

CH30S**Physical Properties & Change Review**

1. Explain why the melting of ice is a physical change, while the rusting of iron is a chemical change.
2. List 4 physical properties of an iron nail.
3. In what state do the following exist at room temperature and standard pressure?
 - a) Diamond
 - b) Clay
 - c) Mercury
 - d) Cooking oil
 - e) Oxygen
 - f) Neon
4. Match each state with the term on the left. More than one state can match each term.

a) Incompressible	1. Gas
b) Indefinite shape	2. Liquid
c) Definite volume	3. Solid
d) Fluid	
5. Classify the following as a physical or chemical change.

a) Bending wire	c) Burning coal
b) Cooking a steak	d) Cutting grass
6. Compare the relationship between the individual particles in the three states of matter. Diagrams will help here.
7. Define STP and give examples of conditions that are met at STP.
8. What is meant by an average kinetic energy graph? What shape does it have?
9. If the average kinetic energy of a beaker of water is 55°C. Do all the particles have the same amount of kinetic energy? Explain.
10. Explain, using a graph, what would happen to the average kinetic energy of the particles of gas in an inflated life raft as the sun heats the raft from 25°C to 37°C.
11. Define vapour pressure. Why must vapour pressure be measured in a closed container?
12. Explain how evaporation lowers the temperature of a liquid.
13. Describe the effect that increasing temperature has on the vapour pressure of a liquid.
14. Explain why the boiling point of a liquid varies with atmospheric pressure.

15. What is meant by intermolecular forces? What state of matter has the strongest intermolecular forces?
16. What is the difference between the terms **boiling point** and **normal boiling point**?
17. At the top of Mount Everest, water boils at 69°C. Use one of your vapour pressure graphs to determine the atmospheric pressure at the top of this mountain.
18. Explain how boiling is a cooling process.
19. Describe what happens (in terms of energy) when a substance is at its melting point.
20. Draw a heating curve for bromine (melting point = -7°C, boiling point = 59°C). At what state would this substance be at room temperature?
21. How can water be made to boil at room temperature?
22. How is the evaporation of water used to regulate body temperature?
23. Early settlers put buckets of water in their cold cellars so that their food preserves wouldn't freeze. How did these buckets prevent the water from freezing (hint: think "moderating effects")
24. What is sublimation and deposition. Give an example of each.
25. What are the main points of the kinetic molecular theory?
26. Containers A, B & C contain H₂O at 120°C, 25°C and -10°C respectively, all at standard pressure.
 - a) Which sample has molecules with the greatest kinetic energy?
 - b) Which sample is least compressible?
 - c) Which sample has the greatest density?
 - d) Which sample has the most regular arrangement of molecules?
 - e) Which sample has definite volume?
27. Describe the 2 main types of solids. Give examples of each.
28. What is an allotrope? Give examples.
29. What is plasma? What are the properties of plasma? Where is plasma found (give examples)?
30. What are the 4 types of crystalline solids? Describe the forces between their particles, and their properties.

31. Match the change of state with its change in energy.

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| a. Freezing | 1. Exothermic |
| b. Melting | 2. Endothermic |
| c. Boiling | |
| d. Condensing | |
| e. Sublimation | |
| f. Deposition | |

32. Use the attached vapour pressure curve to answer the following questions.

- What is the vapour pressure of acetic acid at 80°C ?
- What is the approximate vapour pressure of chloroform at 0°C?
- What is the temperature at which the vapour pressure of ethanol is 50 kPa?
- Which of these substances has the highest vapour pressure?
- Which of the three substances would evaporate fastest at room temperature?
- Which of the three substances would evaporate slowest at room temperature?
- Which substance has the weakest intermolecular forces?
- From the graph, what are the normal boiling points of the four substances?
- What would be the boiling point of water on a day when the atmospheric pressure is 95 kPa?
- Alcohol is heated in a container in which there is a partial vacuum. The air pressure in the container is 25 kPa. At what temperature will the alcohol boil?
- If substance "X" had a normal boiling point of 30°C, where would you expect to find the vapour pressure curve of "X"? Explain your answer.
 - to the left of the chloroform curve?
 - between the chloroform and ethanol curve?
 - between the ethanol and water curve?
 - between the water and acetic acid curve?
 - to the right of the acetic acid curve?
- What would the atmospheric pressure have to be for ethanol to boil at 20.0°C?
- If the temperature was 50.0°C and the atmospheric pressure was 20 kPa, which substances if any would boil?

Increasing Vapour Pressure with Temperature of Four Liquids



