



San Diego Unified School District
Science Department

Grade 1 – Plants and Animals
Life Science
Unit of Study



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**Science Vision for
San Diego Unified School District**
Science is an integral part of the intellectual development of a child. Interest in science begins with attitudes and values established in the earliest years through daily experiences. Students graduating from high school must have a foundation in scientific knowledge and evidence based reasoning.

Updated versions of this unit of study can be found online at www.sandi.net/science.



Grade 1 – Plants and Animals
Module Overview



Overview of the Unit

The Plants and Animals Module provides experiences that heighten young students awareness of the different ways that plants and animals meet their needs. Students care for plants to learn what they need to grow and develop. They observe the structures of plants and discover ways to propagate new plants from mature plants (from seeds, bulbs, roots, and stem cuttings). They observe the structures of plants and discover ways to propagate new plants from mature plants (from seeds, bulbs, roots, and stem cuttings). They observe and describe changes that occur as plants grow, and organize their observations on a calendar and in a notebook. They build a terrarium and provide for the needs of both plants and animals living together in a classroom habitat. They read about and view photographs and videos of plants and animals in different habitats.

Grade 1 Life Science Conceptual Flow

Concept #1			
Plants and animals meet their needs in different ways.			
Subconcepts Investigation #1: Grass and Grain Seeds	Subconcepts Investigation #2: Stems	Subconcepts Investigation #3: Terrariums	Subconcepts Investigation #4: Bulbs and Roots
Seeds are alive.	New plants can grow from stems of mature plants.	A terrarium is place where plants and animals live in soil.	Bulbs are alive.
Seeds need water and light to grow into new plants.	Plants need water and light to grow.	A habitat is a place where plants and animals live. There are many different kinds of habitats.	Bulbs need water to start growing.
Some plants die and some plants continue to grow after they are mowed.	Leaves, twigs, and roots develop on stems at the nodes.	Plants and animals have structures and animals have behaviors that help them live in their habitat.	Parts of roots will grow into new plants. Other parts will not.
Plants have different structures that function in growth and survival.	Potatoes are underground stems.	Changes in a terrarium happen over time and can be recorded.	Animals eat plants.
Wheat and other cereals that we eat come from seeds called grains.	Seeds have structures to help them travel to new locations to grow.		Animal teeth come in different shapes and sizes and are used to capture and eat different kinds of food.
	Plants make their own food, using sunlight.		

1st Grade Science Content Standards Addressed in this Module

Life Science

- LS2 Plants and animals meet their needs in different ways. As a basis for understanding this concept:
 - LS2a Students know different plants and animals inhabit different kinds of environments and have external features that help them thrive in different kinds of places.
 - LS2b Students know both plants and animals need water, animals need food, and plants need light.
 - LS2c Students know animals eat plants or other animals for food and may also use plants or even other animals for shelter and nesting.
 - LS2d Students know how to infer what animals eat from the shapes of their teeth (e.g., sharp teeth: eats meat; flat teeth: eats plants).
 - LS2e Students know roots are associated with the intake of water and soil nutrients and green leaves are associated with making food from sunlight.

Investigation and Experimentation

- I&E4. Scientific progress is made by asking meaningful questions and conducting careful investigations. As a basis for understanding this concept and addressing the content in the other three strands, students should develop their own questions and perform investigations. Students will:
 - I&E4a Draw pictures that portray some features of the thing being described.
 - I&E4b Record observations and data with pictures, numbers, or written statements.
 - I&E4c Record observations on a bar graph
 - I&E4d Describe the relative position of objects by using two references (e.g., above and next to, below and left of).
 - I&E4e Make new observations when discrepancies exist between two descriptions of the same object or phenomenon.

Pacing the Unit as a Whole

Day 1 Start Inv. 1 Part 1 A/I	Day 2 W	Day 3 R	Day 4 Start Inv. 1 Part 2 A/I	Day 5 A/I	<p>A – Active Investigation sessions include firsthand observations about the weather, active thinking about the experiences, small group discussion, simulations, writing in science notebooks, learning new vocabulary in context, and completing written embedded individual assessments to inform instruction. (approximately 45 minutes)</p> <p>W – Wrap-up sessions are teacher-directed vocabulary reinforcement and science content review. (Approximately 15 minutes)</p> <p>I – Individual Assessment: The goal of the FOSS assessment system fall into three categories called assessment variables: (1) content knowledge, (2) conducting investigations, and (3) building explanations. Content knowledge reflects the “facts” of science that students learn throughout the module. Conducting Investigations focuses on skills needed for a successful scientific investigation. Building Explanation refers to students’ discourse – how they communicate observation and how they organize their observation and interpretations of them.</p> <p>R – Reading sessions (Science Resources student book) include interactive reading, answering review questions, and discussing the reading to ensure that students integrate the information. (30 minutes)</p> <p>End-Of-Module Assessment</p>
Day 6 A/I	Day 7 A/I	Day 8 A/I/W	Day 9 Start Inv. 1 Part 3 A/I	Day 10 A/I	
Day 11 A/I	Day 12 A/I	Day 13 A/I/W	Day 14 R	Day 15 Interdisciplinary Extensions	
Day 16 Start Inv. 2 Part 1 A/I	Day 17 A/I	Day 18 A/I/W	Day 19 R	Day 20 Start Inv. 2 Part 2 A/I	
Day 21 A/I	Day 22 A/I/W	Day 23 A/I	Day 24 Start Inv. 2 Part 3 A/I	Day 25 A/I/W	
Day 26 Interdisciplinary Extensions	Day 27 Start Inv. 3 Part 1 A/I/W	Day 28 R	Day 29 Start Inv. 3 Part 2 A/I	Day 30 A/I	
Day 31 A/I	Day 32 A/I/W	Day 33 R	Day 34 Start Inv. 3 Part 3 A/I	Day 35 A/I	
Day 36 A/I/W	Day 37 A/I	Day 38 Interdisciplinary Extensions	Day 39 Start Inv. 4 Part 1 A/I	Day 40 A/I	
Day 41 A/I/W	Day 42 Start Inv. 4 Part 2 A/I	Day 43 A/I	Day 44 A/I	Day 45 A/I/W	
Day 46 R	Day 47 Interdisciplinary Extensions	Day 48 End-Of-Module Assessment			



