

Earth: A Layered Planet

8.1

Imagine that you could drive a car at 100 km/h from the surface of Earth to its very centre. What would you see along the way? How long would your journey take? **Figure 1** shows what scientists think you would see.

LEARNING TIP

As you read this section, use the arrows on the diagram to help you follow this journey to the centre of Earth. Look at the thermometers on the diagram to see how the temperature changes along the way.

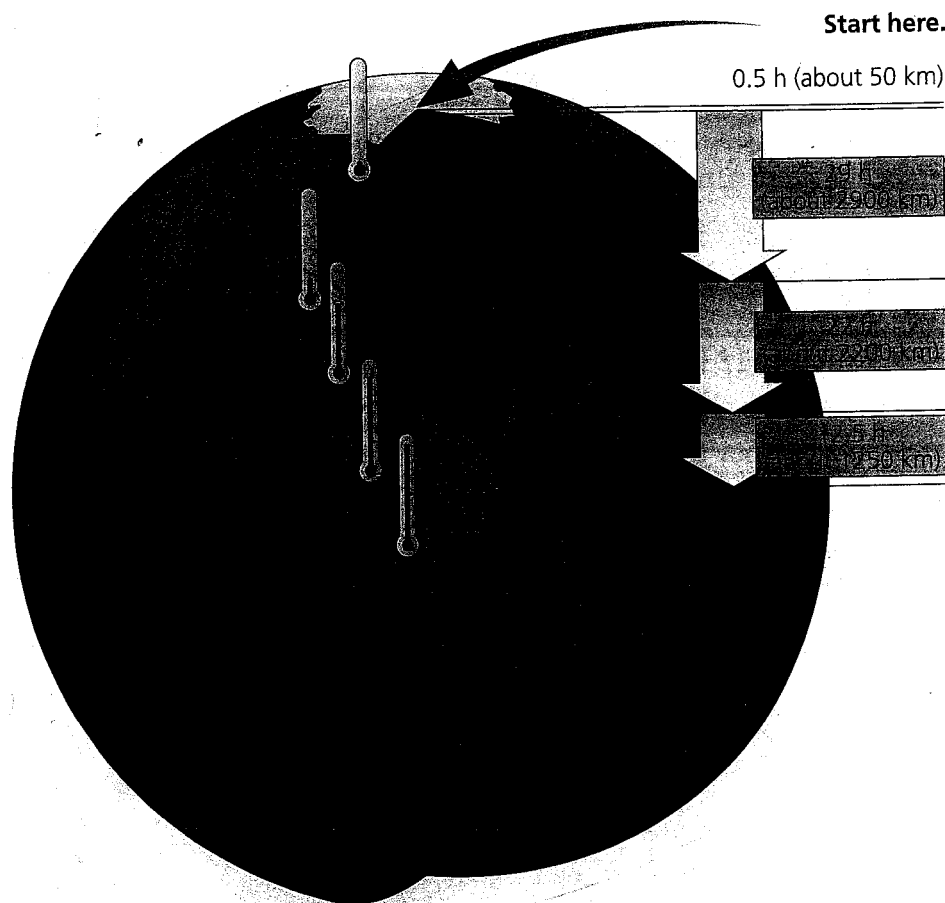


Figure 1
The layers of Earth

For the first half hour, you would pass through the crust. The **crust** is the thin layer of solid rock that makes up Earth's outermost layer. The materials in the crust tend to be lighter than the materials below. Earth's crust "floats" on the inner layers.

For the next 29 h, you would travel through the **mantle**, a hot, thick layer of solid and partly melted rock. Here you would begin to feel some pressure. The pressure would gradually increase because of all the layers above pushing down on you. The mantle moves sluggishly, like thick syrup.



Then you would travel for 22 h through the **outer core**, a dense, hot region that is made up mostly of liquid iron and some nickel. The pressure is very high. Like the mantle, the material in the outer core flows.

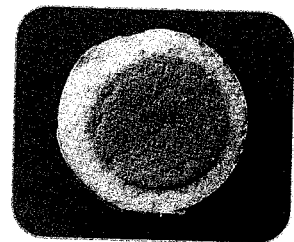
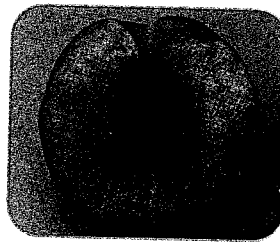
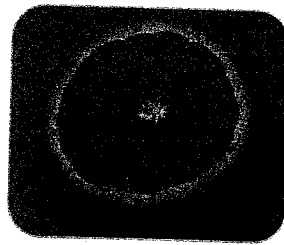
Finally, on the last part of your journey to Earth's centre, you would travel for 12.5 h through the **inner core**, a large ball of iron and nickel. Here, pressure from the weight of the other layers keeps the material solid, even though the temperature is almost as hot as the temperature on the surface of the Sun.

The idea of travelling to the centre of Earth is not new. In 1864, a French writer named Jules Verne published a novel called *Journey to the Centre of the Earth*. It describes the journey of a group of explorers as they try to reach Earth's core. In reality, the deepest hole that humans have made in Earth's crust is a mine that goes down approximately 12 km. At this depth, the temperature is already 70°C. The extreme heat and pressure at deeper levels prevent scientists from making a journey to the centre of Earth even today.

TRY THIS: MODEL A LAYERED EARTH

Skills Focus: creating models

Look at the photos of the orange, the peach, and the hard-boiled egg.



What are the strengths and weaknesses of each model of Earth? Which do you think is the best model? What layer of Earth does each part of this model represent?

CHECK YOUR UNDERSTANDING

1. Draw a diagram of a cross-section of Earth and label the four layers.
2. How are the layers different from one another?
3. Your journey to the centre of Earth took 64 h at 100 km/h. What was the total distance you travelled?
4. Why have scientists never dug a hole to the centre of Earth?