Miller & Levine Biology © 2019 Explorer's Journal

Introduction

Hi, there! Do your students ever ask you the question, "But why do I need to know biology?" If you give me 5 minutes of your time, I'll give you a quick run through of the *Explorer's Journal* on Savvas Realize™— the very place that students will make those connections and see exactly how they can use biology to make a difference in their own communities!

What's the Point?

At first glance, you may have just considered the *Explorer's Journal* activities as part of the supplemental materials that you don't have time to use. But these activities are where students engage in Problem-Based Learning, which is at the heart of *Miller & Levine Biology*.

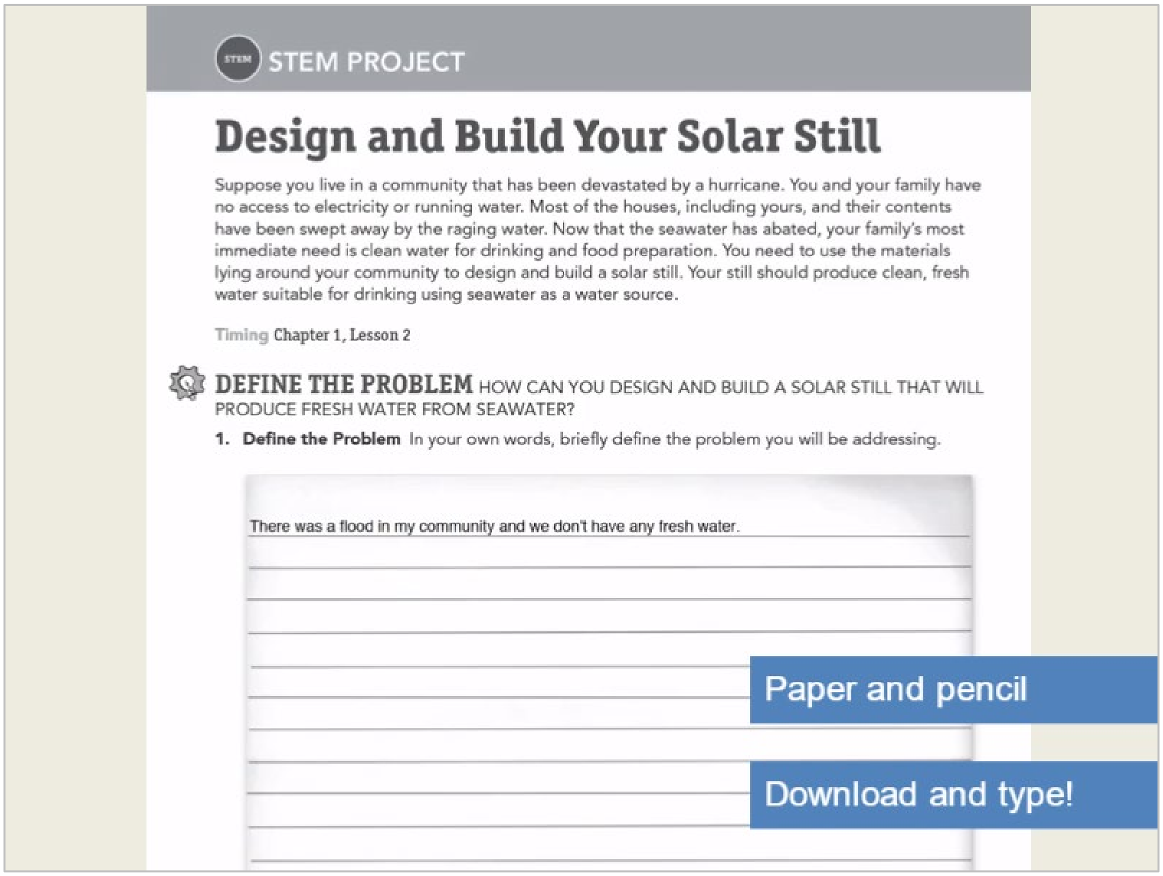
In Problem-Based Learning, or PBL, authentic and relevant questions motivate student learning about each unit's science content.