Grade 1 – Plants and Animals
Pacing Guide – Investigation 1: Grass and Grain Seeds

Investigation Overview

Investigation 1: Grass and Grain Seeds		
<p>Concepts: Plants and animals meet their needs in different ways.</p> <p>Students observe and describe the changes that occur as plants grow and develop. They become familiar with the structures and functions of flowering plants and compare the basic needs of common plants and animals. They draw pictures, acquire vocabulary, and communicate observations about the structures, needs and habitats of plants and animals.</p>		
Part 1: Lawns	Part 2: Mowing The Lawn	Part 3: Wheat
<p><u>Summary</u> Students plant miniature lawns with rye and alfalfa. They mow the lawns and observe the response of grass and alfalfa to cutting. They plant individual wheat seeds in clear soda straws and observe how grain seeds germinate and grow. They read about plant needs and view a video on how plants grow.</p>	<p><u>Summary</u> After the two kinds of plants have grown tall, students cut the lawn plants to simulate mowing. They observe and make drawings of what happens to the two kinds of plants. By viewing a video, students learn how plants make food from sunlight. They also see that other animals eat plants for food.</p>	<p><u>Summary</u> Students plant seeds of an important grain: wheat. The wheat is carefully positioned in transparent soda straws with pieces of paper towel to provide support and water to the seeds. Students observe what happens to the plants and record changes by drawing pictures and making bar graphs. Students read about how wheat begins as a seed and eventually becomes an important part of the food we eat.</p>
<p><u>Subconcepts</u></p> <ul style="list-style-type: none"> ▪ Seeds need water and light to develop into new plants. ▪ Grass and alfalfa are two different types of plants. 	<p><u>Subconcepts</u></p> <ul style="list-style-type: none"> ▪ Not all plants grow like. ▪ Some plants will die if they are cut near the ground, while others will continue to live. ▪ Plants make food from sunlight. ▪ Animals eat plants for food and use plants for shelter and nesting. 	<p><u>Subconcepts</u></p> <ul style="list-style-type: none"> ▪ Wheat and other cereals that we eat come from seeds called grains. ▪ Seeds are alive and grow into new plants. ▪ Plants have different structures that function in growth and survival.
<p><u>Time Allocation:</u> Active Investigation: 2 days Reading: 1 day</p>	<p><u>Time Allocation:</u> Active Investigation: 4 days Video: 1 day</p>	<p><u>Time Allocation:</u> Active Investigation: 5 days Reading 1 day</p>
<p><u>CA Science Standards</u> LS2b, LS2c, LS2e, I&E4a, I&E4b</p>	<p><u>CA Science Standards</u> LS2b, LS2e, I&E4a, I&E4b</p>	<p><u>CA Science Standards</u> LS2b, LS2c, LS2e, I&E4a, I&E4b, I&E4c, I&E4d, I&E4e</p>



Grade 1 – Plants and Animals
Pacing Guide – Investigation 1: Grass and Grain Seeds

Pacing Guide – Investigation 1: Grass and Grain Seeds

Day 1		Day 2		Day 3	
Prep	Instruction	Prep	Instruction	Prep	Instruction
<input type="checkbox"/> Read “At A Glance” <i>TG p. 36-37</i> <input type="checkbox"/> Read “Science Background” <i>TG p. 38-39</i> <input type="checkbox"/> Read “Teaching Children About Grasses and Grains” <i>TG p. 40</i> <input type="checkbox"/> Review “Materials” and “Getting Ready” <i>TG p. 41-45</i>	Guiding the Investigation <input type="checkbox"/> “Part 1: Lawns” Steps 1-16 <i>TG p. 46-49</i>		Guiding the Investigation <input type="checkbox"/> “Part 1: Lawns; Wrap-Up Part 1” Steps 17-19 <i>TG p. 49-50</i>		Reading In Science Resources <input type="checkbox"/> Steps 20-22 <i>TG p. 51</i> Student Reading: Science Resources p. 3-8 <input type="checkbox"/> Body of Evidence Prompt #1 <i>TG p. 165</i>
Day 4		Day 5		Day 6	
Prep	Instruction	Prep	Instruction	Prep	Instruction
<input type="checkbox"/> Review “Materials” and “Getting Ready” <i>TG p. 52-53</i>	Guiding the Investigation <input type="checkbox"/> “Part 2: Mowing The Lawn” Steps 1-7 <i>TG p. 54-55</i>		Guiding the Investigation <input type="checkbox"/> “Part 2: Mowing Lawns” Step 8 <i>TG p. 55</i>		Guiding the Investigation <input type="checkbox"/> “Part 2: Mowing Lawns” Step 8 (Repeat) <i>TG p. 55</i>

Pacing Guide – Investigation 1: Grass and Grain Seeds (continued)

