



San Diego Unified School District
Science Department

Grade 3 – Structures of Life
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 3 – Structures of Life Module Overview



Overview of the Unit

The Structures of Life Module consists of four investigations dealing with observable characteristics of organisms. Students observe, compare, categorize, and care for a selection of organisms. In so doing, they learn to identify properties of plants and animals and to sort and group organisms on the basis of observable properties. Students investigate structures of the organisms and learn how some of the structures function in growth and survival.

Grade 3 Life Science Conceptual Flow

Concept #1

Adaptations in physical structure or behavior may improve an organism’s chance for survival.

Subconcepts

Investigation #1: Origins of Seeds

Seeds develop in the plant structure called a fruit.

Different kinds of fruits have different kinds and numbers of seeds.

Seeds have a variety of properties.

Seeds undergo changes in the presence of water.

A seed is an organism, a living thing.

A seed contains the embryo plant and a store of food and water.

Subconcepts

Investigation #2: Growing Further

Germination is the onset of a plant’s growth.

Plants need water, light, and nutrients to grow.

The life cycle is the process of a seed growing into a mature plant, which in turn produces seeds.

The fruit of the plant develops from the flower.

Subconcepts

Investigation #3: Meet the Crayfish

Crayfish have observable structures that help the organism survive in its environment.

Behavior is what an animal does.

Some animals claim a territory that they defend from other animals.

Different organisms can live in different environments; organisms have adaptations that allow them to survive.

Grade 3 Life Science Conceptual Flow – continued

Concept #1 (continued)

Adaptations in physical structure or behavior may improve an organism's chance for survival.

Subconcepts

Investigation #4: Meet the Land Snail

Land snails have a coiled shell, a large foot on which they glide, and a body with a variety of structures.

An organism's structures have functions that help it survive in its habitat.

The structures found on different kinds of organisms show some similarities and some differences.

Some organisms that lived on Earth died out when environments changed.

Organisms can change their environment; this can be detrimental or beneficial.

3rd Grade Science Content Standards Addressed in this Module

Life Science

- LS3 Adaptations in physical structure or behavior may improve an organism's chance for survival. As a basis for understanding this concept:
- LS3a Students know plants and animals have structures that serve different functions in growth, survival, and reproduction.
 - LS3b Students know examples of diverse life forms in different environments, such as oceans, deserts, tundra, forests, grasslands, and wetlands.
 - LS3c Students know living things cause changes in the environment in which they live: some of these changes are detrimental to the organism or other organisms, and some are beneficial.
 - LS3d Students know when the environment changes, some plants and animals survive and reproduce; others die or move to new locations.
 - LS3e Students know that some kinds of organisms that once lived on Earth have completely disappeared and that some of those resembled others that are alive today.

Investigation and Experimentation

- I&E5 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&E5a Repeat observations to improve accuracy and know that the results of similar scientific investigations seldom turn out exactly the same because of differences in the things being investigated, methods being used, or uncertainty in the observation.
 - I&E5c Use numerical data in describing and comparing objects, events, and measurements.
 - I&E5d Predict the outcome of a simple investigation and compare the result with the prediction.
 - I&E5e Collect data in an investigation and analyze those data to develop a logical conclusion.

Pacing the Unit as a Whole

Pre-Test (Optional)				
Day 1 Start Inv. 1 Part 1 A	Day 2 A/W	Day 3 R	Day 4 No Science Day	Day 5 Start Inv. 1 Part 2 A
Day 6 A	Day 7 R	Day 8 Start Inv. 1 Part 3 A	Day 9 A/W	Day 10 R
Day 11 I-Check 1	Day 12 Review	Day 13 Start Inv. 2 Part 1 A/W	Day 14 R	Day 15 Start Inv. 2 Part 2 A
Day 16 A	Day 17 No Science Day	Day 18 Start Inv. 3 Part 1 A/W	Day 19 No Science Day	Day 20 R
Day 21 Start Inv. 3. Part 2 A	Day 22 No Science Day	Day 23 A	Day 24 A/W	Day 25 R
Day 26 Start Inv. 3 Part 3 A	Day 27 No Science Day	Day 28 A/W	Day 29 No Science Day	Day 30 R
Day 31 R	Day 32 I-Check 3	Day 33 Review	Day 34 Start Inv. 4 Part 1 A/W	Day 35 R
Day 36 Start Inv. 4 Part 2 A	Day 37 A/W	Day 38 R	Day 39 No Science Day	Day 40 R
Day 41 Start Inv. 4. Part 3 A/W	Day 42 R	Day 43 R	Day 44 I-Check 4	Day 45 Review
Day 46 Cont Inv. 2 Part 2 A/W	Day 47 R	Day 48 R	Day 49 I-Check 2	Day 50 Review
Day 51 DISTRICT Benchmark Assessment				