PBL activities also engage students in the kind of 3-D learning advocated by Next Generation Science Standards*.

Plus, it teaches students how to monitor their own learning and engages them in the same kind of notebook practices that real scientists use.

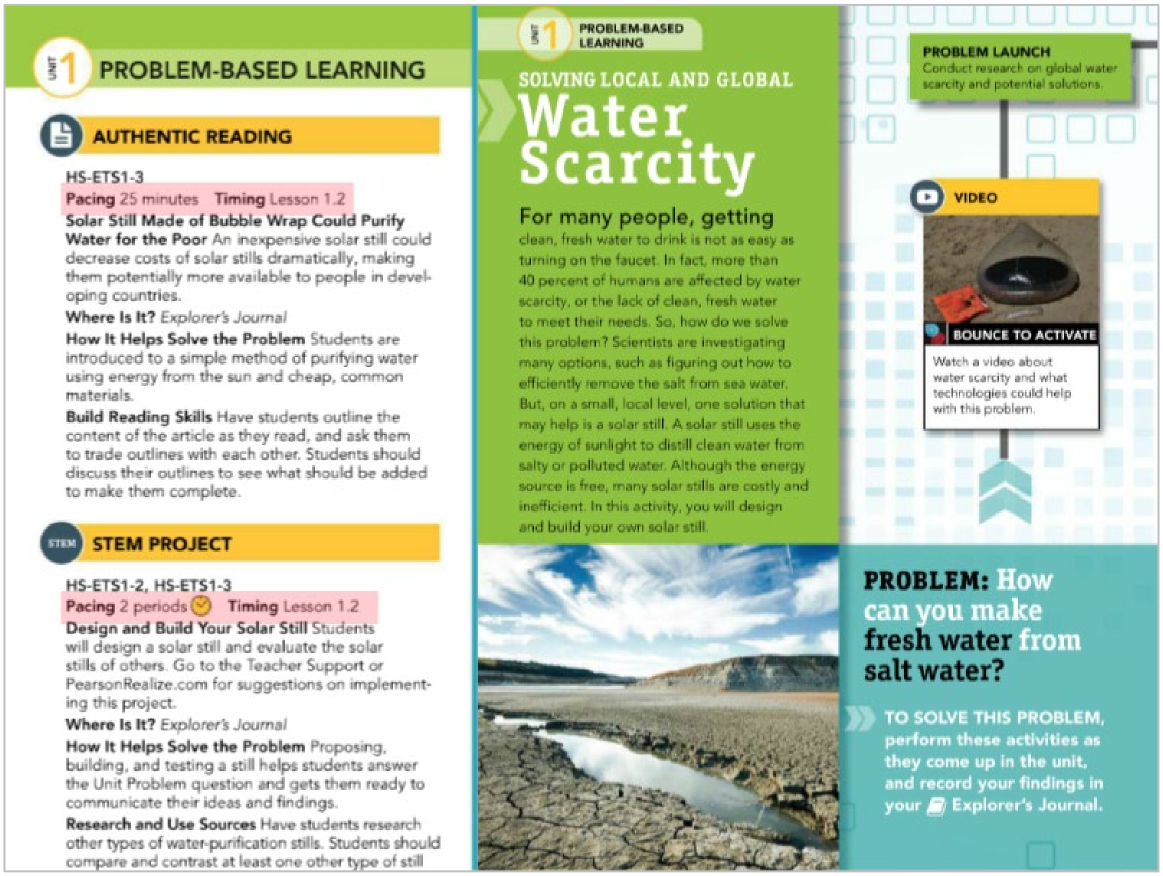
*Next Generation Science Standards is a trademark of Achieve. Neither Achieve nor the lead states and partners that developed the Next Generation Science Standards was involved in the production of, and does not endorse, this product.

What's the Format?



The *Explorer's Journal* can be found on Savvas Realize. It is a digital and downloadable resource, with two options for completion: Either download and print the excerpts for students to complete as paper and pencil, or have students download and type their responses into the digital PDF form! Just keep in mind that some pages will require students to draw.