Day 7		Day 8		Day 9	
Prep	Instruction	Prep	Instruction	Prep	Instruction
	Guiding the Investigation <input type="checkbox"/> “Part 2: Mowing Lawns; Video/I” Steps 9-10 <i>TG p. 55</i>		Guiding the Investigation <input type="checkbox"/> “Part 2: Mowing Lawns; Wrapping Up Part 2” Steps 11-12 <i>TG p. 56</i>	<input type="checkbox"/> Review “Materials” and “Getting Ready” <i>TG p. 57-60</i>	Guiding the Investigation <input type="checkbox"/> “Part 3: Wheat” Steps 1-5 <i>TG p. 61-62</i>
Day 10		Day 11		Day 12	
Prep	Instruction	Prep	Instruction		
	Guiding the Investigation <input type="checkbox"/> “Part 3: Wheat” Steps 6-11 <i>TG p. 62-64</i>		Guiding the Investigation <input type="checkbox"/> “Part 3: Wheat” Steps 12-14 <i>TG p. 64-65</i>		Guiding the Investigation <input type="checkbox"/> “Part 3: Wheat” Step 15 <i>TG p. 65</i>
Day 13		Day 14		Day 15	
Prep	Instruction	Prep	Instruction	Prep	Instruction
	Guiding the Investigation <input type="checkbox"/> “Part 3: Wheat; Wrapping Up Part 3” Steps 16-17 <i>TG p. 66</i>		Reading In Science Resources <input type="checkbox"/> Steps 18-21 <i>TG p. 68</i> Student Reading: Science Resources p. 3-8		<input type="checkbox"/> Review <input type="checkbox"/> Interdisciplinary Extensions <i>TG p. 69-71</i>



Grade 2 – Plants and Animals
Pacing Guide – Investigation 2: Stems



Investigation Overview

<p>Investigation 2: Stems Concepts: Plants and animals meet their needs in different ways. Students will learn what plants need to grow and identify the parts of a plant that help it grow and survive and discover the conditions that induce root growth on stems. Students will use cut plant stems and observe changes over time. They will learn that roots take in water and nutrients, and leaves make food from sunlight.</p>		
Part 1: Rooting Stem Cuttings	Part 2: Spuds	Part 3: New Plants From Cuttings
<p><u>Summary</u> Students try to make new plants from the stems of mature plants. Each student works with part of a plant—a stem, a leaf, or a stem and leaf. They put the parts into water and observe them over time. Students draw and describe in words what they observe. They read how wind and animals disperse seeds to other places.</p>	<p><u>Summary</u> Students cut white potatoes (modified stems) into pieces and plant them in soil. After 2-3 weeks students observe the results and discuss the role of potato eyes in producing new plants.</p>	<p><u>Summary</u> Students select the cuttings that show promise for developing into new plants and plant them in soil. They view a video that describes how plants make food from sunlight, provide oxygen for living things, and take up water and nutrients from their roots.</p>
<p><u>Subconcepts</u></p> <ul style="list-style-type: none"> ▪ Leaves, twigs, and roots develop on stems at the nodes. ▪ Plants need water and light to grow. 	<p><u>Subconcepts</u></p> <ul style="list-style-type: none"> ▪ New plants can grow from the stems of mature plants. ▪ Potatoes are underground stems. ▪ Potato eyes are nodes where buds grow. 	<p><u>Subconcepts</u></p> <ul style="list-style-type: none"> ▪ Wheat and other cereals that we eat come from seeds called grains. ▪ Seeds are alive and grow into new plants. ▪ Plants have different structures that function in growth and survival.
<p><u>Time Allocation:</u> Active Investigation: 3 days Reading: 1 day</p>	<p><u>Time Allocation:</u> Active Investigation: 3 days Video: 1 day</p>	<p><u>Time Allocation:</u> Active Investigation: 2 days Interdisciplinary Extensions: 1 day</p>
<p><u>CA Science Standards</u> LS2b, LS2e, I&E4a, I&E4b</p>	<p><u>CA Science Standards</u> LS2b, LS2e, I&E4a, I&E4b</p>	<p><u>CA Science Standards</u> LS2b, LS2e, I&E4a, I&E4b</p>

Pacing Guide – Investigation 2: Stems

Day 16		Day 17		Day 18	
Prep	Instruction	Prep	Instruction	Prep	Instruction
<ul style="list-style-type: none"> <input type="checkbox"/> Read “At A Glance” <i>TG p. 74-75</i> <input type="checkbox"/> Read “Science Background” <i>TG p. 76-77</i> <input type="checkbox"/> Read “Teaching Children About Stems” <i>TG p. 78</i> <input type="checkbox"/> Review “Materials” and “Getting Ready” <i>TG p. 79-81</i> 	Guiding the Investigation <ul style="list-style-type: none"> <input type="checkbox"/> “Part 1: Rooting Stem Cuttings” Steps 1-10 <i>TG p. 82-84</i> 		Guiding the Investigation <ul style="list-style-type: none"> <input type="checkbox"/> “Part 1: Rooting Stem Cuttings” Steps 11-12 <i>TG p. 84</i> <input type="checkbox"/> Body of Evidence Prompt #2 <i>TG p. 168</i> 		Guiding the Investigation <ul style="list-style-type: none"> <input type="checkbox"/> “Part 1: Stems; Wrapping Up Part 1” Steps 13-14 <i>TG p. 84-85</i>
Day 19		Day 20		Day 21	
Prep	Instruction	Prep	Instruction	Prep	Instruction
	Reading In Science Resources <ul style="list-style-type: none"> <input type="checkbox"/> Steps 15-17 <i>TG p. 86-87</i> Student Reading: Science Resources p. 16-20		Guiding the Investigation <ul style="list-style-type: none"> <input type="checkbox"/> “Part 2: Spuds” Steps 1-13 <i>TG p. 91-93</i> 		Guiding the Investigation <ul style="list-style-type: none"> <input type="checkbox"/> “Part 2: Spuds” Step 14 <i>TG p. 55</i>

Pacing Guide – Investigation 2: Stems (continued)

Day 22		Day 23		Day 24	
Prep	Instruction	Prep	Instruction	Prep	Instruction
	Guiding the Investigation <input type="checkbox"/> “Part 2: Spuds” Steps 15-17 <i>TG p. 93</i>		Guiding the Investigation <input type="checkbox"/> “Part 2: Spuds; Wrapping Up Part 2” Steps 18-19 <i>TG p. 95</i>	<input type="checkbox"/> Review “Materials” and “Getting Ready” <i>TG p. 96-97</i>	Guiding the Investigation <input type="checkbox"/> “Part 3: New Plants From Cuttings” Steps 1-9 <i>TG p. 98-99</i>
Day 25		Day 26			
Prep	Instruction	Prep	Instruction		
	Guiding the Investigation <input type="checkbox"/> “Part 3: Wheat” Step 15 <i>TG p. 99-100</i>		<input type="checkbox"/> Review <input type="checkbox"/> Interdisciplinary Extensions <i>TG p. 101-103</i>		



Grade 1 – Plants and Animals
Pacing Guide – Investigation 3: Terrariums



Investigation Overview

Investigation 3: Terrariums		
Concepts: Plants and animals meet their needs in different ways.		
<p>Students construct a terrarium habitat that provides space, food, water, air, and sunlight for plants and animals. Students plant seeds, introduce organism, add rocks, leaves, and twigs to their terrarium and record observations as the terrarium changes over time. Students learn that plants get water and soil nutrients through their roots, and leaves make food from sunlight</p>		
Part 1: Setting Up The Terrarium	Part 2: Recording Changes	Part 3: Habitat Match
<p><u>Summary</u> Students build a terrarium with soil and the seeds and plants from Investigations 1 and 2. They construct a map showing the location of the seeds and plants. Students review what plants need to live, and think about what animals need. They read a story describing what animals need to live.</p>	<p><u>Summary</u> Students care for the terrarium and record changes they observe over time. They add food, water, shelter, earthworms, and isopods to see how they interact and live. Students are introduced to the concept of habitat, and read a story describing six different habitats around the world.</p>	<p><u>Summary</u> Students use plant and animal cards and match them to various habitats. They learn that plants and animals have structures and behaviors that help them live in their habitat. They review the needs of living things and see how habitats provide for these needs. Students view a video that shows the differences between desert and rain-forest habitats.</p>
<p><u>Subconcepts</u></p> <ul style="list-style-type: none"> ▪ Plants and animals need food, water, air, and space, and plants need sunlight to make food. ▪ A terrarium is a place where plants and animals live in soil. ▪ A map of a terrarium shows where seeds, plants, and animals are ▪ A habitat is a place where plants and animals live 	<p><u>Subconcepts</u></p> <ul style="list-style-type: none"> ▪ The plants and animals in the terrarium need food, water, air, shelter, and sunlight. ▪ There are many different habitats around the world. ▪ Many changes take place in the terrarium habitat over time. ▪ Terrarium changes can be recorded on a map through drawing and writing. 	<p><u>Subconcepts</u></p> <ul style="list-style-type: none"> ▪ Plants and animals have structures, and animals have behaviors, that help them live in their habitat, ▪ A habitat provides everything a plant or animal needs to live. ▪ Habitats can be wet, dry, cold, or hot, and have different plants and animals that are best suited for that habitat.
<p><u>Time Allocation:</u> Active Investigation: 1 day Reading: 1 day</p>	<p><u>Time Allocation:</u> Active Investigation: 4 days Reading: 1 day</p>	<p><u>Time Allocation:</u> Active Investigation: 3 days Video: 1 day Interdisciplinary Extensions: 1 day</p>
<p><u>CA Science Standards</u> LS2a, LS2b, LS2c, I&E4a, I&E4b</p>	<p><u>CA Science Standards</u> LS2a, LS2b, LS2c, I&E4a, I&E4b, I&E4d</p>	<p><u>CA Science Standards</u> LS2a, LS2b, LS2c, LS2e</p>



Grade 1 – Plants and Animals
Pacing Guide – Investigation 3: Terrariums



Pacing Guide – Investigation 3: Terrariums

Day 27		Day 28		Day 29	
Prep	Instruction	Prep	Instruction	Prep	Instruction
<input type="checkbox"/> Read “At A Glance” <i>TG p. 106-107</i> <input type="checkbox"/> Read “Science Background” <i>TG p. 108-110</i> <input type="checkbox"/> Read “Teaching Children About Terrariums” <i>TG p. 111</i> <input type="checkbox"/> Review “Materials” and “Getting Ready” <i>TG p. 112-113</i>	Guiding the Investigation <input type="checkbox"/> “Part 1: Setting Up Terrariums” Steps 1-20 <i>TG p. 114-118</i>		Reading In Science Resources <input type="checkbox"/> Steps 21-23 <i>TG p. 119</i> Student Reading: Science Resources p. 21-27 <input type="checkbox"/> Body of Evidence Prompt #3 <i>TG p. 171</i>	<input type="checkbox"/> Review “Materials” and “Getting Ready” <i>TG p. 120-121</i>	Guiding the Investigation <input type="checkbox"/> “Part 2: Recording Changes” Steps 1-7 <i>TG p. 122-123</i>
Day 30		Day 31		Day 32	
Prep	Instruction	Prep	Instruction	Prep	Instruction
	Guiding the Investigation <input type="checkbox"/> “Part 2: Recording Changes” Steps 8-9 <i>TG p. 123</i>		Guiding the Investigation <input type="checkbox"/> “Part 2: Recording Changes” Steps 8-9 <i>TG p. 123</i>		Guiding the Investigation <input type="checkbox"/> “Part 2: Recording Changes; Wrapping Up Part 2” Step 10 <i>TG p. 123</i> Steps 15-16 <i>TG p. 126</i>

