NGSS Support Guide

FOSS	**New Plants**
	Grade 1 –Structure, Function and Information Processing

IMPORTANT INFORMATION ABOUT CHANGES TO YOUR KIT!

You will notice that a plant investigation (*Planting Brassica)* has been removed from your New Plants kit. This change is to support the transition to NGSS Standards for Grade 1.

Background

In 2013 the Washington State Legislature adopted the *Next Generation Science Standards* as the 2013 Washington State Science Learning Standards. The *Next Generation Science Standards* are built upon a *"three-dimensional"* vision of science learning that exists at the intersection of the *Science and Engineering Practices*, the *Crosscutting Concepts*, and the *Disciplinary Core Ideas*. The Office of the Superintendent of Public Instruction established a multi-year transition timeline and plan to achieve full implementation by the Spring of 2018. Informed by this transition plan, regional LASER science materials centers decided to bring together experienced teachers to provide guidance to those who shared their instructional materials about how best to begin moving to this new paradigm of science learning while still using their existing instructional materials. This guide is one product of that work.

What this Guide Is

The writers of this guide want to help you put the kids in the driver's seat of engaging in science – a key shift in the *Next Generation Science Standards*. They intend this guide to provide you with ideas on how best to build student capacity to work as a scientist or engineer using the *Science and Engineering Practices*; on how best to think about the learning by engaging students in using the *Crosscutting Concepts*; and all while engaging in the content ideas that already exist within this instructional material.

This guide does not align this instructional material to the Next Generation Science Standards, but it assists teachers in aligning instruction and student experiences with the goals of the Next Generation Science Standards. **This guide does not** represent a re-write of the instructional material, neither does it present newly-developed material. It is meant to help you adjust your use of your existing unit toward a more "*three-dimensional"* approach to learning. It is strongly recommended that you have an understanding of the shifts envisioned by the NGSS by familiarizing yourself with the Framework for K-12 Science Education. If you would like more information on the Disciplinary Core Ideas that are the focus of the New Plants kit, please read Life Science Core Ideas 1 and 3.

Directions for Using this Guide

Before teaching this unit, please refer to the NGSS Transition Support Guide to review the *Science and Engineering Practices* and *Crosscutting Concepts* for each investigation. The guide highlights what the teacher and student does in each investigation to support the *Science and Engineering Practices* and *Crosscutting Concepts* that are already implicit in the instructional materials. If you need support on using *Science and Engineering Practices* refer to Appendix F and for *Crosscutting Concepts* refer to Appendix G in the *Next Generation Science Standards.* For example, in Investigation 1- the *Science and Engineering*

Practice is Analyzing and Interpreting Data. Therefore, the teacher should use guiding questions to elicit student responses and model recording observations on a class chart. The students will observe and record data in their own science notebooks.

Heads-Up/Things you might need in order to use this guide

Before you teach this kit, you may want to send home the Letter to Parents from the Duplication Masters because you will be requesting stem and root cuttings to be used in Investigations 3 and 4. Science notebooks are encouraged for this kit. If you would like information of using science notebooks in the classroom, refer to the FOSS Folio included in your teacher guide or visit the LASER Science Notebooking website at www.sciencenotebooks.org . The guide references the use of Page Keeley's Formative Assessment Probes for Uncovering Student Ideas in Primary Science (2013 NSTA Press). Check in your school or district science library, or contact your Science Materials Center for this resource. Investigation 4 has been adapted to include a written performance assessment. If you are unfamiliar with Claims-Evidence-Reasoning (CER) as a method for writing in science, please contact your Science Leadership teacher or Regional Science Coordinator.

For More Information

If you have questions about this guide or its content, please direct your inquiry to your science materials center, or Regional Science Coordinator.

NGSS Transition Support Guide – FOSS Template

Publisher	Kit Title	Grade Level
FOSS	New Plants	1st Grade – Structure, Function, Information Processing

***Please note that the Brassica investigation has been removed from this kit to better support NGSS Standards for 1st grade.

