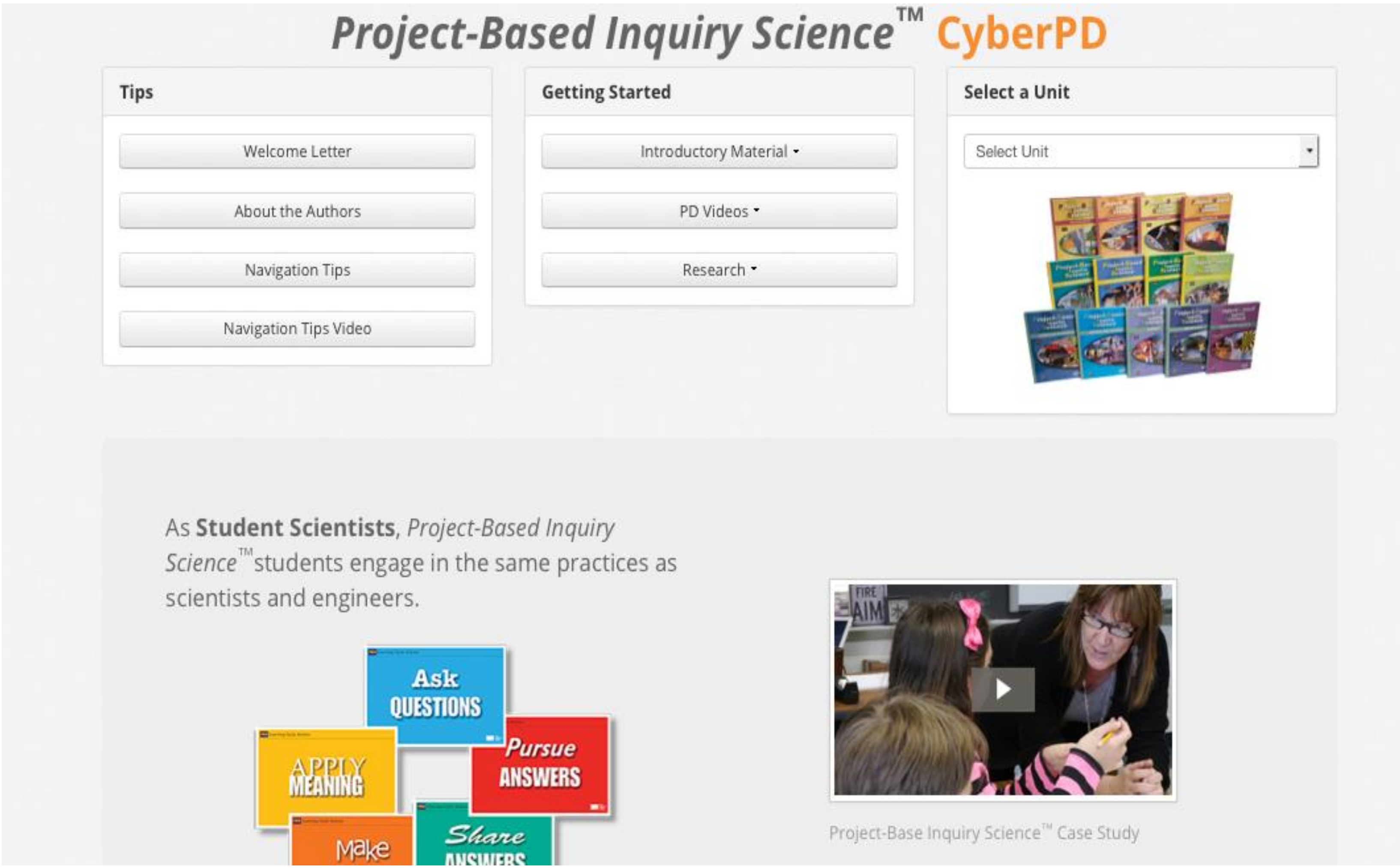
Preparation



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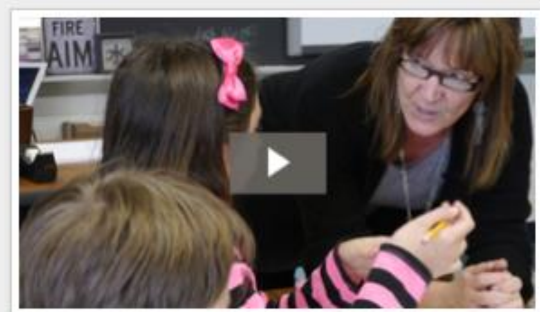
Select Unit

As **Student Scientists**, *Project-Based Inquiry Science*™ students engage in the same practices as scientists and engineers.



