

How Force and Energy Work Together

READ ALOUD PASSAGE

A force and a moving object are closely connected. Think about hitting a ball with a bat. The bat has kinetic energy because it is moving, and when it strikes the ball, it pushes on the ball with a force. That force is what passes the energy from the bat over to the ball, sending it flying.

In a wound-up toy, the spring stores potential energy. When the spring unwinds, it pushes on the gears inside with a force, and that force is what turns the stored energy into the toy's movement. A balloon works the same way. Air pressure inside the balloon pushes outward with a force, and that force turns the balloon's stored energy into its jetting, zooming motion once you let it go.

Gravity is a force too, and people have found ways to put it to work. Water flowing downhill, pulled by gravity, can turn a waterwheel or spin the generators inside a hydroelectric dam. But gravity cannot make energy out of nothing. Whatever comes down has to be lifted back up somehow, and lifting it takes just as much energy as was gained by letting it fall.

The water that turns a dam's generators gets lifted back into the sky again by heat from the sun, which evaporates it, and by wind, which carries it along until it falls again as rain. Wind itself only blows because sunlight heats the air unevenly across the Earth. Even magnets cannot create energy from nothing, since pulling something away from a magnet takes just as much energy as the magnet used to pull it in.

So force and energy always work together, but they answer different questions. Energy tells you how much a thing can do. Force is the push or pull that actually makes something happen, whether it comes from a bat, a spring, gravity, wind, or a magnet.

Activity 1

Fill in the blank with the correct word from the word box.

WORD BOX

force go-between gravity magnetic force wind

1. In a bat hitting a ball, force acts as a _____ that passes energy from the bat to the ball.
2. Water flowing downhill is pulled by the force of _____.
3. A turbine spins because of the force of _____.
4. The pull between a magnet and a piece of iron is called _____.
5. A _____ transfers energy from one object to another.

Activity 2

Circle True or False for each statement.

1. **True / False** Force is what transfers energy from one object to another.
2. **True / False** Gravity can create energy out of nothing.
3. **True / False** Wind ultimately gets its energy from the sun.
4. **True / False** It takes as much energy to pull an object away from a magnet as the magnet used to pull it in.

Activity 3

Because / But / So Complete each sentence three different ways.

Force acts as a go-between that transfers energy from one object to another because

Force acts as a go-between that transfers energy from one object to another but

Force acts as a go-between that transfers energy from one object to another so

Activity 4

Start with the kernel sentence. Use the prompts to expand it into a more detailed sentence.

KERNEL SENTENCE Force transfers energy.

What kind of force?

What is the energy being transferred to?

Write your expanded sentence:
