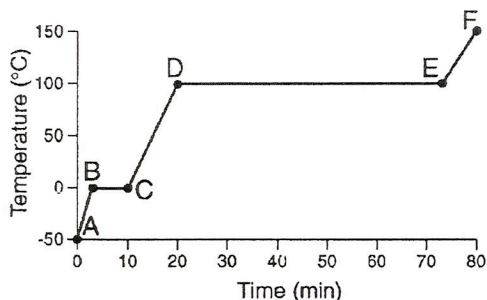


Key

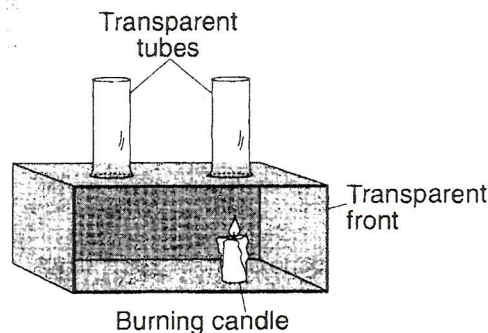
1. Base your answer to the following question on the graph below which shows the results of a laboratory activity in which a sample of ice at -50°C was heated at a uniform rate for 80 minutes. The ice has a mass of 200 grams.



What was the total amount of energy absorbed by the sample during the time between points B and C on the graph?

- A) 334 joules
 B) 9,124 joules
 C) 26,720 joules
 D) 66,800 joules
2. Which process transfers energy primarily by electromagnetic waves?
- A) radiation
 B) evaporation
 C) conduction
 D) convection
3. What is the basic difference between ultraviolet, visible, and infrared radiation?
- A) half-life
 B) temperature
 C) wavelength
 D) wave velocity
4. What happens to most of the sunlight that strikes a dark-colored area of the Earth's surface?
- A) It is reflected and scattered as potential energy.
 B) It is reflected and diffused as ultraviolet radiation.
 C) It is absorbed and reflected as light.
 D) It is absorbed and reradiated as heat.
5. Land surfaces of Earth heat more rapidly than water surfaces because
- A) more energy from the Sun falls on land than on water
 B) land has a lower specific heat than water
 C) sunlight penetrates to greater depths in land than in water
 D) less of Earth's surface is covered by land than by water

6. The diagram below shows a laboratory box used to demonstrate the process of convection in the atmosphere.



Which diagram has arrows that show the direction of airflow that occurs when the candle is burning?

- A)
- B)
- C)
- D)

7. Heat energy transfer will normally occur between two objects that are close to each other if the objects have different
- A) specific heats
 B) temperatures
 C) masses
 D) densities

Labfest Practice

8. The air above a burning candle is heated and rises. Which table correctly identifies the type of heat transfer within the rising air and the change in air density above the burning candle?

A)

Type of Heat Transfer	Change in Air Density
conduction	density increases

B)

Type of Heat Transfer	Change in Air Density
conduction	density decreases

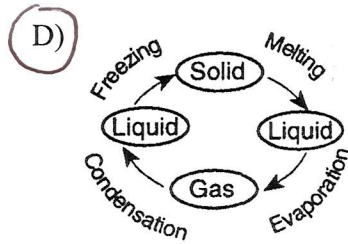
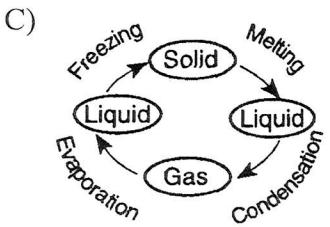
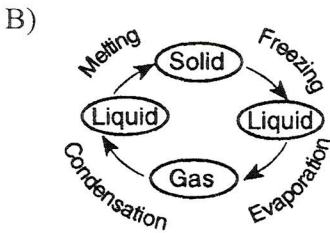
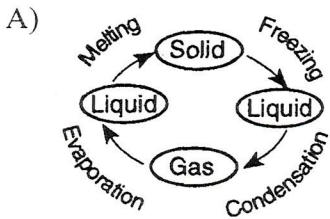
C)

