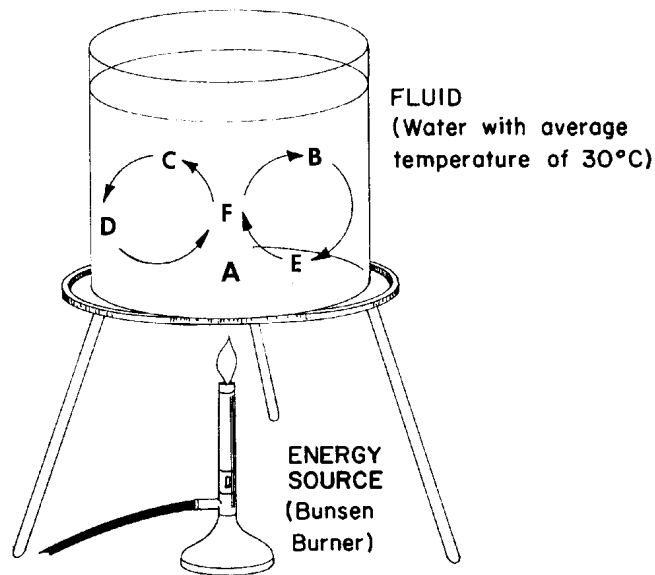


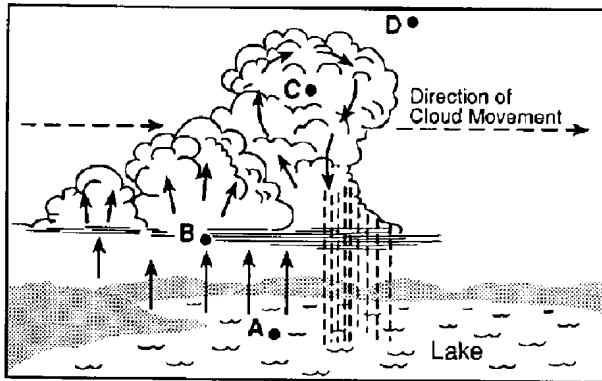
- Light and other forms of electromagnetic radiation are given off by stars using energy released during
  - nuclear fusion
  - conduction
  - convection
  - radioactive decay
- At which temperature would a source radiate the *least* amount of electromagnetic energy?
  - 273 K
  - 212 K
  - 32 K
  - 5 K
- In which region of the electromagnetic spectrum is most of the outgoing radiation from the Earth?
  - infrared
  - visible
  - ultraviolet
  - X-ray
- Electromagnetic energy that is being given off by the surface of the Earth is called
  - convection
  - insolation
  - specific heat
  - terrestrial radiation
- The various forms of electromagnetic energy are distinguished from one another by their
  - temperature
  - wavelengths
  - longitudinal wave properties
  - speed of travel
- As the ability of a substance to absorb electromagnetic energy increases, the ability of that substance to radiate electromagnetic energy will
  - decrease
  - increase
  - remain the same
- Electromagnetic energy that reaches the Earth from the Sun is called
  - insolation
  - conduction
  - specific heat
  - terrestrial radiation
- Short waves of electromagnetic energy are absorbed by the Earth's surface during the day. They are later reradiated into space as
  - visible light rays
  - X-rays
  - infrared rays
  - ultraviolet rays
- An object that is a good absorber of electromagnetic energy is also a good
  - reflector of electromagnetic energy
  - refractor of electromagnetic energy
  - radiator of electromagnetic energy
  - convector of electromagnetic energy

- Which type of surface would most likely be the best reflector of electromagnetic energy?
  - dark-colored and rough
  - dark-colored and smooth
  - light-colored and rough
  - light-colored and smooth
- Base your answer to the following question on your knowledge of Earth science and on the diagram below. The diagram shows the apparatus used as a model to study large-scale motions within the Earth's atmosphere. The water was heated for several minutes.



- What type of energy transfer is indicated by the arrows in the diagram?
- conduction
  - convection
  - radiation
  - insolation
- What method of energy transfer requires no medium for transfer?
    - conduction
    - convection
    - advection
    - radiation
  - Which statement is the best example of heat energy transfer by conduction?
    - Heat energy is transferred from the bottom to the top of a lake.
    - Heat energy is transferred from the surface soil to the rocks below.
    - Heat energy is transferred from the Earth's surface to the upper atmosphere.
    - Heat energy is transferred from the Sun to the Earth.

