Guided Lesson Notes

Name:_____ **Date:**_____

Energy

Directions: Complete this study guide as you move through the lesson. By taking notes, you are more likely to remember what you are learning. The completed study guide can be used for practice activities and to prepare for quizzes and exams. Be sure to save each study guide so you can access it when you need it.

Essential Vocabulary

As you encounter these scientific terms in the lesson, enter the meaning and an example (or two) for each. You can even draw a picture. If there are other unfamiliar words you find, enter them in the blank spaces provided.

energy	*kinetic energy*
work-energy theorem	*elastic potential energy*
law of conservation of energy	*gravitational potential energy*

mechanical energy	*system*

Mechanical Energy

1. Fill in the blanks about energy.

Energy is _____ _____ _____ _____ _____.

2. Define mechanical energy and give three examples of it.

Definition:	
Example 1	
Example 2	

Example 3	

3. **What is the law of conservation of energy?**

An Overview

1. **Which type of energy will we discuss in this class?**

2. **Define gravitational potential energy, elastic potential energy, and kinetic energy and give its formula.**

Name	Definition	Formula
Gravitation potential energy		
Elastic potential energy		
Kinetic energy		

3. **Describe the total energy inside a closed system.**

4. **Complete the equation for total energy.**

Total Energy = _____ + _____ + _____ + _____

5. **Fill in the blanks about the work-energy theorem.**

To change the _____ energy of a _____ or _____, an _____ _____ is required. _____ must be done to change an object's _____ energy.

6. **Write the equation for the work-energy theorem. Then define each term in the equation.**

Work-energy theorem equation:	
W =	
ΔKE =	
KE_{final} =	
$KE_{initial}$ =	

Gravitational Potential Energy

1. **Write the formula for gravitational potential energy.**

2. **Fill in the blanks below about gravitational potential energy.**

Gravitational potential energy (GPE) is the _____ an object has that depends on _____ _____ _____ _____ _____ of the Earth it is. In other words, it is the energy that it has due to its _____ _____.

3. **Why is the GPE the same for an object lifted 2 meters, pushed up a ramp to a height of 2 meters, and carried of stairs to a height of 2 meters?**

GPE in Roller Coasters

(continue on next page)

Draw lines to match the height of these roller coasters to the gravitational potential energy of an 8,350 kg car on the ride.

Height	GPE = mgh
128.02 m	1.036×10^7 J
126.49 m	5.742×10^6 J
92.96 m	6.117×10^6 J
74.68 m	1.049×10^7 J
70.10 m	7.615×10^6 J

Kinetic Energy

1. **Write the formula for kinetic energy.**

2. **Fill in the blanks below about kinetic energy.**

An object that has energy due to its _____ has _____ energy. That _____ energy is directly _____ to the

_____ of the object and _____ _____ it is moving. Energy is not a _____ quantity, so kinetic _____ is also not a vector. You can use the _____ of the _____ in the equation regardless of _____. That kinetic energy provides the object an _____ to do _____ on other _____. In other words, that kinetic energy can be _____ to another object or _____ from one _____ to another on this _____.

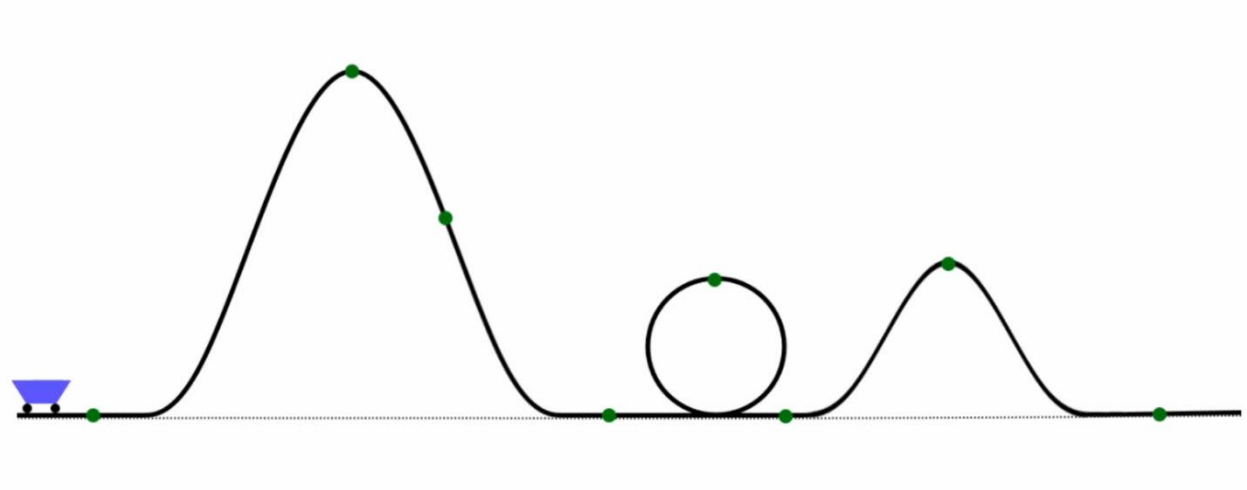
KE in Roller Coasters

Draw lines to match the speed of these roller coasters to the kinetic energy of an 8,350-kg car on the ride.

Speed	GPE = mgh
52.22 m/s	5.742×10^6 J
44.09 m/s	7.740×10^6 J
43.06 m/s	6.117×10^6 J
38.28 m/s	1.138×10^7 J
37.09 m/s	8.114×10^6 J

The Conservation of Energy

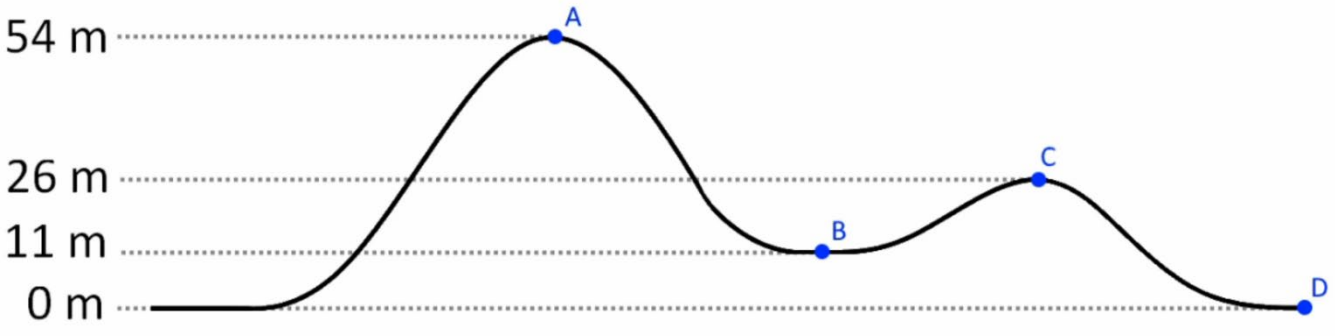
1. **Complete this drawing with the labels provided in the video.**



2. **Are roller coasters the only objects that obey the law of conservation of momentum?**

Conservation of Energy Example

Use the diagram below to answer some questions about a roller coaster.



1. What is the gravitational potential energy at Point A (54 m)? Show your work.

Solution:	

2. How fast is the roller coaster moving at Point C (26 m) when it goes over the top of the second hill? Show your work.

Solution:	

3. What is the general form of the law of conservation of energy? What does it mean in words?

Putting It All Together

Select one of the problems provided and show each of the steps in solving it. Choose from The Fahrenheit, The Storm Runner, or The Blob Jump.