



# Foundations of Science Semester 2 Review

## About Science

Read chapter 1 of the Conceptual Physical Science book, pages 1-12.

Labs and Activities:

Collecting and Interpreting Data      Graphing Activity      Density Lab  
How Do You Measure In Metrics?      Pendulum Project

1. List and explain procedures for a safe lab and classroom.
2. Know the two branches of science and name examples of each of the natural sciences.
3. Define scientific facts, scientific theory and scientific law.
4. Distinguish between qualitative and quantitative descriptions.
5. Know the skills of a good scientist and the steps of the scientific method.
6. Define and graph independent variables, dependent variables and a control.
7. Know and convert the SI units and prefixes.
8. Know, calculate and convert numbers using scientific notation.
9. Know how to calculate and solve problems using proper significant figures.
10. Distinguish between accuracy and precision in making measurements.
11. Define and calculate volume, mass, weight, density and percent error.
12. Explain the limitations of science and define pseudoscience-giving examples.

## Newton's First Law of Motion-The Law of Inertia

Read chapter 2 of the Conceptual Physical Science book, pages 15-30.

Labs and Activities:

Egg Toss Event

13. Define motion, inertia, distance, time, speed, vector quantity and velocity.
14. Distinguish between speed and velocity.
15. Calculate speed and velocity and know the formula.
16. State, explain and give examples of Newton's First Law of Motion.
17. Define force, net force, support force and Newton.
18. Define balanced forces, unbalanced forces and equilibrium.

## Newton's Second Law of Motion-Force and Acceleration Law

Read chapter 3 of the Conceptual Physical Science book, pages 34-48.

Labs and Activities:

Egg Drop Project

19. Define and calculate acceleration using the formula.
20. Explain the difference between mass and weight.
21. Define and explain inversely proportional.
22. State, explain and give examples of Newton's Second Law of Motion.
23. Solve Newton's Second Law for acceleration, force or mass using the formula.
24. Define friction, air resistance (drag) and gravity.
25. Define freefall, terminal velocity and weight.
26. State the acceleration due to gravity in meters per second squared.

### **Newton's Third Law of Motion-Action Reaction**

Read chapter 4 of the Conceptual Physical Science book, pages 53-65.

Labs and Activities:

27. Give example of interactions between forces working in pairs.
28. State, explain and give examples of Newton's Third Law of Motion.

### **Momentum**

Read chapter 5 of the Conceptual Physical Science book, pages 69-79.

Labs and Activities:

Rolling Ball Lab

29. Define and calculate momentum using the formula.
30. Define and calculate impulse using the formula.
31. Explain the Law of Conservation momentum.
32. Define and give examples of elastic and inelastic collisions.

### **Work and Energy**

Read chapter 6 of the Conceptual Physical Science book, pages 83-98.

Labs and Activities:

How High Does the Ball Bounce      Horsepower Lab

33. Know the definitions and units for Joules, Watts and horsepower.
34. Define and calculate work using the formula.
35. Define and calculate power using the formula.
36. Define energy and list forms of energy other than Potential and Kinetic.
37. Define and calculate Gravitational Potential Energy using the formula.
38. Define and calculate Kinetic Energy using the formula.
39. State, explain and give examples of the work-energy theorem.
40. Explain energy transformations in a system.
41. Explain the Law of Conservation of Energy.

### **Gravity**

Read chapter 7 of the Conceptual Physical Science book, pages 102-112.

Labs and Activities:

42. Using the term tangential velocity, explain what it means to be in orbit.
43. Solve the law of universal gravitation for force, mass or distance using the formula.
44. Describe and give examples of the inverse-square law.
45. Explain why there are tides on Earth.
46. Define and explain the Big Bang, the Big Crunch and dark matter.

### **Heat Transfer and Change of State**

Read chapter 10 of the Conceptual Physical Science book, pages 151-165.

Labs and Activities:

Heat vs. Temperature      Phase Changes of Water  
Sand, Soil and water Lab

### **Heat Transfer and Change of State (continued)**

47. Define and explain conduction, convection and radiation giving example of each.
48. List and give examples of the states of matter.
49. Explain the difference between heat and temperature.
50. Explain the kinetic theory.
51. Define evaporation, condensation, sublimation, boiling point and melting point.
52. Describe, on a molecular level, the changes that occur as a solid is heated to a gas.

### **Atoms and the Periodic Table**

Read chapter 17 of the Conceptual Physical Science book, pages 290-303.

Labs and Activities:

Atomic Jungle                  Wicked Chemistry

53. Define chemistry, matter, atom, element and periodic table.
54. Define and explain atomic symbol, atomic number and mass number.
55. Name and calculate the number of each particle in an atom. (3 particles total).
56. Draw and correctly label models, for any element on the Periodic Table.
57. Understand what chemical formulas represent.
58. Define and locate, on the periodic table, the metals, nonmetals and metalloids
59. Define and locate, on the periodic table, periods and families of elements.

