# The 5E Instructional Model

This model describes a teaching sequence that can be used for entire programs, specific units and individual lessons. The NASA Digital Learning Network supports the 5E constructivist learning cycle, helping students build their own understanding from experiences and new ideas.

- **What are the 5Es?**
    - The 5Es represent five stages of a sequence for teaching and learning: **Engage, Explore, Explain, Extend** (or **Elaborate**), and **Evaluate.**
- **ENGAGE:**
    - **The purpose for the ENGAGE stage is to peak student interest and get them personally involved in the lesson, while pre-assessing prior understanding.**
    - During this experience, students first encounter and identify the instructional task. During the **ENGAGE** stage, students make connections between past and present learning experiences, setting the organizational ground work for upcoming activities. NASA Digital Learning Network modules are designed to **ENGAGE** students.
    - Through discussions, the videos may be used to uncover students' prior understanding. The video format arouses students' curiosity and encourages them to ask their own questions.
- **EXPLORE:**
    - **The purpose for the EXPLORE stage is to get students involved in the topic; providing them with a chance to build their own understanding.**
    - In the **EXPLORATION** stage the students have the opportunity to get directly involved with phenomena and materials. As they work together in teams, students build a set of common experiences which prompts sharing and communicating. The teacher acts as a facilitator, providing materials and guiding the students' focus. The students' inquiry process drives the instruction during an exploration. Students are actively learning through inquiry-based science instruction and engineering challenges. Emphasis is placed on: Questioning, Data Analysis and Critical Thinking. NASA Digital Learning Network modules help students **EXPLORE** new topics on their own. Through self-designed or guided exploration students make hypotheses, test their own predictions, and draw their own conclusions.
- **EXPLAIN:**
    - **The purpose for the EXPLAIN stage is to provide students with an opportunity to communicate what they have learned so far and figure out what it means.**
    - **EXPLAIN** is the stage at which learners begin to communicate what they have learned. Language provides motivation for sequencing events into a logical format. Communication occurs between peers, with the facilitator, and through the reflective process. Once students build their own understanding, they may use NASA Digital Learning Network modules to help summarize or **EXPLAIN** their own ideas. These segments introduce vocabulary in context and correct or redirect misconceptions.

- **EXTEND:**
  - **The purpose for the EXTEND** stage is to allow students to use their new knowledge and continue to explore its implications.
  - At this stage students expand on the concepts they have learned, make connections to other related concepts, and apply their understandings to the world around them in new ways. Our modules help students **EXTEND** and apply what they learned to new and unfamiliar situations.
- **EVALUATE:**
  - **The purpose for the EVALUATION stage is for both students and teachers to determine how much learning and understanding has taken place.**
  - **EVALUATE**, the final "E", is an on-going diagnostic process that allows the teacher to determine if the learner has attained understanding of concepts and knowledge. Evaluation and assessment can occur at all points along the continuum of the instructional process. Some of the tools that assist in this diagnostic process are: rubrics, teacher observation, student interviews, portfolios, project and problem-based learning products. Students will be excited to demonstrate their understanding through journals, drawings, models and performance tasks.
- **Who developed the 5E model?**
  - The Biological Science Curriculum Study (BSCS), a team led by Principal Investigator Roger Bybee, developed the instructional model for constructivism, called the "Five Es". Other models have been adapted from this model including the 6E and 7E models.
- **What is constructivism?**
  - Constructivism is a philosophy about learning that proposes learners need to build their own understanding of new ideas. Two of the most prominent constructivist researchers are: **Jean Piaget** (stages of cognitive development) and **Howard Gardner** (multiple intelligences).