

# Unit 6 Review

Science Review  
Energy/Work/Alternative Energy Sources

Name \_\_\_\_\_  
Date \_\_\_\_\_

## Vocabulary: Review these words!

Combustion: rapid BURNING of FUELS that takes place in engines

Conduction: TRANSFER of ENERGY by DIRECT CONTACT (usually in SOLIDS)

Conductor: Material that ALLOWS HEAT TO GO THROUGH (Ex.: copper, aluminum)

Convection: TRANSFER of ENERGY THROUGH FLUIDS (usually GAS or LIQUIDS)

Degrees Celsius: UNITS for measuring TEMPERATURE

Energy: the ABILITY TO CAUSE CHANGE

External combustion engine: a device that BURNS FUEL OUTSIDE ENGINE (steam engine)

Fluid: GAS or LIQUID; any substance that FLOWS

Heat engine: a device that CHANGES THERMAL ENERGY TO MECHANICAL ENERGY

Heat mover: a device that TRANSFERS ENERGY from HOT to COLD

Insulator: material that DOESN'T ALLOW HEAT TO GO THROUGH EASILY (Ex.: wood, glass, plastic)

Internal combustion engine: a device that BURNS FUEL INSIDE ENGINE (car engine)

Joule: UNIT FOR measuring WORK, ENERGY, and HEAT (equal to 1 Newton-meter)

Kinetic Energy (KE): Energy of MOTION; depends on MASS & VELOCITY

Law of Conservation of Energy: says ENERGY CAN'T BE CREATED or DESTROYED, but CHANGES FORM

Magma: MELTED ROCK

Potential energy: STORED energy; TWO TYPES: CHEMICAL (foods & gas) or GRAVITATIONAL (position or height); depends on CONDITION or POSITION

Radiant energy: energy from the SUN (also called SOLAR ENERGY)

Radiation: Transfer of energy that DOES NOT REQUIRE MATTER (Ex.: microwaves)

R- value: a NUMBER THAT TELLS the EFFICIENCY of INSULATION (higher numbers are MORE EFFECTIVE)

Specific heat: the AMOUNT of ENERGY it takes TO RAISE TEMPERATURE of 1 kilogram of material 1 degree Celsius (the HIGHER the SPECIFIC HEAT, the MORE HEAT it can HOLD BEFORE IT FEELS HOT)

Thermal pollution: WASTE THERMAL ENERGY that changes temperature of water in the environment;  
HARMFUL to PLANTS & ANIMALS

Work: the MOVEMENT of FORCE THROUGH A DISTANCE (WORK = FORCE x DISTANCE)

### THE MOST CONFUSING DEFINITIONS:

These are the definitions that are most often confused and some tips that should help you keep them straight:

HEAT: the *MOVEMENT* of energy *FROM WARMER TO COOLER* areas (you want to heat cool things up!)

TEMPERATURE: the *AVERAGE KINETIC ENERGY of all the particles* in a sample of matter (this is the longest word and it goes with the longest definition!)

THERMAL ENERGY: the *TOTAL ENERGY* (both KE and PE) of the particles in a material (Has energy in the definition and both THERMAL and TOTAL begin with a T and end in an AL)

### PRACTICE EXERCISES:

I. MATCH the definitions with the vocabulary words.

- |  |                                  |
|--|----------------------------------|
| ___ 1. Unit for measuring heat, work & energy                      | A. energy                        |
| ___ 2. Transfer of energy by moving FORCE THROUGH A DISTANCE       | B. Joule (J)                     |
| ___ 3. STORED energy   | C. kinetic energy                |
| ___ 4. Says ENERGY CAN'T BE CREATED OR DESTROYED, but CHANGES FORM | D. work                          |
| ___ 5. Ability to CAUSE CHANGE                                     | E. law of conservation of energy |
| ___ 6. Energy of MOTION  | F. potential energy              |

II. Identify each item as having KINETIC ENERGY (KE) or POTENTIAL ENERGY (PE).

- \_\_\_ 7. Ants crawling      \_\_\_ 8. Climbing stairs      \_\_\_ 9. An apple  
\_\_\_ 10. A battery in a remote      \_\_\_ 11. An apple on a tree      \_\_\_ 12. Gasoline  
\_\_\_ 13. A glass of juice      \_\_\_ 14. Rock on a cliff      \_\_\_ 15. Candy bar

III. For each item you marked with a PE, place it in the appropriate column below.

Gravitational Potential Energy	Chemical Potential Energy

IV. Calculate the WORK done in the following. USE THE FORMULA  $W = F \times D$ . Don't forget units! (JOULES!) ALSO, be careful! If the object DOESN'T MOVE IN THE DIRECTION OF THE FORCE, NO WORK IS DONE!