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Pacing Guide – Investigation 3: Terrariums (continued)

Day 33		Day 34		Day 35	
Prep	Instruction	Prep	Instruction	Prep	Instruction
	Reading In Science Resources <input type="checkbox"/> Steps 11-14 <i>TG p. 124-125</i> Student Reading: Science Resources p. 28-46	<input type="checkbox"/> Review “Materials” and “Getting Ready” <i>TG p. 127-128</i>	Guiding the Investigation <input type="checkbox"/> “Part 3: Habitat Match” Steps 1-6 <i>TG p. 130</i>		Guiding the Investigation <input type="checkbox"/> “Part 3: Habitat Match” Steps 7-10 <i>TG p. 130</i>
Day 36		Day 37			
Prep	Instruction	Prep	Instruction		
	Guiding the Investigation <input type="checkbox"/> “Part 3: Habitat Match; Wrapping Up Part 3” Steps 11-12 <i>TG p. 132</i>		<input type="checkbox"/> Review <input type="checkbox"/> Interdisciplinary Extensions <i>TG p. 133-135</i>		



Grade 1 – Plants and Animals
Pacing Guide – Investigation 4: Bulbs and Roots



Investigation Overview

<p>Investigation 4: Bulbs and Roots Concepts: Plants and animals meet their needs in different ways. Students understand that plants have roots that take in water and nutrients, and leaves that make food from sunlight. Students initiate plant growth from a bulb, new plant, root or other part of the plant. Students learn about different kinds of teeth and how animals use them to eat different kinds of foods.</p>	
<p>Part 1: Setting Up The Terrarium</p>	<p>Part 2: Recording Changes</p>
<p><u>Summary</u> Students observe garlic or onion bulbs and plant them in a cup with bit of cotton to hold them in place. They observe the emergence of the roots and the shoot. After 2 weeks student may take their bulbs home to plant where they can observe them grow into mature plants.</p>	<p><u>Summary</u> Students investigate plants with edible roots—carrots and radishes. After observing the parts—leaves, stems, and roots—students cut the plants into three or four parts and plant them in vermiculite to see if they will produce new plants. After observing the changes for 2-3 weeks, students draw conclusions about the likelihood of producing new plants from parts that are usually found underground. Students are introduced to different types of mammalian teeth by observing their own teeth. They read about the shape and size of teeth (canine, incisors, molars) and look at examples of animals that have these teeth. They learn how animals use their teeth to capture and eat their food. They learn the general rule that flat, wide teeth are for eating plants and that sharp, pointed teeth are for eating meat.</p>
<p><u>Subconcepts</u></p> <ul style="list-style-type: none"> ▪ Bulbs are alive. ▪ Bulbs need water to start growing. 	<p><u>Subconcepts</u></p> <ul style="list-style-type: none"> ▪ Some parts of roots will grow into new plants if they are provided with water. Other parts will not. ▪ Animals eat plants. ▪ Animal teeth come in different shapes and sizes and are used to capture and eat different kinds of foods.
<p><u>Time Allocation:</u> Active Investigation: 3 days</p>	<p><u>Time Allocation:</u> Active Investigation: 4 days Reading: 1 day</p>
<p><u>CA Science Standards</u> LS2e, I&E4a, I&E4b</p>	<p><u>CA Science Standards</u> LS2b, LS2d, LS2e, I&E4a, I&E4b, I&E4d</p>



Grade 1 – Plants and Animals
Pacing Guide – Investigation 4: Bulbs and Roots



Pacing Guide – Investigation 4: Bulbs and Roots

Day 38		Day 39		Day 40	
Prep	Instruction	Prep	Instruction	Prep	Instruction
<ul style="list-style-type: none"> <input type="checkbox"/> Read “At A Glance” <i>TG p. 138-139</i> <input type="checkbox"/> Read “Science Background” <i>TG p. 140-141</i> <input type="checkbox"/> Read “Teaching Children About Bulbs and Roots” <i>TG p. 142</i> <input type="checkbox"/> Review “Materials” and “Getting Ready” <i>TG p. 143-144</i> 	Guiding the Investigation <ul style="list-style-type: none"> <input type="checkbox"/> “Part 1: Bulbs” Steps 1-11 <i>TG p. 145-146</i> 		Guiding the Investigation <ul style="list-style-type: none"> <input type="checkbox"/> “Part 1: Bulbs” Steps 12-13 <i>TG p. 147</i> <input type="checkbox"/> Body of Evidence Prompt #4 <i>TG p. 173</i> 		Guiding the Investigation <ul style="list-style-type: none"> <input type="checkbox"/> “Part 1: Bulbs; Wrapping Up Part 1” Steps 14-16 <i>TG p. 148</i>
Day 41		Day 42		Day 43	
Prep	Instruction	Prep	Instruction	Prep	Instruction
<ul style="list-style-type: none"> <input type="checkbox"/> Review “Materials” and “Getting Ready” <i>TG p. 149-151</i> 	Guiding the Investigation <ul style="list-style-type: none"> <input type="checkbox"/> “Part 2: Planting and Eating Roots” Steps 1-13 <i>TG p. 152-154</i> 		Guiding the Investigation <ul style="list-style-type: none"> <input type="checkbox"/> “Part 2: Planting and Eating Roots” Steps 14-15 <i>TG p. 154</i> 		Guiding the Investigation <ul style="list-style-type: none"> <input type="checkbox"/> “Part 2: Planting and Eating Roots” Steps 14-15(Repeat) <i>TG p. 154</i>

Pacing Guide – Investigation 4: Bulbs and Roots (continued)