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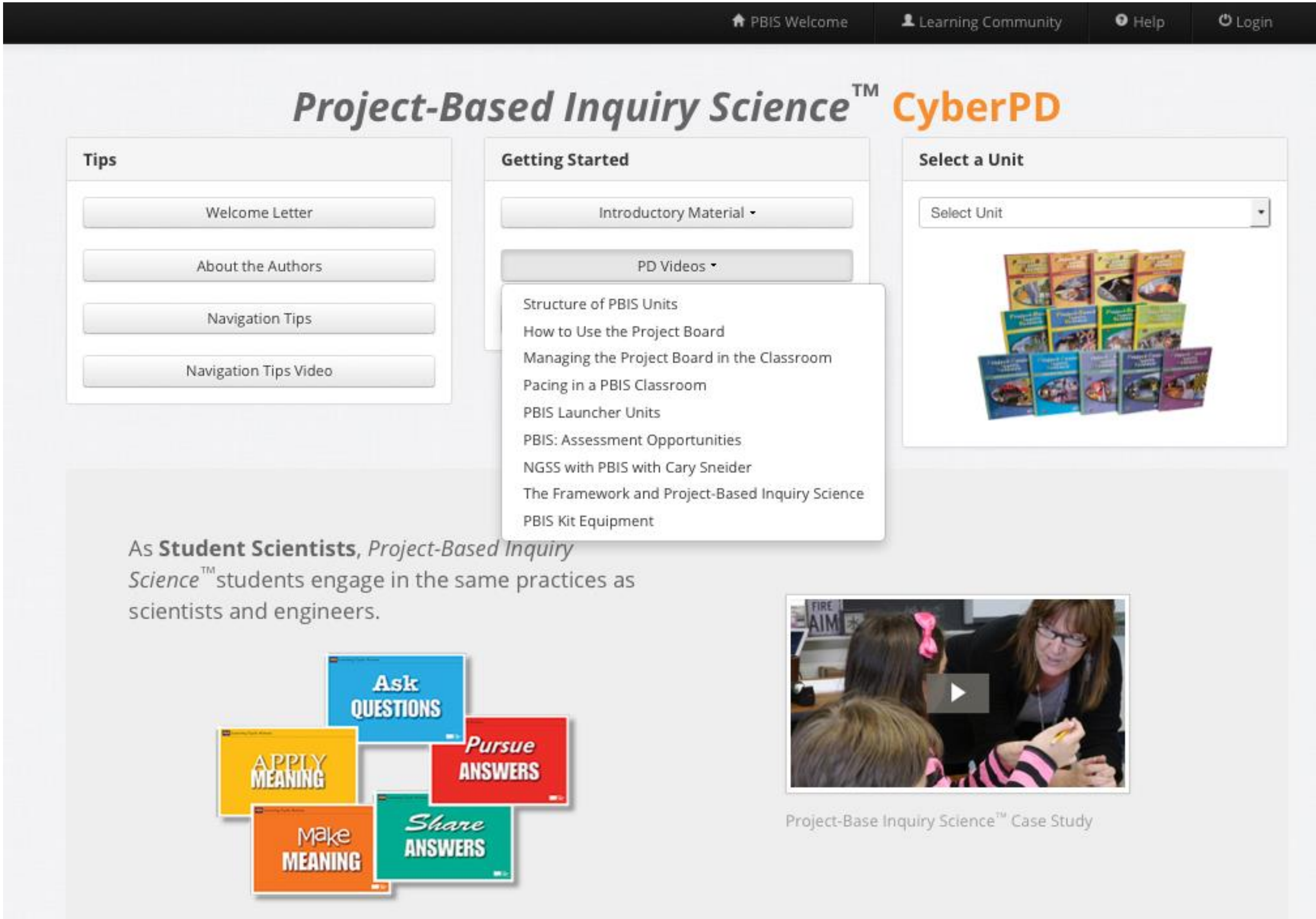
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Select Unit
As Student Scientists, Project-Based Inquiry Science™ students engage in the same practices as scientists and engineers.
Ask QUESTIONS
APPLY MEANING
Pursue ANSWERS
Make MEANING
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- Standardized Test Outcomes - Detroit Public Schools
- Learning by Design into Practices

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Select Unit

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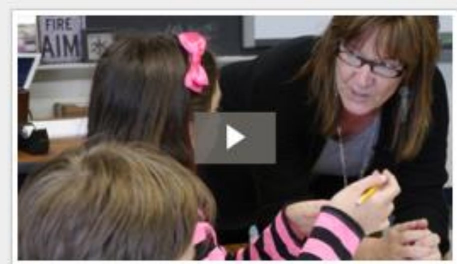

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Select Unit

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- Genetics
- Good Friends and Germs
- Living Together
- Vehicles in Motion
- Weather Watch

As **Student Scientists**, *Project-Based Inquiry Science*™ students engage in the same practices as scientists and engineers.

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Digging In

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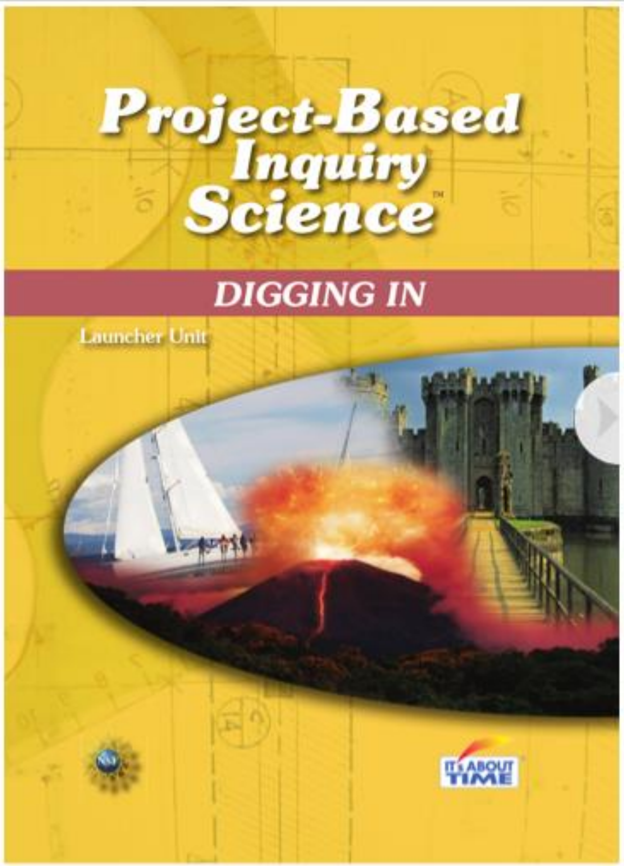

