

Elementary Science Lesson Planning

Created by: Erica Meili



A Toolbox



The

Essential Question

drives the entire investigation.

Essential Question

Plan

How it Looks in Planning:

- ✓ An open-ended question that can be answered with increasing complexity
- ✓ Intriguing to the typical student in your grade level
- ✓ Encompasses all content to be taught under the essential question
- ✓ Rarely contains new academic vocabulary



Unit Outcomes

Essential Questions

1. How do objects make sound?
2. How does sound travel?
3. What makes some sounds high and other sounds low?

Lesson Duration 2 days / 40 minutes each day

Essential Question	Why does it Rain, Sleet, Snow and Hail?
Standard	4.6a The student will investigate and understand how weather conditions and phenomena occur and can be predicted. Key concepts include: a) weather phenomena

Essential Question

Teach

How it Looks in the Classroom:



Start of a Topic

Use the EQ to identify what students think they already know about this topic.

Daily Opener

Use the EQ to revisit the previous day(s) key learnings.

Daily Closure

Use the EQ to revise early thinking and summarize new learning.

End of a Topic

Use the EQ to provide closure as students reflect on this topic and move on to the next.

Essential Question

Teach

How it Looks in the Classroom:

- ✓ Choose and use different structures over time
- ✓ Over time students read, write and speak their thinking
- ✓ Student thinking grows and is revised as the topic is taught
- ✓ Students may provide incorrect ideas without correction

(Misconceptions are cleared up in the sense-making portion of the investigation)



Whole Group
Discussion

Where do Rocks Come From?	
What I think I know about where rocks come from:	What I want to know about where rocks come from:

GLAD
Inquiry Chart



Science Journal



Partner or Table Talk,
followed by share out

An

Objective

aligns the lesson to the standards.

Objective

Plan

How it Looks in Planning:

- ✓ Includes three components: Behavior, Condition and Criteria
- ✓ Aligns with the Standards of Learning and Curriculum Framework Essential Knowledge and Skills in both content and cognitive level.

Standard of Learning	5.6c The student will investigate and understand characteristics of the ocean environment. Key concepts include: ecological characteristics
Objective	Objective 1: The student will... Behavior: Interpret graphical data related to the ecological characteristics of the ocean, such as the number of organisms vs. the depth of the water. Condition: by creating a 3D model Criteria: that accurately reflects the relative number of organisms in each ocean zone. Objective 2: The student will... Behavior: Analyze how the physical characteristics (depth, salinity, and temperature) of the ocean affect where marine organisms can live. Condition: write a one-page paper that details their analysis of how depth, salinity and temperature affect where marine organisms can live Criteria: by scoring 9 out of 12 on a teacher-created rubric.

Standard	4.6a The student will investigate and understand how weather conditions and phenomena occur and can be predicted. Key concepts include: a) weather phenomena
Objective	The student will be able to: Behavior: Compare and contrast the formation of different types of precipitation (e.g., rain, snow, sleet, and hail) by Condition: completing a Venn Diagram with Criteria: at least one accurate fact in each space.

Objective

Plan

The Behavior:

- ✓ Identical to Essential Knowledge, Skills, & Processes in Curriculum Framework
- ✓ Cut & paste from Curriculum Framework or from Canvas



How do Circuits Work?

It is expected that students will:

- Apply the terms insulators, conductors, open and closed in describing electrical circuits.
- Differentiate between an open and closed electric circuit.
- Use the dry cell symbols (–) and (+).
- Describe the contributions of Thomas Edison to the understanding and harnessing of electricity.

