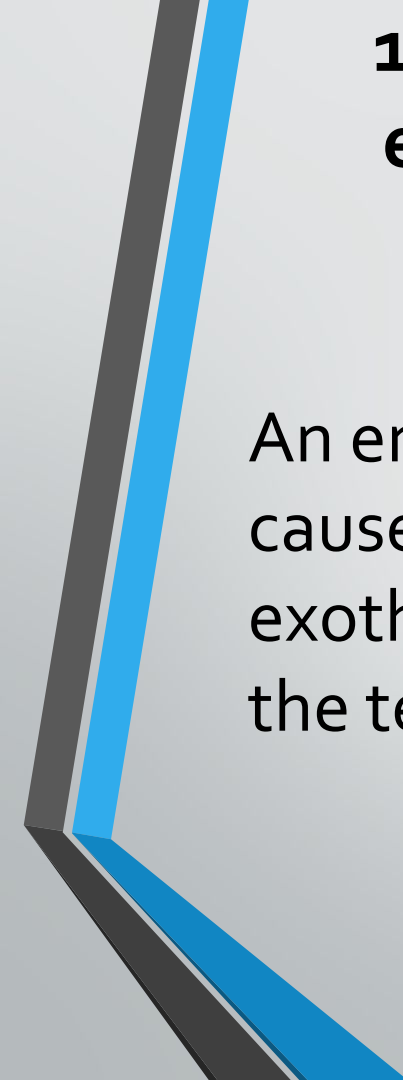


Energy Study Guide

Have your Study Guide out ready for Ms. E.Mac or Mrs. Adkins to check!



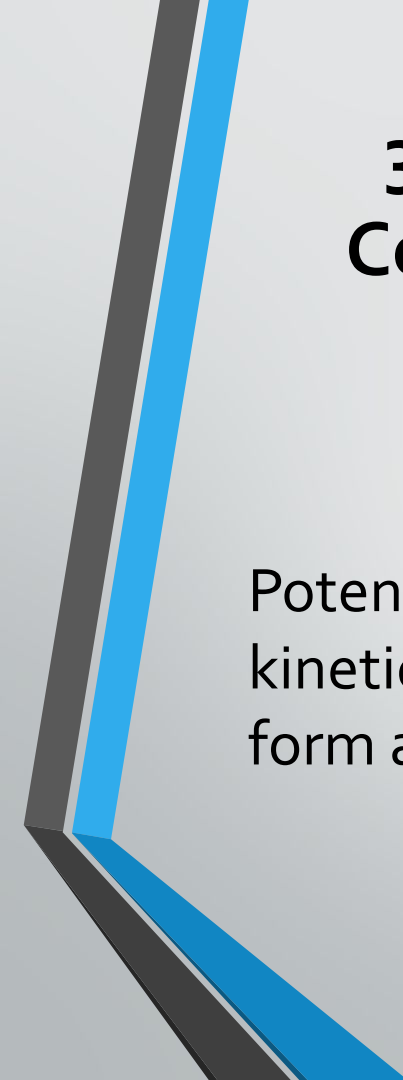
1. What is the difference between an endothermic process and an exothermic process?

An endothermic process absorbs heat which causes the temperature to decrease. An exothermic process releases heat which causes the temperature to increase.



2. What does the Law of Conservation of Energy mean?

Energy cannot be created or destroyed. Energy can change form or be transferred to another substance.



3. Give an example of how the Law of Conservation of Energy applies to roller coasters.

Potential energy from the 1st hill doesn't all become kinetic energy. The energy isn't destroyed - it changes form and becomes sound and thermal energy.



4. At which point on a rollercoaster does the cart have the most potential energy? Why?

The cart has the most potential energy at the top of the tallest hill. The greater the height of an object, the more potential energy.

5. Identify the type of energy that is shown in the diagram to the right.

Potential Energy



6. What is the difference between potential and kinetic energy? Give an example of each.

Potential energy is stored energy.

Examples:

- A book sitting on a shelf
- A roller coaster car sitting at the top of a hill
- What other examples did we discuss?

Kinetic energy is the energy of motion.

Examples:

- A tennis ball falling from a height of 50 cm
- A roller coaster cart going down a hill
- What other examples did we discuss?

Use the image to answer questions 7-10.