How Do I Use It?



UNIT 1 PROBLEM-BASED LEARNING

AUTHENTIC READING

HS-ETS1-3
Pacing 25 minutes **Timing** Lesson 1.2
Solar Still Made of Bubble Wrap Could Purify Water for the Poor An inexpensive solar still could decrease costs of solar stills dramatically, making them potentially more available to people in developing countries.
Where Is It? *Explorer's Journal*
How It Helps Solve the Problem Students are introduced to a simple method of purifying water using energy from the sun and cheap, common materials.
Build Reading Skills Have students outline the content of the article as they read, and ask them to trade outlines with each other. Students should discuss their outlines to see what should be added to make them complete.

STEM PROJECT

HS-ETS1-2, HS-ETS1-3
Pacing 2 periods **Timing** Lesson 1.2
Design and Build Your Solar Still Students will design a solar still and evaluate the solar stills of others. Go to the Teacher Support or PearsonRealize.com for suggestions on implementing this project.
Where Is It? *Explorer's Journal*
How It Helps Solve the Problem Proposing, building, and testing a still helps students answer the Unit Problem question and gets them ready to communicate their ideas and findings.
Research and Use Sources Have students research other types of water-purification stills. Students should compare and contrast at least one other type of still

UNIT 1 PROBLEM-BASED LEARNING

SOLVING LOCAL AND GLOBAL
Water Scarcity

For many people, getting clean, fresh water to drink is not as easy as turning on the faucet. In fact, more than 40 percent of humans are affected by water scarcity, or the lack of clean, fresh water to meet their needs. So, how do we solve this problem? Scientists are investigating many options, such as figuring out how to efficiently remove the salt from sea water. But, on a small, local level, one solution that may help is a solar still. A solar still uses the energy of sunlight to distill clean water from salty or polluted water. Although the energy source is free, many solar stills are costly and inefficient. In this activity, you will design and build your own solar still.

PROBLEM LAUNCH
Conduct research on global water scarcity and potential solutions.

VIDEO
BOUNCE TO ACTIVATE
Watch a video about water scarcity and what technologies could help with this problem.

PROBLEM: How can you make fresh water from salt water?

TO SOLVE THIS PROBLEM, perform these activities as they come up in the unit, and record your findings in your Explorer's Journal.

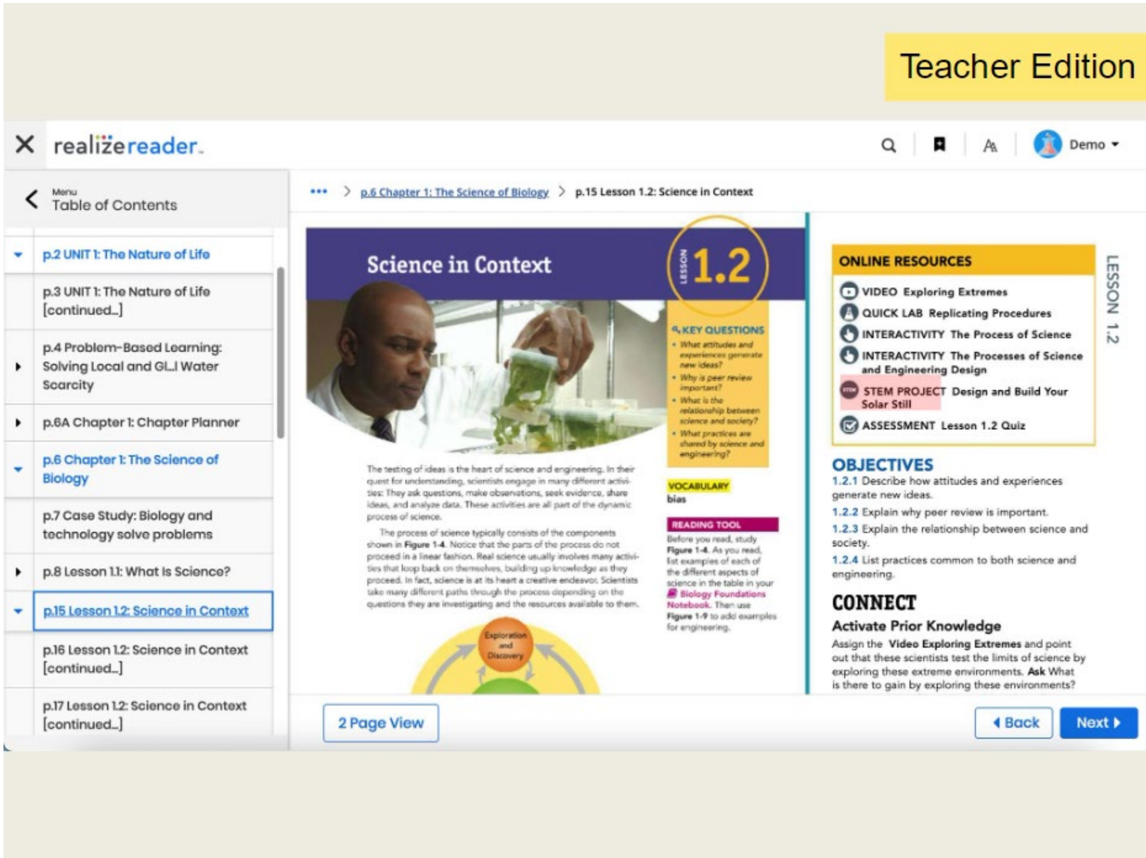
One thing you may be wondering is whether the *Explorer's Journal* activities will require extra time. The short answer is no! For the best estimate of how long PBL activities will take, use the pacing information provided at the beginning of each unit. Follow along with me as we browse PBL activities in Unit 1.