Vocabulary: circuit, open circuit, closed circuit, conductor, insulator, dry cell

Essential Knowledge, Skills, and Processes

In order to meet this standard, it is expected that students will

- apply the terms insulators, conductors, open and closed in describing electrical circuits.
- differentiate between an open and closed electric circuit.
- use the dry cell symbols (–) and (+).
- create and diagram a functioning series circuit using dry cells, wires, switches, bulbs, and bulb holders.
- create and diagram a functioning parallel circuit using dry cells, wires, switches, bulbs, and bulb holders.
- differentiate between a parallel and series circuit.
- describe the types of energies (i.e., thermal, radiant, and mechanical) that are transformed by various household appliances (e.g., lamp, toaster, fan).
- create a diagram of a magnetic field using a magnet.
- compare and contrast a permanent magnet and an electromagnet.
- explain how electricity is generated by a moving magnetic field.
- design an investigation using static electricity to attract or repel a variety of materials.
- explain how static electricity is created and occurs in nature.
- construct a simple electromagnet using a wire, nail, or other iron-

Objective

Plan

The Condition:

- ✓ Tells the conditions under which students will exhibit the behavior
- ✓ Match the condition to the cognitive level of the behavior.
- ✓ Choose assessment tools that authentically gauge learning

Task:
Find an item in the room that is magnetic and bring it to the carpet

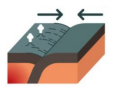
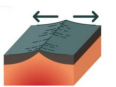
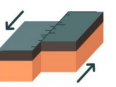
Performance



Writing

Name: Teacher Answer Key
What can Earthquakes and Volcanoes Tell Us About Earth's Changing Surface?
Topic Check-in

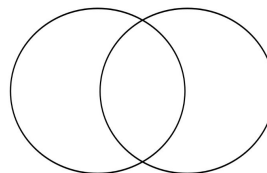
Directions:
Draw a picture above each term to show what it means.

		
Convergent Boundary	Divergent Boundary	Transform Boundary

Draw or Diagram



Create a Model



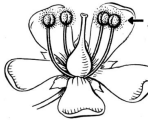
Graphic Organizer

How Do Plants Make New Plants?
Topic Check-in: 4.4b

1. Use crayons to color each plant part according to the key.

Plant Part Key

Red	Sepals
Pink	Stigma
Orange	Stamen
Red	Pollen
Blue	Petals
Yellow	Pistil



Exit Ticket

			
Mercury	Jupiter	Uranus	Mars
			
Neptune	Venus	Saturn	Earth
Terrestrial Planets		Gas Giants	

Sort (including realia)

Objective

Plan

The Criteria:

- ✓ Tells the criteria used to determine if learners have met the lesson objective.
- ✓ Choose a criteria that matches the condition.

Some Examples of Criteria:

- | | |
|---|--|
| ✓ Includes at least one accurate fact in each space (<i>Venn Diagram</i>) | ✓ Score of 8 or more (out of 12) on the rubric |
| ✓ Correctly labels 5 of 6 major features (<i>Diagram</i>) | ✓ Demonstrated 2 of 3 skills on the checklist |
| ✓ Correctly answers 7 of 9 questions (<i>exit ticket</i>) | ✓ With 100% accuracy |
| ✓ Sorts objects with 90% accuracy. | ✓ Correctly identifies an object 4 out of 5 times |
| | ✓ Inferences are plausible (<i>Writing Assignment</i>) |

We

Identify Prior Knowledge

to tailor each lesson to the students in the room.

Identify Prior Knowledge

Plan

How it Looks in Planning:

- ✓ Any tool or activity that quickly identifies what students already know.
- ✓ Looks for potential gaps in learning or common misconceptions
- ✓ Explains how instruction will be differentiated or adjusted based on the results of this tool or activity.

Identify Prior Knowledge How will you find out what students already know about this topic? How will student response change your instruction?	Day 1 Students will complete the Analyze a Chart formative assessment to determine whether they can interpret data and analyze how physical characteristics affect where marine organisms can live. If students can not demonstrate this skill, the teacher will work with select students in small group to understand how to interpret data by asking questions about data and co-creating a chart.
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Identify Prior Knowledge How will you find out what students already know about this topic? How will student response change your instruction?	Day 1 1. Informal Discussion: Essential Question 2. Mountaintop Fossil Probe. <i>Uncovering Student Ideas in Science, Volume 2: 25 More Formative Assessment Probes</i> Use probe to decide whether or not to include #4 below in lesson plan.
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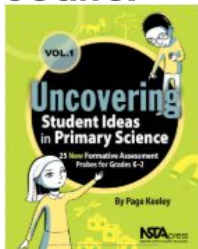
Identify Prior Knowledge How will you find out what your students already know about this topic? How will student response change instruction?	Students will do the formative assessment probe: Is it made of cells? to gauge whether students can identify which items come from living things. Teacher will conduct a mini-lesson on living vs. nonliving things if needed. Teacher will provide examples and ask students to identify living vs. non-living. Teacher will pull students into a small group to reteach if the majority of the class understands this concept.
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Identify Prior Knowledge

