

Uncle Tungsten

The questions for this assignment are listed by the chapter in the book in which the answers can be found. For the most part, they are in order with very few exceptions. Throughout the book you will keep a running tab on all key/new science vocabulary terms and all the chemical experiences that Oliver has. Define/describe the vocabulary and chemical experiences by how the book presents it. If you need more room than the tables provided, please create an additional chart (using a ruler) and staple it to the back of this assignment.

New Vocabulary (minimum 10)(10 pts)

Word	Definition

Chemical Experiences (minimum 10)(10 pts)

Chemical	Book Experience

Chapter 1 – Uncle Tungsten

1. Who is Uncle Tungsten? (1 pt)
2. What does young Oliver observe at home? (3 pts)

Chapter 2 – “37”

3. How could Oliver’s family and living situation have affected his affinity for chemistry? (2 pts)

Chapter 3 – Exile

4. Where was Oliver during World War II? Why? (2 pts)
5. What type of bomb burned with a “white-hot heat” (1 pt)
6. What, in particular, did Oliver love about math? (1 pt)
7. What are Pythagorean numbers? (1 pt)

Chapter 4 – “An Ideal Metal”

8. What is another term for an “oxide”? (1 pt)
9. Describe the process used to isolate elements. (1 pt)
10. Why is “W” the symbol for tungsten? (1 pt)
11. Describe the discovery of some of the lesser known elements. (1 pt)
12. How do most metals exist? (1 pt)
13. What process is described on page 43 in paragraph number 2? (1 pt)

14. What is the great virtue of the platinum metals? (1 pt)

15. What is “lime”? (1 pt)

16. What is the density of gold? (1 pt)

Chapter 5 – Light for the Masses

17. What is used to “pearl” glass bulbs? (1 pt)

18. How would life be different today if gas mantle lights had succeeded over electric light? (1 pt)

19. What melting point was needed in order to use a metal as a filament? (1 pt)

20. What three metals had this melting point (3 pts)

21. Outline the development of the carbon filament light bulb. Include dates, people, and all relevant information. (5 pts)

Chapter 6 – The Land of Stibnite

22. What is stibnite? (1 pt)

23. What causes galena to form cubes? (1 pt)

24. What two elements make up galena? (2 pts)

25. What was the original name for vanadium? (1 pt)

Chapter 7 – Chemical Receptions

26. What happens when vinegar pickled red cabbage juice comes into contact with ammonia? (1 pt)

27. What happens to a red rose over burning sulfur? (1 pt)

28. Describe Oliver's strange collection. (1 pt)

Chapter 8 – Stinks and Bangs

29. How did Marcus lose his eyebrows? (1 pt)

30. What are the "coloring elements"? (4 pts, ½ point each)

31. What solvent are all the alkali metals dissolvable in? (1 pt)

32. Describe the different valences or oxidation states of vanadium. (2 pts)

33. What reaction creates a violet flame? (1 pt)

34. What is responsible for the smell of pears? (1 pt)

Chapter 9 – Housecalls

35. Who acted as a second mother to the Sacks boys? (1 pt)

Chapter 10 – A Chemical Language

36. Whose work made chemistry a true science? (1 pt)

37. What were the ancient four elements? (2 pts; ½ pt each)

38. What were the 3 Principles of the Alchemists? (3 pts)

39. Who is the father of modern chemistry? (1 pt)

40. What is phlogiston? (1 pt)

41. What were the five enterprises of Lavoisier? (5 pts)

42. What did Lagrange say about the death of Lavoisier (quote)? (1 pt)

43. What is the heaviest known vapor? (1 pt)

Chapter 11 – Humphrey Davy: A Poet-Chemist

44. What two things did Davy discover but not develop? (2 pts)

45. What was used to isolate potassium and sodium? (1 pt)

46. List Oliver's observations/experiences with the alkali metals in water. What is the overall explanation of this? (6 pts)

Chemical Observation or Experience (5)	Overall explanation (1)

Chapter 12 – Images

47. Describe “parallax”. (1 pt)

48. Describe the Finlay color method. (2 pts)

49. What led Oliver to believe that movement was constructed by the brain? (1 pt)

Chapter 13 – Mr. Dalton’s Round Bits of Wood

50. What are the “special ingredient” examples that are provided for mixtures? (2 pts)

51. How are compounds different from mixtures? (1 pt)

52. What is the Law of Fixed Proportions? Who is given credit for it? (2 pts)

53. What term is being described at the end of the top paragraph on page 150? (1 pt)

54. How did Dalton die? (1 pt)

55. What two scientists did experimentation that confirmed Dalton’s ideas? (2 pts)

56. Whose work ended the atom/molecule dispute? (1 pt)

57. Record the Cannizarro quote on page 155 and analyze it. (2 pts)

Chapter 14 – Lines of Force

58. What is a Leyden jar? (1 pt)

59. What color is gaseous gold? (1 pt)

60. List Oliver's observations about placing a zinc rod in various sorts and what his overall explanation was. (5 pts)

Chemical Observation or Experience (4)	Overall explanation (1)

61. Who created/discovered the Daniel cell? Diagram and label a Daniel cell. (5 pts; 1/4)

62. What element of electricity is critical to the decomposition of water? (1 pt)

63. Who was the first person to liquefy gases? (1 pt)

64. Define and diagram (with labels) a dynamo. (3 pts)

65. Who was Oliver's physics uncle? (1 pt)

66. How are light and magnetism linked? (1 pt)

Chapter 15 – Home Life

67. What is used to “clean” a wine stain? (1 pt)

Chapter 16 – Mendeleev’s Garden

68. What do you think naphtha is? (1 pt)

69. What does valency mean? (1 pt)

70. What “dominates the periodic table”? (1 pt)

71. On pages 191 and 194 the author describes the periodic table in geographic terms. Draw a map of the lower 48 states and label/color the areas that are mentioned in his description. (5 pts)