Digging In Unit Home

- Getting Started Course
- Parent Letter
- **Unit Overview**
  - Storyline and Science Content
  - Pacing, Purpose, and Assessment Guide
  - Targeted Concepts, Skills, and Science Practices
- **Correlations**
  - Next Generation Science Standards and PBIS
  - **Common Core State Standards**
  - **Framework for K-12 Science Education**
- Digging In Walkthrough Videos
- **Digging In Equipment**
  - PBIS Kits Overview Video
  - Unit Materials List
  - Equipment Setup Videos
  - IDEO: Deep Dive Content Video

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Learning Set 1

Learning Set 1 Additional Content Support

Exploring the Science Framework

The National Research Council's recent publication, A Framework for K–12 Science Education: Practices, Crosscutting Concepts, and Core Ideas, places unprecedented focus on the practices involved in doing scientific and engineering work. In an effort to lend specificity to the broad notion of "inquiry," the intent behind the practices outlined in the Framework is for students to engage in sensible versions of the actual cognitive, social, and material work that scientists do. This article focuses on one of those practices: "obtaining, evaluating, and communicating information" and provides detailed examples of implementation for pre-K, grades 5, 8, and 10.

Engaging Students in the Scientific Practices of Explanation and Argumentation

This article examines two of the eight science and engineering practices, concerning explanation and argumentation. The two practices depend on each other: For students to practice explanation construction, they must also engage in argumentation. Argumentation and explanation are first defined individually and then their relationship is explored in four classroom examples.

The Scientific Method

A common misconception in science is that science provides facts or "truth" about a subject. Science is not collection of facts; rather, it is a process of investigation into the natural world and the knowledge generated through that process.

Density

Density is a fundamental physical property of matter. This module introduces the concept of density, explains how density is calculated, and lists the densities of common substances. The relationship between density and buoyancy is discussed. The module relates the concept of density to the operation of large ships, submarines, and hot air balloons.

Buoyancy Basics

This site goes over the basics of buoyancy using an example of wood blocks in a cup of water.

What is Matter?

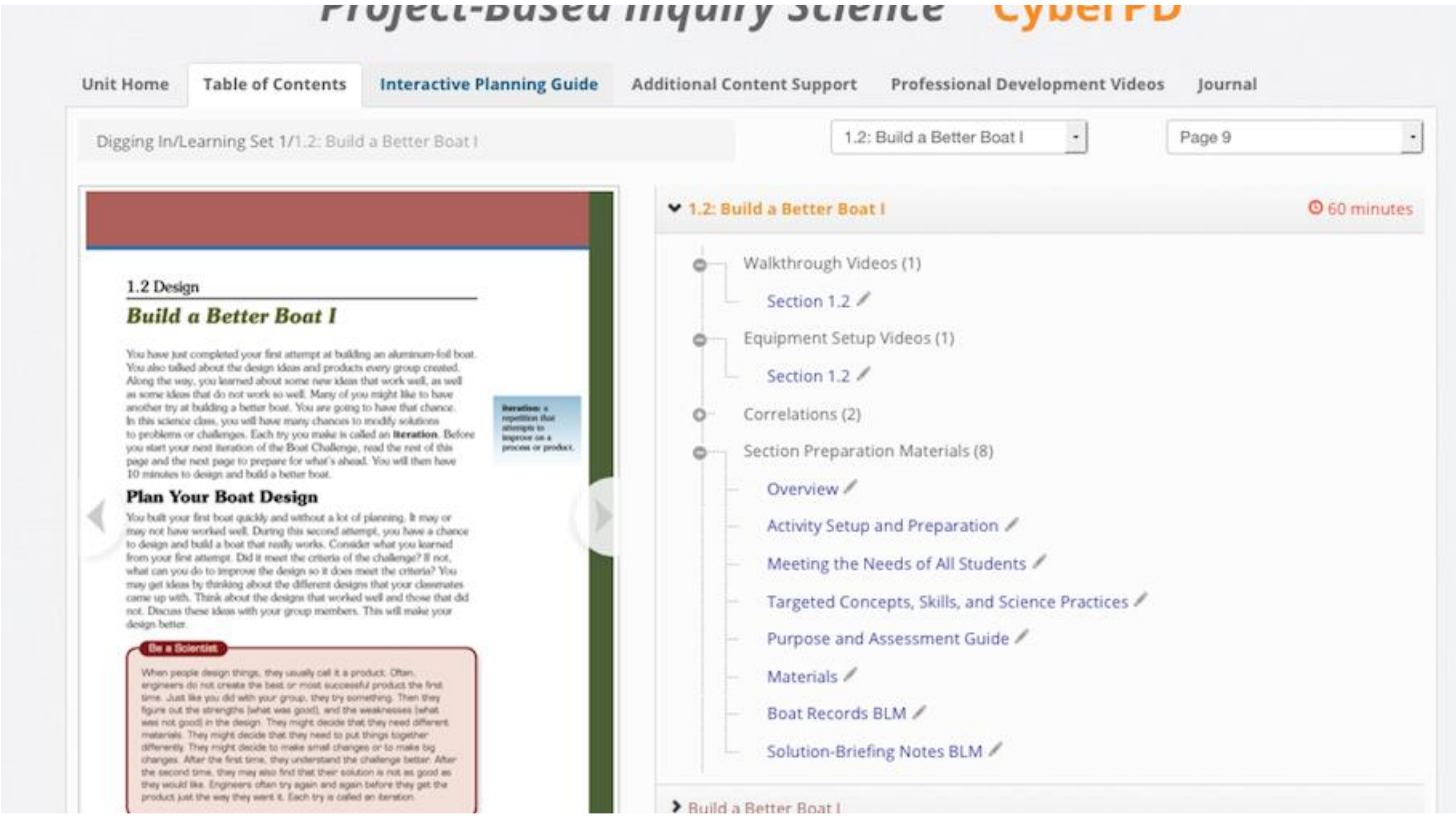
This video/animation defines matter, mass, and volume using water as an example. The size, electrical charge, and location of the subatomic particles of matter are described.