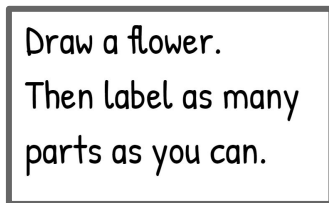
**Assess
Adjust**

How it Looks in the Classroom:

- ✓ Individual responses (to collect data on each student)
- ✓ Students may provide incorrect ideas without correction
(Misconceptions are cleared up in the sense-making portion of the investigation)
- ✓ Teacher quickly gauges the room to adjust the lesson based on results.



Uncovering Student
Ideas in Science Probes



Draw / Diagram



Mind map



Essential Question
Writing Prompt

Column 1	Column 2	Column 3	Column 4	Column 5	Column 6	Column 7	Column 8	Column 9	Column 10
1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

Data from
previous lesson

The

Activator

makes new content immediately engaging.

Activator

Plan

How it Looks in Planning:

- ✓ Engaging
- ✓ Often less than 5 minutes
- ✓ Activates Prior Knowledge
- ✓ Motivates students to learn about the new topic
- ✓ The [Steve Spangler](#) website is a resource for science tricks

Activator What engaging activity will bridge your students life experience to this science topic?	Students will create an Ice Cube Rope in table groups. They will be told that this is a model of one form of precipitation. Read the Riddle . Tell students that they will try to figure out the answer to the riddle and you will ask them their thoughts at the end of the lesson.
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Activator What engaging activity will bridge your students life experience to this science topic?	Scale of the Universe 2 Students will explore the size of cells (and other things) in this engaging interactive. They will discover that a skin cell is about $\frac{1}{3}$ of the size of a human hair.
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Activator What engaging activity will bridge your students life experience to this science topic?	Teacher will play the Mystery Science Activator Video: How Deep Does the Ocean Go? , a video prompt that stirs student curiosity re: how deep the ocean goes and what is really down at the bottom?
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Activator

Teach

How it Looks in the Classroom:

- ✓ Whole Class Engaged
- ✓ Teacher uses thought-provoking questions to further engage students



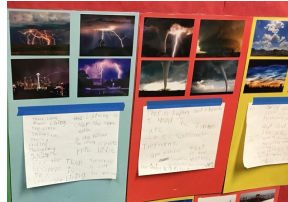
A “science trick”



Public Service
Announcement



Interactive
Exploration Tool



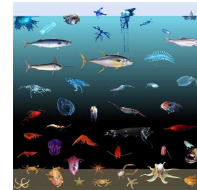
GLAD Observation Chart



News Article



Personal Story



Image



Nature Hunt



Video Intended to
Spark Curiosity



Strange Object

Framing the Learning

helps students take responsibility for their own learning.

Framing the Learning

Plan Teach

How it Looks in Planning:

- ✓ Indicate how the topic is relevant to other grade levels, content areas, and/or real life

How it Looks in the Classroom:

- ✓ Objective written on the board
- ✓ Teacher reads the objective and explains how the topic is relevant.

Frame the Learning How is this relevant to other grade levels, content areas, and/or real life?	Teacher will explain to Students that they are made of cells. They will learn more about cells in grade 6 science, however, students will learn the basic structure and parts of a cell and their functions in 5th grade.
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Frame the Learning	Tell students that today we will be learning about how fossils give us clues to what the land was like years ago. Our goal is to examine the fossils we can find in Virginia and figure out how Virginia has changed over time. Tell students that at the end of tomorrow, they will be writing a paragraph to explain how the Earth's Surface in Virginia has changed over time.
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The

Investigation

gives students a shared experience,
then helps them make sense of it.