72. Who were the three major contributors to Mendeleev’s periodic table? (3 pts)

73. Create a timeline of Mendeleev’s life. (3 pts)

74. Who was the first person to note a connection between physical properties and atomic weights? (1 pt)

75. When was Mendeleev’s dream? Describe it. (2 pts)

76. What was astonishing about Mendeleev’s prediction? (1 pt)

77. Who predicted the atomic weights of the inert/perfect gases? (1 pt)

78. What compound is mentioned that includes a noble gas? (1 pt)

79. In what ways is periodicity met on the periodic table? (1 pt)

80. What is a hydride? Name three examples. (4 pts)

81. What are the unique properties of water? (2 pts)
82. What scientific ignorance could have changed the course of history? (1 pt)
83. What color is liquid copper? (1 pt)
84. Where do all rare earth elements seem to come from? (1 pt)
85. What were the final two rare earth elements to be isolated? (2 pts)
86. What compound does uranium form? What is this compound used for? (2 pts)
87. What physical methods are used to isolate elements (2 pts)?
88. What elements were originally named “extremium and “ultimum”? Why? (3 pts)
89. What did Glen Seaborg predict? (1 pt)

Chapter 17 – A Pocket Spectroscope

90. What are the names for the dark and bright-lined spectra? (2 pts)
91. What elements were discovered with the aid of spectroscopy (name 3; 3 pts)? By whom? (1 pt)
92. Spectroscopy Table (5 pts)

Element Name	Color Flame

93. Describe the discovery of helium. (1 pt)

Chapter 18 – Cold Fire

94. What element glows spontaneously? (1 pt)

95. List Oliver's observations about phosphorus and his overall explanation for what he experienced. (5 pts)

Chemical Observation or Experience (4)	Overall explanation (1)

96. Define luciferins. (1 pt)

97. What is the difference between fluorescent and phosphorescent? (1 pt)

98. Name 3 elements of "special fluorescence". (3 pts)

99. Describe "luminous buoys". (1 pt)

Chapter 19 – Ma

100. What is progeria? (1 pt)

Chapter 20 – Penetrating Rays

101. What is an induction coil? (1 pt)

102. Describe Roentgen rays. (1 pt)

103. What are the dangers of x-rays? Who first introduced them? When?
(3 pts)

104. How did Becquerel test uranium? (1 pt)

105. What word would you use for the penetrating uranium rays? (1 pt)

Chapter 21 – Madame Curie's Element

106. What other known element of the time emitted Becquerel's rays? What did it have in common with uranium? (2 pts)

107. What two elements are named for the Curies? (2 pts)

108. Describe the process of fractional crystallization. (1 pt)

109. What instrument did Pierre Curie invent? (1 pt)

110. How much radium did the Curies isolate? (1 pt)

111. What year did Marie win the Nobel Prize in physics? (1 pt)

112. How did the Curies die? (2 pts)

113. What are some of the effects of radium? (2 pts)
114. Draw and label a radium clock (3 pts)
115. What did Mendeleev believe was the source of radium's energy? (1 pt)
116. What is ether? (1 pt)
117. Describe the radioactive warmth of U, Po, Ra, and Rn. (1 pt)

Chapter 22 – Cannery Row

118. What is the difference between blue and red blood. Provide 2 examples. (3 pts)

Chapter 23 – The World Set Free

119. Who worked with Rutherford on the issue of radioactivity and emanation? (1 pt)
120. What is the half-life of one radon isotope? (1 pt)
121. What 3 elements proved Lord Kelvin wrong? (3 pts)
122. What 3 things allowed for element identification? (3 pts)
123. How many radium atoms in a gram disintegrate per second? (1 pt)

124. Rutherford's Gold Foil experiment found on pages 288-289. (5 pts)

Observations	Patterns in the Observations	Overall Explanation

125. Who is Leo Seigard and how is he connected to H.G. Wells and Albert Einstein?
(2 pts)

Chapter 24 – Brilliant Light

126. Describe Moseley's experiment and his results. (2 pts)

127. What did the atomic number indicate? (1 pt)

128. What determines an element's chemical properties? (1 pt)

129. Define Bohr's ground state. (1 pt)

130. Explain spectral lines and stationary states. (1 pt)

131. How and where did Moseley die? (2 pts)

132. Describe how an electron enters an atom. (1 pt)

133. What does "aufbau" mean? (1 pt)

134. What was Bohr's explanation of electrons in the transition and rare earth elements? (1 pt)
135. What element was discovered purely on a theoretical basis? (1 pt)
136. How do electrons explain metallic properties? (1 pt)
137. What happens to mercury when it is super-cooled? (1 pt)
138. What the minimum units of energy that light comes in called? (1 pt)
139. What is the temperature of the surface of the sun? What is the temperature inside of the sun? (2 pts)
140. What causes the color of a candle flame? (1 pt)
141. Describe the fusion balance of the sun. (1 pt)
142. What is the end point of nucleosynthesis? How are heavier elements made? (2 pts)

Chapter 25 – The End of the Affair

143. Describe super-cooled helium. (1 pt)