All of these activities are part of the PBL project for the unit, and the time is already budgeted into your science period.

Icons in the Teacher Edition will prompt you to the activities on Savvas Realize and the *Explorer's Journal* at the right time during the lesson.

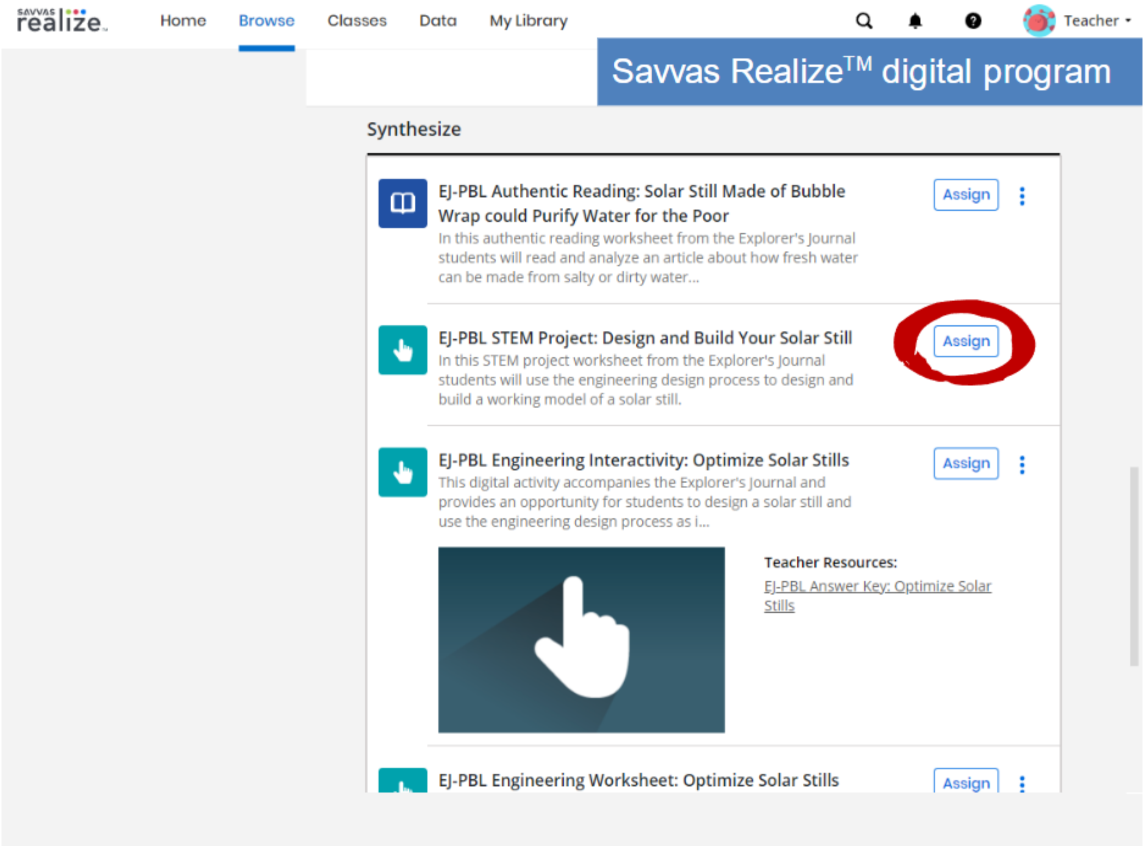
Now let's look closer at an activity-the STEM Project.