17. Michael lifts a 50 N sack of groceries 1.5 meters from the ground to the car's trunk.  
18. Steven pushes a 250 N bookcase 5 meters across the floor.  
19. Brandon lifts a 150 N buck and carries it 30 meters across the field.

V. Fill in the Blanks. Choose a word from the WORD BANK below to complete the sentence.

CHEMICAL      DISTANCE      CHANGE      HEAT      KINETIC

20. To most scientists, WORK is the transfer of FORCE through \_\_\_\_\_.

21. The energy STORED in food, fuel, & batteries is \_\_\_\_\_ potential energy.
22. The law of conservation of energy says that matter can't be created or destroyed, but it can \_\_\_\_\_ form.
23. TEMPERATURE is a measure of the AVERAGE \_\_\_\_\_ ENERGY of the particles in a material.
24. The MOVEMENT from WARMER to COOLER areas is called \_\_\_\_\_.

VI. TRUE OR FALSE. Put T if True, correct the underlined word if it's false.

25. The amount of KINETIC ENERGY depends on mass and SHAPE. \_\_\_\_\_
26. The POTENTIAL ENERGY depends on its POSITION or condition. \_\_\_\_\_
27. WORK & HEAT are measured in degrees Celsius. \_\_\_\_\_
28. The MORE MASS something has the LESS thermal energy it has. \_\_\_\_\_
29. TOTAL Kinetic and potential energy is THERMAL energy. \_\_\_\_\_

VII. Fill in the Blanks with the words below to complete the following sentences.

CONDUCTION      GEOTHERMAL      NUCLEAR      POTENTIAL  
TEMPERATURE      THERMAL      WIND

30. Some countries use \_\_\_\_\_ to power WINDMILLS to generate electricity.
31. The transfer of energy through DIRECT CONTACT is called \_\_\_\_\_.
32. Taking ENERGY from INSIDE the EARTH, like MAGMA is using \_\_\_\_\_ energy.
33. STORED ENERGY is called \_\_\_\_\_ energy.

34. The AVERAGE KINETIC ENERGY of all the particles in a material is called \_\_\_\_\_.

35. Power made from SPLITTING ATOMS is called \_\_\_\_\_ energy.

VIII. Multiple Choice. CIRCLE the answer you think best fits the sentence/question.

36. The amount of HEAT needed to raise 1 kg 1 degree Celsius is:

- A. specific heat
- B. temperature
- C. warmth

37. High specific heat means:

- A. it gets hot quickly
- B. it can take a lot of heat before it feels hot
- C. the temperature it takes to destroy Darth Vader

38. Insulation with an R-value of 50 is \_\_\_\_\_ to heat loss than R-5.

- A. Less resistant
- B. More resistant
- C. Not resistant

39. Thermal pollution can be controlled by using:

- A. Officer Joe to arrest offenders
- B. Greenhouses
- C. Cooling towers

40. When water temperature gets too hot and is released in the environment:

- A. it causes water pollution
- B. it causes thermal pollution
- C. it causes air pollution

41. Some sources of thermal pollution are:

- A. factories & power plants
- B. thermal underwear and thermoses left in the rain
- C. mercury from thermometers dumped in rivers

42. Which of the following is an example of a heat mover:
- A. refrigerator
  - B. the delivery truck for Trane heating systems
  - C. Sting or Hulk Hogan in a WCW match
43. Gasoline engines are examples of:
- A. external combustion engines
  - B. internal combustion engines
  - C. turbocharged engines
44. Wind and ocean currents, both FLUIDS, heat up by:
- A. conduction
  - B. convection
  - C. radiation
45. Which word means to BURN FUEL?
- A. burning
  - B. combustion
  - C. conduction
46. Which type of energy transfer DOES NOT REQUIRE MATTER, so it can take place in a vacuum?
- A. conduction
  - B. convection
  - C. radiation
47. A \_\_\_\_\_ changes heat into MECHANICAL energy.
- A. heat engine
  - B. heat magician
  - C. heat mover