Name _____ Period _____ Date _____

Work and Energy

Pre-Test - Post-Test

1. In physics, work is defined as _____.

A) force divided by time.
B) force times distance.
C) distance divided by time.
D) force times time.
E) force divided by distance.

2. Potential energy is the energy an object has because of its _____.

A) temperature.
B) size.
C) location.
D) density.
E) speed.

3. An object that has linear kinetic energy must be _____.

A) at an elevated position.
B) at rest.
C) moving.
D) none of the above

4. A car moves 4 times as fast as another identical car. Compared to the slower car, the faster car has _____.

A) 4 times the KE.
B) 8 times the KE.
C) 12 times the KE.
D) 16 times the KE.

5. How much farther will a car traveling at 100 km/s skid than the same car traveling at 50 km/s?

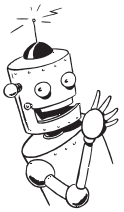
A) Four times as far
B) Twice as far
C) The same distance
D) Five times as far
E) Half as far

6. As a pendulum swings back and forth _____.

A) at the lowest part of its swing, its energy is all kinetic.
B) potential energy is transformed into kinetic energy.
C) at the end points of its swing, its energy is all potential.
D) kinetic energy is transformed into potential energy.
E) all of the above

7. A ball is thrown vertically into the air with 100 J of kinetic energy, which is transformed into gravitational potential energy at the top of its trajectory. When it returns to its original position after encountering air resistance, its kinetic energy is

A) less than 100 J.
B) 100 J.
A) more than 100 J.
B) Not enough information given.



© 2016 Doc Fizzix Products, Saving the world with his knowledge of science

Name _____ Period _____ Date _____

Work and Energy

Work and Energy

1. What is energy?

2. What are the units for energy?

3. What is work?

4. How do you know when work is being done?

5. Write the formula for work.

6. Is energy required to keep objects moving when there is no friction?

7. Is energy required to keep objects moving when there is friction?

8. How many joules of work are done on an object when a force of 10 N pushes it a distance of 10 m?

Power

9. What is power and what are the units of power?

10. Write the formula for power.

Mechanical Energy

11. List the two types of mechanical energy.

Potential Energy

12. Explain potential energy.

13. Name three examples of potential energy:

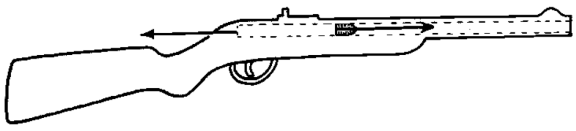
14. Write the formula for gravitational potential energy.

Kinetic Energy

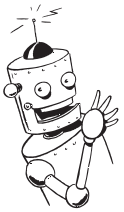
15. Explain kinetic energy.

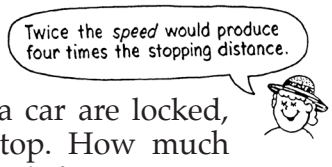
16. Write the formula for kinetic energy.

17. When a bullet is fired from a gun the momentum for the gun is the same as the bullet but does this also hold true for energy? Explain



© 2016 Doc Fizzix Products, Saving the world with his knowledge of science





18. A baseball and a golf ball have the same momentum, do they also have the same kinetic energy? Explain

19. A car is traveling at 30 mph.

a) How much more energy does a car have when traveling at 60 mph?

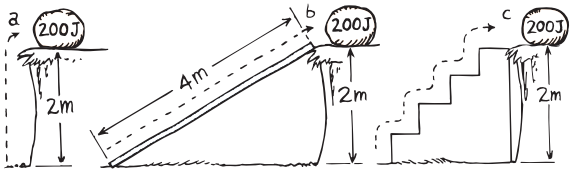
b) What if it is traveling at 90 mph?

Work-Energy Theorem

20. What is the work-energy theorem?

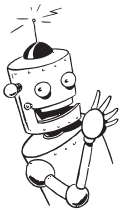
21. Write the work theorem formula for potential energy.

22. Calculate how much work was done in each of the following:



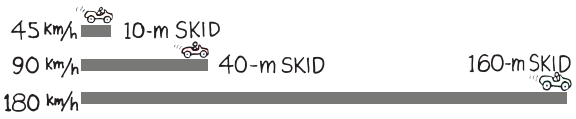
23. For the same force, why is the speed of a cannonball greater when shot from a longer cannon barrel? Explain

24. Write the work theorem formula for kinetic energy.



25. When the brakes of a car are locked, the car skids to a stop. How much farther will the car skid if it's moving twice as fast? Show your work

26. A car traveling at 45 km/hr will require 10 meter to stop.



a) How much distance is required to stop a vehicle traveling 90 km/hr?

