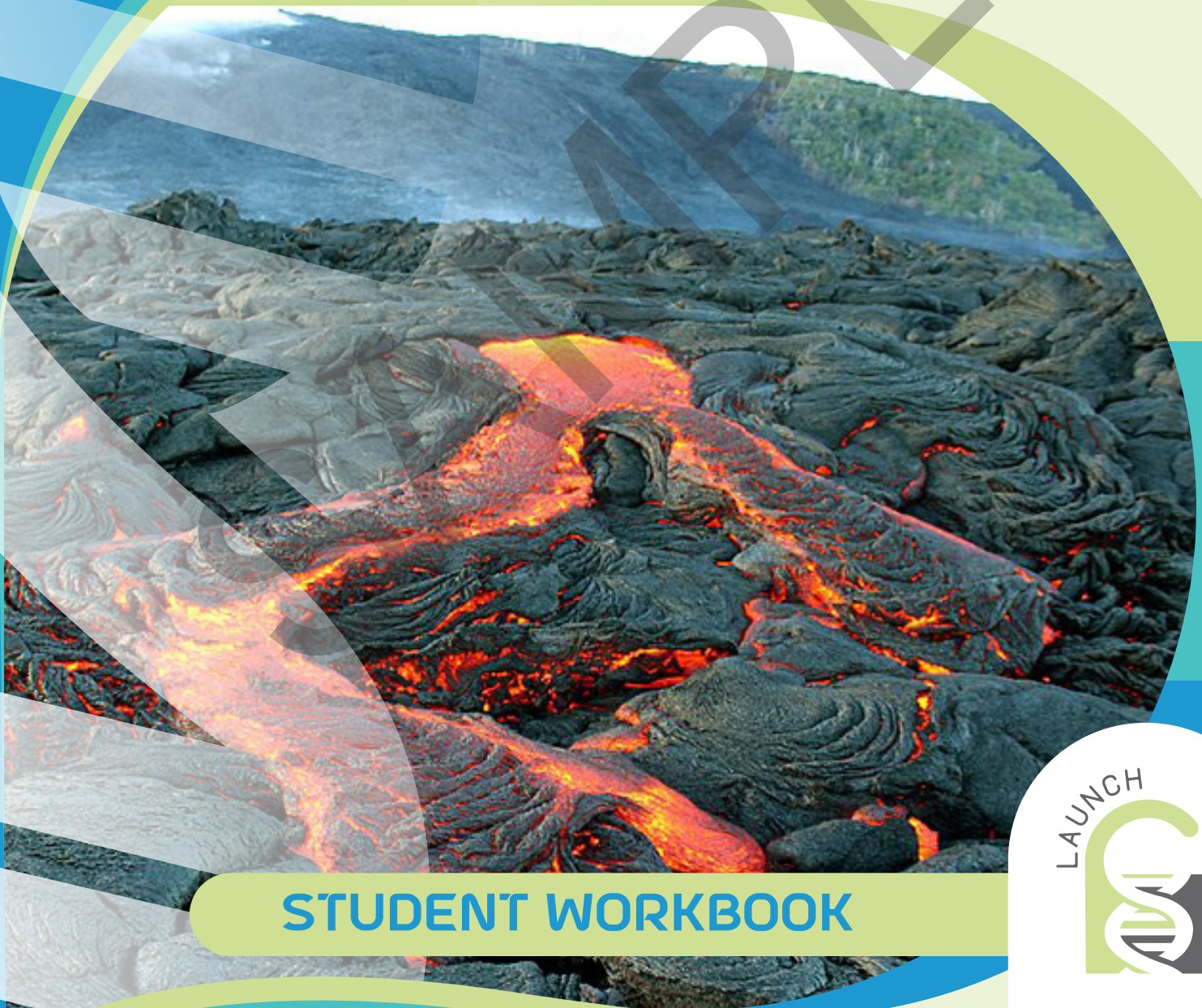
RESTLESS ROCKS



STUDENT WORKBOOK

LAUNCH

ACTIVITY 3

CONTINENTAL CHANGES

The movement of a large piece of Earth's surface is not limited to the ocean. Let's explore other ways in which the ground is shifting.

LEARNING GOALS:

I can use evidence to explain how the ages of crustal rocks are affected by past and current movement of tectonic plates.