Investigation

Plan

How it Looks in Planning:

Step 1: Shared Experiences

- ✓ Gathering New Information
- ✓ Figuring Something Out
- ✓ Working Together

Step 2: Sense - Making Activities

- ✓ Explicit Instruction of Content
- ✓ Vocabulary Instruction
- ✓ Answering Essential Question
- ✓ Revising Early Thinking
- ✓ Addressing Misconceptions

Investigation How will students inquire into this topic? Step 1: Shared Experiences Step 2: Sense-Making	Step 1: Shared Experiences How Do Rain, Sleet & Snow Form? Students will watch the video where a real meteorologist explains the Formation of Rain, Sleet, Snow and Hail . Step 2: Sense-Making Following the video, the teacher will engage with the class summarize the video. The class will then re-watch the video, pausing it at key points to create a diagram of Rain, Snow & Sleet Formation .
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Investigation How will students inquire into this topic? Step 1: Shared Experiences Step 2: Sense-Making	Step 1: Shared Experiences Students will rotate to microscopes to look for plant cells in leaves. Step 2: Sense-Making Seeing Cells Discovery Education Interactive. Students evaluate whether four items are living or non-living based on whether or not they are made of cells.
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Investigation

Step 1: Shared Experiences

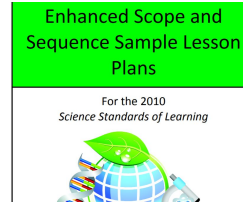
Plan

Planning Shared Experiences:

- ✓ Choose experiences designed to stimulate student curiosity.
- ✓ Use Kagan structures to support student discourse during the experience.



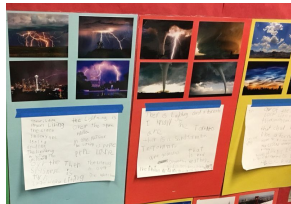
[FOSS](#)



[VDOE Lesson Plans](#)



Current Events



[GLAD](#)

Observation Chart

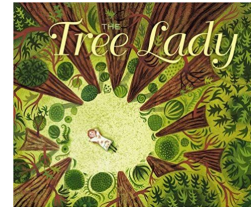


[GLAD](#)

Narrative Input



Investigate Models



Interactive Read Aloud



Hands-On Investigation



Outdoor Experience

MYSTERYscience

[Mystery Science](#)

[ACPS Sign Up](#)

Investigation

Step 1: Shared Experiences

Teach

How Shared Experiences Look in the Classroom:

- ✓ Students “figure out” new information and may not know the vocabulary yet.
- ✓ New vocabulary is taught as needed to describe the experience
- ✓ During whole group experiences, the teacher should embed opportunities for students to talk in smaller groups.
- ✓ Teacher looks for student misconceptions to clear up during sense-making



Partners



Small Groups



Whole Group

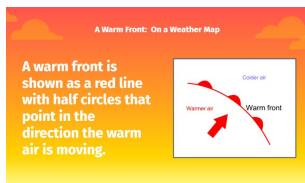
Investigation

Step 2: Sense-Making

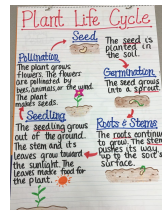
Plan
Adjust

Planning Sense-Making:

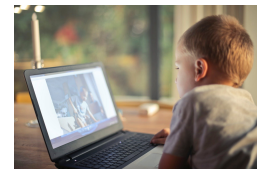
- ✓ Explicitly Teach Vocabulary and Key Understandings
- ✓ Address misconceptions
- ✓ Apply vocabulary to explain the shared experience.



Instructional Slides



Anchor Chart

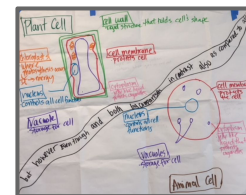
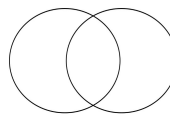


Personal Cognitive Content Dictionary

Word	Definition	Picture	Sentence
vacuum	A device that sucks a larger mass.		
impact	An event during which two objects or systems exert a force on another.		
gravity	A force that attracts objects with mass together.		

