**ESS Unit 1 Nature of Science Study Guide**

**Asking Questions, Observations, & Earth’s System Interactions**

**Asking Good Scientific Questions🡪 Good scientific questions are defined, measurable, and controllable.**

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| **NOT GOOD SCIENTIFIC QUESTIONS** | Based on **values or opinions** like what people believe is right or wrong, or beautiful or ugly. |
| **GENERAL SCIENTIFIC QUESTIONS** | FACT FINDING and EASY TO ANSWER Example: “What makes a seed grow?” |
| **GOOD SCIENTIFIC QUESTIONS** | **Can be answered** by **direct observations** or with **scientific tools**  Can be **answered by investigation or experiment**.  Example of a good scientific question: “What effect does the amount of water have on radish seed germination?” |
| **HOW TO ASK A SCIENTIFIC QUESTION** | * “How does \_\_\_\_\_\_ affect \_\_\_\_\_\_\_\_?” * “What is the relationship between \_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_?” * “What factors cause \_\_\_\_\_\_\_ to \_\_\_\_\_\_\_?” * “What effect does \_\_\_\_\_\_ have on \_\_\_\_\_\_?” * Remember the question goes “How does **independent variable** affect the **dependent variable**?” |

**Variables Practice Problems:**

1. Amanda had trouble finishing her homework. She’d sit at her desk in her bedroom and stare at her book, but her mind would wander and she couldn’t finish her work. She wondered if she would finish if she turned off all of the distractions around her. She got her homework together and turned off the TV and all of the other things in her room that made noise- making her room silent. She predicted that eliminating “background noise” would help her finish more homework problems.
2. What is the testable Scientific Question?: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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1. Joey-Jo-Jo got grounded by his parents because he was being a distraction in science class instead of doing his work. He wondered if moving his seat to the front of the class would help him pay attention and receive higher scores on assignments.
2. What is the Testable Scientific Question?: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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1. SpongeBob and his Bikini Bottom pals have been busy doing a little research. Read the description for each experiment and answer the questions.

Mr. Krabbs wants to make Bikini Bottoms a nicer place to live. He has created a new sauce that he thinks will reduce the production of body gas associated with eating crabby patties from the Krusty Krab.

* He recruits 100 customers with a history of gas problems.
* He has 50 of them (Group A) eat crabby patties with the new sauce.
* The other 50 (Group B) eat crabby patties with sauce that looks just like new sauce but is really just mixture of mayonnaise and food coloring.
* Both groups were told that they were getting the sauce that would reduce gas production.

Two hours after eating the crabby patties, 30 customers in group A reported having fewer gas problems and 8 customers in group B reported having fewer gas problems.

What is the testable scientific question? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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**Observations & Inferences Practice**

1. Examine the photo. Write down 2 or more inferences and observations for each category.



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| **Inferences**  (what you think or why🡪 a possible explanation) | **Qualitative Observations**  Adjectives  Qualities | **Quantitative Observations**  Numbers  Measurement  Quantity |
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**Earth’s System Interactions Practice**

1. Examine the photo. Explain what is part of each sphere:



1. Examine the photo and describe possible interactions between the 4 Earth systems.