# SIED 5325: Inquiry Science Education in Bilingual Settings – Spring 2011

5E Lesson Template

## Title:

## Introduction/Overview

This portion of the lesson addresses the intended results, including what students should know, understand and be able to do, and content worthy of understanding. It also identifies the concepts to be addressed throughout the lesson. Specific examples of content, process, or skills from are stated**.** The justification and purpose are clearly stated and links to the standards identified. Student performance expectations are linked to the overarching understanding and intent of the standards.

## Standards

TEKS:

6.6 The student knows that there is a relationship between force and motion.

6.6A Identify and describe the changes in position, direction of motion, and speed of an object when acted upon by a force.

6.6B Demonstrate that changes in motion can be measured and graphically represented.

7.6The student knows that there is a relationship between force and motion.

7.6B Demonstrate that an object will remain at rest or move at a constant speed and in a straight line if it is not being subjected to an unbalanced force.

8.7 The student knows that there is a relationship between force and motion.

**National Science Education Standards  
Content Standards: 5-8**

* The motion of an object can be described by its position, direction of motion and speed.
* An object that is not being subjected to a force will continue to move at a constant speed in a straight line.
* If more than one force acts on an object along a straight line, then the forces will reinforce or cancel one another, depending on the their direction and magnitude. Unbalanced forces will cause changes in the speed or direction of an object’s motion.
* Energy is transferred in many ways.

## Grade

Students in 6th, 7th grade

## Objectives

Before the lesson is prepared, the teacher should have a clear idea of what the teaching objectives are. The objective statement will:

* Inform the students of the day’s objectives and outline what they will be able to do at the end of the lesson, also
* Clarify how and why the lesson is important and useful.

**Objective format (The student will [TSW])**

Students will be able to [**Verb from Bloom’s Taxonomy**] by [**the task**]

## Materials

Glue

Crayons

Markers

Teacher made worksheets

Poster boards

Various Manipulative

Thermometer

## Time Frame

Content goes here

## Engage

Whether you begin in a very directed or less directed manner will depend on the complexity of the concept and the background of the children. Sometimes you will want to use a hands-on experience to create interest and arouse questions, then lead children into a exploration to develop a concept for which they have some background knowledge. Sometimes, because you feel that children lack the background knowledge, you will begin in a very guided manner to carefully introduce the concept and later, when children have become familiar, move to a more exploratory activity. The direction that you take should come from the decisions that you make during preplanning.

Regardless of the direction that you take, your introduction should engage children, arouse curiosity, and set a direction for the lesson. The children should, by the end of your introduction have an idea about the focus of the lesson and what they will be doing. The introductory activity should also help you reaffirm your thinking about your student's background knowledge and

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| **What the teacher does:**  -Creates interest  -Generates curiosity  -Raises questions  -Identifies what students know about the topic | **What the student does:**  -Asks questions: Why did this happen? |

readiness for the experience.

## Explore

This is the bulk of the lesson where children are immersed in exploration of topics or concepts. This is the primary activity of the lesson. Students work with one another to explore ideas through hands-on activities. The teacher is the facilitator and observes and listens to students as they interact. The teacher asks probing questions of the students so that they clarify their own understanding of major concepts. Additional questions may be asked to redirect students’ investigations when necessary. Adequate time for thorough investigation is critical at this time.

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| **What the teacher does:**  -Encourages students to work together without direct instruction  -Observes and listens to students  -Asks probing questions  -Provide time for student to work on their tasks  -Acts as a consultant | **What the student does:**  -Thinks freely  -Tests predictions and hypotheses  -Forms new predictions  -Tries alternatives  -Records observations |

## Explain

This is the meat of the lesson. Here is where you will carefully develop a specific questioning sequence that relates to the new knowledge that you identified as your purpose of the lesson. The sequence of questions in this portion of the lesson is most important. Here is where your knowledge of children development and learning theory really becomes important. This is the place to reflect on stages of learning, moving from concrete to abstract, from the known to the new. You will also want to refer to people who support inquiry and carefully guide children's exploration of a topic or concept while you probe their thinking and provide feedback.

During lesson development you are the one who is responsible for knowing the content well enough that you can flexibly respond to what children do and say during the lesson development. Your knowledge of various ways to teach will be needed to decide if you must revise your lesson plan in midstream. Your knowledge of management will be needed to help you redirect children who do not follow the "group" as you expected, yet need to be engaged for learning. All of these possibilities make teaching complex and often difficult to do well.

