

Correct Answers for the Multiple Choice Items:

1. D
2. D
3. A
4. C
5. A
6. A
7. A
8. D
9. B
10. C
11. D
12. D
13. B
14. C
15. C
16. A
17. C
18. D
19. B
20. C
21. A
22. B
23. C
24. D
25. D

Correct Answers and Scoring Rubrics for Supply-Response Items:

26. Correct Answer: gas, gas and liquid (turning from gas to a liquid, condensing), liquid

Scoring Rubric:

3 points for an accurate list of all three states of matter the water passes through

2 points for a list of two correct states of matter the water passes through

1 point for a list of one correct state of matter the water passes through

0 points for no answer/no correct answers in the list

27. Correct Answer:

$$Q = (20 \text{ grams})(1.00 \text{ calorie/grams} \cdot \text{degrees C})(30 \text{ degrees C} - 55 \text{ degrees C})$$

$$Q = - 700 \text{ calories}$$

Scoring Rubric:

2 points for successfully inserting the correct values for each variable and solving for the correct answer

1 point for successfully inserting the correct values for each variable but not solving for the correct answer

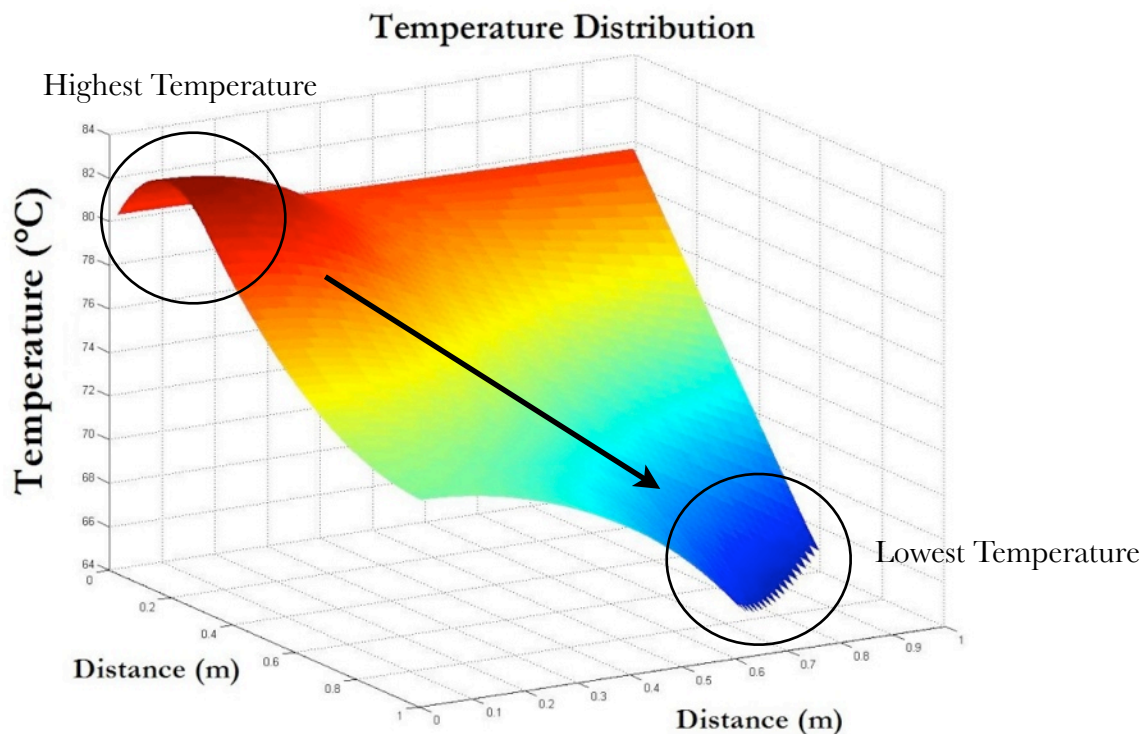
0 points for either not successfully inserting the correct values for each variable and not getting the correct answer or not successfully inserting the correct values for each variable and getting the correct answer

28. Correct Answers:

- A. Conduction: stovetop burners, blowtorch, anything with contact to a flame/heat source; Convection: upwelling in the oceans, roasting a marshmallow over a fire, etc.; Radiation: anything dealing with a light source
- B. All three ways are alike because they all transfer energy in the form of heat from one object to another. The amount of heat may also be large or small, and all three may vary the time energy is transferred.
- C. All three are different because of the various ways in which they transfer energy. Conduction involves touching, convection involves movement of warmer particles upward and cooler particles downward, and radiation involves light energy. Each type of transfer is unique, and therefore different.

Scoring Rubric:

- A. 6 points for all three correct ways and a correct example for all three ways
5 points for all three correct ways and two correct examples
4 points for all three correct ways and one correct example; two correct ways and two correct examples
3 points for two correct ways and one correct example
2 points for one correct way and one correct example
1 point for one correct way and a no correct examples
0 points for no correct ways or examples
- B. 2 points for two correct similarities
1 point for one correct similarity
0 points for no correct similarities
- C. 2 points for two correct differences
1 point for one correct difference
0 point for no correct differences



29. Correct Answer: see above for both parts

Scoring Rubric:

5 points for both circles correctly drawn and labeled and arrow showing the correct direction of heat flow

4 points for both circles correctly drawn and labeled and no arrow or incorrect arrow

3 points for both circles correctly drawn but no labels and arrow showing correct direction of heat flow

2 points for both circles correctly drawn and no arrow; both circles correctly drawn but not labeled and arrow showing the correct direction of heat flow

1 point for both circles correctly drawn but not labeled and arrow showing the incorrect direction of heat flow; no circles but arrow showing the correct direction of heat flow

0 points for no circles and arrow; incorrect circles or heat flow

30. Correct Answer:

$$Q = (50,000 \text{ grams})(1.00 \text{ calorie/grams} \cdot \text{degrees C})(84 \text{ degrees C} - 66 \text{ degrees C})$$

$$Q = 900 \text{ kilocalories}$$

Scoring Rubric:

2 points for successfully inserting the correct values for each variable and solving for the correct answer

1 point for successfully inserting the correct values for each variable but not solving for the correct answer

0 points for either not successfully inserting the correct values for each variable and not getting the correct answer or not successfully inserting the correct values for each variable and getting the correct answer

31. Correct Answer: The three temperature scale are different in their measure of absolute zero. For the Kelvin scale, absolute zero is 0 Kelvins, for the Fahrenheit scale it is -460 degrees, and for the Celsius scale it is -273 degrees. The Fahrenheit scale is also different from the Kelvin and Celsius scales because it has 180 ticks between the melting and boiling points of water, whereas the other two have 100 ticks between the points. Finally, the three scales have different measures for the melting and boiling points of water.

Scoring Rubric:

3 points for three correct differences

2 points for two correct differences

1 point for one correct difference

0 point for no correct differences