A – Active Investigation sessions include hands-on work with organisms, active thinking about the concrete experiences, small-group discussion, writing in science notebooks, learning new vocabulary in context, viewing a video, and completing written embedded assessments to inform instruction. (Approximately 60 minutes)

W – Wrap-up sessions are teacher-directed vocabulary reinforcement and science content review. (Approximately 30 minutes)

R – Reading sessions (*Science Resources* book) include individual and interactive reading, answering review questions, and discussing the reading to ensure that students integrate the information. (Approximately 30 minutes)

I-Checks are short summative assessments. Students respond to written prompts. (Approximately 30 minutes)



Grade 3 – Structures of Life
Pacing Guide – Investigation 1: Origin of Seeds



Investigation Overview

Investigation 1: Origin of Seeds		
<p>Concept: Adaptations in physical structure of behavior may improve an organism’s chance for survival.</p> <p>Students conduct a seed hunt by opening fresh fruit and locating the seeds. They describe and compare seed properties and structures. They investigate the effect water has on the seeds by setting up seed sprouters and observing and recording changes over a week. Students systematically find out how much water lima beans soak up in a day and read about seeds.</p>		
Part 1: Seed Search	Part 2: The Sprouting Seed	Part 3: Seed Soak
<p><u>Summary</u> Students embark on a seed hunt, delving into an assortment of fresh fruits. They open fruit, locate the seeds, describe seed properties, and count or estimate the number of seeds in the fruit. Students read about structures of seeds and fruit that help plants survive.</p>	<p><u>Summary</u> Students use two kinds of sprouting devices to find out what effect water has on seeds. They water the seeds daily for a week and record their observations. Students read about one important seed, rice, and learn that organisms change their environments.</p>	<p><u>Summary</u> Students compare the mass of seeds that have been soaked in water overnight to the mass of dry seeds. They determine how much water the seeds soaked up. Students read about the life of geneticist Barbara McClintock.</p>
<p><u>Subconcepts</u></p> <ul style="list-style-type: none"> ▪ Seeds develop in the plant part called a fruit. ▪ Different kinds of fruit have different kinds and number so seeds. ▪ Seeds have a variety of properties. 	<p><u>Subconcepts</u></p> <ul style="list-style-type: none"> ▪ A seed is an organism, a living thing. ▪ Seeds undergo changes in the presence of water. ▪ Organisms can change their environments. 	<p><u>Subconcepts</u></p> <ul style="list-style-type: none"> ▪ A seed contains an embryo of a plant and a store of food and water. ▪ When seeds are soaked in water, they become bigger and heavier.
<p><u>Time Allocation</u> Active Investigation/Wrap-up: 2 days Reading: 1 day</p>	<p><u>Time Allocation</u> Active Investigation: 2 days Reading: 1 day</p>	<p><u>Time Allocation</u> Active Investigation/Wrap-up: 2 days Reading: 1 day Assessment/Review: 2 days</p>
<p><u>CA Science Standards</u> LS3a, I&E5c, I&E5e</p>	<p><u>CA Science Standards</u> LS3a, LS3c, I&E5c</p>	<p><u>CA Science Standards</u> LS3a, I&E5a, I&E5c, I&E5d</p>