Teacher Edition



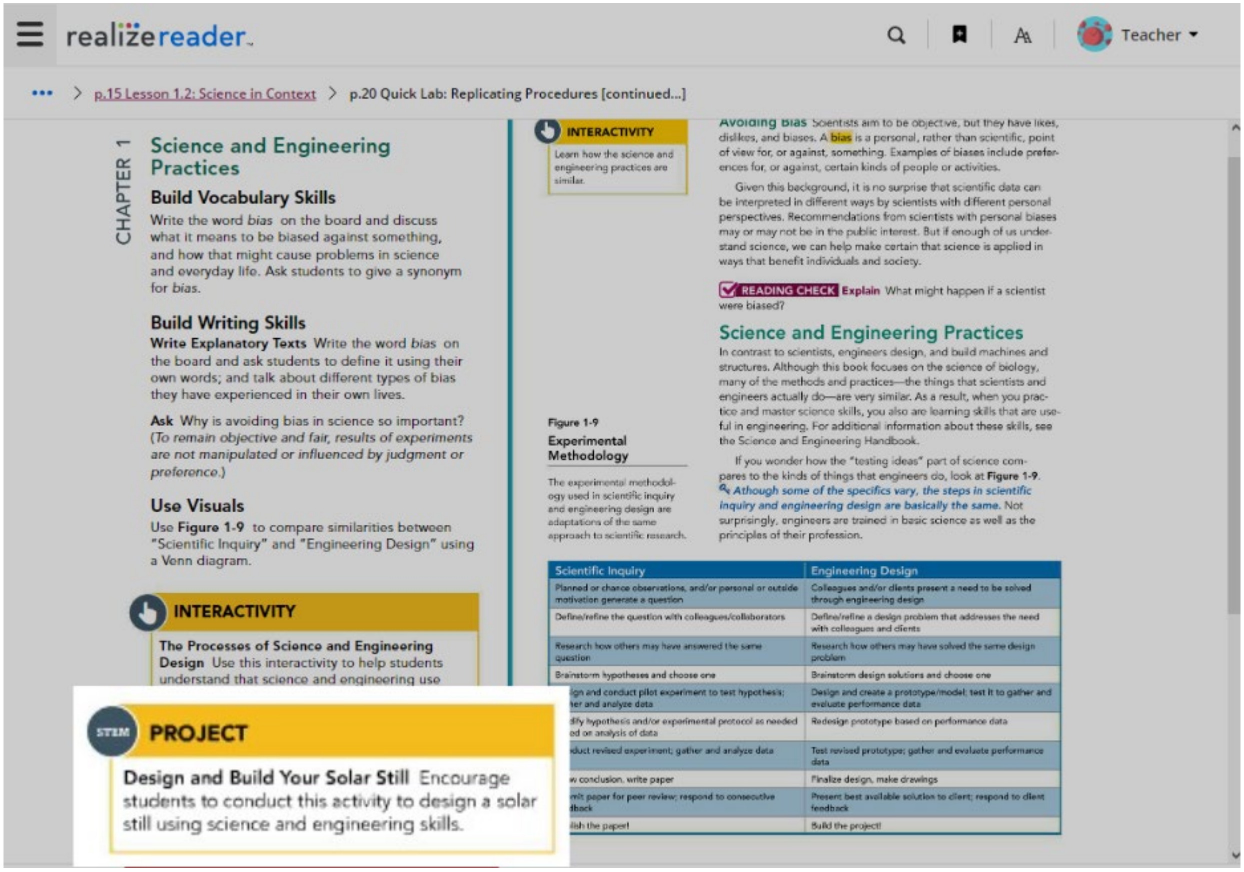
The Teacher Edition cues me that students will work on the project during this lesson.

