

**Chapter 17, Part 1.**

1. The definition of energy is the \_\_\_\_\_ to make things \_\_\_\_\_. In some cases it is easy to see the motion, in others it is more difficult. Give several examples of energy and motion:
2. It is important to remember that energy is the \_\_\_\_\_ to make things move, although the energy may be stored up before it becomes \_\_\_\_\_ energy. \_\_\_\_\_ is an example.
3. Why is it important to study about energy and its usage?
4. Energy use can be classified either as \_\_\_\_\_ or \_\_\_\_\_.

**Part 2.**

5. An energy \_\_\_\_\_ is the material in \_\_\_\_\_ that can be changed into useful energy. Until about 500,000 years ago, \_\_\_\_\_ and \_\_\_\_\_ were the only energy resources. Then \_\_\_\_\_ was discovered and people were easily able to make heat and light.
6. Since people have learned to use \_\_\_\_\_, \_\_\_\_\_, and \_\_\_\_\_ as sources of energy, the amount of energy we use has grown for what two reasons?
7. A \_\_\_\_\_ can be renewed within an average human lifetime. Two common renewable resources include materials from \_\_\_\_\_ and \_\_\_\_\_ and the \_\_\_\_\_ found in rivers. A \_\_\_\_\_ takes so long to renew that once it is used up, it may as well be gone for ever!
8. \_\_\_\_\_ is made from plants and animal wastes which contain \_\_\_\_\_ energy. This is obtained indirectly from the \_\_\_\_\_ and the process of \_\_\_\_\_. What are some of the advantages and disadvantages of Biomass fuel sources?

9. The energy produced by \_\_\_\_\_ water is called \_\_\_\_\_. To control the water, \_\_\_\_\_ are built along rivers to create water reserves. The advantages of hydroelectricity include:
10. A \_\_\_\_\_ is an energy source formed from the decomposition of plants and animals millions of years ago. \_\_\_\_\_ is a solid made up of carbon, an element found in all living things. As plants died and decayed, they sank into swamps and the result was \_\_\_\_\_. \_\_\_\_\_ and \_\_\_\_\_ are chemical compounds called \_\_\_\_\_.
11. With the help of a diagram, briefly describe the formation of hydrocarbon fossil fuels over time:
12. Coal is \_\_\_\_\_ found between the layers of \_\_\_\_\_ rock. They may be thin or thick. Petroleum and natural gas \_\_\_\_\_ found in separate layers, they travel through the \_\_\_\_\_ in the sedimentary rock until they are \_\_\_\_\_ by solid rock. Wherever sedimentary rock exists, there is a chance of finding \_\_\_\_\_.
13. What \_\_\_\_\_ methods are used to remove coal from the ground?
14. Removing petroleum and natural gas from the ground may be either \_\_\_\_\_ or difficult! On land it is easier, out to sea the task is much more difficult. Transportation of the fossil fuel also represents a major challenge. Describe some of the problems associated with this:

### Part 3.

15. The process to separate pure substances from a mixture of petroleum is called \_\_\_\_\_. Most of the heat and light resulting from burning fossil fuels comes from \_\_\_\_\_ reactions. In one reaction, \_\_\_\_\_ combines with carbon in the fuel to make \_\_\_\_\_. In the other reaction, \_\_\_\_\_ in the fuel combines with oxygen to make water vapour. Burning fossil fuels also produce unwanted \_\_\_\_\_ like soot, smoke, gases, and pollution. Another problem can be the formation of \_\_\_\_\_ rain or \_\_\_\_\_.
16. Briefly describe the concerns and environmental problems caused by the burning of fossil fuels:

17. Explain why do you think that it is important to conserve energy? What tips do you suggest?

#### **Chapter 18, Part 4.**

18. Review Figure 18.1 on page 386 of your textbook. See if you can find the many types of energy. There are essentially two classes of energy. \_\_\_\_\_ energy, like the energy stored in a stretched out sling shot, is stored energy. Energy in motion is called \_\_\_\_\_. List several examples of these energy types below:
19. Energy is measured in units called \_\_\_\_\_. Review Figure 18.2 on page 389 of your textbook and see how many kJ units are require to do a number of common activities. A change of one form of energy to another is called an energy \_\_\_\_\_. Examples of this include \_\_\_\_\_ a basket ball. Write a word equation for this example below:
20. Briefly list as many common energy transformations as you can think of in the space below:
21. Read about *Physiotherapy Technologies* on page 395 of your textbook. What is Physiotherapy?