### **Atomic Models**

Read chapter 18 of the Conceptual Physical Science book, pages 305-318.

Labs and Activities:

May I Cut In                  4<sup>th</sup> of July

59. Describe the history of the model of the atom.
60. Define electron shell and valence electrons.
61. Describe the present nuclear model on an atom.
62. Use the Periodic Table of Elements to predict an atom's structure and its reactivity.

### **Atoms to Minerals**

Read Chapter 3 of the Earth Science book by Heath, pages 28-41.

Labs and Activities:

Crystals and Crystal Systems

63. Define a mineral and give 5 characteristics minerals must have.
64. Describe how minerals form.
65. List and describe the six crystalline systems.

### **How to Know the Minerals**

Read Chapter 4 of the Earth Science book by Heath, pages 46-61.

Labs and Activities:

Identification of Minerals

68. Define color, luster, crystal shape, streak, cleavage & hardness.
69. Explain how to perform the following tests; streak, hardness, acid, and magnetic.
70. Explain how we use the results of the tests to identify minerals.

71. List characteristics of micas, calcite, feldspars, quartz & silicates.
72. Use specific gravity to distinguish metals from nonmetals.

### **Rocks and the Rock Cycle**

Read Chapter 5 of the Earth Science book by Heath, pages 62-76.

Labs and Activities:

Igneous Rock Lab                      Sedimentary Rock Lab  
Metamorphic Rock Lab

73. How are igneous, sedimentary and metamorphic rocks formed?
74. How are igneous, sedimentary and metamorphic rocks grouped?
75. Give examples for each group:
  - \*igneous rocks= felsic & mafic; coarse, fine and no crystals
  - \*sedimentary= clastic(3), organic(2) and chemical(2)
  - \*metamorphic= foliated(3) and nonfoliated(2)
76. Explain the rock cycle.

### **Plate Tectonics**

Read Chapter 13 of the Earth Science book by Heath, pages 230-247

Labs and Activities:

Patterns of Magnetic polarity                      Plate Boundaries  
Plate Tectonics Essays #1- #3

77. Define and explain the following boundaries:
  - \*Diverging
  - \*Sliding
  - \*Converging (subducting & collision)
78. Define and locate lithosphere and asthenosphere.
78. Give an explanation for plate movements including the terms heating, cooling, convection currents and density.
80. Define and give evidence for continental drift.
81. Tie in the Earth's magnetic field, volcanoes, earthquakes to plate tectonics.

### **Volcanism, Earthquakes and Plate Tectonics**

Read Chapter 14 (Topics 1-6), pages 252-256 & Chapter 15 (Topics 1-4), pages 270-273

Labs and Activities:

Volcanic Rocks Activity                      Plate Tectonic Essays #4 & #5

82. Compare and contrast the composition, color & formation of mafic and felsic rocks.

### **Volcanism, Earthquakes and Plate Tectonics (continued)**

83. Define and explain what causes earthquakes.
84. Compare and contrast the motion, speed and medium of S, P and L waves.
85. Define earthquake focus.
86. Define epicenter.
87. Explain the elastic-rebound theory.
88. Where were the largest earthquakes in the U.S.?
89. How does the medium the earthquake travels in relate to the damage it may cause?

## **The Rock Record**

Read Chapter 32 of the Earth Science book by Heath, pages 596-609

Lab and Activities:

Rock Correlation

Interpreting Geologic History

Half-Life Lab

90. Define relative and absolute time.
91. List and explain 3 laws for finding relative time.
92. List and explain 3 methods for telling absolute time.
93. Define radioactivity, electric force and nuclear force.
94. List and describe alpha, beta and gamma particles.
95. List and explain 3 ways fossils are preserved in rocks.
96. Define and give examples of index fossils and key beds.
97. Explain how fossils are used as evidence for evolution.

## **Archean Through Cenozoic Eras**

Read Chapter 33 of the Earth Science book by Heath, pages 614-623

Read Chapter 34 of the Earth Science book by Heath, pages 628-639

Labs and Activities:

Geologic Timeline

96. Compare and contrast the age, life, geology and climate of the following Eras, periods and epochs.
  - Archean Era
  - Proterozoic Era
  - Paleozoic Era (Cambrian, Ordovician, Silurian, Devonian, Mississippian, Pennsylvanian, Permian)
  - Mesozoic Era (Triassic, Jurassic, Cretaceous)
  - Cenozoic Era (Tertiary, Quaternary, Pleistocene epoch)

## **Astronomy**

Read Chapter 20 of the Earth Science book by Heath, Topics 8, 13, 14, 15, 16  
electromagnetic spectrum, light, Doppler Effect

Read Chapter 21 of the Earth Science book by Heath, Topics 6-18  
Types of stars, life cycle of stars, galaxies

Read Chapter 22 of the Earth Science book by Heath, Topics 1, 2, 3, 4, 5  
Properties of Sun, northern lights, solar system and planets

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It is much better to understand the Universe as it really is than to persist in delusion...  
...no matter how reassuring that delusion may feel to your soul!