7. What kind of energy does the chain that's pulling the car up to point A have?

Mechanical Energy

8. What kind of energy does the car have while at rest at point A?

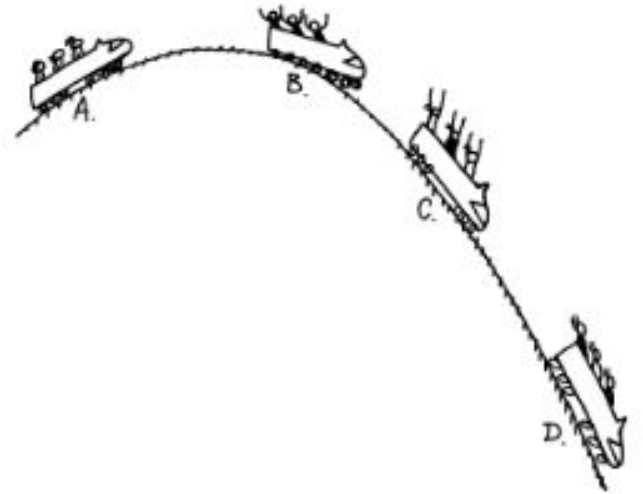
Potential Energy


9. At point C, what kind of energy is the car using?

Kinetic Energy

10. At point D, what force is pulling the car down the hill?


Gravity





11. Summarize important ideas you learned about energy and engineering safety when you designed your roller coaster.

The first hill of a roller coaster must be the tallest. It is important that a rollercoaster doesn't have too much kinetic energy at the end -- the roller coaster must be able to stop safely.



12. Explain what happens to the kinetic energy of an object when its temperature decreases.

The kinetic energy of the object's particles decreases as the temperature decreases.


13. Complete the following statements using the words **increases** or **decreases**.

- A. As a tennis ball falls to the ground the Potential Energy **Decreases** and the Kinetic Energy **Increases**.
- B. As a roller coaster cart moves up a hill the Potential Energy **Increases** and the Kinetic Energy **Decreases**.
- C. As a roller coaster cart moves down a hill the Potential Energy **Decreases** and the Kinetic Energy **Increases**.




14. What is the formula to calculate PE?

$$\text{PE} = \text{mass (kg)} \times 9.8 \text{ m/s}^2 \times \text{height (m)}$$



**15. On planet earth what number do we use
for gravitational acceleration?**

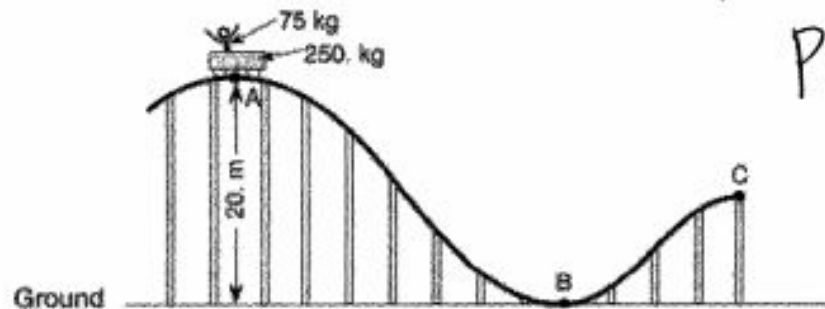
9.8 m/s²



16. What type of potential energy does an object have if the object is raised above the surface of the earth?

Gravitational Potential Energy

17. Calculate the PE of the roller coaster car (include the passenger).



$$PE = 325 (9.8) (20)$$

$$PE = 63,700 \text{ J}$$

18. Calculate the PE of a 15 kg ball that is setting on a 2m tall counter.

$$PE = 15 (9.8) (2)$$

$$PE = 294 \text{ J}$$

Identify the following as an example of Conduction, Convection, or Radiation.

19. A cold metal spoon warming up in a bowl of hot soup.	Conduction
20. The coils in a portable heater help warm a room.	Radiation/Convection
21. The Sun warms the Earth.	Radiation
22. Burning your hand by touching a hot pan.	Conduction
23. Boiling Water.	Convection
24. Hot air rising in a hot air balloon.	Convection

25. Two cups of water are placed in a room at 22°C . One cup of water is at 50°C and one cup of water is at 2°C , what will happen to the temperature of the water in both cups over the next hour?

The cup of water at 50°C will decrease in temperature and the cup of water at 2°C will increase in temperature until both cups of water are at room temperature.