GLAD

Cognitive Content Dictionary



GLAD

Pictorial Input Chart

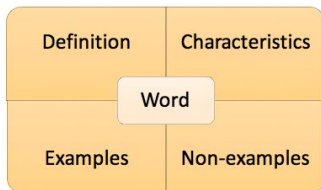
Weather Tools Yes Ma'am
Written by Rebecca Pittman 2016

Is this a thermometer?
Is this a thermometer?
How do you know?
How do you know?
What do you use it for?
What do you use it for?

Yes ma'am.
Yes ma'am.
It has a number line.
It has degrees.
To measure temperature.
To measure temperature.

GLAD

Chants



Frayer Model



Gizmos



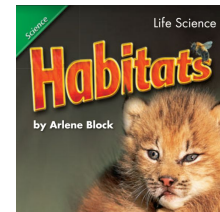
Writing



Techbook

I Thought You'd Just Like To Know....About Electricity!
Written By Erica Melli & Anna Harvin 2018

GLAD
Big Book



eBooks

Investigation

Step 2: Sense-Making

Teach

How Sense-Making Looks in the Classroom:

- ✓ Students are explicitly taught content & vocabulary
- ✓ Questions and prompts help students revise their early thinking
- ✓ Previously held misconceptions addressed and cleared up
- ✓ Students see visuals, read text, and hear the content being spoken.
- ✓ Teacher uses 10-2 rule to maintain student engagement



Partners



Small Groups



Whole Group



Individual

Sometimes we

Extend the Learning

so students can explore the content on their own.

Extend the Learning

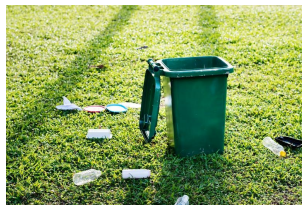
Plan

How it Looks in Planning:

- ✓ Learned content and vocabulary is used in a new context.
- ✓ Students demonstrate the application of skills, content, and vocabulary.



Engineering Challenges



Service Project



Create a Model



Breakout
EDU



Design an
Experiment



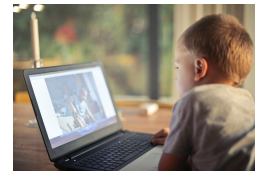
GLAD

Team Tasks



GLAD

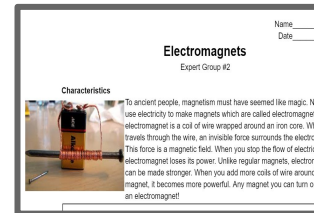
Cooperative
Strip Paragraph



Research



Creative Writing



GLAD

Expert Groups

We

Gauge Student Learning

to find out which students need reteaching.

Gauge Student Learning

Plan

How it Looks in Planning:

- ✓ Copy/Paste the condition & criteria from the objective
- ✓ Indicate how you will informally assess and adjust as needed throughout the lesson
- ✓ Choose authentic ways to gauge student learning when possible

Informally Gauge Learning Throughout the Lesson:



Preplanned Questions

Task:

Point to an Object
that is translucent.

Quick Check in

Task



Reading the Room



Quick Check In
Conversation with
target student(s)

Gauge Student Learning

Assess

How it Looks in the Classroom:

- ✓ Non-evaluative. The goal is to determine which students need more support.
- ✓ Students individually demonstrate the behavior listed in the objective.
- ✓ Teacher provides scaffolds as needed
- ✓ Unplanned reteaching might occur on the spot, with the student given another opportunity to demonstrate mastery.



Individual

The

Closure

encapsulates the learning.

Closure

Plan

How it Looks in Planning:

- ✓ Review the content using academic vocabulary
- ✓ Summarize the learning
- ✓ Answer the essential question
- ✓ Consider choosing structures that highlight how student thinking has grown and changed over the course of the topic.

