

The 5E Model of Instruction

Engage

The first phase is to engage the student in the learning task. The student mentally focuses on an object, problem, situation, or event. The activities of this phase should make connections to past and future activities. The connections depend on the learning task and may be conceptual, procedural, or behavioral.

Asking a question, defining a problem, showing a discrepant event, and acting out a problematic situation are all ways to engage the students and focus them on the instructional activities. The role of the teacher is to present a situation and identify the instructional task. The teacher also sets the rules and procedures for the activity.

| Student Behavior | Engage | Teaching Strategy |
|---|---|---|
| Asks questions such as, Why did this happen? What do I already know about this? What can I find out about this? How can this problem be solved? | Initiates 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. | Generates interest. |
| Shows interest in topic. | | Generates curiosity. Raises questions and problems. Elicits responses that uncover students' current knowledge about the concept/topic. |

Explore

Once the activities have engaged students, they need time to explore their ideas. Exploration activities are designed so that all students have common, concrete experiences upon which they continue building concepts, processes, and skills. This phase should be concrete and meaningful for the students.

The aim of exploration activities is to establish experiences that teachers and students can use later to formally introduce and discuss scientific and technological concepts, processes, or skills. During the activity, the students have time in which they can explore objects, events, or situations. As a result of their mental and physical involvement in the activity, the students establish relationships, observe patterns, identify variables, and question events.

The teacher's role in the exploration phase is that of facilitator or coach. The teacher initiates the activity and allows the students time and opportunity to investigate objects, materials, and situations based on each student's own ideas and phenomena. If called upon, the teacher may coach or guide students as they begin constructing new explanations.

| Student Behavior | Explore | Teaching Strategy |
|---|---|---|
| Thinks creatively within the limits of the activity. | Provide students with a common base of experiences which current concepts, processes, and skills are identified and developed. | Encourages students to work together without direct instruction from the teacher. |
| Tests predictions and hypotheses. | | Observes and listens to students as they interact. |
| Forms new predictions and hypotheses. | | Asks probing questions to redirect student's investigations when necessary. |
| Tries alternatives to solve a problem and discusses them with others. | | Provides time for students to puzzle through problems. |
| Records observations and ideas. | | Acts as a consultant for students. |
| Suspends judgment. | | |
| Tests ideas. | | |

Explain

Explanation means the act or process in which concepts, processes, or skills become plain, comprehensible, and clear. The process of explanation provides the students and teacher with a common use of terms relative to the learning experience. In this phase, the teacher directs student attention to specific aspects of the engagement and exploration experiences. First, the teacher asks the students to give their explanations. Second, the teacher introduces scientific or technological explanations in a direct and formal manner. Explanations are ways of ordering and giving a common language for the exploratory experiences. The teacher should base the initial part of this phase on the students' explanations and clearly connect the explanations to experiences in the engagement and exploration phases of the instructional model. The key to this phase is to present concepts, processes, or skills briefly, simply, clearly, and directly, and then continue on to the next phase.

| Student Behavior | Explain | Teaching Strategy |
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| <p>Explains possible solutions or answers to other students.</p> <p>Listens critically to other students' explanations.</p> <p>Questions other students' explanations.</p> <p>Listens to and tries to comprehend explanations offered by the teacher.</p> <p>Refers to previous activities.</p> <p>Uses recorded observations in explanations.</p> | <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> | <p>Encourages students to explain concepts and definitions in their own words.</p> <p>Asks for justification (evidence) and clarification from students.</p> <p>Formally provides definitions, explanations, and new vocabulary.</p> <p>Uses students' previous experiences as the basis for explaining concepts.</p> |

Elaborate

Once the students have an explanation of their learning tasks, it is important to involve them in further experiences that apply, extend, or elaborate the concepts, processes, or skills. Some students may still have misconceptions, or they may only understand a concept in terms of the exploratory experience. Elaboration activities provide further time and experience that contribute to learning.

| Student Behavior | Elaborate | Teaching Strategy |
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| <p>Applies new labels, definitions, explanations, and skills in new, but similar, situations.</p> <p>Uses previous information to ask questions, propose solutions, make decisions, design experiments.</p> <p>Draws reasonable conclusions from evidence.</p> <p>Records observations and explanations.</p> | <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> | <p>Expects students to use vocabulary, definitions, and explanations provided previously in new context.</p> <p>Encourages students to apply the concepts and skills to new situations.</p> <p>Reminds students of alternative explanations.</p> <p>Refers students to alternative explanations.</p> |

Evaluate



At some point, it is important that students receive feedback on the adequacy of their explanations. Informal evaluation can occur from the beginning of the teaching sequence. The teacher can complete a formal evaluation after the elaboration phase. As a practical educational matter, science teachers must assess educational outcomes. This is the phase in which teachers administer tests to determine each student's level of understanding. This also is the important opportunity for students to use the skills they have acquired and evaluate their understanding.

| Student Behavior | Evaluate | Teaching Strategy |
|---|---|---|
| <p>Checks for understanding among peers.</p> <p>Answers open-ended questions by using observations, evidence, and previously accepted explanations.</p> <p>Demonstrates and understanding or knowledge of the concept or skill.</p> <p>Evaluates his or her own progress and knowledge.</p> <p>Asks related questions that would encourage future investigations.</p> | <p>Encourage students to assess their understanding and abilities and provide opportunities for teachers to evaluate student progress.</p> | <p>Refers students to existing data and evidence and asks, What do you already know? What do you think...?</p> <p>Observes students as they apply new concepts and skills.</p> <p>Assesses students' knowledge and/or skills.</p> <p>Looks for evidence that students have changed their thinking.</p> <p>Allows students to assess their learning and group process skills.</p> <p>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?</p> |