**8th Grade Final Exam Study Guide**

**Nature of Science:**

1. DEFINE and GIVE AN EXAMPLE of each of the following terms:
   * Theory:
   * Law:
   * Hypothesis:
   * Inferences:
   * Data:
   * Prior Knowledge:

**Matter and Properties of Matter (Chapter 2 and 3)**

1. What is matter? What are the two criteria?
   * Matter is anything that has \_\_\_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_\_\_\_.
2. What is mass?
   * What is the difference between mass and weight?
3. What is volume?
4. Define the term “***physical property***” of matter.
   * List at least three physical properties. Give an example of that physical property for a substance (ex: the density of water is 1.00 g/cm3)
5. What is a ***“chemical property”***? What are two chemical properties?
   * Give 2 examples of a chemical *change.*
   * What might be some signs of a chemical *change?*
6. What are the four states of matter? Describe the bonding/attraction of the molecules in each state of matter.
   * \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
   * \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
   * \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
   * \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
7. Name the processes that allow the following changes in state to occur and identify whether (heat) **energy was added [endothermic]**, or if **energy was lost/released [exothermic]**
   * Solid 🡪 liquid: \_\_\_\_\_\_\_\_\_\_\_\_\_\_
     1. ***endothermic*** (heat added)? or ***exothermic*** (heat lost)?
   * Liquid🡪 solid
     1. ***endothermic*** (heat added)? or ***exothermic*** (heat lost)?
   * Liquid 🡪gas
     1. ***endothermic*** (heat added)? or ***exothermic*** (heat lost)?
   * Gas 🡪 liquid
     1. ***endothermic*** (heat added)? or ***exothermic*** (heat lost)?
   * Solid 🡪 gas
     1. ***endothermic*** (heat added)? or ***exothermic*** (heat lost)?
8. Define and GIVE AN EXAMPLE OF EACH OF THE FOLLOWING:
   * Element:
   * Compound:
   * Mixture:
     1. Suspension:
     2. Colloid:
     3. Solution:
9. What is the periodic table of elements? How is it organized?

**Forces and Motion (Chapters 5 and 6)**

1. What is motion? Define it. How do we describe motion?
2. How do we measure motion?
   * What is velocity?
   * What is acceleration?
3. What is the formula for velocity?
   * If an object travels 875 meters in 50 seconds what is its velocity?
   * A car is traveling at 225 m/s in 60 seconds, how far did it travel?
4. What is the formula for acceleration?
   * A plane passes over Point A with a velocity of 8,000 m/s north. Forty seconds later, it passes over Point B with a velocity of 10,000 m/s north. What was the acceleration of the plane between point A and B?
5. By definition, what is a force?
   * What does it mean when forces are balanced?
   * What does it mean when forces are unbalanced?

1. Explain what the universal gravity is.
2. How does mass affect the gravitational pull exerted by an object? i.e. what is the relationship between mass and gravitational pulls
3. How does distance affect the gravitational pull exerted by an object?
4. What is the acceleration of objects due to gravity on Earth?
5. What does it mean for an object to be in free fall?
   * How does air resistance affect free fall?
6. What is an orbiting object?
   * Explain how orbiting occurs**.**
7. What is projectile motion? Explain it. What two types of motion are involved in projectile motion? Be able to apply it to specific examples and situations.
8. What is friction?
   * What are the different types of friction? Give an example of each.
     1. Fluid:
     2. Rolling:
     3. Sliding:
     4. Static:
9. What are Newton’s Three Laws of Motion? Be able to explain it in detail and give specific examples and real-life applications of these laws.
   * Law of Inertia. Explain it and give some specific examples of its applications in real life.
     1. What is inertia?
   * Newton’s Second Law. Explain it and give specific examples of its applications in real life. What is the formula? What might be some ways to test this law?
     1. Calculate the force produced by a mass of 45 kg accelerating at a rate of 2 m/s.
     2. What is the acceleration of a 10 kg mass that exerts a force of 35 N?
   * Newton’s Third Law. Explain it and give specific examples of its applications in real life.

**Astronomy (Chapters 19 and 20)**

1. Define what a star is.
2. Explain how a star’s temperature and color are related to each other. What color of stars tend to be the coolest and what are the hottest?
3. What nuclear process fuels the burning in a star? What is the reaction that occurs (name specifically what and how many atoms are involved)?
4. When measuring the “magnitude” of a star, what is being measured? What is the difference between **apparent magnitude vs. absolute magnitude**?
5. How do stars form? Explain the formation process.
6. Define the following:
   * Red giant:
   * White Dwarf:
   * Supernova:
   * Neutron Star:
   * Black Hole:
7. What is the HR diagram? What is its function? What variables are needed to plot stars on the HR diagram?
8. What is a light year? How long is one light year? Why use light years to measure spaces between objects in space?
9. Explain how looking at the light from an object that is several hundred or thousands of light years away is like looking into the past?
10. What is an astronomical unit (AU)?
11. What is a galaxy?
12. What are galaxies classified by?
13. What are the three types of galaxies and DEFINE THEIR GENERAL CHARACTERISTICS?
    * What type of galaxy is the Milky Way?

**Chemistry Unit (Chapter 12-14)**

1. List ALL the major people who contributed to the development of **The Atomic Theory**, and summarize their major ideas/findings/contributions:
   * Democritus:
   * John Dalton:
   * JJ Thomson:
   * Ernest Rutherford:
   * Niels Bohr:
   * Modern Atomic Theory:
2. What is an atom?
   * What do scientists believe atoms look like now?
3. What are the three subatomic particles which make up an atom?
4. What comprises the nucleus of an atom?
5. What are some signs of a chemical reaction?
6. Count the number of atoms in the following chemical formulas:
   * vitamin C (ascorbic acid) -- C6H8O6
   * glucose – C6H12O6
   * Mg(OH)2
   * Al2(SO4)3
7. What are the different types of chemical reactions?
8. Balance the following equations:

* 2H2 + O2 → \_\_\_H\_\_ O
  + \_\_\_Na + Cl2 → \_\_\_\_\_NaCl
  + N\_\_O\_\_ → 2NO2
  + 2Mg + O\_\_ → \_\_\_MgO
  + 2H2O2 → \_\_\_\_H2O + O\_\_\_
  + \_\_\_Ca + N\_\_\_→ Ca3N2

1. What is an **acid**? What is a **base?** What range of pH levels do each have?