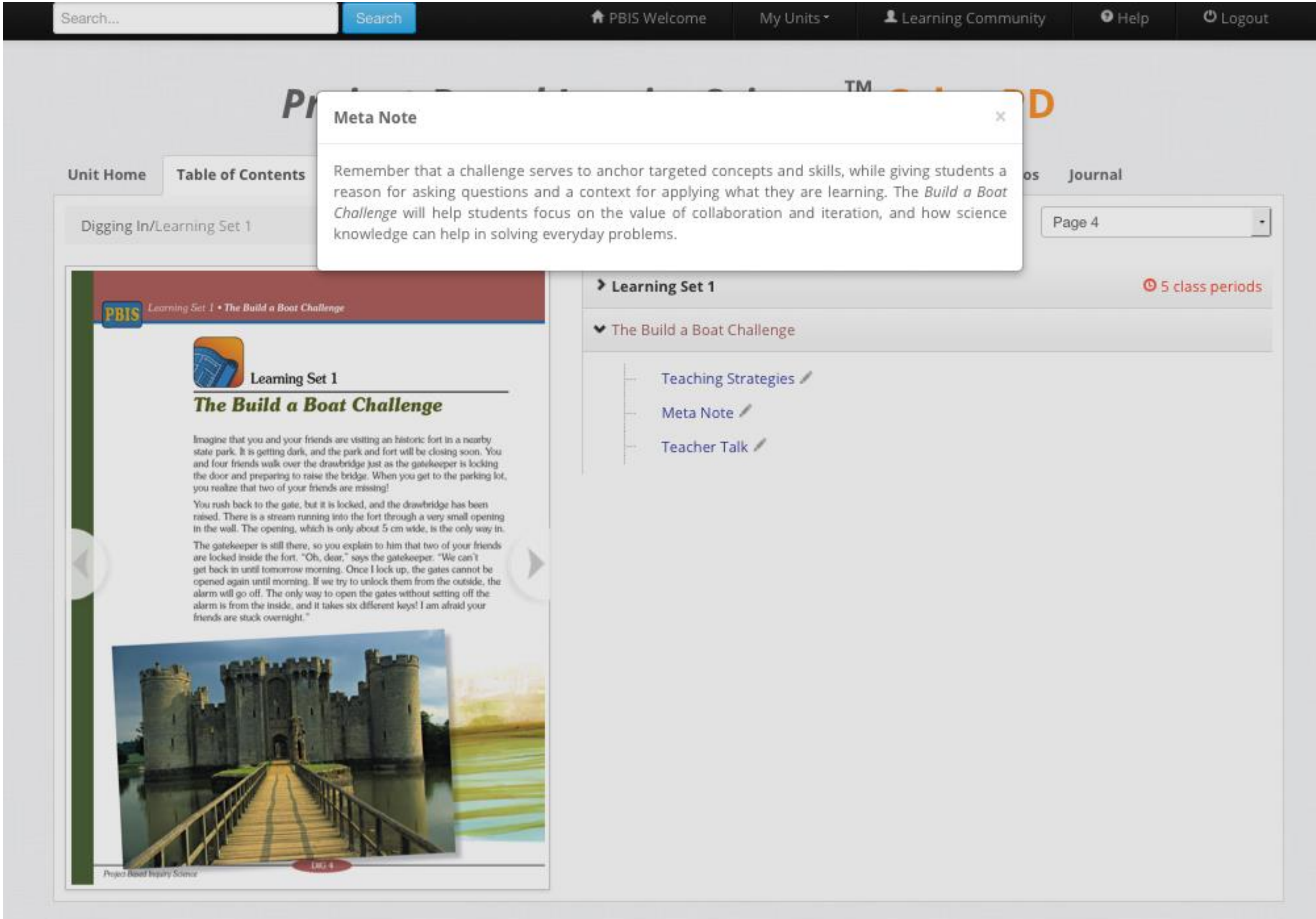
Learning Set 2

Learning Set 3

Digging In Prior to beginning the Unit	As you saw, *Digging In* is a *PBIS Launcher Unit*. Do not expect mastery of the science concepts in this unit. To help you understand the pacing issues in *PBIS* units, select "PD Videos" and view *Pacing in a PBIS Classroom* to see how other teachers have handled pacing. Consider how you will deal with pacing in your classroom. Duplicate the *Parent Letter* on the Unit Home Page to send home with the students on the day you begin the unit. **Unit Overview, *What's the Big Question?*, *The Build a Boat Challenge*, and *1.1 Identify Criteria and Constraints*** Read *The Storyline and Science Content* and view the *Digging In Walkthrough Video, What's the Big Question?* Read the Student Edition *What's the Big Question*, and read the *Overview* of *What's the Big Question?* Read the page-specific teaching notes for *What's the Big Question?* One teacher suggested that a *Teacher Talk* question you could ask students is "How many scientists do we have in class today?" Read the page-specific teaching notes for *The Build a Boat Challenge* DIG 4-5 *Teaching Strategies*, *Meta Note*, and *Teacher Talk*. Read the Section Planning Guide Materials and page-specific teaching notes for *1.1 Identify Criteria and Constraints*. View the *Walkthrough Video* for *1.1*. View the *Equipment Set-up Video for Section 1.1*. Gather the equipment that you will need. Consider whether you will provide each group with water to test their boat (this is the ideal situation) or whether you will have one station at which students can test their boats. Build and test a boat to carry the keys before class. In the *CyberPD Journal*, make any additional notes that you will find helpful in the classroom. You can do this by clicking on the pencil icon. Duplicate the *Boat Records* page.