Day 44		Day 45		Day 46	
Prep	Instruction	Prep	Instruction	Prep	Instruction
	Guiding the Investigation <input type="checkbox"/> “Part 2: Planting and Eating Roots” Steps 14-15(Repeat) <i>TG p. 154</i>		Guiding the Investigation <input type="checkbox"/> “Part 2: Planting and Eating Roots; Wrapping Up Part 2” Steps 16-17 <i>TG p. 155</i>		Reading In Science Resources <input type="checkbox"/> Steps 18-21 <i>TG p. 156-157</i> Student Reading: Science Resources p. 47-51 <input type="checkbox"/> Body of Evidence Prompt #5 <i>TG p. 175</i>
Day 47		Day 48			
Prep	Instruction				
	<input type="checkbox"/> Review <input type="checkbox"/> Interdisciplinary Extensions <i>TG p. 159-161</i>		End-Of-Module Assessment <i>TG p. 207-209</i>		



Grade 1 – Plants and Animals Recommended Body of Evidence



Overview

This guide is intended to support the collection of a Body of Evidence. A student's Body of Evidence should, at a minimum, include work from the listed prompts and in-class investigations. Other class work and assessments that demonstrate a student's level of proficiency may be included.

Download samples of proficient work @ <https://eteams.sandi.net/sites/sbrc>

Note: Administer Grade 1 Life Science End-of-Module assessment (can also be used as a pre-assessment at the beginning of the unit).

Recommended Body of Evidence – Grade 1 Life Science

Concept #1

Plants and animals meet their needs in different ways. (CA Standards LS2a, LS2b, LS2C, ls2d, LS2e)

Prompt #1: (I&E) FOSS: Plants and Animals: Investigation 1: Grass and Grain Seeds Part 1: Mowing the Lawn

(TG p. 165 – What Do Plants Need? Review – No. 3 – Science Notebook)

1. What do plants need? 2. What part of a plant takes up water? 3. Where do the nutrients for a plant come from? 4. What part of a plant captures light?

Prompt #2: (I&E) FOSS: Plants and Animals: Investigation 2: Stems Part 1: Rooting Stem Cuttings

(TG p. 168 – Stem Cuttings – No. 6 – Science Notebook)

Draw what the cuttings look like after about 10 days. Draw what the cuttings look like after 17 days.

Prompt #3: (I&E) FOSS: Plants and Animals Investigation 3: Terrariums Part 1: Setting Up Terrariums

(TG p. 171 – What Do Animals Need? Review – No. 9 – Science Notebook)

1. What do animals need to live? What do plants need to live? 3. What did you add to your terrarium that will help animals live? Why do animals need shelter?

Prompt #4: (I&E) FOSS: Plants and Animals Investigation 4: Bulbs and Roots Part 1: Bulbs

(TG p. 173 – Growing Bulbs – No. 11 – Science Notebook)

Draw what a bulb looks like when it first starts to grow. Draw what a bulb looks like 1 week after it starts to grow.

Prompt #5: (I&E) FOSS: Plants and Animals Investigation 4: Bulbs and Roots Part 1: Bulbs

(TG p. 175 – Animal Teeth Review – No. 13 – Science Notebook)

1. What are long, pointed, side teeth called? Name some animals that use these teeth to catch their food. 2. What are big, sharp, front teeth called? Name some animals that use these teeth to cut their food. 3. What are wide, flat, back teeth called? Name some animals that use these teeth to chew their food.



**Grade 1 – Plants and Animals
Module Materials and Equipment**



Materials Provided

The FOSS kit comes with most of the supplies that are needed to teach the unit. The kits will be delivered to the school site prior to the start of the 12-week unit of instruction. At the end of the 12-weeks, the kit will be returned to the Science Resource Center where it will be refurbished and prepared for its next use. Please review the refurbishment calendar for kit drop-off and return dates. Kits must be returned according to the refurbishment calendar to ensure that all kits are checked and restocked with consumable materials.

Materials Supplied by the Teacher or School Site

Be aware that the classroom teacher or school site must supply a few items. These are indicated in the materials list for each part of the investigation with an asterisk (*). Here is a summary of those items.

<p>Investigation 1: Grass and Grain Seeds</p> <ul style="list-style-type: none"> ▪ 1 Flip Chart or Chart Paper ▪ 4 Pieces of Construction Paper, 2 Brown, 2 Green ▪ 32 Paper cups or plastic bags (optional) ▪ White Glue ▪ Newspaper ▪ Overhead-Transparency Pen ▪ Paper Towels ▪ 32 Pencils ▪ Potting Soil 4 liters (4 quarts) ▪ 1 Metric Ruler ▪ 8 Sharp Scissors ▪ 1 Straight Edge ▪ 1 VCR and Monitor ▪ 33 Pieces of White Paper ▪ 40 Small Plastic Bags (optional) ▪ 32 Roots (carrots, radishes) to eat ▪ 16 roots (carrots, radishes) to plant ▪ 1 Pair of scissors ▪ 1 Transparency (optional) ▪ Rulers (optional) 	<p>Investigation 2: Stems</p> <ul style="list-style-type: none"> ▪ 1 Camera and Film (optional) ▪ Drawing Paper ▪ 2 Plastic Flowerpots 6-8 inches with Coasters ▪ 1 Large Flowerpot (optional) ▪ 1 Paring Knife ▪ Newspaper ▪ 1 Overhead-transparency Pen ▪ Paint, Colored Pencils, Markers, and other media ▪ 32 Pencils ▪ 1 Pitcher or 2-liter soda bottle ▪ Plants for cutting ▪ 1 Large plastic bag ▪ Small plastic bags (optional) ▪ 8 small white potatoes ▪ Potting Soil 6 liters (6 Quarts) ▪ 16 Scissors ▪ 1 VCR and Monitor ▪ Bottle Water (optional) 	<p>Investigation 3: Terrariums</p> <ul style="list-style-type: none"> ▪ 1 Flip Chart or chart paper ▪ Food for Animals (apple, carrot, seeds, dried leaves) ▪ 20 index cards (optional) ▪ Newspaper ▪ Overhead –Transparency Pen ▪ Paper Towels ▪ 32 Pencils ▪ 1 Pitcher or 2-liter soda bottle ▪ Potting Soil 8 Liters (8 Quarts) ▪ Small sticks and stones ▪ 8 plastic spoons ▪ VCR and Monitor 	<p>Investigation 4- Bulbs and Roots</p> <ul style="list-style-type: none"> ▪ Bottle Water (optional) ▪ 34 Bulbs, onion or garlic ▪ 1 Camera and film (optional) ▪ 2 Paring knives ▪ Newspaper ▪ Overhead Projector (optional) ▪ Overhead-transparency Pen ▪ Paper Towels ▪ 8 Pencils ▪ 40 Small Plastic Bags (optional) ▪ 32 Roots (carrots, radishes) to eat ▪ 16 roots (carrots, radishes) to plant ▪ 1 Pair of scissors ▪ 1 Transparency (optional) ▪ Rulers (optional)
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San Diego Unified School District
Science Department