Type of Heat Transfer	Change in Air Density
convection	density increases

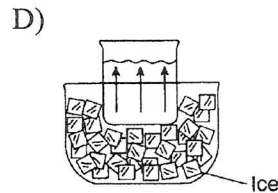
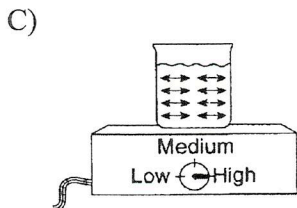
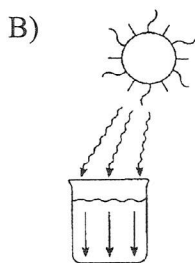
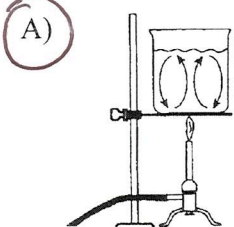
D)

Type of Heat Transfer	Change in Air Density
convection	density decreases

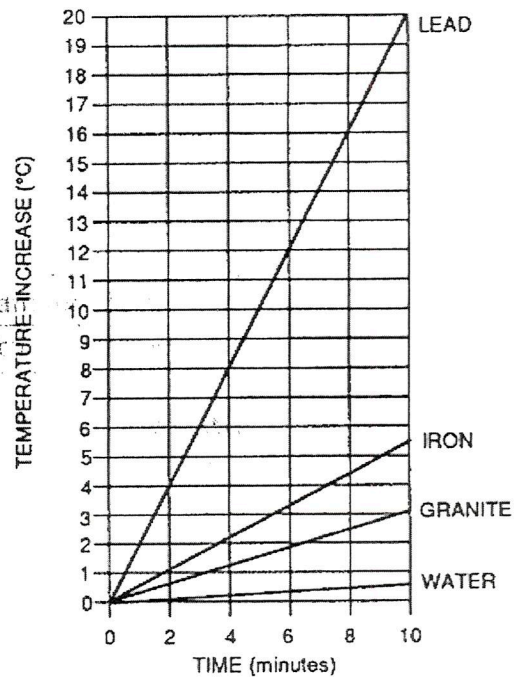
9. Which diagram correctly shows the processes that change the states of matter?



10. Which diagram shows the normal pattern of water movement that occurs when density differences transfer energy within the beakers?



11. Base your answer to the following question on the graph below, which shows the temperature increase of samples of water, granite, iron, and lead. Each sample has a mass of 100 grams. Each sample was placed an equal distance from a light bulb and heated for a 10-minute period. This investigation was performed at room temperature under ordinary classroom conditions.



Which statement best describes the amount of energy received by the samples?

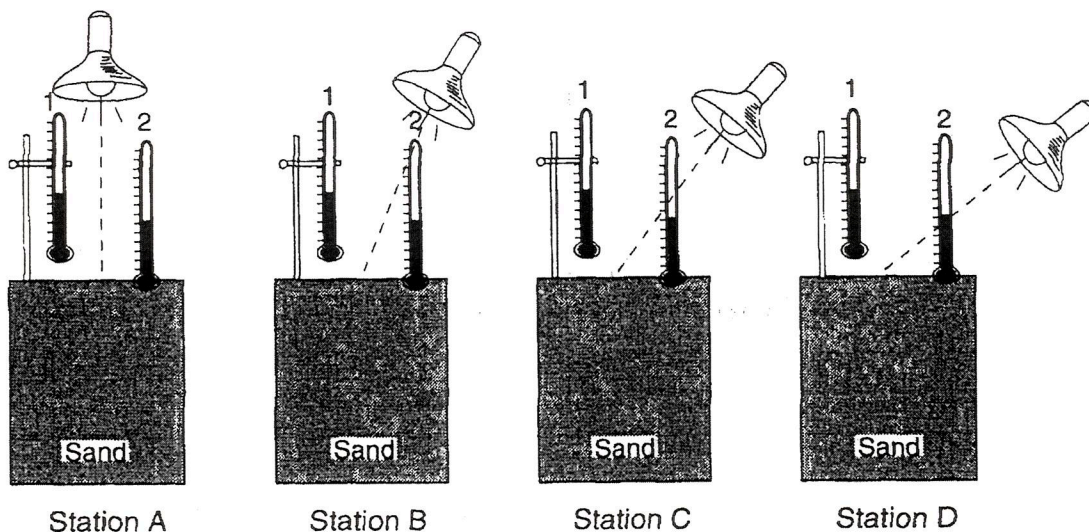
- A) The water received the most energy.
 B) The lead received the most energy.
 C) The granite received the most energy.
D) All samples received the same amount of energy.