"Just-in-Time" Support

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Remember that a challenge serves to anchor targeted concepts and skills, while giving students a reason for asking questions and a context for applying what they are learning. The *Build a Boat Challenge* will help students focus on the value of collaboration and iteration, and how science knowledge can help in solving everyday problems.
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Learning Set 1
The Build a Boat Challenge
Imagine that you and your friends are visiting an historic fort in a nearby state park. It is getting dark, and the park and fort will be closing soon. You and four friends walk over the drawbridge just as the gatekeeper is locking the door and preparing to raise the bridge. When you get to the parking lot, you realize that two of your friends are missing!
You rush back to the gate, but it is locked, and the drawbridge has been raised. There is a stream running into the fort through a very small opening in the wall. The opening, which is only about 5 cm wide, is the only way in.
The gatekeeper is still there, so you explain to him that two of your friends are locked inside the fort. "Oh, dear," says the gatekeeper. "We can't get back in until tomorrow morning. Once I lock up, the gates cannot be opened again until morning. If we try to unlock them from the outside, the alarm will go off. The only way to open the gates without setting off the alarm is from the inside, and it takes six different keys! I am afraid your friends are stuck overnight."
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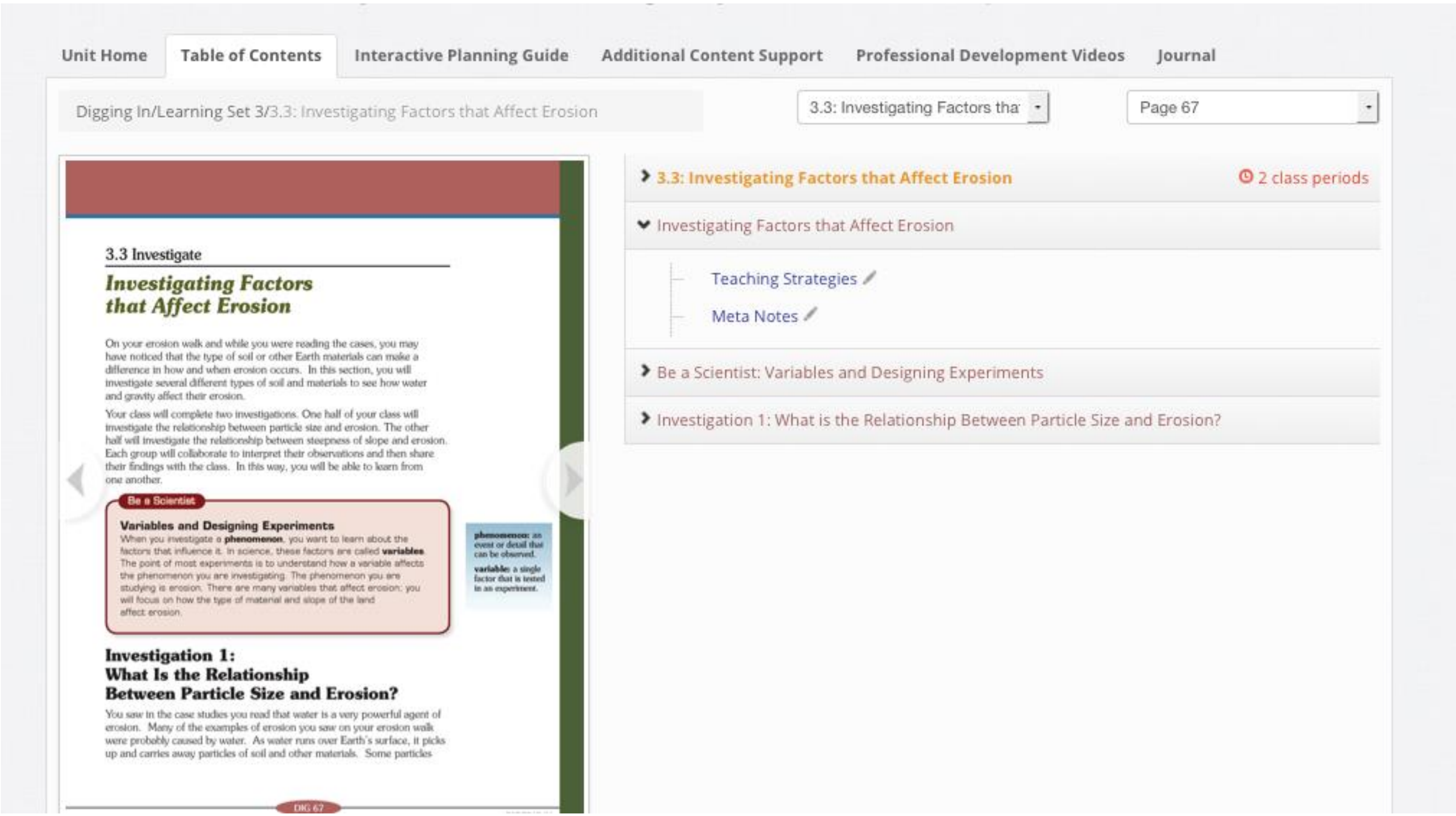
5 class periods
The Build a Boat Challenge
Teaching Strategies
Meta Note
Teacher Talk

