III. Monitoring Earthquakes

A. The **Seismograph**: a device that records ground movements caused by seismic waves as they move through Earth.

1. Consists of a heavy weight attached to a frame by a spring or wire; a pen is connected that rests its point on a rotating drum.
2. Seismic waves cause the drum to vibrate, but the weight moves very little; this allows the pen to stay in place and record the drum's vibrations.

B. Measuring Seismic Waves

1. Seismographs make use of a basic principle of physics: Whether it is moving or at rest, every object resists any change to its motion.
2. A seismograph's heavy weight resists motion during a quake, but the rest of the seismograph vibrates when waves arrive.

C. Reading a Seismogram: the record of an earthquake's seismic waves produced by a seismograph

1. The height of the jagged lines drawn on the seismograph's drum is greater for more severe earthquakes or for one that is close to the seismograph

D. Instruments That Monitor Faults

1. Along a fault, geologists may detect a slight rise or fall in the elevation and tilt of the land.
   a. They hypothesize that such changes signal a build up of stress in rock that could eventually lead to an earthquake.
   b. To monitor faults, geologists have developed instruments to measure:
      1) changes in elevation
      2) tilting of the land surface
      3) ground movement along faults

E. Using Seismographic Data: Seismographs and fault monitoring devices provide data used to map faults, detect changes along faults, and develop a method to predict earthquakes.

1. Mapping Faults

a. When seismic waves encounter a fault, the waves are reflected off the fault.
b. Geologists use this data to map the fault's length and depth to determine the earthquake risk for the area.

2. Monitoring Changes Along Faults

a. How rocks move along a fault depends on how much friction there is between the sides of the fault.
b. **friction:** the force that opposes the motion of one surface as it moves across another surface.
   1) When friction is low, the rocks on both sides of the fault slide past without much sticking.
   2) When friction is moderate, the sides of the fault jam together; if they jerk free, small quakes occur.
   3) When friction is high, the rocks lock together and do not move, increasing stress until it is strong enough to overcome the friction, causing a quake.