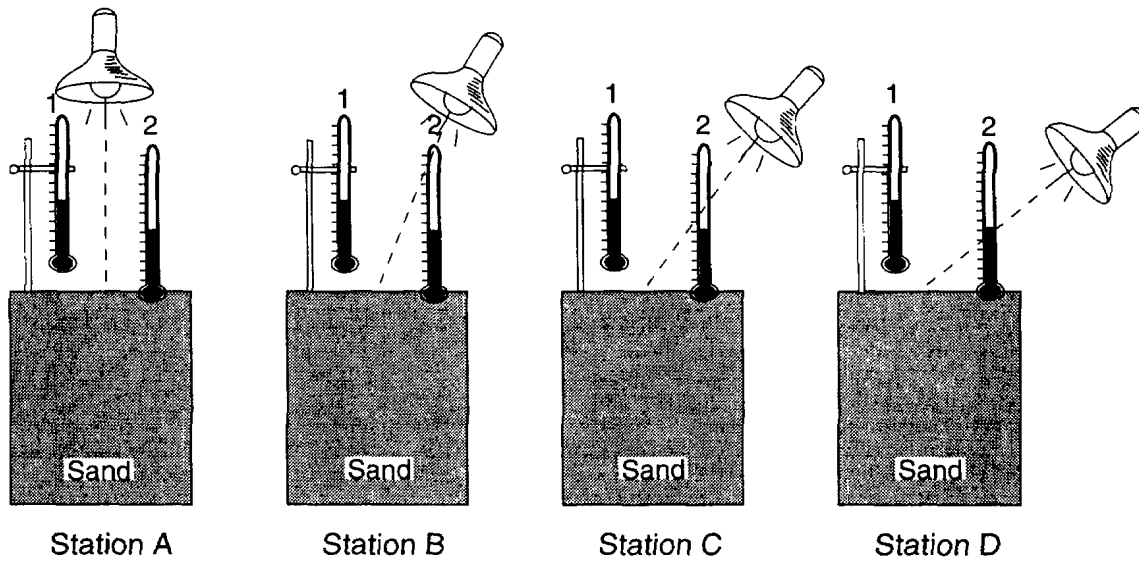
14. Base your answer to the following question on the *Earth Science Reference Tables* and the diagram below. The diagram shows air movements associated with cumulus cloud formation over a lake during a summer day. *A*, *B*, *C*, and *D* are reference points.



The arrows around point *C* represent the transfer of energy by

- A) conduction                      B) convection  
C) radiation                        D) precipitation
15. Conduction is the transfer of heat energy by
- A) density differences  
B) molecular contact  
C) electromagnetic waves  
D) movement through a vacuum
16. By which process do light rays pass through window glass?
- A) conduction                      B) convection  
C) radiation                        D) compression

17. 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.

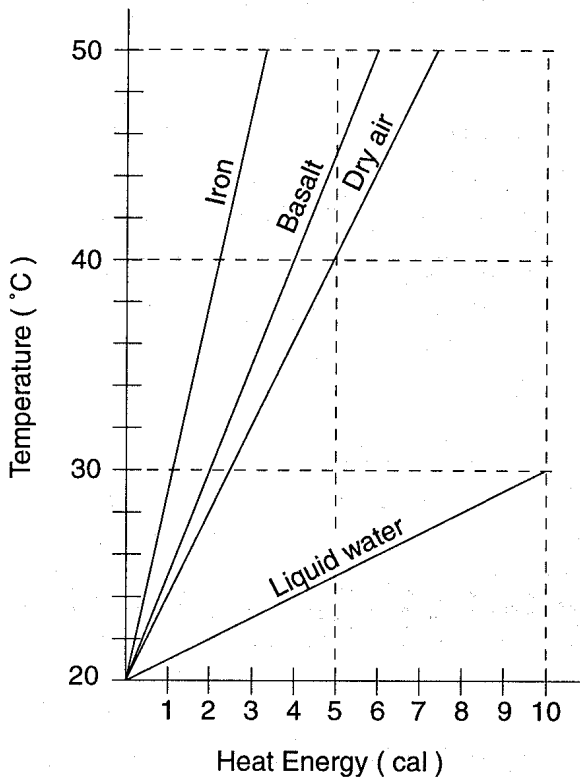


(Not drawn to scale)