Investigation 2	Classroom Instruction	Science and Engineering Practice	Crosscutting Concept	Helpful Modifications
Grass and Grain Seeds		**Constructing Explanations and Designing Solutions** Use information from observations to construct an evidence-based account of natural phenomena.	**Patterns** Patterns in the natural world can be observed, used to describe phenomena and used as evidence. Patterns can support students in identifying causality.	**Core Idea – from NRC Framework and NGSS Performance Expectation** How do plants structured to obtain what they need to grow and survive? (LS1.A) Also, consider using "Seeds in a Bag?" probe (Keeley, Vol. 1 pgs 25-29. Use "The Story of Wheat" from the student books to make the connection of wheat in student daily lives. 1-LS1-1
	What the student does	Students will need to collect on going data from their observations to determine why grass continues to grow and alfalfa does not (Investigation 2.2), as well as how wheat grows without soil (Investigation 2.3).	Students cut the lawn (cause) and observe future growth of the plants (effect) to find patterns that support or refute their explanations.	Students are building on the Core Idea question 'How to plants obtain what they need to grow and survive?' They now have some conflicting information and may need a new graphic organizer to record new evidence.

Throughout the investigation	What the teacher does	• Modeling recording observations on a chart. • Facilitating discussion with probing questions	• Be sure to use 'Cause and Effect' language. (What caused the grass to grow? What was the effect of mowing the alfalfa?)	

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Investigation 3	Classroom Instruction	Science and Engineering Practice	Crosscutting Concept	Necessary Modifications
Stems		**Planning and Carrying Out Investigations** Plan and conduct and investigation collaboratively to produce data to serve as the basis for answering a question.	**Stability and Change** Some things stay the same while other things change.	**Core Idea – from NRC Framework and NGSS Performance Expectation** Use "What Do Plants Need?" in the student book to help organize student thinking about planning their investigation, and apply vocabulary from the unit. 1-LS1-1
	What the student does	Students bring in stem cuttings to observe growth of new plants without seeds. As students' progress to Parts 3.2 and 3.3, they plan the investigation using what they know about how plants obtain the nutrients they need to plan a proper environment for the promising plant.	Students predict what will happen to stem cuttings placed in water.	
Throughout the investigation:	What the teacher does	• Use a PEO (Predict, Explain, Observe) model. Have students make a prediction about how the cuttings will change when placed in water, have them explain their prediction then observe and document those changes over the duration of the investigation.	• In addition to drawing the changes (or stable conditions) of the cuttings, press students for explanations for the changes. • Models effective questioning strategies using open-ended questions.	This can be combined with the 'Seeds in a Bag' probe extensions suggested by Keeley, 2013 "Uncovering Student Ideas in Primary Science."

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Investigation 4	Classroom Instruction	Science and Engineering Practice	Crosscutting Concept	Necessary Modifications
Bulbs and Roots		**Constructing Explanations and Designing Solutions** Use information from observations to construct an evidence-based account of natural phenomena.	**Patterns** Events have causes that generate observable patterns. Patterns can help support students in identifying ways that young plants are alike their parents.	**Core Idea – from NRC Framework and NGSS Performance Expectation** LS3.A and LS.B Inheritance and Variation of Traits. **Performance Assessment** How are young plants like their parent plants?
	What the student does	Students observe growth of bulbs and edible roots to determine if they are alive. Students record information from observations to use as data as the bulbs and roots grow.	Students predict what will happen to bulbs exposed to moisture, but not soil; and then roots exposed to vermiculite. Students can develop an explanation based on observed patterns for how young plants look different and same to older plants as they grow.	Students are attempting to answer the focus question 'Are bulbs alive?' in Part 4.1 You might consider using the 'Is It a Plant?' or 'Is It Alive?' probes to guide discussion around criteria for deciding if the bulbs or root cuttings are alive and will grow into new plants. (Keeley, 2013)
Throughout the investigation:	What the teacher does	• Teachers will guide students to answering the focus question in this investigation, using observations as evidence. • As a culminating performance assessment, students will attempt to answer the Core Idea question that they've been developing evidence for throughout the unit. Provide students with Claims-Evidence-	• To connect to the crosscutting concept, elicit ideas about what caused the bulb to grow into a new plant?	For more information on Claims-Evidence-Reasoning, contact your Regional Science Coordinator.

		Reasoning sentence frames to model this method of constructing an explanation.		