Grade 3 – Structures of Life
Pacing Guide – Investigation 1: Origin of Seeds

Pacing Guide – Investigation 1: Origin of Seeds

Day 1		Day 2		Day 3	
Prep	Instruction	Prep	Instruction	Prep	Instruction
<input type="checkbox"/> Read “Science Background” <i>TG p. 6-11</i> <input type="checkbox"/> Read “At a Glance” <i>TG p. 44-45</i> <input type="checkbox"/> Read “Background for the Teacher” <i>TG p. 46-47</i> <input type="checkbox"/> Read “Teaching Children About Seeds” <i>TG p. 48-49</i> <input type="checkbox"/> Watch Video demo of Inv. 1, Pt 1 <input type="checkbox"/> Review “Materials” and “Getting Ready” <i>TG p. 50-54</i> <input type="checkbox"/> Administer Grade 3 Life Science Benchmark	Guiding the Investigation <input type="checkbox"/> “Part 1: Seed Search” Steps 1-6 <i>TG p. 55-57</i>		Guiding the Investigation <input type="checkbox"/> “Part 1: Seed Search; Wrapping up Part 1” Steps 7-14 <i>TG p. 57-59</i> <input type="checkbox"/> Body of Evidence Prompt #1 <i>TG p. 58</i>		Reading in Science Resources <input type="checkbox"/> Steps 15-16 <i>TG p. 60</i> Student Reading: Science Resources p. 83-87

Pacing Guide – Investigation 1: Origin of Seeds (continued)

Day 4		Day 5		Day 6	
Prep	Instruction	Prep	Instruction	Prep	Instruction
	No Science Day	<input type="checkbox"/> Watch Video demo of Inv. 1, Pt 2 <input type="checkbox"/> Review “Materials” and “Getting Ready” <i>TG p. 61-64</i>	Guiding the Investigation <input type="checkbox"/> “Part 2: The Sprouting Seed” Steps 1-15 <i>TG p. 65-69</i>		Guiding the Investigation <input type="checkbox"/> “Part 2: The Sprouting Seed” Steps 16-17 <i>TG p. 69</i> <input type="checkbox"/> Body of Evidence Prompt #2 <i>TG p. 69</i>
Day 7		Day 8		Day 9	
Prep	Instruction	Prep	Instruction	Prep	Instruction
	Reading in Science Resources <input type="checkbox"/> Steps 18-19 <i>TG p. 70</i> Student Reading: Science Resources p. 88-91	<input type="checkbox"/> Watch Video demo of Inv. 1, Pt 3 <input type="checkbox"/> Review “Materials” and “Getting Ready” <i>TG p. 71-72</i>	Guiding the Investigation <input type="checkbox"/> “Part 3: Seed Soak” Steps 1-7 <i>TG p. 73-74</i>		Guiding the Investigation <input type="checkbox"/> “Part 3: Seed Soak; Wrapping up Part 3” Steps 8-15 <i>TG p. 74-76</i> <input type="checkbox"/> Body of Evidence Prompt #3 <i>TG p. 74-75</i>
Day 10		Day 11		Day 12	
Prep	Instruction	Prep	Instruction	Prep	Instruction
	Reading in Science Resources <input type="checkbox"/> Steps 16-17 <i>TG p. 77</i> Student Reading: Science Resources p. 92-95		Concluding Investigation 1 <input type="checkbox"/> I-Check 1 Step 18 <i>TG p. 77, 272-277, 303-305</i>		<input type="checkbox"/> Review <input type="checkbox"/> Interdisciplinary Extensions <i>TG p. 78-80</i>



Grade 3 – Structures of Life
Pacing Guide – Investigation 2: Growing Further



Investigation Overview

Investigation 2: Growing Further		
<p>Concept: Adaptations in physical structure of behavior may improve an organism’s chance for survival. Students examine germinated seeds to determine similarities and difference in the way the plants grow. They set up a hydroponic garden to observe the life cycle of a bean plant. Through direct observations and readings students learn about plan structures and functions.</p>		
Part 1: Germination	Part 2: Life Cycle of the Bean	
<p><u>Summary</u> Students compare four seeds as they germinate in minisprouters. They identify and describe emerging plant structures, including seed coats, cotyledons, stems, leaves, and roots. Students read about germination strategies used by different plants and how those strategies enhance the plants’ chances of survival.</p>	<p>Students grow seedlings hydroponically in nutrient solution and observe them throughout their life cycle (7weeks). They observe and record the emergence of flowers, fruit, and new seeds. They sequence illustrations that depict different stages in the life cycle of a bean plant. Students read about the concept of life cycle in plants and animals. Life cycles are compared.</p>	
<p><u>Subconcepts</u></p> <ul style="list-style-type: none"> ▪ Germination is the onset of a seed’s growth. ▪ Plants need water, light, and nutrients to grow. ▪ Plants can grow in water if nutrients are added. 	<p><u>Subconcepts</u></p> <ul style="list-style-type: none"> ▪ The fruit of the plant develops from the flower. ▪ The life cycle is the process of a seed growing into a mature plant, which in turn produces seeds. 	
<p><u>Time Allocation</u> Active Investigation/Wrap-up: 1 day Reading: 1 day</p>	<p><u>Time Allocation</u> Active Investigation/Wrap-up: 2 days Reading: 2 days Assessment/Review: 2 days</p>	
<p><u>CA Science Standards</u> LS3a, I&E5a, I&E5e</p>	<p><u>CA Science Standards</u> LS3a, I&E5a, I&E5e</p>	



