soil has become wet from heavy rains. The wet soil becomes slippery and heavy. Earthquakes often trigger landslides. The shaking ground causes soil and rocks to break loose and start sliding. If a landslide flows into a body of water, it may cause a huge wave called a tsunami.



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**FIGURE 1.1**

This 2001 landslide in El Salvador (Central America) was started by an earthquake. Soil and rocks flowed down a hillside and swallowed up houses in the city below.

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## Mudslides

A **mudslide** is the sudden flow of mud down a slope because of gravity. Mudslides occur where the soil is mostly clay. Like landslides, mudslides usually occur when the soil is wet. Wet clay forms very slippery mud that slides easily. You can see an example of a mudslide in **Figure 1.2**.



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**FIGURE 1.2**

Mudslide. A mudslide engulfs whatever is in its path.

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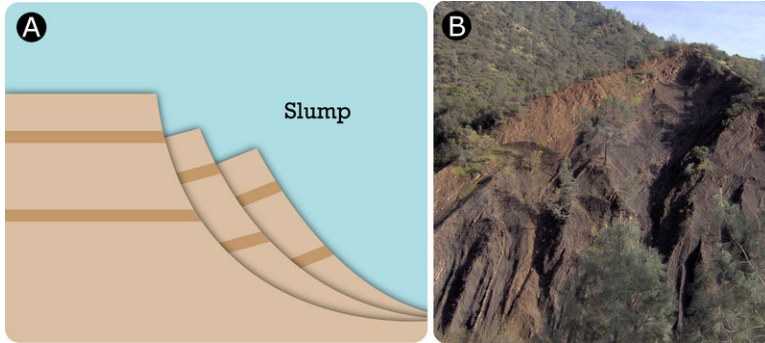
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## Other Types of Mass Movement

Two other types of mass movement are slump and creep. Both may move a lot of soil and rock. However, they usually aren't as destructive as landslides and mudslides.

## Slump

**Slump** is the sudden movement of large blocks of rock and soil down a slope. You can see how it happens in **Figure 1.3**. All the material moves together in big chunks. Slump may be caused by a layer of slippery, wet clay underneath the rock and soil on a hillside. Or it may occur when a river undercuts a slope. Slump leaves behind crescent-shaped scars on the hillside.

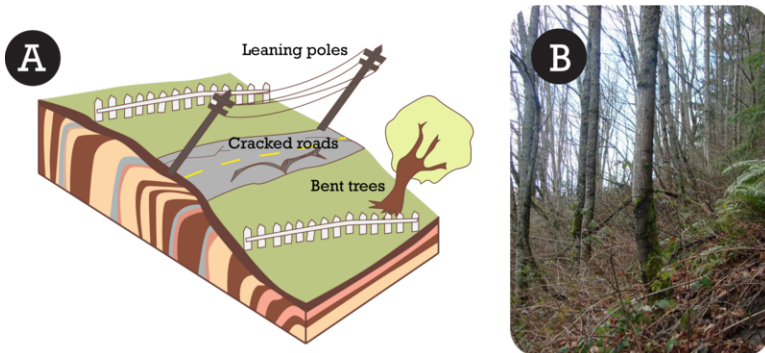


**FIGURE 1.3**

Slump takes place suddenly, like a landslide. How does slump differ from a landslide?

## Creep

**Creep** is the very slow movement of rock and soil down a hillside. Creep occurs so slowly you can't see it happening. You can only see the effects of creep after years of movement. This is illustrated in **Figure 1.4**. The slowly moving ground causes trees, fence posts, and other structures on the surface to tilt downhill.



**FIGURE 1.4**

Creep is seen on a hillside. What evidence shows creep has occurred?

Creep usually takes place where the ground freezes and thaws frequently. Soil and rock particles are lifted up when the ground freezes. When the ground thaws, the particles settle down again. Each time they settle down, they move a tiny bit farther down the slope because of gravity.

## Lesson Summary

- Gravity can pull soil, mud, and rocks down cliffs and hillsides. This is called mass movement. The most destructive types of mass movement are landslides and mudslides. They occur suddenly and without warning. They engulf everything in their path.

- Two other types of mass movement are slump and creep. They usually aren't as destructive as landslides and mudslides. Slump is the sudden movement of large blocks of rock and soil down a slope. Creep is the very slow movement of rock and soil down a slope. It causes trees, fence posts, and other structures to tilt downhill.

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## Lesson Review Questions

### Recall

1. Define mass movement.
2. List four types of mass movement.
3. What is a landslide?
4. What factors increase the chances of landslides occurring?
5. What type of soil forms mudslides?

### Apply Concepts

6. Assume you are riding in a car down a road or street. Suddenly, you see evidence of creep. Describe it.

### Think Critically

7. Relate earthquakes to mass movement.
8. Compare and contrast slump and creep.

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## Points to Consider

Erosion and deposition are always changing Earth's surface.

- Do you think that the same forces that cause erosion today —moving water, wind, ice, and gravity —were also at work in the past?
- How might observations of erosion and deposition today help us understand Earth's history?

Image for Lesson 10.4, Lesson Review Question 8: Flickr:jhoc. <http://www.flickr.com/photos/22400437@N03/2658071097/> . CC BY 2.0.

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## References

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