#### **Part 5.**

22. The \_\_\_\_\_ of conservation of energy states that : \_\_\_\_\_  
 \_\_\_\_\_. In other words, the amount of energy before a transformation is always exactly equal to the amount of energy after the transformation. This is a fundamental scientific idea. Two important parts of the law of conservation of energy affect energy transfer:
23. The disadvantage of using fossil fuels is that they are \_\_\_\_\_, can harm the \_\_\_\_\_, and will not \_\_\_\_\_. As a result, our society has to find \_\_\_\_\_. What features would such fuels have?
24. The advantage of hydroelectric generating stations is that their energy is renewable. The water behind a dam has \_\_\_\_\_ potential energy. As the water falls it helps drive a \_\_\_\_\_ wheel device that is connected to generators to produce electrical energy.
25. Why may hydroelectricity not be an ideal energy solution for everyone?
26. Biomass fuels from plant and animal wastes are \_\_\_\_\_ easy to use because they must firstly be \_\_\_\_\_ up for use and require a lot of room for \_\_\_\_\_. Another method for making biomass fuels is strongly \_\_\_\_\_ up \_\_\_\_\_ with out oxygen. This method produces \_\_\_\_\_ which can be burned as a fuel.
27. Another method is to use \_\_\_\_\_ organisms like \_\_\_\_\_ or \_\_\_\_\_. They act on biomass with little or no oxygen to make \_\_\_\_\_. The method can also be used to make \_\_\_\_\_ and \_\_\_\_\_ from corn, sugar, or even wood! The alcohol produced can be mixed with \_\_\_\_\_ for cars, or even used as \_\_\_\_\_.

28. Compare the advantages and disadvantages of utilising biomass fuels:
29. Other alternate sources of energy include \_\_\_\_\_. With the sun, wind energy could not exist since it is caused by the different \_\_\_\_\_ that the land and \_\_\_\_\_ surfaces heat or cool. The difference between them causes the air to move and make winds.
30. Compare the advantages and disadvantages of utilising wind energy:
31. Energy collected from the sun and its radiation is called \_\_\_\_\_. This is a \_\_\_\_\_ and \_\_\_\_\_ resource. Solar energy absorbed by the materials used to build houses is stored as \_\_\_\_\_ energy. During the night and as the temperature cools off, thermal energy in the \_\_\_\_\_ and \_\_\_\_\_ is slowly released!
32. Compare the advantages and disadvantages of utilising solar energy:
33. About twice a day the ocean waters surge in and out with the tides. \_\_\_\_\_ results from the \_\_\_\_\_ of the moon and sun on the oceans. This is independent of solar energy, but it can be transformed in to \_\_\_\_\_ by the use of dams and \_\_\_\_\_ electric turbines. This is a very clean, \_\_\_\_\_, and renewable resource.
34. \_\_\_\_\_ and \_\_\_\_\_ are evidence of thermal energy under the earth's surface. When heat comes from the Earth's interior this is called \_\_\_\_\_ energy. Compare the advantages and disadvantages of utilising geothermal energy:

## Chapter 19, Part 6.

35. A \_\_\_\_\_ is a push or a pull. All forces may cause \_\_\_\_\_ when they act on an object or material, this is called an \_\_\_\_\_. Once an object starts to move it will continue to do so until another force, like \_\_\_\_\_, acts upon it. Friction is a force that \_\_\_\_\_ motion. The rougher the surface and rubbing, the \_\_\_\_\_ the friction.
36. \_\_\_\_\_ is a force of attraction between all objects on Earth. It can slow down or speed up objects depending on the \_\_\_\_\_ or \_\_\_\_\_ energy in question. A unit for measuring force is the \_\_\_\_\_, named after famous scientist Sir Isaac Newton. Force is sometimes measured by the amount of pull on a \_\_\_\_\_.
37. The scientific definition of work is: \_\_\_\_\_.  
Work is done on an object only when a force moves that object through a \_\_\_\_\_.  
This depends on what two factors? Write the equation for work in the space below:
38. The measuring unit of \_\_\_\_\_ is a \_\_\_\_\_ metre, or *Joule*. One joule is amount of work done when a force of \_\_\_\_\_ pushes or pulls an \_\_\_\_\_ a distance of \_\_\_\_\_. Try the problem posed in the example on page 415 of the text.

## Part 7.

39. A \_\_\_\_\_ is a device that helps us to do work more \_\_\_\_\_. The amount that a machine can \_\_\_\_\_ a force is called its \_\_\_\_\_. The equation for this is written as follows:
40. The amount of force needed to move an object without a machine is called \_\_\_\_\_. Whereas, the amount of force needed to move an object with a machine is \_\_\_\_\_. Describe three different examples of the function of machines and their ability to do work:
41. Consider the ramp example in your book. What general statement can we make about machines?

