Objectives

• **Explain** the role of gravity as an agent of erosion and deposition.

• **Explain** how angle of repose is related to mass movement.

• **Describe** four types of rapid mass movement.

• **Describe** three factors that affect creep.
I. Angle of Repose

A. Gravity is an agent of erosion and deposition. It influences the movement of water and ice, and it causes rocks and soil to move downslope.

B. Mass movement is the movement of any material, such as rock, soil, or snow, downslope.
I. Angle of Repose *continued*

C. Material such as rock, soil, or snow moves downhill until the slope becomes stable. The *angle of repose* is the steepest angle at which loose material will not slide downslope.

D. The angle of repose is different for different surface material. Size, weight, shape, and moisture level determine at what angle material will move down-slope.
II. Rapid Mass Movement

A. **Rock falls** happen when loose rocks fall down a steep slope. The rocks can range in size from small fragments to large boulders.

B. Mass movements, like rock falls, happen suddenly and rapidly, and can be very dangerous.
II. Rapid Mass Movement continued

C. Landslides are sudden and rapid movements of a large amount of material downslope.

D. The most common type of landslide is a *slump*. Slumping occurs when a block of land becomes detached and slides downhill.
II. Rapid Mass Movement continued

E. Mudflows are rapid movements of large masses of mud. Mudflows happen when a large amount of water mixes with soil and rock. The water causes the slippery mass of mud to flow rapidly downslope.

F. Mudflows commonly happen in mountainous regions when a long dry season is followed by heavy rains.
II. Rapid Mass Movement continued

G. **Lahars** are mudflows caused by volcanic eruptions or heavy rains on volcanic ash. Lahars can travel at speeds greater than 80 km/h and can be as thick as cement.

H. On volcanoes with snowy peaks, an eruption can suddenly melt a great amount of ice. Water from the ice liquefies the soil and volcanic ash to produce a hot mudflow that rushes downslope.
III. Slow Mass Movement

A. **Creep** is the slow mass movement of material downslope.

B. Although rapid mass movements are visible and dramatic, slow mass movements happen a little at a time. However, slow mass movements occur more frequently, and more material is moved collectively.