◊ Discuss 1 & 2 above. Allow students to share their ideas.

Ask:

If you believe that there is no energy in the water in the lake, from where does the water get its energy when it begins to flow downhill again?

Energy is stored in the lake water. This energy comes from its position above the ground below (just like the book above the floor in the earlier description of gravitational potential energy). Therefore the flow of water downhill is kinetic energy. The greater the height of the water, the more potential energy it had.

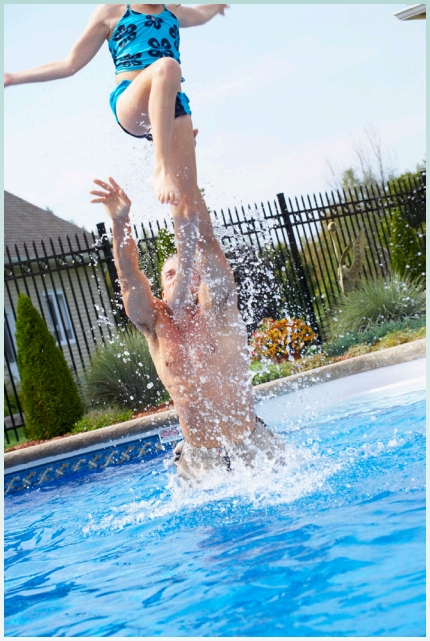
Say:
"So, we see that not only moving objects have energy. The water in the lake had energy too, which was held until the lake overflowed. Then, the stored potential energy changed into moving or kinetic energy."

◊ Read the following information as a class.

In the other units, you learned that energy exists in different forms—heat energy, light energy and sound energy are a few examples. In the hands-on activity, you saw that energy can be energy of movement or energy that is stored. The energy of movement is called **kinetic energy**. You show kinetic energy when you are running, jumping, or swimming.

Stored energy is called **potential energy**. For instance, think of a rubber band. You can put energy into the band to stretch it out. When it is held that way, it has potential energy. When you let it go, all of a sudden there is kinetic energy. In other words, kinetic and potential energy can be changed into one another, just as you saw potential energy changed into kinetic energy in the river activity.

Kinetic energy demonstrates motion. Potential energy has stored energy that gravity or another process will tap into at a later time.



You show kinetic energy when you are running, jumping or swimming.

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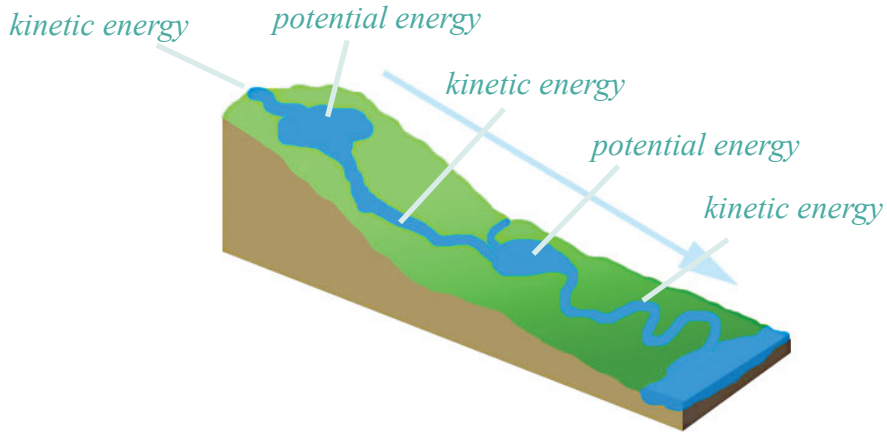
3. On the diagram below of the model river valley, label the area or areas where the water has kinetic energy and potential energy.



Explain (½ period)

Ask:

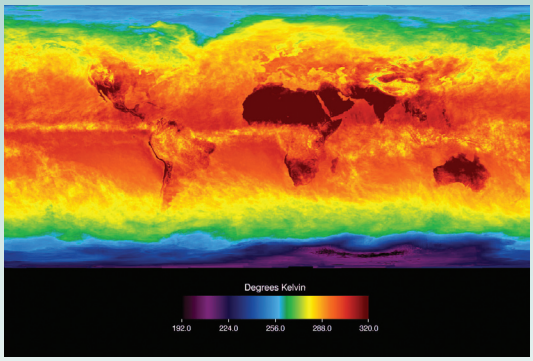
What are the two sources of energy for the Earth's surface?

The Sun and internal energy within Earth's core

Say:
"Let's read more about energy in the Earth system. Let's see how it is used in Earth's spheres and the material cycles we learned about in the last lesson."

In the laboratory exercise, you observed the potential energy of the water in the lake being converted into kinetic energy. Energy anywhere in the Earth system can be stored or changed into different forms. Every time energy changes forms, some energy escapes as heat. When you turn on a light, electrical energy changes into visible light energy. If you touch the light bulb you will notice that it gets hot. Heat is escaping from the light bulb. Heat from the light bulb is released into the environment.

Eventually, *all* energy in the Earth system changes to heat. A lot of that heat escapes into space.



Infrared image shows temperature of the Earth's surface.
Credit: NASA/JPL