

## Energy - Brainpop Viewing Guides

### Forms of Energy (1:52) (Science → Energy)

- 1) Energy can make matter \_\_\_\_ **move** \_\_ or \_\_\_\_\_ **change** \_\_\_\_\_ .
- 2) Energy is the ability to do \_\_\_\_\_ **work** \_\_\_\_\_ .
- 3) Stretching a bow will give it \_\_\_\_\_ **potential** \_\_\_\_\_ energy.
- 4) An arrow moving through the air will have \_\_\_\_ **kinetic** \_\_\_\_\_ energy.
- 5) **Chemical** \_\_\_\_\_ energy is stored in food.
- 6) Power plants and batteries provide \_\_\_\_\_ **electrical** \_\_\_\_\_ energy.
- 7) The Sun gives off \_\_\_\_ **light** \_\_\_\_\_ energy.
- 8) Wind, moving water and sound all have \_ **mechanical** \_\_\_\_\_ energy.
- 9) Heat is considered to be \_\_\_\_ **thermal** \_\_\_\_\_ energy.
- 10) **Nuclear** \_\_\_\_\_ energy is released when atoms are broken apart or fused together.

### Potential Energy (2:06) (Science → Energy)

- 1) Potential energy is \_\_\_\_ **stored** \_\_\_\_ energy an object has because of its \_\_\_\_ **position** \_\_\_\_\_ or \_\_\_\_\_ **condition** \_\_\_\_\_ .
- 2) Kinetic energy is energy because of an objects \_\_\_\_ **motion** \_\_\_\_\_ .
- 3) A \_\_\_\_\_ **pendulum** \_\_\_\_\_ in a clock swings back and forth constantly changing the potential and kinetic energy.
- 4) Riding up a ski lift will increase \_\_\_\_\_ **potential** \_\_\_\_\_ energy.
- 5) The greatest potential energy will be at the \_\_\_\_\_ **mountain top** \_\_\_\_ .
- 6) As you move down a mountain \_\_\_\_\_ **potential** \_\_\_\_\_ energy changes to \_\_\_\_\_ **kinetic** \_\_\_\_ energy.
- 7) A larger \_\_\_\_\_ **mass** \_\_\_\_\_ will cause a greater potential energy.
- 8) If the height \_\_\_\_ **increases** \_\_\_\_\_ the potential energy will also increase.

## **Kinetic Energy (2:28)** (Science → Energy)

- 1) The amount of kinetic energy an object has depends on its \_\_\_\_\_ **mass** \_\_\_\_\_ and \_\_\_\_\_ **speed** \_\_\_\_\_.
- 2) If the mass is \_\_\_\_\_ **increased** \_\_\_\_\_ it will have more kinetic energy.
- 3) For objects of the same mass, as the speed increases the kinetic energy \_\_\_\_\_ **increases** \_\_\_\_\_.
- 4) When objects collide the kinetic energy is \_\_\_\_\_ **transferred** \_\_\_\_\_ to the other object.
- 5) Kinetic energy can be transformed into electricity by a \_\_\_\_\_ **generator** \_\_\_\_\_.
- 6) Energy cannot be \_\_\_\_\_ **created** \_\_\_\_\_ or \_\_\_\_\_ **destroyed** \_\_\_\_\_, it can only be transferred or stored.

## **Gravity (2:43)** (Science → Motions, Forces, & Time)

- 1) Gravity is a \_\_\_\_\_ **force** \_\_\_\_\_ that pulls objects \_\_\_\_\_ **together** \_\_\_\_\_.
- 2) In 1687, \_\_\_\_\_ **Sir Isaac Newton** \_\_\_\_\_ came up with the theory of gravity.
- 3) Gravity depends on two things, \_\_\_\_\_ **mass** \_\_\_\_\_ and \_\_\_\_\_ **distance** \_\_\_\_\_.
- 4) As the mass of an object increases, its gravitational pull will \_\_\_\_\_ **increase** \_\_\_\_\_.
- 5) If objects are moved farther apart, the gravitational attraction will \_\_\_\_\_ **decrease** \_\_\_\_\_.
- 6) **Weight** \_\_\_\_\_ is the force exerted on an object's mass by gravity.
- 7) On the moon gravity is \_\_\_\_\_ **1/6<sup>th</sup>** \_\_\_\_\_ of Earth's gravity.
- 8) Gravity causes planets to \_\_\_\_\_ **orbit** \_\_\_\_\_ the Sun.

## **Energy – Simulation Guide – Answer Key**

### **Skate Park Sim**

Play with this simulation to see if you can determine the following:

- If you increase the mass of the skater what happens to the amount of PE?

**When the mass of the skater increases the amount of PE will increase.  
Doubling the mass will double the PE.**

- If you increase the height of the skater what happens to the amount of PE?

**When the height of the skater is increased the amount of PE will increase.  
Doubling the height will double the PE.**

- As the skater moves down what happens to the PE, KE and the speed of the skater?

**As the skater moves down the ramp PE will decrease.  
As the skater moves down the ramp KE will increase.  
As the skater moves down the ramp the speed of the skater will increase.  
(PE is converted into KE when the skater is moving down)**

- As the skater moves up what happens to the PE, KE, and the speed of the skater?

**As the skater moves up the ramp PE will increase.  
As the skater moves up the ramp KE will decrease.  
As the skater moves up the ramp the speed of the skater will decrease.  
(KE is converted into PE when the skater is moving up)**

### **Perihelion and Aphelion**

Consider the following questions:

- What is aphelion?

**Aphelion is the point in an orbit where the planet is farthest from the star.**

- What is perihelion?

**Perihelion is the point in the orbit where the planet is closest to the star.**

- What happens to the speed of a planet as it moves from aphelion to perihelion?

**The speed will increase as the planet moves from aphelion to perihelion.**

- What happens to the speed of a planet as it moves from perihelion to aphelion?

**The speed will decrease as the planet moves from perihelion to aphelion.**

- Is the Sun located in the center of the planets orbit?

**The Sun is not located in the center of a planetary orbit. (The Sun is located at one of the foci of the orbit)**

## **Planetary Orbit Simulator**

Play with the controls on the simulation to determine the following:

- If the eccentricity of the orbit increases, what happens to the shape of the orbit?

**If the eccentricity of an orbit increases, the shape of the orbit becomes more flattened. (more eccentric or elliptical)**

- Look at the Earth's orbit. What is the eccentricity? Is it more circular or flattened?

**Earth's orbit has an eccentricity of 0.017. Earth's orbit looks more circular.**

- If the size of the orbit increases, what happens to the speed of the planet?

**If the size of the orbit is increased, the speed of the planet will decrease.**

- Which planet would orbit around the Sun in the least time? Why?

**Mercury will orbit the Sun in the least time. Mercury orbits fastest because it is closest to the Sun. Mercury has the shortest orbital path and it orbits at the greatest velocity. Mercury has the greatest gravitational force from the Sun.**

- As the distance from the Sun increases, what happens to the time needed to orbit?

**If the distance from the Sun increases, the time needed to orbit the sun will also increase.**

- Which planet has the most eccentric orbit? Which planet's orbit is most circular?

**Mercury has the most eccentric orbit. (e=0.206)**

**Venus has the most circular orbit. (e=0.007)**