Grade 1 – Plants and Animals Caring for Live Materials



Live Materials Used in This Module

Red Worms
Pill Bugs
Bugs

Introduction to Life in the Classroom

In several of the FOSS modules and courses, living organisms are brought into the classroom to be cared for and observed by K-5 students. Through the direct experience with organisms provided by these modules, we hope to engender in students a sense of respect for all life and to spark a desire to understand the complex systems that support life on Earth.

The FOSS program endorses the National Science Teachers Association Guidelines for Responsible Use of Animals in the Classroom as they apply to elementary and middle school classrooms.

The FOSS program provides detailed information on how to obtain organisms, how to prepare for their arrival, how to care for them in the classroom, and how to instruct students to properly handle each animal. The animals in the modules were selected because they are abundant, safe for students, easy to care for, and hardy and well-adapted to classroom environments. FOSS selected organisms that were nonexotic, commonly available from local and regional suppliers, and, in some cases, found in the natural environments in many regions. When investigations are carried out as described in the FOSS teacher guide, the insects, worms, crustaceans, snails, and fish are not harmed in any way.

RED WORMS

Worms are a varied lot. You may have heard of roundworms, flatworms, tapeworms, earthworms, and who knows what other kinds of worms. None of them conjures up a particularly warm or pleasant feeling in most people. Worms have low reputations in human circles, often associated with some not-so-pleasant circumstances. But this activity may turn all that around as you dig into the subject of earthworms.

Earthworms are members of the phylum Annelida, or ringed animals. They are fairly simple life-forms, put together from a number of disklike segments stuck together like a long flexible roll of coins. Earthworms have no internal skeleton like a fish, no hard protective exoskeleton like an insect, and no shell into which they can withdraw. Worms are flexible, elongated bundles of muscle, uniquely suited for life underground.

The characteristic wriggling of earthworms is accomplished by the contraction of two kinds of muscles. When the short muscles that circle each segment (like lots of rings on a finger) contract, the worm gets thinner and longer. When the long muscles that connect all the segments contract, the head and tail are pulled toward each other, and the worm becomes short and fat. Depending on which end of the worm is anchored, the worm can move along the surface of the ground or through its burrow effectively in either direction, head first or tail first.

Earthworm organs are quite different from ours, making it possible for them to live their very different lifestyle efficiently. Earthworms have five pairs of simple hearts that pump blood throughout the body. They have no lungs. Instead the blood flowing close to the worm's surface absorbs oxygen and releases carbon dioxide directly through the moist skin (called the cuticle). For this reason earthworms can live for some time in water if the oxygen supply is adequate. They don't drown per se, but they may suffocate if the oxygen content is low. This is why worms leave the soil and crawl out on the sidewalk during a heavy rain—they are seeking oxygen. Earthworms are not adapted to feed in water, however, so they would starve to death in due course.

Instead of a nose, ears, and eyes, earthworms have a nervous system throughout their bodies that controls actions in response to environmental stimuli, such as vibrations, heat, cold, moisture, light, and the presence of other worms. They have no brain, however, so worms do not ponder their lowly lot in life, nor do they plan a strategy for obtaining their next meal or crossing the sidewalk safely.

Reproduction. Like all animals earthworms have effective strategies for begetting their own kind. With earthworms it is not a matter of boy meets girl, but rather a simpler matter of worm meets worm. All worms carry two sets of sexual organs, but they cannot fertilize their own eggs—mating is still a necessary part of reproduction. Mature earthworms have an enlarged band some distance from the head. This enlarged clitellum plays an important role in reproduction.

In mating, two worms approach each other nose to nose. With their bodies touching, they slide past each other until their heads are a bit past the clitellum. Both worms pass sperm through an opening located between the head and the clitellum, into a temporary holding receptacle in the other worm. The two worms separate. The clitellum secretes a liquid that solidifies into a flexible tube. As the tube lengthens, the worm backs out of it. Soon the tube covers the front part of the worm. The worm lays a few eggs inside the tube, deposits some of the stored sperm, and withdraws from the tube, leaving the eggs and sperm inside the tube. The ends of the tube pinch off to form a cocoon, and the whole thing shrinks to a tidy package about the size of a fat grain of rice. The cocoon is left alone sitting on or just under the surface of the soil. The worm continues to produce cocoons until the sperm is used up. Cocoons are durable, can overwinter in cold climates, and can wait out hot dry spells in arid environments. After 3 weeks (ideal conditions) or longer the cocoon opens, and out sallies the next generation.