Most of the energy from the light sources was transferred to the sand by the process of

- A) conduction      B) convection      C) radiation      D) transpiration
- 
18. Compared to land surface temperature changes, water surface temperature changes occur
- A) more slowly because water has a lower specific heat  
B) more slowly because water has a higher specific heat  
C) faster because water has a lower specific heat  
D) faster because water has a higher specific heat
19. Large oceans moderate the climatic temperatures of surrounding coastal land areas because the temperature of ocean water changes
- A) rapidly, due to water's low specific heat  
B) rapidly, due to water's high specific heat  
C) slowly, due to water's low specific heat  
D) slowly, due to water's high specific heat
20. Which substance has the highest specific heat?
- A) iron                      B) water  
C) lead                      D) granite

21. Base your answer to the following question on the graph below which shows the amount of heat energy (calories) needed to raise the temperature of 1-gram samples of four different materials.



Which of these materials has the highest specific heat?

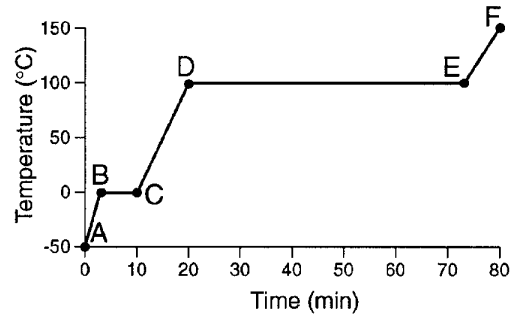
- A) liquid water                      B) dry air  
C) basalt                                D) iron
22. Base your answer to the following question on the information below.
- A camper takes a 100-gram piece of basalt rock from a campfire and places it in a cup holding 250 milliliters of water. The temperature of the rock is 300°C and the temperature of the water is 20°C. Air temperature also is 20°C.
- In the process of heating the water with the basalt, the temperature of the basalt decreased more than the temperature of the water increased. This difference most likely occurred because
- A) water has a higher specific heat than basalt  
B) water has a higher density than basalt  
C) the basalt had a greater mass than the water did  
D) the basalt had a higher starting temperature than the water did

23. On a sunny day at the beach, the dark-colored sand gets hot while the water stays cool because the sand
- A) reflects less energy and has a lower specific heat than the water  
B) reflects less energy and has a higher specific heat than the water  
C) reflects more energy and has a lower specific heat than the water  
D) reflects more energy and has a higher specific heat than the water
24. Most of the radiant energy released by the sun results from the process of
- A) nuclear fission  
B) nuclear fusion  
C) combustion  
D) electrical generation
25. Which object forms by the contraction of a large sphere of gases causing the nuclear fusion of lighter elements into heavier elements?
- A) comet    B) planet    C) star    D) moon
26. Where has the process of nuclear fusion been occurring for over four billion years?
- A) in Earth's inner core  
B) on the surface of the Moon  
C) at lithospheric plate boundaries  
D) in the Sun's interior
27. For which phase change does water absorb the most energy?
- A) freezing                                B) melting  
C) condensation                        D) evaporation
28. During which phase change does water absorb the most heat?
- A) freezing                                B) melting  
C) condensation                        D) evaporation
29. During which phase change of water is the most energy released into the environment?
- A) water freezing  
B) ice melting  
C) water evaporating  
D) water vapor condensing

30. Which phase change requires water to gain 2260 Joules per gram?

- A) solid ice melting
- B) liquid water freezing
- C) liquid water vaporizing
- D) water vapor condensing

31. 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  $-50^{\circ}\text{C}$  was heated at a uniform rate for 80 minutes. The ice has a mass of 200 grams.



During which interval of the graph is a phase change occurring?

- A) *A to B*
- B) *E to F*
- C) *C to D*
- D) *D to E*