12. By which process is heat energy transferred when molecules within a substance collide?

- A) conduction** B) convection
 C) radiation D) sublimation

Labfest Practice

13. Base your answer to the following question on the diagram below, which represents four stations, *A*, *B*, *C*, and *D*, in a laboratory investigation in which equal volumes of sand at the same starting temperature were heated by identical light sources. The light sources were the same distance from each station, but at different angles to the surfaces. Two thermometers were used at each station, one just above the surface and the other just below the surface. The lights were turned on for 30 minutes and then removed for the next 30 minutes. Temperatures were recorded each minute for the 60 minutes.



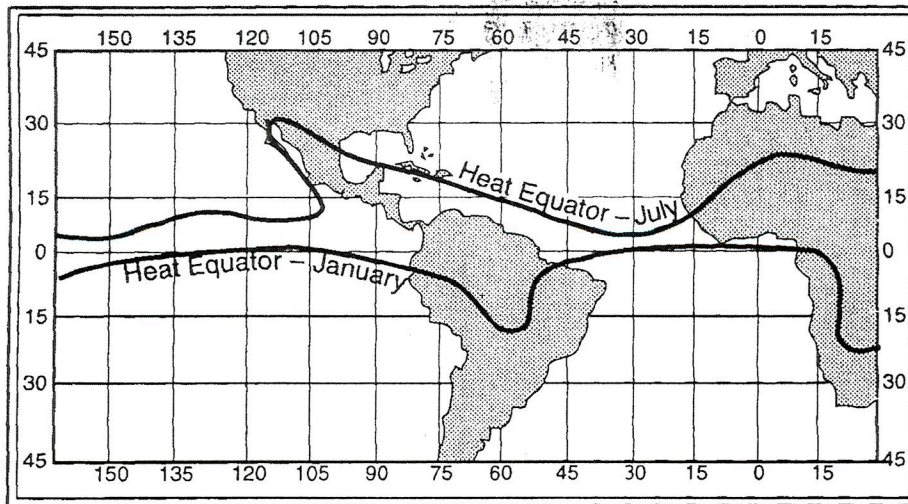
(Not drawn to scale)

Which station received the least intense light energy?

- A) *A* B) *B* C) *C* D) *D*
-
14. An ice cube is placed in a glass of water at room temperature. Which heat exchange occurs between the ice and the water within the first minute?
- A) The ice cube gains heat and the water loses heat.
 B) The ice cube loses heat and the water gains heat.
 C) Both the ice cube and the water gain heat.
 D) Both the ice cube and the water lose heat.
15. The diagram below shows a solid iron bar that is being heated in a flame.
-
- The primary method of heat transfer in the solid iron bar is
- A) convection B) conduction
 C) absorption D) advection
16. As the temperature of an object approaches absolute zero (0°K), the amount of electromagnetic energy radiated by the object will
- A) decrease B) increase
 C) remain the same
17. Which type of land surface would probably reflect the most incoming solar radiation?
- A) light colored and smooth
 B) light colored and rough
 C) dark colored and smooth
 D) dark colored and rough
18. The greatest amount of energy would be gained by 1,000 grams of water when it changes from
- A) water vapor to liquid water
 B) liquid water to water vapor
 C) liquid water to ice
 D) ice to liquid water
19. During which phase change will the greatest amount of energy be absorbed by 1 gram of water?
- A) melting B) freezing
 C) evaporation D) condensation

Labfest Practice

20. Base your answer to the following question on the map below, which shows the location of the Heat Equator for July and January. A Heat Equator is a line connecting the locations of the highest average monthly temperatures.