Food. Earthworms feed on decomposing organic material, mostly vegetation, from the surface of the soil and within the soil itself. In the process of burrowing and feeding they process tons of soil in a typical pasture or garden, improving the quality of soil for plants and other animals. There are some 1800 species of earthworms worldwide. Some are tiny, no more than 2 cm (1”) at maturity. At the other end of the scale are the Australian giants that average about 3 m (10’) in length, and the record holder, a South African gargantuan measuring 7 m (22’) in length. Not to worry—the largest earthworms in North America are the common night crawlers, which can reach a length of little more than 30 cm (12”).

What to do when they arrive. Worms may be kept in shipping container for short periods. Upon arrival, mist with water to moisten, but do not make soil wet. Worms can be kept in the refrigerator for short periods of time. To maintain worms for a longer period of time, keep at room temperature in diffused light, feeding crushed dead leaves or cornmeal sprinkled over the surface of the soil. Add rich soil (preferably humus) as needed, and remove any mold as it appears.

PILL BUGS AND SOW BUGS

Isopod is Greek for "similar or equal." Pod means "foot." Put them together and you have the isopod, an organism that has an equal number of feet or legs on both sides with all legs similar to one another. Isopods have 14 legs that all function the same. This distinguishes them from closely related organisms that have legs that are modified to perform different functions, such as walking, feeding, feeling, grasping, and so on.

The many different species of isopods around the world share certain characteristics. Isopods are crustaceans, distant kin of shrimps, crabs, and crayfish. Like all crustaceans, isopods have a segmented outer shell (seven overlapping plates) that provides a measure of protection from the environment and predators. Like their aquatic relatives, isopods get the oxygen they need to survive through gill-like structures located at the bases of their legs, rather than through lungs like most terrestrial organisms. That is why isopods must keep moist at all times—if they dry, they die.

Two kinds of isopods are of interest as classroom organisms. The genus *Armadillidium* (arm•uh•duh•LID•e•um) is known casually as the pill bug or roly-poly. It gets these names from its habit of rolling into a tight sphere when threatened or stressed. The pill bug has a highly domed shape, short legs, and inconspicuous antennae. When in its defensive rolled posture, it is hard for a predator to grip, and it is also more resistant to drying out.

Pill bugs move slowly and have a difficult time righting themselves if they roll onto their backs on a smooth surface. They range from light brown to dark gray or black. Often they have white, cream, or yellowish spots on their backs. The largest individuals of this kind of isopod can be 1 cm long, but most are 7 or 8 mm.

The second isopod used extensively in classrooms, genus *Porcellio* (por•sel•E•oh), is commonly called the sow bug or wood louse. These names are potentially confusing because *Porcellio* don't show a particular affinity for swine, nor are they lice. They are relatively flat with legs that extend a little bit beyond the edge of the shell, and they have powerful antennae to sense their environment. They move rather quickly and will use their long antennae and little spikelike tail projections to right themselves if they happen to roll onto their backs. Sow bugs come in a surprising array of colors, including tan, orange, purple, and blue, as well as the usual battleship gray. Their size is similar to that of the pill bug.

In the wild, isopods are not usually seen out and about. They are members of that large category of animals known descriptively (not taxonomically) as cryptozoa, or hidden animals. They are most often found in layers of duff and leaf litter, under rocks or logs, or burrowed a short distance under the surface of the soil. The environment they seek is moist and dark, in or near dead and decomposing wood and other plant material. The former is their main source of food, accounting, perhaps, for their common name of wood lice. Isopods are not, however, above eating fresh strawberries and carrots, making them a minor pest in the garden.

Life cycle. There are both male and female isopods, but only another isopod can reliably tell them apart. After mating, the female lays several dozen eggs, which she carries in a compact white package on her underside between her legs. This package is a specialized brood pouch, the marsupium, in which the eggs develop for 3 or 4 weeks before hatching. A few days after hatching, a swarm of fully formed, minute isopods strike out into the world. They are nearly invisible at first but soon grow to a size that can be seen by the unaided eye. Like all crustaceans that carry a hard outer shell, isopods must shed their shells in order to grow. In the molting process the shell is cast off, and the new soft shell underneath expands before hardening. Interestingly, the whole shell is not shed at once; first the rear (posterior) shell segments are shed, and 2 or 3 days later the front (anterior) ones fall off.

What to do when they arrive. The shipping container contains damp paper to provide moisture. Upon arrival, mist paper slightly. Food should be removed if it shows any sign of mold and replaced with sliced carrot, potato, or apple. Pill bugs and sow bugs can be kept in the shipping container for a few days until ready to use in class. Moisten the paper towels as necessary.

If you are keeping them for a longer period of time, place them in a terrarium with rich, moist soil. Place moist paper towels in the container to provide humidity. Continue to add vegetables, replacing them as necessary to control mold. Keep container at room temperature in low light.

Classroom habitat. Isopods are excellent classroom animals—they exhibit interesting behaviors, they are small but not tiny, they don't bite, smell, fly, or jump, and they are easy to care for. Isopods can live in just about any vessel, from a recycled margarine tub to a 50-liter aquarium. If the container is smooth-sided, it doesn't even have to be covered, because isopods can't climb smooth surfaces at all. A layer of soil covered with some dead leaves, twigs, and bark is great, but isopods will be comfortable with some paper towels or newspaper laid on the soil. They do like to have some structure to crawl under.

Food and water. The most important thing to remember is that the soil must be kept moist at all times—not wet, but moist—so that the isopods don't dry out. A chunk of raw potato in the container with the isopods serves as a source of both food and moisture. Otherwise they will eat the decomposing leaves and twigs or the paper towels and newspaper.