Savvas Realize



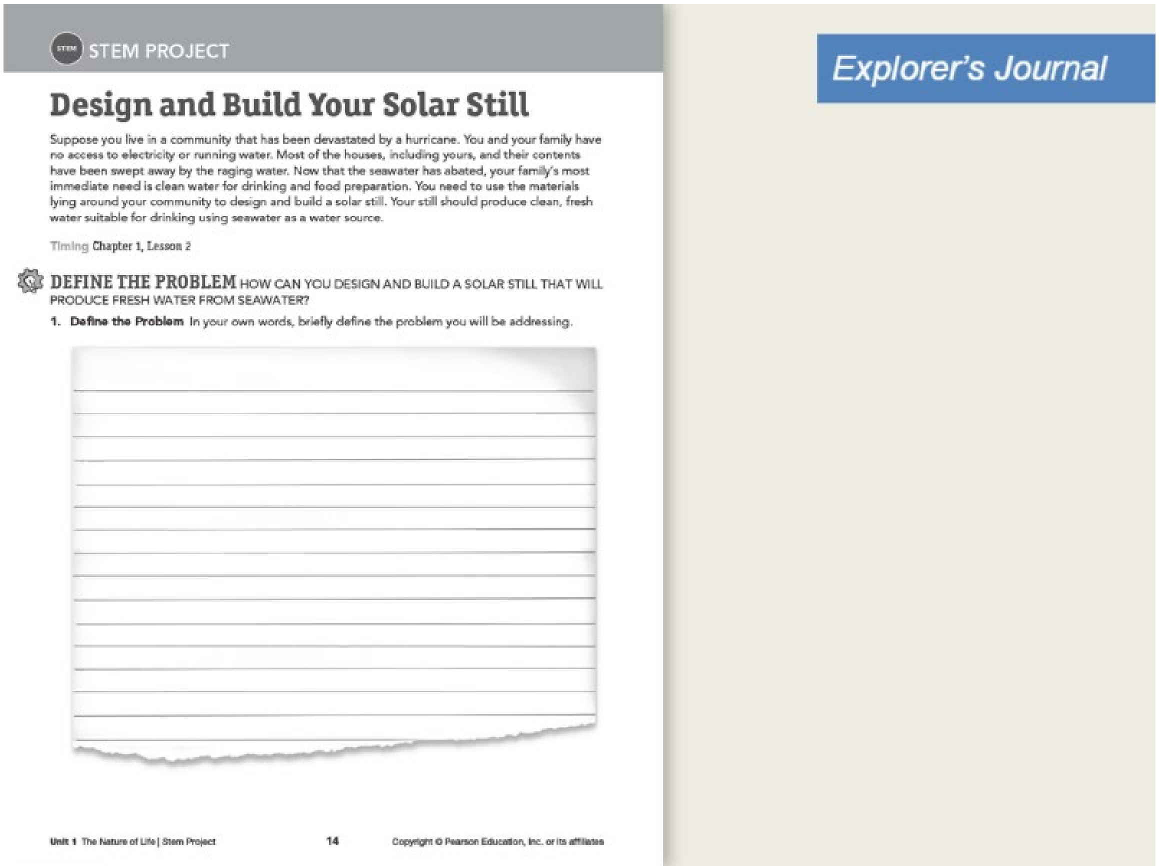
I can assign it, along with the other PBL activities, from Savvas Realize.