Grade 3 – Structures of Life
Pacing Guide – Investigation 2: Growing Further



Pacing Guide – Investigation 2: Growing Further

Day 13		Day 14		Day 15	
Prep	Instruction	Prep	Instruction	Prep	Instruction
<input type="checkbox"/> Read “At a Glance” <i>TG p. 82-83</i> <input type="checkbox"/> Read “Background for the Teacher” <i>TG p. 84-85</i> <input type="checkbox"/> Read “Teaching Children About Growth and Life Cycles” <i>TG p. 86-87</i> <input type="checkbox"/> Watch Video demo of Inv. 2, Pt 1 <input type="checkbox"/> Review “Materials” and “Getting Ready” <i>TG p. 88-89</i>	Guiding the Investigation <input type="checkbox"/> “Part 1: Germination; Wrapping up Part 1” Steps 1-9 <i>TG p. 90-92</i> <input type="checkbox"/> Body of Evidence Prompt #5 <i>TG p. 91</i>		Reading in Science Resources <input type="checkbox"/> Steps 10-11 <i>TG p. 93</i> Student Reading: Science Resources p. 96-99	<input type="checkbox"/> Watch Video demo of Inv. 2, Pt 2 <input type="checkbox"/> Review “Materials” and “Getting Ready” <i>TG p. 94-96</i>	Guiding the Investigation <input type="checkbox"/> “Part 2: Life Cycle of the Bean” Steps 1-5 <i>TG p. 97-98</i>
<div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 0 auto;"> <p>NOTE: Investigation 2 continues on Day 46 and concludes the unit. Complete Investigations 3 and 4 (Days 18 – 45) before returning to this section. (p. 12 of Unit of Study)</p> </div>					
Day 16		Day 17		Day 46	
Prep	Instruction	Prep	Instruction	Prep	Instruction
Guiding the Investigation <input type="checkbox"/> “Part 2: Life Cycle of the Bean” Steps 6-7 <i>TG p. 99</i>	Note: This is a teacher task, not a student task. That is the reason for Steps 6-7 being in the prep section. Students continue to make observations for 6 weeks.		No Science Day		Guiding the Investigation <input type="checkbox"/> “Part 2: Life Cycle of the Bean; Wrapping up Part 2” Steps 8-13 <i>TG p. 100-102</i>

Pacing Guide – Investigation 2: Growing Further (continued)

Day 47		Day 48		Day 49	
Prep	Instruction	Prep	Instruction	Prep	Instruction
	Reading in Science Resources <input type="checkbox"/> Steps 14-15 <i>TG p. 103</i> Student Reading: Science Resources p. 100-103		Concluding Investigation 2 <input type="checkbox"/> Steps 16-17 <i>TG p. 104</i> Student Reading: Science Resources p. 104-106		Concluding Investigation 2 <input type="checkbox"/> I-Check 2 Step 18 <i>TG p. 104, 278-283, 306-308</i>
Day 50		Day 51			
Prep	Instruction	Prep	Instruction		
	<input type="checkbox"/> Review <input type="checkbox"/> Interdisciplinary Extensions <i>TG p. 105-106</i> Student Reading: Science Resources p. 107-108		<input type="checkbox"/> Administer Grade 3 DISTRICT Life Science Benchmark Assessment		