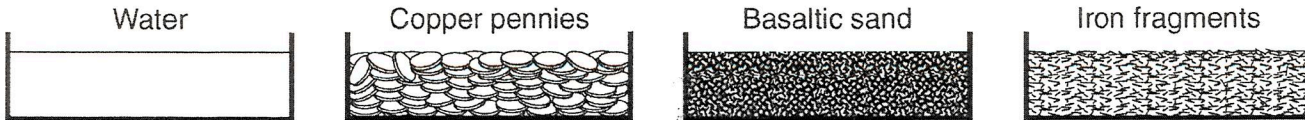


Why does the location of the Heat Equator change more over the land than over the oceans?

- A) Land temperatures are cooler than ocean temperatures.
 B) The prevailing winds change direction as they pass over land.
 C) Hurricanes form over oceans and cool the water surfaces.
 D) Oceans have a higher specific heat than land.
-
21. How does the amount of heat energy reflected by a smooth, dark-colored concrete surface compare with the amount of heat energy reflected by a smooth, light-colored concrete surface?
- A) The dark-colored surface will reflect less heat energy.
 B) The dark-colored surface will reflect more heat energy.
 C) The dark-colored surface will reflect the same amount of heat energy.
22. An object that is a good radiator of electromagnetic waves is also a good
- A) insulator from heat
 B) reflector of heat
 C) absorber of electromagnetic energy
 D) refractor of electromagnetic energy
23. Pieces of lead, copper, iron, and granite, each having a mass of 1 kilogram and a temperature of 100°C, were removed from a container of boiling water and allowed to cool under identical conditions. Which piece most likely cooled to room temperature first?
- A) copper
 B) lead - *lowest specific heat*
 C) iron
 D) granite
24. Most of the solar radiation absorbed by Earth's surface is later radiated back into space as which type of electromagnetic radiation?
- A) x ray
 C) infrared
 B) ultraviolet
 D) radio wave
25. An insulated cup contains 200 milliliters of water at 20°C. When 100 grams of ice is added to the water, heat energy will most likely flow from the
- A) water to the ice, and the temperature of the mixture will drop below 20°C
 B) water to the ice, and the temperature of the mixture will rise above 20°C
 C) ice to the water, and the temperature of the mixture will drop below 20°C
 D) ice to the water, and the temperature of the mixture will rise above 20°C

Labfest Practice

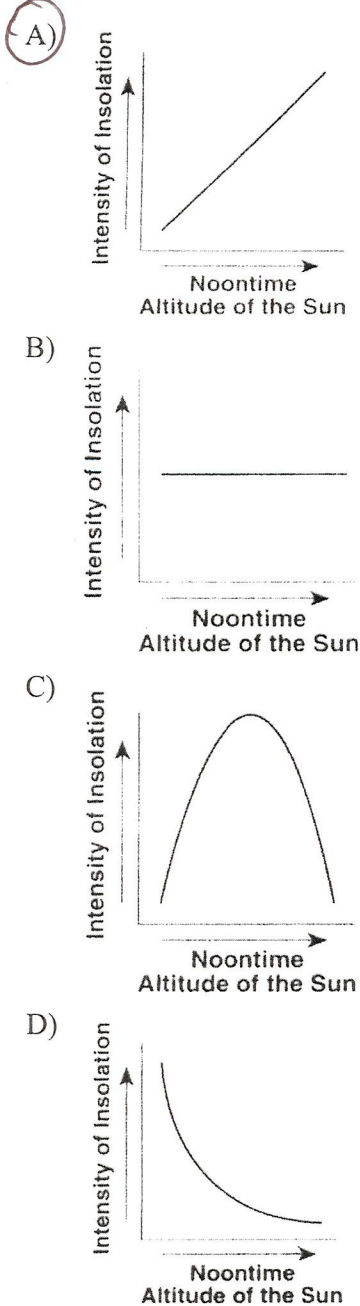
26. Equal volumes of the four samples shown below were placed outside and heated by energy from the Sun's rays for 30 minutes.