Closure How will you encapsulate what students have learned?	Whole Group Reflection Questions → Revisit Riddle: <i>What do students think now? Why? Do you agree?</i> → Discuss Essential Question. Extend by asking, <i>What does the type of precipitation tell us about the air temperature?</i> → Discuss: <i>How is hail formation similar to the rest? How is it different?</i>
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Closure How will you encapsulate what students have learned?	Students will watch Ocean Habitats BrainPop Jr to encapsulate key understandings from this topic. The teacher will also ask group reflection questions: <i>What was one surprising thing you learned this week? What do you know now about where marine organisms live?</i>
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Closure

Teach

How it Looks in the Classroom:

- ✓ Students engaged in a class discussion
- ✓ When a video is part of the closure, there is still a class discussion.
- ✓ Students reflect on their learning and how their thinking has changed.



Closing Circle

Differentiation

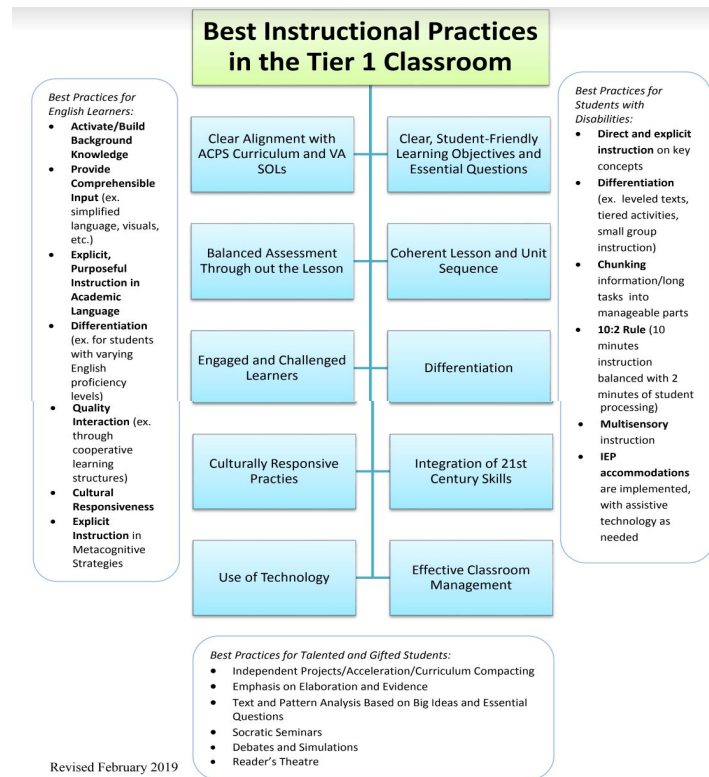
EL, TAG and SWD teachers can identify strategies that help students access/extend the curriculum.

Differentiation

Adjust

How it Looks in Planning:

- ✓ Specific to the lesson plan developed and the students in the room.
- ✓ EL, SWD & TAG teachers provide strategies to make the tier I lesson accessible to these populations.
- ✓ Might look different in each classroom



We create a

Plan for Intervention

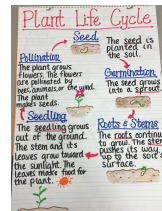
so that we are prepared when students need reteaching.

Plan for Intervention

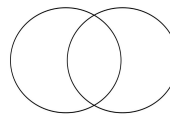
Adjust Plan

How it Looks in Planning:

- ✓ Choose at least 2 new sense-making activities on the target standard.
- ✓ Reteach using a different modality than the original lesson.
- ✓ Students should listen, read and write/draw in a reteaching session.
- ✓ Small group or one-on-one is the preferred setting



Anchor Chart



Graphic Organizer



Definition	Characteristics
Word	
Examples	Non-examples

Frayer Model



Easy-to-understand Videos



Frequently Asked Questions

Where does “I do, We do, You do” fit in?

It is best practices in science to use the gradual release model to teach skills, not knowledge. We want students to use the inquiry cycle to learn how air pressure works (knowledge) but use “I do, We do, You do” to teach students how to read a barometer (a skill). Skills should be taught immediately before they are needed in the lesson. Often this will occur at the beginning of the Investigation step 1: Shared Experiences, but not always.

Question?

Send an email to: Erica.Meili@acps.k12.va.us