



Gold Seal Lesson

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Grade Span			ICLE Application Model			
K-4	5-8 x	9-12	A	B	C x	D

Instructional Focus:

Science as Inquiry – Students demonstrate knowledge and skills necessary to perform scientific inquiry.
Habits of Mind – Students develop habits of mind including curiosity, open-mindedness and persistence.
Communication – Students communicate and apply scientific concepts.
Basic Concepts and Knowledge – Students develop an understanding of scientific concepts using facts, theories, principles, and models.
Listening – Students listen for a variety of purposes appropriate to the grade level.
Speaking – Students speak for a variety of purposes and audiences with sophistication and complexity appropriate to the grade level.

Performance Task

<ol style="list-style-type: none"> 1. On the board write, The Scientific Method. Check for prior understanding or knowledge of this concept. 2. Explain the aspects of the scientific method: formulate a hypothesis, experiment, collection of data, evaluation of data, and re-testing. Ask students how this is used in science and why it's important to use. Try and direct the discussion towards understanding that scientists must first ask questions, state what they believe the answer is, try an idea out (experiment) to see if their answer works, collect the information from their experiment, decide if their answer was correct. 3. Inform the students that they are going to practice the scientific method. Also inform them that the question they are going to be trying to solve is, "how can the color of a flower be changed?" Explain that they are going to be working in groups of 4 and that each person needs to come up with an answer to the question (hypothesis); Also explain that they need to follow the directions carefully, work together, and decide the hypotheses to test. 4. Distribute 3 white carnations, food coloring, glasses and water. 5. Have each group report what hypothesis they used, how they tested the hypothesis, and what the results of their experiment were. Assuming that someone figured out how to get the carnation to change color, have that group direct the rest of the class in performing the experiment. 6. Once everyone has had the opportunity to view the color change, ask the class "what do you think will happen if the flower were placed back in clear water?" (the carnation will return to being white) 7. Ask, "why do you think the carnation changed color?" Begin a discussion on how the stem has veins that move the nutrients throughout the plant's body, like the veins in the human body. 8. Continue to discuss how the plant uses sunlight to manufacture energy and food, how carbon dioxide is taken in and oxygen expelled., and how soil types affect the type of plants that either flourish or perish. 9. Each student describes the experiment and what happened in his or her science journal. <p>This activity meets specific competencies and indicators as outlined in the National Career Development Guidelines.</p>

ICLE Essential Skills

Know the structure and functions of roots, stems, leaves flowers and other parts of plants. (s 11)
Know the characteristics, roles, and divisions of complex organisms (i.e., plants and animals). (s 30)
Know and apply the principles of scientific inquiry. (Implicit in this statement are the processes of prediction, estimation, developing hypotheses, drawing conclusions, evaluation, and following ethical principles and professional procedures. (s 114)
Plan and apply real or hypothetical models and constructions to facilitate investigation and learning and the solution to practical problems. (s 115)
Use writing as a tool for learning in formats such as learning logs, laboratory reports, note-taking, journals and portfolios. (ela 40)
Give oral or written directions that are clear and are understood by another person. (ela 2)
Follow oral or written directions. (ela 4)
Use brainstorming, role playing, and standard problem solving strategies to define a problem and suggest solutions. (ela 19)
Participate, sometimes leading, in group meetings by contributing, taking turns speaking, and working toward a common goal. (ela 20)
Gather information such as data, facts, ideas, concepts, and generalizations from oral sources. (ela 51)

Scoring Guide:

4	The student fully achieves all project goals. The scientific experiment demonstrates clear thinking and explanation. All work is complete and correct.
3	The student substantially achieves the project goals. The main thrust of the project and the science concepts behind it is understood., but there may be some minor misunderstanding of content, errors in computation, or weakness in presentation.
2	The student partially achieves project goals. A limited grasp of the main scientific ideas or project requirements is demonstrated. Some of the work may be incomplete, misdirected, or unclear.
1	The student makes little progress toward accomplishing the goals of the project because of lack of understanding or lack of effort.

Keywords

English Language Arts	Mathematics	Science
Reading	Algebra	Earth Science
Writing	Geometry	Life Science Plants Scientific inquiry
Communications Discussion Listening Illustration Visuals	Statistics	Chemistry
Literature	Calculus	Physics
Other	Trigonometry	Other
	Other	