Name: _____ **Date:** _____ **Block:** _____

Heat Energy (Conservation & Transfer) Unit Study Guide

Matching

Match the correct definition to each term.

1. ____ Insulator
2. ____ Conductor
3. ____ Heat
4. ____ Thermal equilibrium
5. ____ Temperature
6. ____ Medium
7. ____ Thermal energy
8. ____ Heat transfer
9. ____ Conduction
10. ____ Convection
11. ____ Radiation
12. ____ Thermal expansion
13. ____ Thermal contraction

a. Form of energy caused by the internal movement of molecules

b. Transfer of heat through a medium by direct contact of molecules, without movement of the material itself.

c. Transfer of heat by movement of currents within fluids or liquids.

d. Enlargement that occurs when materials are heated, since heat is absorbed.

e. Material that does not easily allow the transfer of heat, electricity, light or sound.

f. Heat energy moving from a warmer object to a cooler object.

g. Measure of the average kinetic energy of the individual particles in an object.

h. Transfer of heat through electromagnetic waves in space.

i. Total energy of the particles in a substance.

j. Material that readily allows the transfer of heat, electricity, light, or sound.

k. Material through which heat can be transferred; can be solids, liquids, gases, or even a vacuum/space.

l. Heat flow through materials or across space from warmer objects to cooler objects, until *both* objects are at the same temperature.

m. Shrinkage that occurs when materials are cooled, since heat is released.

True and False

Identify the following statements as either True or False. If the statement is false, correct the wrong word.

14. _____ The transfer of heat always travels in one direction from hot to cold.
15. _____ A material that conducts (or transfers) heat well is called an insulator.

16. _____ A conductor is a material that does not conduct (or transfers) heat well.

17. _____ The more molecules in a substance, the greater the heat energy contained.

18. _____ The expansion of matter when it is heated is known as thermal contraction.

19. _____ The more molecules a material has, the greater the heat energy of the object.

20. _____ During thermal equilibrium, molecules move from cold to warm until they reach a balance.

Fill in the Blank
Fill in the blank with the term that correctly completes the sentence.

21. Radiation is the transfer of energy through _____ _____.

22. A substance generally expands when its _____ increases.

23. The circular movement when heated fluid rises and is replaced by a cooler fluid is called a(n) _____ _____.

24. Metals, like copper or aluminum, are good _____ of heat and electricity.

25. When a substance changes from a solid to a liquid, _____ occurs; however, when a substance changes from a liquid to a solid, _____ _____ occurs.

26. The direction of heat movement is from _____ temperature to a _____ temperature.

27. The phase of matter that has the highest contraction of molecules is ____ _____.

28. Wool is a good _____ of heat and electricity.

Identifying Conduction, Radiation, and Convection
Read each example carefully. Label the example with the appropriate method of heat transfer.

29. _____ Sunlight melts a wax crayon left outside.

30. _____ A kite rises high above a hot, sandy beach.

31. _____ An entire lake is heated by water from a hot spring at the bottom of the lake.

32. _____ A burner on a stove heats the bottom of a pot.

33. _____ You feel the warm glow of a bonfire.

34. _____ A cup of hot cocoa warms your hands while you hold it.

35. _____ Water boiling on a stove.

36. _____ Feeling the heat on your bare feet as you stand on the sidewalk.

37. _____ Water near the surface of a swimming pool is slightly warmer than the rest of the water.

38. _____ Cause of the weather systems on Earth.

39. _____ Spoon used to stir hot coffee becomes warm.

Classifying Conduction, Radiation, and Convection

Read each example carefully. Write the example under the appropriate method of heat transfer.

- Transfers through solids
- Sun rays reaching the Earth
- Transfers through space
- Transfers through fluids
- Burning your tongue with hot chocolate
- Moves as a wave
- Pot of boiling water
- Moves as a current
- Direct contact is required

Conduction	Radiation	Convection

Short Answer Questions (2-3 sentences)

Answer the following questions to the best of your ability. Make sure to answer every component of the questions and to incorporate the appropriate vocabulary terms.

40. The dry end of a metal spoon sitting in a pan feels warm, but the dry end of a wooden spoon does not. Why?

41. What happens to the movement of molecules as the temperature is increased?

42. What happens to the density of molecules as the temperature is increased?

43. Explain why you would want to have a car with fabric covered seats rather than leather covered seats.

44. After running the mile, your friends lies down on a tile floor, because he says that the "coldness of the tile transfers to his body." Why is this statement incorrect?

45. Small gaps are placed between the lengths of railway tracks. Why are tracks built this way? What might happen if there were no gaps between the tracks?

46. Explain how hawks and eagles can cruise high in the air without needing to expend much energy.

47. Compare and contrast how you would dress on a warm, summer day versus a cold, wintery day. Be as specific as possible and incorporate all possible terms.

48. A hot stone is placed in a beaker of cold water. Explain what happens to the stone and the water after a period of time. Why?

49. Examine the illustration below. Use the terms molecules, heat, expansion, and contraction in your explanation.

Hot Metal Ball

Cold Metal Ball