Teacher Edition 2



When I see the icon for the STEM Project, I can direct students to the activity to complete.

Explorer's Journal


STEM PROJECT

Design and Build Your Solar Still

Suppose you live in a community that has been devastated by a hurricane. You and your family have no access to electricity or running water. Most of the houses, including yours, and their contents have been swept away by the raging water. Now that the seawater has abated, your family's most immediate need is clean water for drinking and food preparation. You need to use the materials lying around your community to design and build a solar still. Your still should produce clean, fresh water suitable for drinking using seawater as a water source.

Timing Chapter 1, Lesson 2

DEFINE THE PROBLEM HOW CAN YOU DESIGN AND BUILD A SOLAR STILL THAT WILL PRODUCE FRESH WATER FROM SEAWATER?

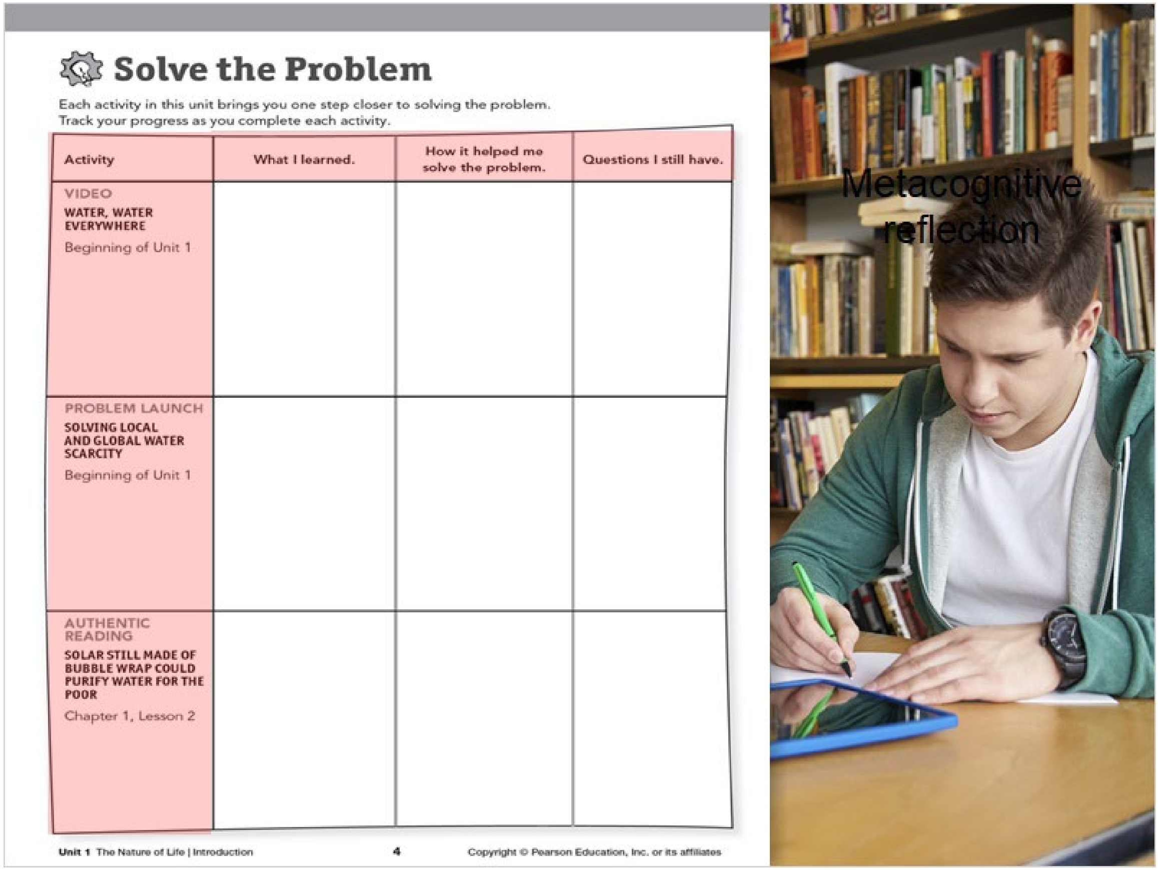
1. **Define the Problem** In your own words, briefly define the problem you will be addressing.

