



The Data Literacy Company

## Data and 5E Instructional Model

**5E Framework:** The 5E instructional framework (Bybee et al. 2006) uses how people learn to provide a roadmap for building instructional experiences in which the learner is actively constructing their understanding of the concept over time in multiple ways. Data can be integrated at every phase of the 5E framework. Therefore, let's take a moment to think of why and how we may want to think about data across the framework.

- **Engage** with prior knowledge.
  - *Why with Data?* - Real-world datasets spark interest and engage students to wonder about the processes and phenomena around them.
  - *How with Data?* - Use a dataset that resonates with what they know and are familiar with to help your students connect with their prior knowledge and to prompt them to reason more formally about problem or topic.
- **Explore** key concepts.
  - *Why with Data?* - Real-world datasets provide a relevant context to the concept being explored. The material matters more than just something a teacher has assigned.
  - *How with Data?* - Students probe data to examine their thinking around the concept. When students have choice in how they visualize and analyze data, with guidance to provide focus and stimulate meaningful inquiry, they take more ownership of their learning.
- **Explain** new understandings and connections.
  - *Why with Data?* - Students can connect their prior knowledge to real-world data as they make sense of the concept. New discoveries from the data are empowering and have a larger impact on their retention of the material.
  - *How with Data?* - Students are challenged to make sense of their graphs, reconcile surprising outcomes, account for the patterns they see, and communicate what they are finding in the data.
- **Elaborate** learning to a new or similar situation.
  - *Why with Data?* - Using data, students can ask and explore related questions about a concept through similar datasets to deepen their understanding of science processes and phenomena.
  - *How with Data?* - Provide students the necessary data skills so that they can transfer and build on their previous knowledge by integrating a new dataset into their analysis or exploring a new dataset.
- **Evaluate** progress towards understanding.
  - *Why with Data?* - Students can ask: Is my understanding supported by the data? Teachers can ask: To what extent are my students learning from and engaging with the data?



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- *How with Data?* - Students can demonstrate and self-assess their understanding and skills using open-ended and multiple-response activity assessment tools, with individual feedback from teachers.

**Reference:**

Bybee, Rodger W., Joseph A. Taylor, April Gardner, Pamela Van Scotter, Janet Carlson Powell, Anne Westbrook, and Nancy Landes (2006). The BSCS 5E Instructional Model: Origins, Effectiveness, and Applications. BSCS, Colorado Springs, CO.