SCILLSS Classroom Science Assessment Workshop

# High School Earth and Space Science Sample Task Ideas

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| **NGSS PE: HS-ESS2-5.** Plan and conduct an investigation of the properties of water and their effects on Earth materials, surface processes, and groundwater systems. |

# Example Task Ideas

1. Students actively explore the properties of water and its effects on Earth materials and surface properties by planning and conducting investigations. Initially, they identify evidence needed to answer a question related to the properties of water and its effects on Earth materials and surface properties. For example, the evidence may be related to:
   * The properties, such as heat capacity of water, density of water in its liquid and solid states, and the polar nature of a water molecule due to its molecular structure.
   * The effect of the properties of water on energy transfer that causes patterns of temperature, the movement of air, the movement and availability of water at Earth's surface.
   * Mechanical effects of water on Earth's materials that can be used to infer the effect of water on Earth's surface properties. Some examples include stream transportation and deposition, erosion using variations in soil moisture content, and expansion of water as it freezes.
   * The chemical effects of water on Earth materials that can be used to infer the effect of water on Earth's surface processes. This may include the properties of solubility, the reaction of water on iron, and the properties of water that lower the melting temperature of most solids, and decreases the viscosity of melted rock.

Next, students plan out their investigation to align their data collection methods with the evidence they are seeking. For example, they may decide to investigate the mechanical nature of running water on sediment transport and deposition by changing the slope of a stream table. Once their protocol has been designed, they run their investigation and collect data. They analyze and interpret the data, and if necessary, they modify the protocol and run the investigation again.

1. Provide an image of a landform, such as a landslide, a braided stream bed, or sand spit that has been formed by water. The student formulates a scientific question based on the provided observation.
2. Provide an experimental design to investigate the impact of water on Earth's surface. The student identifies factors that might affect the result of the investigation.
3. Provide a list of variables related to a scientific investigation on the impact of water on Earth's surface. The student identifies the dependent and independent variables in the investigation.
4. Provide a scientific question about the impact of water on Earth's surface and a list of tools and instrumentation. The student identifies the tools and instrumentation that can help obtain accurate and precise data.
5. Provide alternate experimental designs and/or data from a flawed design to determine the impact of water on Earth's surface. The student evaluates alternative designs to determine which design provides the evidence necessary to address the purpose of the investigation better.
6. Provide a set of data relevant to the goal of the investigation on the impact of water on Earth's surface. The student evaluates the quality of data to determine if the data meet the goal of the investigation.

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