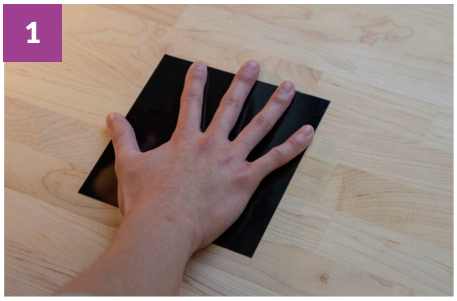
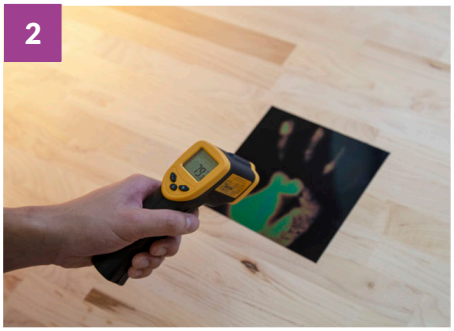
EXPLORING EARTH

Temperature Mapping

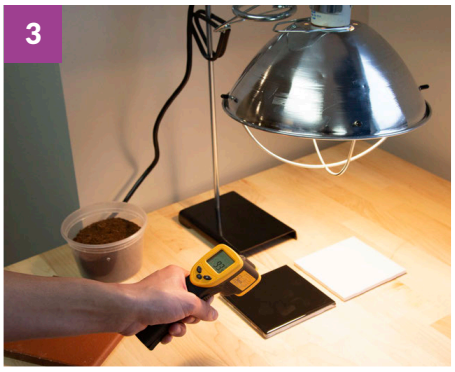
Try this!



Place your hand on the thermal sheet for about five seconds. Lift your hand away. What happens? What do you think the different colors represent or mean?



Use the infrared (IR) thermometer to measure the temperatures of your handprint and of the surrounding area on the sheet. What do you notice? Now what do you think the colors represent?



Use the thermometer to measure the temperatures of the black and white tiles sitting under the lamp. How do they compare? Next, try comparing the temperatures of the paver and the soil. What do you notice?

Tip: Before you use the tool, try predicting which surface will have a higher temperature.

Earth is a constantly changing and dynamic system.

Different types of land cover on Earth absorb or reflect energy from the Sun in different ways. The infrared thermometer in this activity measures the temperature of each of the different materials—those under the lamp and the handprint you've left behind! In the case of the handprint, you have transferred heat from your hand onto the thermal sheet. The materials under the lamp are absorbing (or reflecting) light from the bulb, just as materials outside absorb (or reflect) sunlight.

Developed land (dark red) absorbs more energy from sunlight than rural or natural land.

Just like the materials in this activity, different types of land cover on Earth absorb more or less light. For example, concentrated urban areas trap more energy, leading to higher temperatures in these regions. Rural areas or undeveloped forests reflect more light, and use some light energy in photosynthesis, so they tend to have lower temperatures.

Some cities are beginning to paint roofs and roads white to reflect sunlight.

NASA scientists study land cover to understand and predict how Earth's climate is changing. Some satellites, like those in the NASA/USGS Satellite Landsat Program, collect data that can be analyzed as temperature. The Landsat 8 satellite uses a *Thermal Infrared Sensor* to better understand Earth's surface temperature. Collecting these data allows researchers to build *thermal images* (kind of like the heat map of your handprint) and provide a visual representation of varying temperatures and varying land cover. These data help scientists develop computer models for predicting how Earth's climate is changing, and can help people plan and manage land use. Together, we can all make choices about building materials, land use, and land cover that affect our environment (even at very local scales).