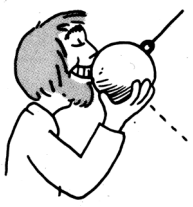
b) How much distance is required to stop a vehicle traveling 180 km/hr?

Conservation of Energy

27. What is the law of conservation of energy?

28. Write the formula for conservation of energy.

29. A physics instructor demonstrates energy conservation by releasing a heavy pendulum bob, as shown in the sketch, allowing it to swing to and fro. What would happen if in his exuberance he gave the bob a slight shove as it left his nose? Explain.



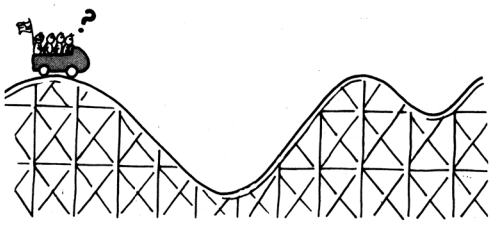
© 2016 Doc Fizzix Products, Saving the world with his knowledge of science

30. In the space below, draw a picture of a pendulum as it swings from one side to the other. Label where it has the maximum KE and maximum PE. Also label where the pendulum will have an equal amount of KE and PE.

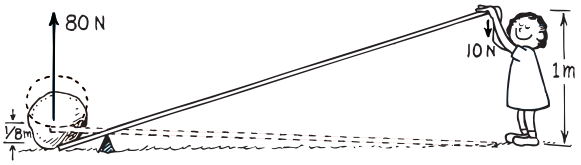
31. In the space below, draw a roller coaster and label the points of maximum KE and PE.

32. You are discussing the design of a roller coaster with two classmates. One classmate says that each hill must be lower than the previous one. Your other classmate says that as long as the first one is the highest, it doesn't matter what height the other hills. What do you say?

33. In the picture below, does the roller coaster make it up the next hill? Does friction make a difference in your answer?



Machines



34. How does the work you put into a machine compare to the work you get out of a machine?

35. Write the work in work out formula.

Lost Forms of Energy

36. Explain why a super ball will never bounce to its original height.

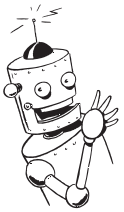
37. What forms of energy are considered the lost forms of energy?

38. Does it violate the law of conservation of energy when a super ball does not bounce back to its original release height? Explain

39. Write a formula for conservation of energy that includes heat and sound.

40. On a playground slide, a child starts with 1000 J of energy at the top of a slide. At the bottom of the slide the child has only 600 J of energy, how much and where is the missing energy?

© 2016 Doc Fizzix Products, Saving the world with his knowledge of science



41. True or false, using the radio, lights, and/or air conditioner in your car affects the gas mileage?

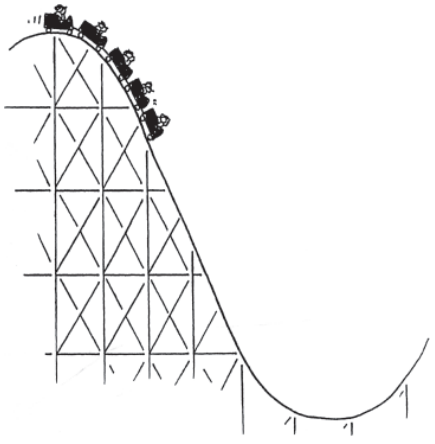
42. How much energy is stored in one liter of gasoline?

43. How far can a car travel on one gallon of gasoline assuming 1000 N of friction?

44. If an automobile's engine was 100% efficient would you still need an exhaust/muffler and would the engine still get hot to the touch? Explain

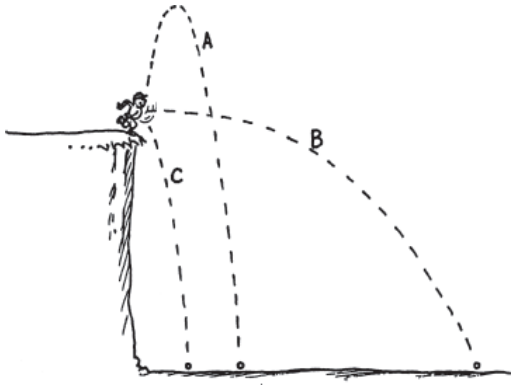
45. What is the number one reason why patents get turned down at the US Patent Office?

46. In which car will you be moving fastest at the very bottom of the incline?



c) The front car
d) The middle car
e) The back car

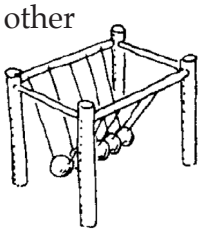
47. Three baseballs are thrown from the top of the cliff along paths A, B and C. If their initial speeds are the same and there is no air resistance, the ball that strikes the ground below with the greatest speed will follow which path?