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| **What the teacher does:**  -Encourages students to explain problems and definitions  -Ask for evidence/justification and clarification  -Formally provide definition, explanations, new labels  -Uses students’ previous experiences as basis for his explanations | **What the student does:**  -Explains possible solutions  -Listens to another students’ explanations  -Questions other explanations  Refers to previous activities  -Uses recorded observations |

## Elaborate

Depending upon the time that you have allocated for the lesson and the manner in which the lesson development proceeds, you will eventually need to bring the lesson to closure. If you completed the lesson development as you planned. Then closure is really an elaboration of what was done and learned during the lesson. It is most helpful here if students are the ones who verbalize what was learned. It is also appropriate here to move students toward possible applications for what was learned. If the lesson development did not go as planned, then closure may merely be a temporary stopping point, with less elaboration, until you can resume tomorrow.

Learning theorists tell us that it helps us to retain new knowledge if we can link it to what is already known and can chunk it in related pieces. This is the purpose that closure serves. We must help children make "chunks" out of the new information and relate it to what they already know so that the new knowledge can successfully stored, then retrieved at a later time.

Closure is important to retention of information and concepts. It is important, then, to watch the timing of the lesson so that ample time will be reserved for the closure. Remember, you will always have tomorrow. What you try to stuff into children's heads in the fleeting moments of a lesson probably won't be retained anyway. The time would be better spent in a good closure, saving other new information for another lesson.

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| **What the teacher does:**  -Expects students to use formal definitions and explanations  -Encourages students to apply concepts and skills  -Remind students of alternative explanations  -Refers students to data, and evidence, and asks probing questions | **What the student does:**  -Applies new labels, definitions, explanations, and skills  -Uses previous information to ask questions  -Draws reasonable conclusions  -Records observations and explanations  -Check for understanding among peers |

## Evaluate

Evaluation should not wait until the lesson is over. You should be evaluating all along. You will have a sense of how the lesson is proceeding. As you gain experience, you should find it easier to watch the responses of children. In the initial stages it may be difficult for you to do this with much accuracy. But still, you will have a sense of the lesson, which is part of evaluation.

If you planned your lesson to carefully reflect your stated purpose or objective, then evaluation should follow naturally. The type of activities that you plan should allow you to answer the question, "What did children learn about my objective and how did they demonstrate that learning?"

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| **What the teacher does:**  -Observes students as they apply new concepts  -Assess students’ knowledge and skills  -Look for evidence that students have changed their thinking  -Asks open-ended questions, such as: what evidence do you have | **What the student does:**  -Answers open-ended questions  -Evaluates his or her own progress  -Asks related questions that would encourage future investigations |

## Closure

Those actions or statements used by a teacher that are designed to bring the lesson to an appropriate conclusion. These actions are used to help students bring things together in their own minds, to make sense out of what has just been taught. “Any questions” No OK, let’s move on” is not closure.

Closure is used:

* To cue students to the fact that they have arrived at an important point in the lesson or the end of a lesson.
* To help organize student learning.
* To help form a coherent picture, to consolidate, eliminate confusion and frustration, etc.
* To reinforce the major points to be learned, to help establish the network of thought relationships that provide a number of possibilities for cues for retrieval. Closure is the act of reviewing and clarifying the key points of a lesson, tying them together into a coherent whole, and ensuring their utility in application by securing them in the student’s conceptual framework.

## Activity1

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### Step 1

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## Safety

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## Special Needs

ELL students will be given a periodic table with oxidation numbers already labeled as well as a sheet with Bohr models already drawn with valence electrons colored as a specific color. In addition, this activity is designed for students to use their previous knowledge to construct and idea that is not presented with words. This way, English language learners can learn without much language interference, which is an example of Constructivism, as explained by Fathman and Crowther in their book Science for English Language Learners (p. 15).

(Fathman and Crowther, 2006, p. 15)

In Chapter 7, Hakuta suggests “strategies for incorporating English-language learners into assessments include extra time, small-group administration, flexible scheduling, reading of directions aloud, use of dictionaries…and allowing English-language learners to display their knowledge using alternative forms of representation (e.g., showing math operations on numbers and knowledge of graphing in problem solving)” (p. 44). In order for this chemistry lesson to be easily followed and understood by ELL students, some modifications were made by providing the students a periodic table with oxidation numbers already labeled along with Bohr models with valence electrons specifically colored. ELL students were paired with English speaking students that may help them with the lesson.

## Quiz

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## Writing

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## Student Sheets

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## Answers

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## References

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## Links

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## Acknowledgements

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