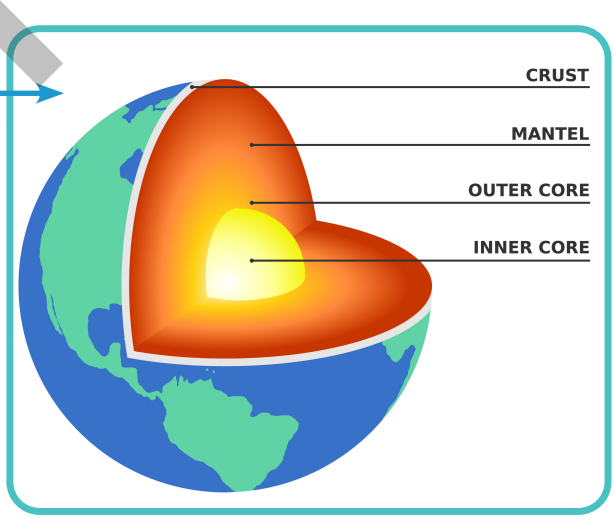
EARTH'S LAYERS

Swing for the Faces

When you explored the spring force, there was tension resisting the pull of gravity applied to the spring. In this activity, we will investigate the tension applied to a string and observe a similar phenomenon.

So far, you have heard about Earth's crust and the movement of the crust that occurs as tectonic plates shift along their boundaries. The crust is not the only layer of Earth's interior. In fact, Earth has four major layers that can be broken down into nine minor layers.

The major layers of Earth's interior are the crust, mantle, outer core, and inner core.



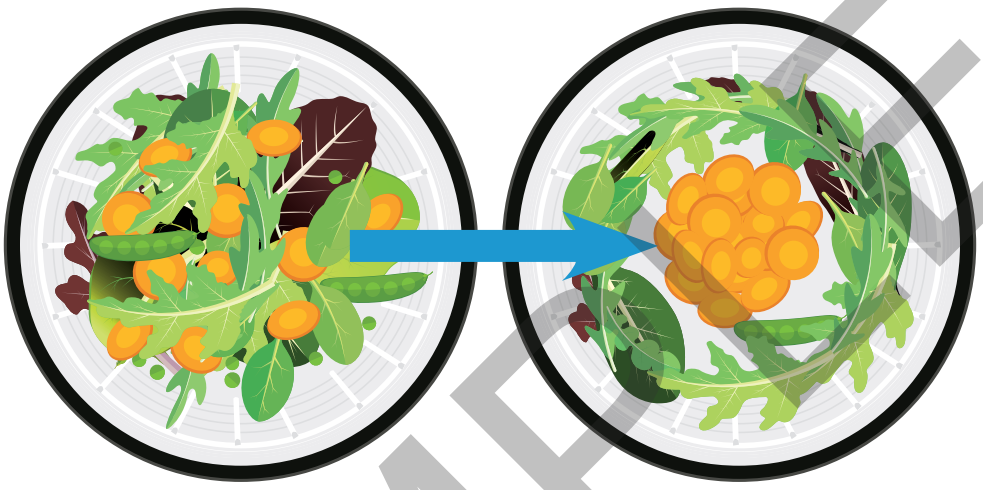
The **crust** is the rocky outer layer of Earth. Earth's crust forms from cooled magma that comes from below Earth's surface. When magma comes out of Earth's interior it is referred to as lava.

Magma is found in the Earth's mantle. The **mantle** is a hot, fluid layer of rock found just below the Earth's crust. The mantle layer of Earth's interior is thinker than the crust. Earth's mantle is much hotter than Earth's crust and is so hot because it is constantly heated by Earth's core.

Earth's core is deeper into Earth than the mantle or crust. The core consists of two parts – the outer core and the inner core. The **outer core** is made of extremely hot, electrically charge liquid metal. The **inner core** is solid and consists of iron. Heat is released form the inner core to other layers of Earth's interior through nuclear reactions. Because Earth's inner core is rich in magnetic iron, it is responsible for Earth's magnetic field, including the polarity of Earth's poles.

Density, the amount of mass in a certain volume, is important for Earth's interior. When Earth was forming, it was spinning quickly. As a result of the spinning, the more dense portions of the earth moved towards the center and the less dense portions moved towards the ends. Earth's inner core is the most dense layer, with the outer core being next most dense, then the mantle, and finally the core being the least dense layer of Earth.

This process can be seen with materials in your day-to-day life, such as with a salad spinner. If you were to put pieces of carrot and pieces of lettuce in a salad spinner and spin them, the carrots would move towards the center while the lettuce moved towards the ends.



While the upper boundary of the asthenosphere is well defined, the lower boundary is not. This is because below the asthenosphere is the mantle transition, connecting the asthenosphere to the lower mantle.

The upper most portion of the asthenosphere is partially molten. This allows the lithosphere to "ride along" to fluid asthenosphere, leading to tectonic plate movement. If Earth's upper asthenosphere was not partially molten, like the lower, solid portion of the asthenosphere, the lithosphere would be unable to move.

THINK ABOUT IT!

