

OpenSciEd units are designed using a form of “science storyline” approach. The goal of a science storyline approach is to provide students with a coherent experience that is motivated by the students’ own desire to explain something they don’t understand or to solve a problem (Reiser, Novak, & McGill, 2017). We use the metaphor of a storyline to capture the fact that learners should be motivated to work through the next step in a science unit just as they are motivated to see what happens next in an unfolding story.

An OpenSciEd unit storyline is a logical sequence of lessons that are motivated by students’ questions. It is a science storyline because the questions arise from students’ interactions with phenomena. OpenSciEd storylines are designed to provide students with the goal of explaining a phenomenon and/or solving a problem. Each step is designed to enable students to make progress on their questions by using science and engineering practices to help figure out a piece of a science idea. Each piece they figure out adds to the developing explanation, model, or designed solution. Each step may also generate new questions that add to students’ work in the storyline. As a step-wise process of questioning, investigating, and building understanding, a storyline provides a coherent path toward building a disciplinary core idea and cross-cutting concepts, anchored in students’ own experiences and questions.

To help teachers and students advance through a unit storyline, OpenSciEd takes advantage of routines—activities that play specific roles in advancing the storyline with structures to help students achieve the objectives of those activities. OpenSciEd units use five routines drawn from the work of the NextGen Science Storylines Project (Reiser, Novak, McGill, 2017).

Routine	Purpose
Anchoring Phenomenon routine	Develop curiosity to drive learning throughout the unit based on a common experience of a phenomenon and connections to any related phenomena students have experienced.
Navigation routine	Establish and reinforce the connections between what we have previously done in a unit, what we are about to do, what we will do in the future, and what our driving purpose is in the context of the unit.
Investigation routine	Use scientific practices to investigate and make sense of a phenomenon.
Putting Pieces Together routine	Take the pieces of ideas we have developed across multiple lessons and figure out how they can be connected together to account for the phenomenon we have been working on.
Problematizing routine	Evaluate the adequacy of our scientific ideas to explain a phenomenon in order to identify what we still need to understand.

How and where the routines are found will vary somewhat across the units in OpenSciEd, but these routines typically follow a pattern as students kick off a unit of study, investigate different questions they have, put the pieces together from those investigations, and then problematize the next set of questions to investigate. Each unit will have a slight variation on what happens within a particular routine, based on the anchoring phenomenon and the focal SEPs and CCCs, but the purpose and general approach of the routine is consistent across all units.

The OpenSciEd Instructional Model on back provides a general path through an OpenSciEd unit using the routines. Note: the Navigation Routine is something that occurs from lesson-to-lesson and is not on the model, but described more fully in the OpenSciEd Teacher Handbook <https://www.openscienced.org/resources/>

# OpenSciEd INSTRUCTIONAL MODEL

