

Directions: This is a foundational chapter included in the AP Chemistry curriculum in Big Ideas 1, 2, and 3 along with foundational mathematical concepts in Big Ideas 4, 5, and 6. Many of these concepts and skills are review from previous science classes. Be sure to read chapter 1 in your book. As you read, make a list of the concepts and vocabulary to review in chapter w.

1.1 Atoms and Molecules

1. Provide an example of a substance comprised entirely of only atoms.
2. Provide an example of a substance comprised of molecules.
3. What is the difference between atoms and molecules?

1.2 The Scientific Approach to Knowledge

4. What is the scientific process? Explain the steps of this process.
5. How does this scientific process lead to the development of laws and theories?
6. Explain the contributions of the following scientists
 - a. Antoine Lavoisier
 - b. John Dalton
7. In your own words, explain the Law of Conservation of Mass and give an example.

1.3 Classification of Matter: Solid, Liquid, and Gas

8. Explain the differences among solids, liquids, gases, crystalline, and amorphous substances. Use drawings if appropriate. Justify your answer with evidence from the characteristics of each.

9. Fill in the chart

Type of Matter	Example	Shape	Volume
Solid			
Liquid			
Gas			
Amorphous Substance			
Crystalline Substance			

10. Draw a concept map showing the relationship among matter, atoms, elements, substances, compounds, mixtures, homogenous mixtures. In your map, include examples and linking words, explaining how each heading relates to the others.

11. Explain what a volatile substance is and how to determine if a substance is volatile.

12. Draw diagrams to help explain the differences in the following techniques used in separating mixtures: decanting, distillation, and filtration. Give an example of a use for each technique.

a. Decanting

b. Distillation

c. Filtration

1.4 Physical and Chemical Changes and Physical and Chemical Properties

13. What is a physical change? Give three examples. Use drawings if appropriate.

14. What is a chemical change? Give three examples. Use drawings if appropriate.

15. How can you tell the difference between a physical change and a chemical change?

16. What is a physical property? Give three examples.

17. What is a chemical property? Give three examples.

18. How can you tell the difference between a physical property and a chemical property?

1.5 Energy: A Fundamental Part of Physical and Chemical Change

19. Explain the different types of energy and give an example of each. Use drawings if appropriate.

a. Kinetic Energy

b. Potential Energy

c. Thermal Energy

20. Explain the Law of Conservation of Energy and how it differs from the Law of Conservation of Mass.

21. Define the following terms

a. Temperature

b. Heat

22. Provide an example illustrating the difference between heat and temperature. Explain.

1.6 Units of Measurement

23. What type of unit system of measurement is used in chemistry?

24. For each quantity in the chart below, give the SI unit and symbol

Quantity	Temperature	Time	Length	Mass	Amount of Substance	Electric Current
Unit						
Symbol						

25. Define each of the following units

- Meter
- Kilogram
- Second
- Kelvin

26. How does one convert from a temperature in degrees Celsius to a temperature in Kelvin?

27. What is a derived unit?

28. Give three examples of a derived unit.

29. Explain what volume is. Include an example in your answer.

30. What are two common units of volume used in chemistry and their symbols?

31. What is the relationship between mass and volume of a substance?

32. Fill in the following table of prefixes often used in chemistry

Prefix	Kilo-	Deci-	Centi-	Milli-	Nano-
Symbol					
Multiplier					

1.7 The Reliability of a Measurement

33. How is the reliability of a measurement indicated in science?

34. Explain how to take a measurement correctly. Use an example in your answer.

35. What are significant figures?

36. Explain how to determine the number of significant figures in a measurement.

37. State the number of significant figures in the following measurements.
 - a. 1.00350 g
 - b. 1.0020 g
 - c. 240 g
38. Explain how to round a numerical value in a chemistry calculation

39. In a series of calculations, why is it important to only round once?

40. Explain how to determine the number of significant figures in the final result in a calculation using multiplication or division.

41. Explain how to determine the number of significant figures in the final result in a calculation using addition or subtraction.

42. Explain the difference between accuracy and precision. Include an example of each.

1.8 Solving Chemical Problems

43. What is a conversion factor?

44. How would you set up a problem to convert 37.0 mL to L?

45. What is dimensional analysis and why do chemists use it?

46. Show how to set up a problem to convert 0.075 km/hr to m/s.

Self-Assessment Answers

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|----------|----------|----------|-----------|-----------|
| 1. _____ | 4. _____ | 7. _____ | 10. _____ | 13. _____ |
| 2. _____ | 5. _____ | 8. _____ | 11. _____ | 14. _____ |
| 3. _____ | 6. _____ | 9. _____ | 12. _____ | 15. _____ |