Day 11 - 12 ***3.2 What Causes Erosion?*** DIG 53–66 To better understand the effects of erosion, students read various case studies showing them real-life examples of how this problem has been solved.	View the *Walkthrough* video for *Section 3.2.* Read *Section 3.2* in the student edition, DIG 53–66. Read the *Section Preparation Guide Materials.* Duplicate the *Erosion Case-Study* page, four per student. Read the page-specific teaching notes. Read the Sample Answers for *Erosion Case-Study* pages provided. If you wish, edit and duplicate the *Additional Homework Option* questions for *Section 3.2.* After completing *Section 3.2*, consider the *Teacher Reflection Questions*. In your *CyberPD Journal*, make notes that will help you when you teach this section again.
Day 13 - 14 ***3.3 Investigating Factors that Affect Erosion*** DIG 67–75 The class is divided in half to run two simultaneous investigations. To share the results, students participate in their first *Investigation Expo.*	View the *Walkthrough* video for *Section 3.3.* Read *Section 3.3* in the student edition, DIG 47–52. Read the *Section Planning Guide Materials* for *Section 3.3.* See the *Equipment Set-Up* video for *Section 3.3.* (in development) Duplicate the *Particle Size and Erosion* and *Slope and Erosion* pages, one for each student–half of the class will do one investigation and half will do the other investigation.