42. Believe it or not, all machines are made up of one or more of a group of six simple machines. Using the space below, briefly describe each of the six simple machine called the \_\_\_\_\_ plane, the \_\_\_\_\_, the \_\_\_\_\_, the \_\_\_\_\_ and \_\_\_\_\_, the \_\_\_\_\_, and finally the \_\_\_\_\_:

**Part 8.**

43. Moving \_\_\_\_\_ are always involved whenever simple machines are used. The surfaces of

the moving parts slide against each other and cause \_\_\_\_\_. Extra \_\_\_\_\_ must be used to overcome friction. To compare machines we calculate their \_\_\_\_\_. The \_\_\_\_\_ of a machine is its \_\_\_\_\_ as a percentage of its \_\_\_\_\_. Write equations below for both ways of describing efficiency:

44. Consider the example in your book. What general statement can we make about real machines?

### Chapter 20, Part 9.

45. To understand the scientific meaning of temperature, you must know about the theory of matter called \_\_\_\_\_. Briefly describe the Kinetic molecular theory.
46. The measure of average energy of the particles in a solid, liquid, or gas is called \_\_\_\_\_. At any given time, some molecules of a substance may be moving faster or slower than others, but it is the average of the energy which results in the temperature. The total energy of all of the particles in an object is called the \_\_\_\_\_ energy and depends on its quantity.
47. When comparing terms like temperature or thermal energy, it involves only one substance at a time. When discussing \_\_\_\_\_ we are talking about two substances or objects! \_\_\_\_\_ is the amount of energy \_\_\_\_\_ from one object at a higher temperature to an object at a \_\_\_\_\_ temperature. Energy in the form of heat is often transferred through objects.
48. For example & according to the kinetic molecular theory, hot water particles in a beverage have a high amount of \_\_\_\_\_. This collides with the inside of the mug, which in turn transfers the energy to other mug particles and eventually to the out side and your \_\_\_\_\_.

**Part 10.**

49. Heat capacity and heat transfer have a great deal to do with our \_\_\_\_\_. Being close or far from large bodies of \_\_\_\_\_ affects the type of weather a region can expect. Substances which heat up and cool slowly are said to have a greater \_\_\_\_\_ capacity. They take a lot of energy to raise their \_\_\_\_\_, but tend to release that energy quite slowly.
50. In what ways does water demonstrate a high heat capacity?
51. Different substances have different \_\_\_\_\_. To compare heat capacities of various substances you must use an \_\_\_\_\_ of each substance. The amount of heat \_\_\_\_\_ when the temperature of 1.0 kg of the substance changes \_\_\_\_\_ ie:
52. Review the Specific Heat Capacities Table 20.2 on page 443 of your text. What do you notice?
53. Matter may exist in one of \_\_\_\_\_ states: \_\_\_\_\_. List the properties of each state in the space provided below:
54. Briefly describe the six possible changes of state of matter in the space provided below:

55. Kinetic molecular theory helps explain why a substance's \_\_\_\_\_ remains constant during a change of \_\_\_\_\_. The theory also states that the particles of a substance are constantly \_\_\_\_\_. As the melting point is reached, the temperature does not rise, instead the substance particles are set \_\_\_\_\_ to move around. A graph of this change of state is called a \_\_\_\_\_.
56. Other changes of state are \_\_\_\_\_ to melting. As substances cool, the reverse process happens. This is called the \_\_\_\_\_. The melting and boiling points for different substances happen at different \_\_\_\_\_. The melting point and freezing point of a \_\_\_\_\_ substance are the same.

**Part 11.**

57. The freezing point of water \_\_\_\_\_ when other substances are added to it. Mixing \_\_\_\_\_ with water lowers its freezing point. Adding \_\_\_\_\_ to water also lowers its freezing point and is often used on icy \_\_\_\_\_ or \_\_\_\_\_.
58. A change in \_\_\_\_\_ affects the \_\_\_\_\_ temperature of water. If the air pressure is high, the boiling point is \_\_\_\_\_. At higher mountain elevations, the boiling point of water is \_\_\_\_\_. This can lead to overheating in automobile engines!
59. How does blanching vegetables in the frozen food industry help to preserve food?
60. How can fruit farmers and orchardists protect their crops from frost damage?
61. An old-fashioned method of heating buildings was to use steam radiators. Steam made from a furnace travels a system of pipes and radiators where it \_\_\_\_\_ back to water. As it does, the steam releases a lot of \_\_\_\_\_ and provides heat for the room.
62. Why are steam burns so dangerous? Which part of the steam cloud is the most dangerous?