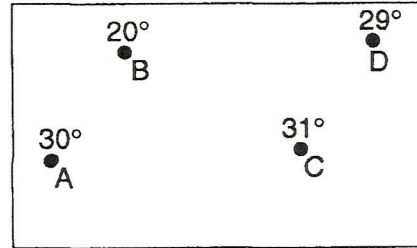
The surface temperature of which sample increased at the *slowest* rate?

- (A) water ^{Highest Specific heat} B) copper pennies C) basaltic sand D) iron fragments

27. Which graph best shows the general relationship between the altitude of the noontime Sun and the intensity of insolation received at a location?



28. The map below shows four locations in a temperature field. The temperature of each location is given in degrees Celsius.



Heat energy will normally flow from

- (A) A to B B) A to C
C) B to D D) D to C

29. The data table below shows the temperatures of two similar objects for 10 minutes after the objects were placed near each other.

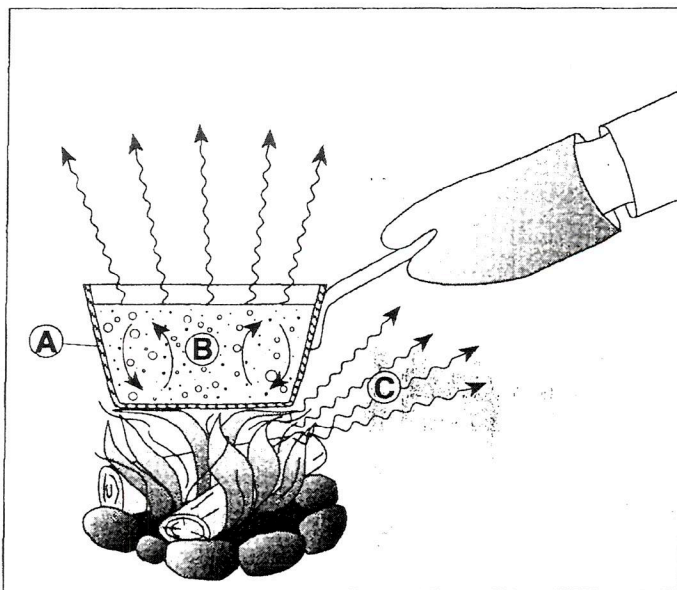
Time (minutes)	Temperature (°C)	
	Object A	Object B
0	32	18
2	29	19
4	26	20
6	25	20
8	24	21
10	23	21

Which statement is best supported by the data?

- A) Some of the heat energy lost by object B was gained by object A.
(B) Most of the heat energy lost by object A was gained by the environment.
C) Both objects lost heat energy.
D) Both objects gained heat energy.

Labfest Practice

30. The diagram below shows a student heating a pot of water over a fire. The arrows represent the transfer of heat. Letter A represents heat transfer through the metal pot, B represents heat transfer by currents in the water, and C represents heat that is felt in the air surrounding the pot.



Which table correctly identifies the types of heat transfer at A, B, and C?

A)

Letter	Type of Heat Transfer
A	conduction
B	radiation
C	convection

B)

Letter	Type of Heat Transfer
A	conduction
B	convection
C	radiation

C)

Letter	Type of Heat Transfer
A	radiation
B	conduction
C	convection

D)

Letter	Type of Heat Transfer
A	radiation
B	convection
C	conduction