

Thermal Energy and Heat ▪ *Guided Reading and Study*

Temperature, Thermal Energy, and Heat

This section describes the three common temperature scales and explains how temperature, thermal energy, and heat are related.

Use Target Reading Skills

This section explains how temperature, thermal energy, and heat are related. As you read the section, compare and contrast temperature, thermal energy, and heat by completing the graphic organizer. The completed graphic organizer can be used to see the ways in which temperature, thermal energy, and heat are similar and different.

| | Energy Measured | Units |
|----------------|-----------------|-------|
| Temperature | | |
| Thermal Energy | | |
| Heat | | |

Temperature

1. Is the following sentence true or false? The faster that particles of matter move, the more kinetic energy they have. _____

2. What is temperature?

3. Which particles are moving faster, the particles in a mug of hot cocoa or the particles in a glass of cold chocolate milk?

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Temperature, Thermal Energy, And Heat *(continued)*

4. What are the three common scales for measuring temperature?
 - a. _____
 - b. _____
 - c. _____
5. The most common temperature scale in the United States is the _____ scale.
6. The temperature scale used in most of the world is the _____ scale.
7. The temperature scale commonly used in physical science is the _____ scale.
8. What are the intervals on the Fahrenheit scale called?

9. Which scale is divided into 100 equal parts between the freezing and boiling of water? _____
10. What is the temperature called at which no more energy can be removed from matter? _____
11. Complete the following table.

| Temperature Scales | | | |
|---------------------------|----------------------|----------------------|--------------------|
| Scale | Absolute Zero | Water freezes | Water boils |
| Fahrenheit | -460° | | |
| | -273° | | 100° |
| | 0 | 273 | |

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12. The total energy of the particles in a substance is called its _____ energy.
13. Circle the letter of each sentence that is true of thermal energy.
 - a. Thermal energy partly depends on the temperature of a substance.
 - b. Thermal energy partly depends on the scale used to measure the temperature of a substance.
 - c. Thermal energy partly depends on how the particles of a substance are arranged.
 - d. Thermal energy partly depends on the number of particles of a substance.

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Specific Heat

14. What is a substance's specific heat?

15. What is the unit of measure for specific heat?

16. Materials with a high specific heat can absorb a great deal of thermal energy without a great change in _____.

17. The energy gained or lost by an object is related to which of the following? Circle the letter of the terms that answer the question.

- a. mass
- b. volume
- c. specific heat
- d. change in temperature

18. What is the formula you can use to calculate thermal energy changes?
