**Unit 1: Review/Study Guide**

**Vocabulary:**

Scientific Inquiry Variable Control Extraneous/Controlled Variables Manipulated Variable Responding Variable Hypothesis Empirical Anecdotal Measurement Error Assumption Observing/Observation Inferring Predicting Qualitative Quantitative Scientific Attitudes True Value/Accuracy/Precision Meniscus System Climate System Closed System Geosphere/Lithosphere Atmosphere Hydrosphere Biosphere Model Simulation Energy Inputs Tidal Energy Radioactive Decay Geothermal Energy Solar Energy Theory Law

**Scientific Inquiry**

1. Know the 6 steps in the Scientific Inquiry process.
2. **E1.1A:** Come up with questions that can be investigated in the laboratory or field (i.e., S.I. step 1).
3. **E1.1h:** Be able to create an experiment that tests a hypothesis (i.e., S.I. step 3).
4. **E1.1h:** Draw conclusions from data presented in charts or tables (i.e., S.I. step 4).
5. **E1.1g:** Use empirical evidence to come up with a conclusion (i.e., S.I. step 5).
6. **E1.1B:** Understand that measurement error, the challenges of controlling variables, accuracy of data analysis, logic of argument, logic of experimental design, and/or the dependence on underlying assumptions can make a scientific conclusion wrong.
7. E1.1f Predict what would happen if the **variables**, methods, or timing of an investigation were changed.

Scientific Reflection and Social Implications

1. E1.2A: Critique whether or not specific questions can be answered through scientific investigations.

Example: Is this brick hard? Or What chemical(s) or process makes this brick hard?

1. E1.2h: Understand the difference between scientific theories, laws, hypotheses, and observations.
2. E1.2k: Analyze how science and society interact from a historical, political, economic, or social perspective.
3. E1.2f: Critique solutions to problems, given criteria and scientific constraints (i.e., S.I. step 5).
4. E1.2E: Evaluate the future career and occupational prospects of science fields. (i.e., pgs 16-17)

**Earth Systems Overview**

1. **E2.1A:** Explain why the Earth is essentially a closed system in terms of outside matter.
2. **E2.1B:** Analyze the interactions between the major systems (geosphere, atmosphere, hydrosphere, biosphere) that make up the Earth.
3. **E2.1C:** Explain, using specific examples, how a change in one system affects other Earth systems.

**Energy in Earth Systems**

1. **E2.2A:** Describe the Earth’s principal sources of internal and external energy (e.g., Geothermal- radioactive decay, core; Solar- sun’s radiation; Tidal: gravity).
2. **E2.2e:** Explain how energy changes form through Earth systems. (e.g., solar energy heats water; water evaporates and becomes cloud; water droplets form in cloud; gravity pulls water to ground as rain)

**Safety in the Laboratory**

1. Know the “In Case of Emergency” rules (pg. 27).

**Unit 1: Review/Study Guide**

**6 Steps of Scientific Inquiry**

Posing Questions:

Forming a Hypothesis:

Creating a Controlled Experiment:

 Collecting and Interpreting Data:

Stating Conclusion:

Communicating:

**Know how to write a hypothesis** (i.e., a testable statement):

**Know each of the parts of an experiment and be able to find them in an experiment**

Manipulated (independent) Variables:

Responding (dependent) Variables:

Control:

Placebo Effect:

Controlled Variables:

**Know this measurement vocabulary:**

Anecdotal evidence:

Empirical evidence:

Qualitative data:

Quantitative data:

**Understand accuracy in measurement and why it is important in scientific investigations**

True value:

 Precision:

 Accuracy:

 Sample size:

 Generalizing to larger populations:

Meniscus

**Know this “Thinking Like a Scientist” vocabulary:**

Inferring:

Observing:

Predicting:

Scientific attitudes:

**Be able to tell the difference between:**

Theories:

Laws:

**Know why models and simulations are used in science to understand systems and their interactions/**

**Know the spheres:**

Biosphere:

Geo/Lithosphere:

Hydrosphere:

Atmosphere:

**Know how a change in one system/sphere can impact others** (e.g., volcano/lithosphere releases dust/gas causing blockage of sun on other areas of Earth, leading to death of plants/biosphere).

**Know that the two primary energy inputs to Earth’s systems are the core and the sun.**

**Know that the primary input to Earth’s climate system is the sun.**

**Understand that Earth is primarily a closed system in terms of matter and how this plays a role is sphere interaction.**

**Know the safety information.**