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Conceptual Physics: _____
Date: _____

Unit IV
Work, Power and Machines
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IV

Video: Work and Energy

Objective: Develop an understanding of the energy, the states of energy and the concept of work as a function of energy.

Directions: Answer the following questions as you watch the video.

1. Matter and _____ make up the physical universe.
2. Matter cannot be _____ nor destroyed.
3. The total amount of energy in the universe remains _____.
4. To a physicist energy is work or the capacity to perform _____.
5. Work is when a force is applied to an object so that it moves a _____.
6. The formula for work is _____
7. Work (W) equals total force (F) times the _____ moved x.
8. Though energy has many _____ it is all the same thing.
9. Objects in _____ all possess energy.
10. Energy in motion is called _____ energy.
11. Another form of energy is potential energy or the energy of _____.
12. Gasoline in a gas tank is a form of _____ energy until it explodes in the cylinder.
13. All matter is made up of _____ that are held together by positive and negative forces.
14. Static electricity is the electrical discharge of electrons jumping to _____ the protons.
15. The nervous systems in animals are made up of _____ charges transmitted by special cells called neurons.
16. The most important source of electromagnetic energy on Earth is the _____.
17. Within the nucleus of atoms the strong nuclear force holds the protons and neutrons together in the form of potential _____.

18. Sometimes this energy is released in the form of _____ energy.
19. The Sun is made up primarily of _____.
20. When two isotopes of hydrogen atoms fuse to produce _____ atoms energy is released.
21. This process is called _____.
22. Fission is the process of _____ atoms.
23. The source of all energy for all living things is a _____ process called photosynthesis.
24. Photosynthesis can only be performed in the _____ of plants and some microorganisms.
25. Electromagnetic waves from the sun provide the energy to convert water (H_2O) and carbon dioxide (CO_2) from the air are combined to form oxygen and _____.
26. Glucose is a source of chemical energy that is stored as _____ energy.
27. When animals eat plants the glucose is _____ as energy in their cells.
28. Energy stored in the cells of the wood can be transformed into _____.
29. Coal is the remains of ancient _____ fossilized millions of years ago.
30. An advantage of these forms of energy is that they can be _____ for long periods of time.
31. Sound is a form of kinetic _____.
32. When sound is created the molecules adjacent to the instrument are _____ and radiates outward.
33. Heat, a form of kinetic energy, is the consequence of the rapid _____ molecules.
34. When the molecules slow down the object _____.
35. The force of _____ always has a heat byproduct.
36. The movement of parts of a machine creates friction which is released as _____.
37. One of the most remarkable things about energy is that it is constantly being _____ and recycled from one form to another.
38. The sheep eating grass convert the chemical _____ in the leaves into a form that can be used in their bodies.
39. The conversion of energy from one form to another is called an energy _____.

40. Electricity has become our most important _____ of energy.
41. Electricity can be generated when _____ are rotated in an electrical field.
42. Kinetic energy is needed to _____ the magnets. Steam power from the burning of coal, natural gas or nuclear fission is one method.
43. Wind and _____ power are other sources of kinetic energy.
44. Water power is one of the most environmentally _____ sources of energy.
45. The water sitting above the dam is _____ energy.
46. As the water travels through the tunnels spins turbines which spin magnets that produce electricity.
47. Energy of electricity can be converted to various uses in your home such as _____ electric light bulbs.
48. Another example of the _____ of energy is the automobile.
49. Car engines have a serious problem with _____.
50. 70% of the energy in a cars engine is converted to heat which requires a _____ system.
51. The study of heat has resulted in the three _____ of thermodynamics
52. The first law states that energy can neither be _____ nor destroyed
53. The second law says that energy flows from the center outward until it reaches _____.
54. The third law states that as a system approaches absolute _____, the extraction of energy becomes more and more difficult.
55. At absolute zero temperature the _____ can pass through wire with no resistance.
56. Albert Einstein challenged the view that _____ and energy were separate.
57. Einstein's equation stated that energy (E) equals mass (m) times the speed of _____ squared (c^2).
58. This formula indicates that matter and energy are _____ aspects of the same thing.

Quiz

1. Energy can be created and sometimes destroyed. True or False
2. The formula physicists use to express the expenditure of work or energy is _____.
3. Kinetic energy is described as energy of matter in motion. True or False
4. Potential energy is NOT important in the total amount of energy available in the universe. True or False
5. Electromagnetic energy only exists as radiant energy from the Sun and stars. True or False
6. Under intense heat two hydrogen isotopes will fuse to form a helium atom and release energy. This process is called _____.
7. Photosynthesis is a process that converts energy from the Sun into chemical energy in the leaves of plants. True or False
8. Energy can be changed and recycled from one form to another. True or False
9. The second law of thermodynamics concludes that all things are moving towards _____.
10. Einstein's formula of $E = mc^2$ states that energy equals mass times the speed of light squared. True or False