Reflection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3.3 Investigate
Investigating Factors that Affect Erosion
On your erosion walk and while you were reading the cases, you may have noticed that the type of soil or other Earth materials can make a difference in how and when erosion occurs. In this section, you will investigate several different types of soil and materials to see how water and gravity affect their erosion.
Your class will complete two investigations. One half of your class will investigate the relationship between particle size and erosion. The other half will investigate the relationship between steepness of slope and erosion. Each group will collaborate to interpret their observations and then share their findings with the class. In this way, you will be able to learn from one another.
Be a Scientist
Variables and Designing Experiments
When you investigate a phenomenon, you want to learn about the factors that influence it. In science, these factors are called variables. The point of most experiments is to understand how a variable affects the phenomenon you are investigating. The phenomenon you are studying is erosion. There are many variables that affect erosion; you will focus on how the type of material and slope of the land affect erosion.
phenomenon: an event or detail that can be observed.
variable: a single factor that is tested in an experiment.
Investigation 1: What Is the Relationship Between Particle Size and Erosion?
You saw in the case studies you read that water is a very powerful agent of erosion. Many of the examples of erosion you saw on your erosion walk were probably caused by water. As water runs over Earth's surface, it picks up and carries away particles of soil and other materials. Some particles
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3.3: Investigating Factors that Affect Erosion
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Investigating Factors that Affect Erosion
Teaching Strategies
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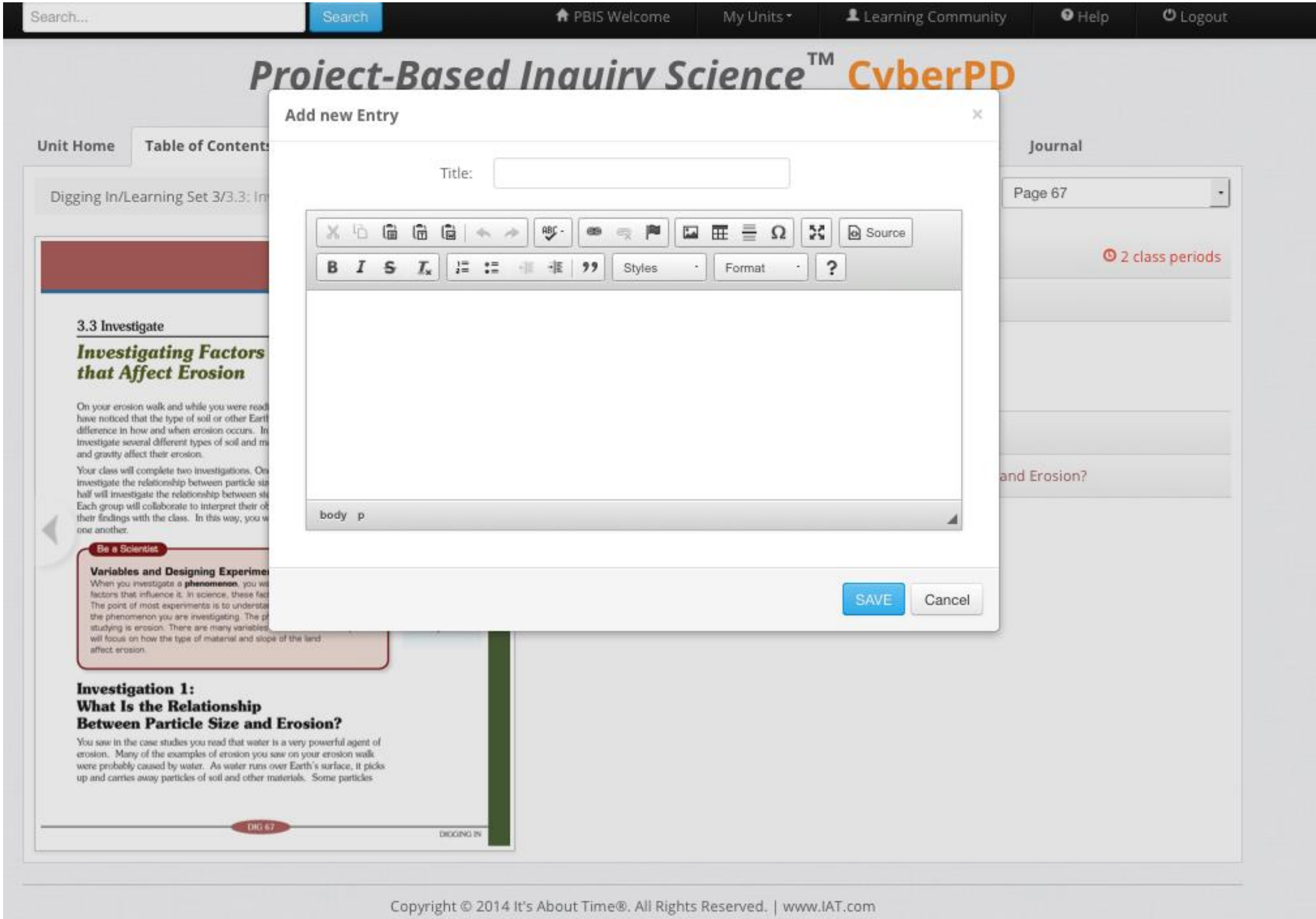
Be a Scientist: Variables and Designing Experiments
Investigation 1: What is the Relationship Between Particle Size and Erosion?



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DIGGING IN
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3.4 Explain

Communicate

Share Your Explanation

When everyone is finished, you will share your explanations with the class. As each group shares theirs, record the explanation. You might also create a poster for the classroom that has the full set of explanations on it. You will have an opportunity to revise your explanations after you learn more about what causes erosion and how it can be managed.

What's the Point?

Science is about understanding the world around you. Scientists gain understanding by investigating and explaining. The results of investigations are useful in making sense of and organizing the world. To help others better understand what they have learned through their investigations, scientists must communicate their results and understandings effectively. Scientists make claims about the phenomena they investigate. They support their claims with evidence they gather during investigations. They also read science that others have written about. They combine all of that together to create explanations of their claims—statements about why their claims are so. Other scientists carefully examine these explanations. They discuss them with each other. They try to decide if the explanation is complete enough for them to be sure about whether the claim is valid. Scientists accept a claim as valid when many different scientists agree. The evidence and their science knowledge must justify the claim. Scientists also help each other make their claims and explanations better.

Throughout this school year, you will investigate a variety of phenomena. You will apply what you learn to solving *Big Challenges* and answering *Big Questions*. You will be asked to create explanations. Every explanation you write will include a claim, evidence, and science knowledge. As you move through each Unit and learn more, you will create new explanations. You will have the opportunity to edit and improve the explanations you created earlier. Just as you iteratively improved your boats, you will iteratively improve your explanations.

You will also use explanations you create to help you predict what will happen in new situations. For example, now you know that rain, waves, gravity, and wind are all causes of erosion. That means you can probably predict what might cause erosion around the proposed basketball court. Make sure you can make that prediction. Making that prediction successfully will help you know that you understand the science you have been learning.