1. Explain how the layers of Earth's interior allow for continental drift to occur.

2. How does heat and material move through Earth's interior?

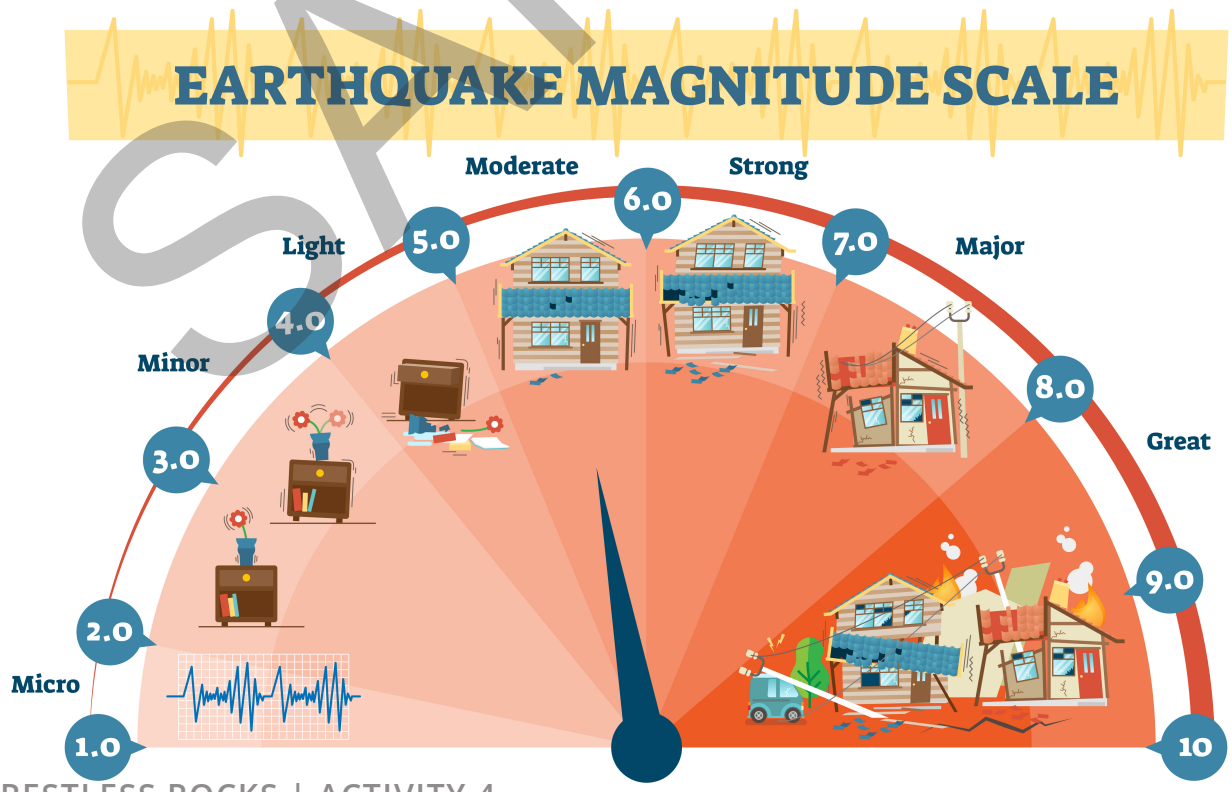
Seismographs produce digital records of earthquakes through their graphing mechanisms. As earthquakes shake the ground, the seismograph also shakes, producing lines on a graph that are read by scientists. The digital recordings are called seismograms.

Seismographs are used in countries and laboratories around the world. The collective data allows communities to better understand the strength and duration of earthquakes.

The **intensity** of an earthquake is the strength of an earthquake perceived by people. Intensity isn't typically reliable since each person feels the power of an earthquake differently. People who are closer to the center of the earthquake feel it more intensely than people further from it. A person who lives in areas where earthquakes are common may not feel the same intensity as a person who does not regularly feel earthquakes. Because of this, **magnitude** is a better measurement for the strength of an earthquake.

Magnitude is the amount of energy released by an earthquake at the center. This measurement is recorded on seismographs through a wave like image. Each wave has an **amplitude** which is the height of a wave from the midline to the crest or trough (of a transverse wave) or the highest or lowest point (of a longitudinal wave). The greater an earthquake's magnitude, the greater the amplitude the line drawn by the seismograph.

Each measurement of earthquake magnitude relates to the amount of destruction caused by the earthquake. Magnitude is on a scale from 1–10. Any earthquake with a magnitude less than 2.5 is typically not felt by people, but can be recorded on a seismograph. Minor damage occurs from a magnitude of 2.6–5.4. Major damage doesn't typically occur until an earthquake is a magnitude of 6.1 or greater, with a magnitude of 8 or higher leading to damage of entire communities.



LAUNCH

SCIENCE UNLOCKED

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Kit	SU-WHATGO
Instructions	IN-WHATGOS
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