

5E Model of Instruction

(Based on the 5E Instructional Model presented by Dr. Jim Barufaldi at the Eisenhower Science Collaborative Conference in Austin, Texas, July 2002. Adapted from description by Cornel University, 2005, Achieving Scientific Literacy by Rodger w. Bybee, Heinemann, Portsmouth, NH, 1997)

Engagement

This phase of the instructional model initiates the learning task. The activity should make connections between past and present learning experiences, anticipate activities, and focus students' thinking on the learning outcomes of current activities. The student should become mentally engaged in the concept, process, or skill to be explored.

The student...	Explain Activities	The teacher...
<ul style="list-style-type: none"> • Asks questions such as: <ul style="list-style-type: none"> • Why did this happen? • What do I already know about this? • What can I find out about this? • How can this problem be solved? • Shows interest in topic. • Responds to questions demonstrating their 	Initiate the learning task. The activity should make connections between past and present learning experiences, and anticipate activities and organize students' thinking toward the learning outcomes of current activities. <ul style="list-style-type: none"> • Generate interest • Access prior knowledge • Connect to past knowledge • Set parameters of the focus • Frame the idea 	<ul style="list-style-type: none"> • Raises questions and problems. • Elicits responses that uncover students' current knowledge about the concept/topic. • Generates interest. • Generates curiosity.

Exploration

This phase of the teaching model provides students with a common base of experiences within which they identify and develop current concepts, processes, and skills. During this phase, students actively explore their environment or manipulate materials.

The Student...	Explain Activities	The Teacher...
<ul style="list-style-type: none"> • Thinks creatively within the limits of the activity. • Tries alternatives to solve a problem and discusses them with others. • Suspends judgment. • Conducts activities, predicts, and forms hypotheses or makes generalizations • Becomes a good listener • Shares ideas and suspends judgment • Records observations and/or generalizations • Discusses tentative alternatives 	Provide students with a common base of experiences which current concepts, processes, and skills are identified and developed. <ul style="list-style-type: none"> • Experience key concepts • Discover new skills • Probe, inquire, and question experiences • Examine their thinking • Establish relationships and understanding 	<ul style="list-style-type: none"> • Elicits responses that uncover students' current knowledge about the concept/topic. • Raises questions and problems. • Acts as a facilitator • Observes and listens to students as they interact • Asks good inquiry-oriented questions • Generates interest. • Generates curiosity.

Explanation

This phase of the instructional model focuses students' attention on a particular aspect of their engagement and exploration experiences and provides opportunities for them to verbalize their conceptual understanding, or demonstrate their skills or behaviors. This phase also provides opportunities for teachers to introduce a formal label or definition for a concept, process, skill, or behavior.

The Student...	Explain Activities	The Teacher...
<ul style="list-style-type: none"> • Explains possible solutions or answers to other students. • Listens critically to other students' explanations. • Questions other students' explanations. • Listens to and tries to comprehend explanations offered by the teacher. • Refers to previous activities. • Uses recorded observations in explanations. • Uses previous observations and findings • Provides reasonable responses to questions 	<p>Focus students' attention on a particular aspect of their engagement and exploration experiences, and provide opportunities to demonstrate their conceptual understanding, process skills, or behaviors. This phase also provides opportunities for teachers to introduce a concept, process, or skill.</p> <ul style="list-style-type: none"> • Connect prior knowledge and background to new discoveries • Communicate new understandings • Connect informal language to formal language 	<ul style="list-style-type: none"> • Formally provides definitions, explanations, and new vocabulary. • Uses students' previous experiences as the basis for explaining concepts. • Encourages students to explain their observations and findings in their own words • Provides definitions, new words, and explanations • Listens and builds upon discussion from students • Asks for clarification and justification • Accepts all reasonable responses

Elaboration

This phase of the teaching model challenges and extends students' conceptual understanding and allows further opportunity for students to practice desired skills and behaviors. Through new experiences, the students develop deeper and broader understanding, more information, and adequate skills.

The Student...	Explain Activities	The Teacher...
<ul style="list-style-type: none"> • Applies new labels, definitions, explanations, and skills in new, but similar, situations. • Uses previous information to ask questions, propose solutions, make decisions, design experiments. • Draws reasonable conclusions from evidence. • Provides reasonable conclusions and solutions • Records observations, explanations, and solutions 	<p>Challenge and extend students' conceptual understanding and skills. Through new experiences, the students develop deeper and broader understanding, more information, and adequate skills.</p> <ul style="list-style-type: none"> • Apply new learning to a new or similar situation • Extend and explain concept being explored • Communicate new understanding with formal language 	<ul style="list-style-type: none"> • Expects students to use vocabulary, definitions, and explanations provided previously in new context. • Encourages students to apply the concepts and skills to new situations. • Reminds and refers students of alternative explanations. • Uses previously learned information as a vehicle to enhance additional learning • Encourages students to apply or extend the new concepts and skills • Encourages students to use terms and definitions previously acquired

Evaluation

This phase of the teaching model encourages students to assess their understanding and abilities and provides opportunities for teachers to evaluate student progress toward achieving the educational objectives.

The Student...	Explain Activities	The Teacher...
<ul style="list-style-type: none"> • Demonstrates an understanding or knowledge of concepts and skills • Answers open-ended questions by using observations, evidence, and previously accepted explanations. • Evaluates his or her own progress and knowledge. • Asks related questions that would encourage future investigations. • Provides reasonable responses and explanations to events or phenomena 	<p>Encourage students to assess their understanding and abilities and provide opportunities for teachers to evaluate student progress.</p> <ul style="list-style-type: none"> • Demonstrate understanding of new concept by observation or open-ended response • Apply within problem situation • Show evidence of accomplishment 	<ul style="list-style-type: none"> • Assesses students' knowledge and skills • Observes students as they apply new concepts and skills. • Looks for evidence that students have changed their thinking. • Allows students to assess their learning and group process skills. • Asks open-ended questions such as, Why do you think...? What evidence do you have? What do you know about the problem? How would you answer the question? • Encourages students to assess their own learning