**SIMTM Scientific Argumentation Routine**

**#4 – Evaluate the Quality of Evidence**

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| --- | --- | --- |
| **Factor** | **Poor** | **Good** |
| **Reliable** | data is inconsistent, shows a lot of variability | data is consistent, shows little variability |
| **Valid** | evidence loosely addresses the claim being made *(high levels of soda consumption lead to osteoporosis in humans - but only females were part of the test)* | evidence connects directly to the claim being made *(high levels of soda consumption lead to osteoporosis in women - only females were part of the test)* |
| **Objective** | bias or opinion affected the design of the experiment and/or the way the data was interpreted | bias or opinion did not affect the design of the experiment or the way the data was interpreted |
| **Methodology** | there are serious flaws in experimental design (such as small sample size, no control group, or more than 1 variable), data collection (opportunities for error existed, units of measurements were not appropriate), and/or analysis (averaging averages without weighting them, distorting data) or is missing | there are no obvious flaws in experimental design, data collection or analysis |
| **Evaluated as:**  Poor: 2 or more factors are rated “poor” or are missing  Average: 3 factors are rated “good”  Good: All 4 factors are rated “good” | | |

**#5, 6, 7 – Evaluate the Quality of the Chain of Reasoning**

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| **Factor** | **Defined as** | **Poor** | **Good** |
| **Strength of Authority** | **Authority (A):** Research was conducted by a reputable institution such as a university (University of Florida) or a government agency (Environmental Protection Agency). If the research was conducted by an individual or a non-profit or profit making agency, consider if the person or organization might be biased. | research was done by an individual or organization that lacked authority or may be biased, no authority is identified | research was done by a reputable institution or an individual or organization considered free of bias |
| **Application of Theory** | **Theory (T):** A scientific theory like the cell theory | does not mention an applicable scientific theory | correctly mentions an applicable scientific theory |
| **Type of Logic** | **Analogy (AN):** If acid rain kills trees in the Amazon rainforest in Brazil, it will also kill the trees in Hawaiian rainforest in the US. | None of the types of logic are present | 1 or more types of logic are present |
| **Correlation (C):** Crime rate and emergency room visits increase during a full moon. |
| **Cause-Effect (CE):** Cars with airbags decrease the chance of a person dying in a car accident. |
| **Generalization (G):** Since the people in the Cheerios research study lowered their cholesterol levels by eating Cheerios breakfast cereal, all people who eat Cheerios will lower their cholesterol levels. |
| **Evaluated as:**  Poor: 1 or more factors are rated “poor”  Average: 2 factors are rated “good”  Good: All 3 factors are rated “good” | | | |