Unit 1 The Nature of Life | Stem Project 14 Copyright © Pearson Education, Inc. or its affiliates

Explorer's Journal

Students can download the pages from Realize and fill in their answers directly into the PDF form, or you can print out copies for them to complete!

Students as Independent Learners



True scientific inquiry is student-driven rather than teacher- or curriculum-driven. So, at the beginning of each unit in the *Explorer's Journal*, students will find a few tools to track their learning over the course of the exploration.

First is a diagram that maps each activity in the learning path so they can see where they're going. They'll check each activity off as they complete it. (Who doesn't love the feeling of checking things off your to-do list?)

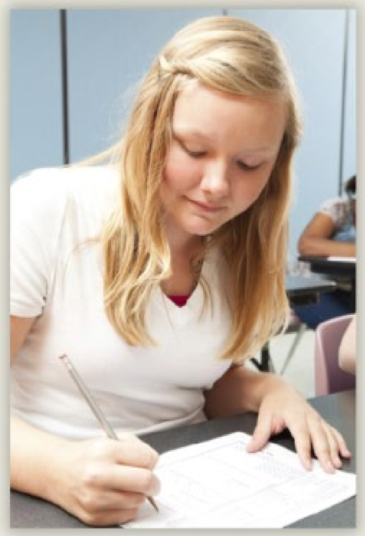
Next, they'll use a table like this to record how each activity contributed to their learning and project goals. Noting questions they still have will make the next activities more purpose-driven.

How Do I Assess the Explorer's Journal?

Unit 1 Solution Rubric

	EXEMPLARY Score your work a 4 if:	ACCOMPLISHED Score your work a 3 if:	DEVELOPING Score your work a 2 if:	BEGINNING Score your work a 1 if:
Project Design and Operation Student Score ____ Teacher Score ____	Your solar still functioned efficiently. Your team's design met all criteria and constraints. You successfully improved your design when you redesigned and retested the still.	Your solar still was mostly efficient. Your team's design met most criteria and constraints. Your design improved somewhat when you redesigned and retested the still.	Your solar still was somewhat efficient. Your team's design met a few criteria and constraints. Your design improved only slightly when you redesigned and retested the still.	Your solar still was inefficient. Your team's design met only one or two criteria and constraints. Your design did not improve when you redesigned and retested the still.
Using the Engineering Design Process Student Score ____ Teacher Score ____	All the steps of the engineering design process were completed. When you redesigned your solar still, you revisited any steps necessary to complete the redesign.	Most of the steps of the engineering design process were completed. When you redesigned your solar still, you revisited at least one step to complete the redesign.	Only a few of the steps of the engineering design process were completed. You attempted to redesign your solar still.	No evidence of the design process was used. You did not attempt to redesign your solar still.
Collaboration Role Student Score ____ Teacher Score ____	You fully collaborated with your teammates and contributed to the group project wherever you could. You listened to others. You respected the contributions of others.	You mostly collaborated with your teammates and often contributed to the group project. You usually listened to others. You respected the contributions of others.	You partially collaborated with your teammates by occasionally contributing to the group project. You sometimes listened to others. You sometimes ignored others' contributions.	You rarely collaborated with your teammates and contributed very little to the group project. You rarely listened to others. You ignored others' contributions.

Self-assessment rubrics



Finally, students will find a self-assessment rubric in the *Explorer's Journal* at the end of each unit. Introducing this rubric early in the unit will help them see what their goals should be for their work. After they complete their work, they can compare it against the rubric to see how their work measures up!

Use this as a grade if you wish, but try to make sure the student's voice is reflected.

Closing

Thanks for sticking with me! I hope I've convinced you that the *Explorer's Journal* is a valuable tool for engaging students in authentic scientific inquiry.

And for more information about *Miller & Levine Biology* and Problem-Based Learning, visit some of the other tutorials on My Savvas Training!