Strategies to Create a Coherent Science Content Storyline

STeLLA STRATEGY F
MAKE EXPLICIT LINKS BETWEEN SCIENCE IDEAS AND ACTIVITIES

A science lesson with a strong science content storyline should be a connected thread of content-related talk and activities leading from the focus question through a flow of events and science ideas to the final conclusion or summary. Explicit links throughout the lesson should get students thinking about their own initial ideas, new science ideas introduced through lesson activities, and how their understanding changes throughout the lesson. Students should be able to make connections in each lesson to the growing storyline—not simply complete the activity.

In order to intentionally provide students opportunities to construct a coherent storyline, students should have a purpose for doing the activity and a chance to consider their initial ideas or make predictions before they begin. In STeLLA, that is considered the ***setup*** to an activity. Activities that students carry out should be explicitly linked to the content storyline so students are challenged to work with their initial ideas and make connections to new science concepts. Finally, students need opportunities to focus on how the activity helped them to better understanding the science storyline, what they learned, and how their initial thinking may have changed. This phase of the lesson is called the ***follow-up*** to the activity.

SETUP THE ACTIVITY with the SCIENCE IDEAS IN MIND

Setup for the activity makes explicit links to science ideas: Many times, teachers get so caught up in making sure students understand the procedures for carrying out an activity, they forget to engage students in talking about the purpose of the activity as it relates to the main learning goal and to the developing storyline. In planning to teach, consider how you will set up each activity so that students are required to think or make predictions about the science ideas related to the learning goal before they begin an activity. Anticipate the initial ideas students may hold and consider how to respond to those ideas during the setup. In planning the lesson, think of ways you can help students make connections between their initial ideas or predictions and new science ideas introduced during the activity.

USING SCIENCE IDEAS DURING THE ACTIVITY

Activity is designed so that it requires students to make links between the activity and the science ideas: Too often, students can simply follow procedures without thinking about the science ideas embedded within the activity. In planning to teach, design the activity so that students are required to think about science ideas as they carry out the activity.

USING SCIENCE IDEAS AFTER THE ACTIVITY

Follow-up the activity by focusing on linking the activity with science ideas and the science content storyline: After each activity, students' attention should be focused on the ways in which the activity contributes to the science content storyline. In a follow-up to the activity, students go beyond simply describing their observations and results to thinking about how the activity relates to the science ideas and the focus question of the lesson. In planning to teach, leave time after each main activity to engage students in thinking about the ideas related to the activity.

To make sure you are explicitly linking a science idea and an activity, ask yourself the following questions:

Can I clearly identify the science idea (complete sentence) I expect students to think about before, during, and after an activity? After the activity, will *students* be able to identify the science idea? **AND/OR**

Am I (or the students) stating a science idea (complete sentence) and indicating how that idea is related to the activity students will do, are doing, or have done?

Examples of activities that are explicitly linked/not linked to science ideas

About Natural Selection

	Setup for the activity	**During the activity**	**Follow-up to the activity**
Activity and science ideas ARE NOT EXPLICITLY LINKED	"Today in our unit about the how species change over time we will complete a chart comparing the features of stickleback fish living in freshwater with stickleback living in saltwater. *[Focus is on the activity, not the science ideas.]*	"Let me show you how to use the information on your cards to fill out the chart." The teacher provides an example on the board. The students complete their graphs as the teacher walks among the groups of students. *[Focus is on the activity, not the science ideas.]*	Students share their graphs and summarize the differences they found among fish of the same species living in different environments with a focus on how the fish look. The teacher asks some students to redo their charts using examples from other students. *[No discussion of science ideas related to the activity.]*
Activity and science ideas ARE EXPLICITLY LINKED	"As we get ready to look at stickleback fish living in different environments, I want you to think about how our observations might help to answer today's focus question: What factors might lead a population (group) of living things to change over time? *[Students are engaged in thinking about science ideas, not just procedures, for the activity.]*	Students compare pictures of stickleback fish living in freshwater to stickleback fish living in saltwater and explore features of the environments where each population lives. Students notice that saltwater stickleback have plates and spines which freshwater stickleback lack. Students also notice that in freshwater the primary predators are small nymphs and in saltwater the predators are mostly larger fish. Students discuss why differences in physical features might be an advantage to individual fish in each environment. *[Students are engaged in thinking about the science ideas related to their observations.]*	Students work in small groups to generate an diagram showing how *individuals* having certain advantageous traits might, over time, lead to changes in the *population*. Afterward students are challenged to make a clear statement of how the factors environment might have influence changes in a population over time. *[Teacher challenges students to use ideas about which individuals live and die – and therefore have a greater chance of reproducing – to describe changes to a population.*