DIG 81 DIGGING IN

3.4: Create an Explanation — 1 Class Period

Communicate

Additional Homework Questions

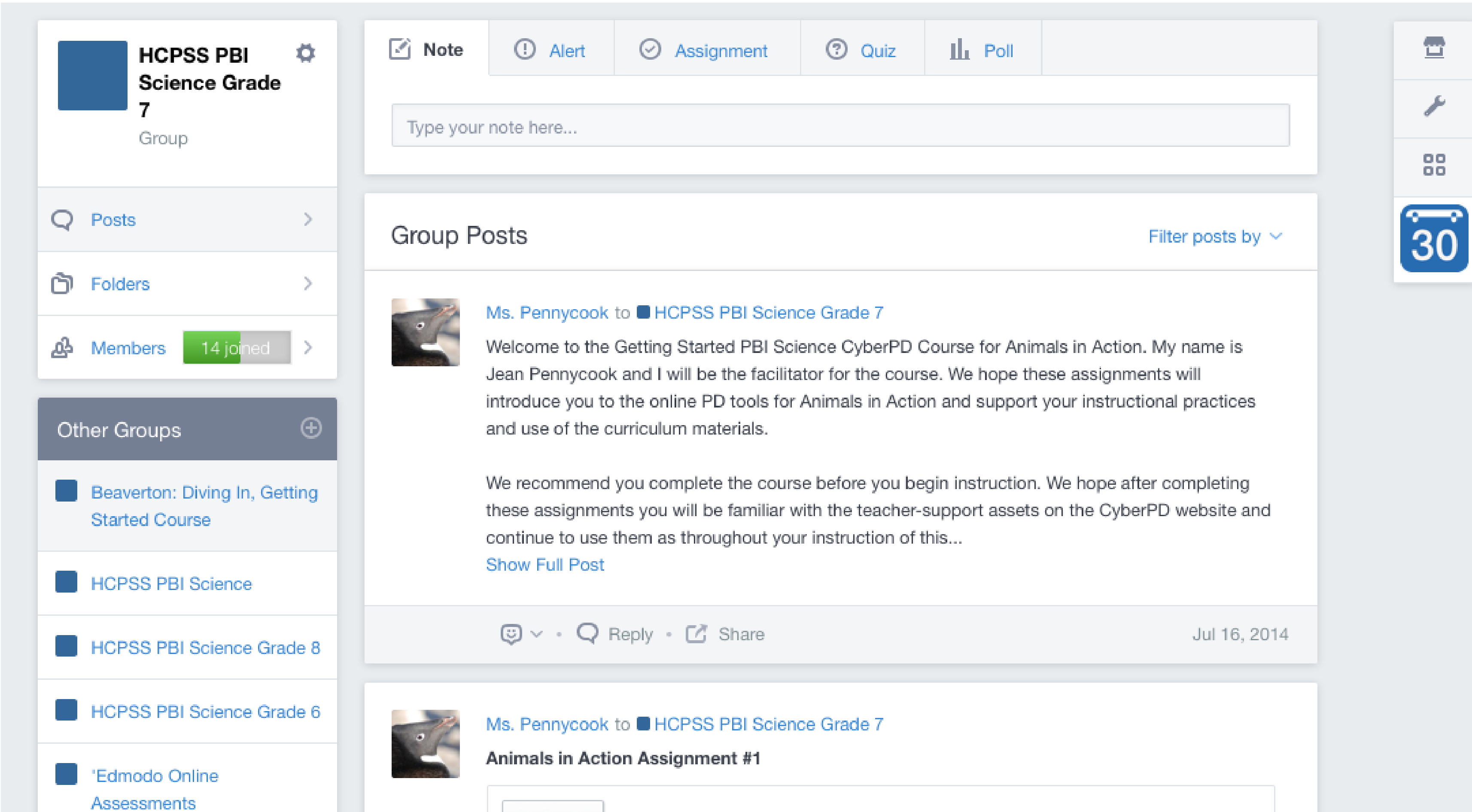
Teacher Reflection

1. What difficulties did students have understanding what a scientific explanation is? What ideas do you have for guiding their understanding during the next section?

2. Would modeling another explanation be beneficial for the students? What ideas do you have for modeling explanations?

3. How did you use the student text? How could you assist students in their reading ability as well as their comprehension?

Professional Learning Community



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Aug 5 test gorup

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Beaverton Pilot PBIS CyberPD

Charlotte Project Science

Menasha Project-Based Science

PBIS CyberPD

Show All

Ms. Pennycook to HCPSS PBI Science Grade 7

Animals in Action Assignment #1

Turn In Due Aug 31, 2014

Getting to know Edmodo and your Professional Learning Community
Introduce yourself to the Group by hitting the Reply button here and post a little bit about yourself. For example: How many years have you been teaching? What is your current teaching assignment? How familiar are you with project-based and inquiry learning?

3 Replies Jul 16, 2014

Ms. Bauer • Jul 21, 2014

Hi everyone! I will be starting my 20th year of teaching this fall. My 16th at ELMS (yikes!) I am currently the science team leader in my building and a 7th grade teacher. I have an idea about what PBI learning is and I am anxious to see how it looks with PBI science.

Mrs. Belsky • Jul 23, 2014

Hi- I'm Stacey Belsky and will be starting my 10th year of teaching at ELMS. I taught 6th grade for the first 8 years then switched to 7th last year where I will be again this fall. I am not very familiar are you with project-based and inquiry learning but am sure that will soon change!

Ms. Pennycook • Jul 24, 2014

Stacey,
Thank you for joining the class. Let me know if you have any questions.
Jean

Type a reply...