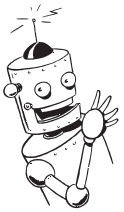
a) A
b) B
c) C

Newtonian Demonstrator

48. Consider the swinging-balls apparatus. If two balls are lifted and released, momentum is conserved as two balls pop out the other side with the same speed as the released balls at impact. But momentum would also be conserved if one ball popped out at twice the speed. Can you explain why this never happens?



© 2016 Doc Fizzix Products, Saving the world with his knowledge of science

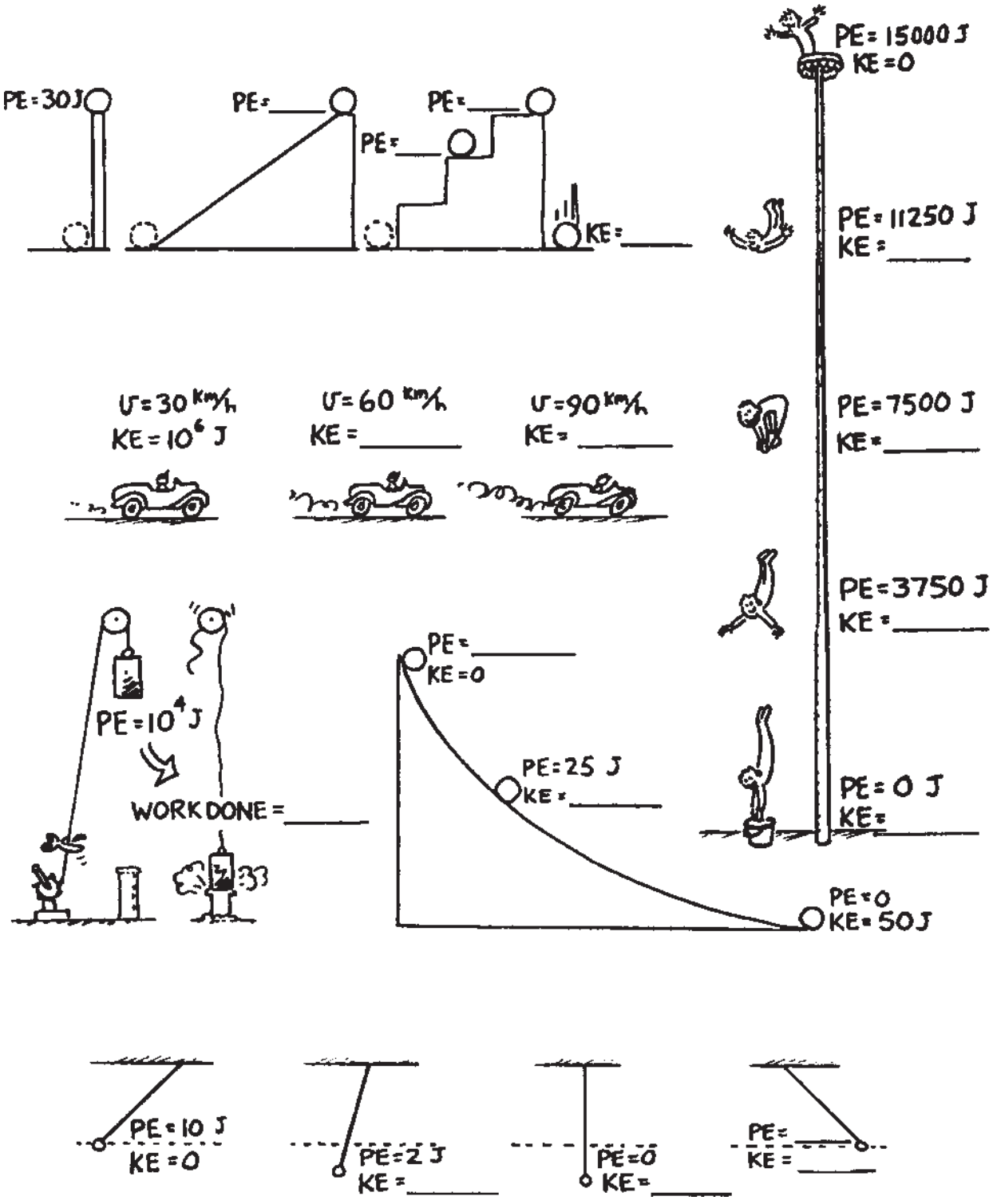


Name _____ Period _____ Date _____

Chapter 8 Work and Energy

Conservation of Energy

1. Fill in the blanks for the six systems shown.



© 2016 Doc Fizzix Products, Saving the world with his knowledge of science