Grade 3 – Structures of Life
Pacing Guide – Investigation 3: Meet the Crayfish



Investigation Overview

Investigation 3: Meet the Crayfish		
<p>Concept: Adaptations in physical structure of behavior may improve an organism’s chance for survival.</p> <p>Students observe and record some of the structures of a crustacean, the crayfish. They investigate crayfish behavior and map where the crayfish spend their time within their habitat. Through readings, organism cards, and a video, students learn about adaptations of organisms in different environments.</p>		
Part 1: Crayfish Structures	Part 2: Adaptation	Part 3: Crayfish Territory
<p><u>Summary</u> Students observe and record the structures of crayfish through direct interaction with live crayfish. They learn firsthand how to handle them carefully, so that no harm will come to the crayfish. They set up an appropriate habitat for crayfish and attend to their needs. Students read about crayfish structures and functions.</p>	<p><u>Summary</u> Students study crayfish behavior and learn that their behaviors have survival value. They are introduced to the idea of adaptations, structures and behaviors that improve an organism’s chances of survival. This idea is extended beyond crayfish with video and interactive multimedia activities. Students study several environments and consider the particular adaptations that allow organisms to survive in diverse environments. Students read about animal and plant adaptations.</p>	<p><u>Summary</u> Students set up a long-term observation for investigating territorial behavior in crayfish. The locations of individual crayfish are recorded and analyzed. The territorial behavior is considered as a possible adaptation that serves to improve the crayfish’s chances for survival. Students read an article that surveys the diversity of life forms found on Earth in wetlands, deserts, forests, grasslands, tundra, and oceans.</p>
<p><u>Subconcepts</u></p> <ul style="list-style-type: none"> ▪ Crayfish have observable structures such as legs, eyes, and pincers. ▪ Crayfish have particular requirements for life, including clean water, food, and shelter. ▪ Habitat is where an animal lives. 	<p><u>Subconcepts</u></p> <ul style="list-style-type: none"> ▪ Behavior is what an animal does. ▪ Structures and behaviors are adaptations that improve an organism’s chance of survival. ▪ The diversity of organisms on Earth is related to the diversity of environments on Earth. 	<p><u>Subconcepts</u></p> <ul style="list-style-type: none"> ▪ Some animals claim a territory that they defend against others of their kind. ▪ The diversity of organisms on Earth is related to the diversity of environments.
<p><u>Time Allocation</u> Active Investigation/Wrap-up: 1 days Reading: 1 day</p>	<p><u>Time Allocation</u> Active Investigation/Wrap-up: 3 days Reading: 1 day</p>	<p><u>Time Allocation</u> Active Investigation/Wrap-up: 2 days Reading: 2 days Assessment/Review: 2 days</p>
<p><u>CA Science Standards</u> LS3a</p>	<p><u>CA Science Standards</u> LS3a, LS3b</p>	<p><u>CA Science Standards</u> LS3a, LS3b, I&E5d, I&E5e</p>



Grade 3 – Structures of Life
Pacing Guide – Investigation 3: Meet the Crayfish



Pacing Guide – Investigation 3: Meet the Crayfish

Day 18		Day 19		Day 20	
Prep	Instruction	Prep	Instruction	Prep	Instruction
<input type="checkbox"/> Read “At a Glance” <i>TG p. 108-109</i> <input type="checkbox"/> Read “Background for the Teacher” <i>TG p. 110-112</i> <input type="checkbox"/> Read “Teaching Children About Crayfish” <i>TG p. 113</i> <input type="checkbox"/> Watch Video demo of Inv. 3, Pt 1 <input type="checkbox"/> Review “Materials” and “Getting Ready” <i>TG p. 114-117</i>	Guiding the Investigation <input type="checkbox"/> “Part 1: Crayfish Structures; Wrapping up Part 1” Steps 1-17 <i>TG p. 118-123</i> <input type="checkbox"/> Body of Evidence Prompt #6 <i>TG p. 119</i>		No Science Day		Reading in Science Resources <input type="checkbox"/> Steps 18-19 <i>TG p. 124</i> Student Reading: Science Resources p. 109-114
Day 21		Day 22		Day 23	
Prep	Instruction	Prep	Instruction	Prep	Instruction
<input type="checkbox"/> Watch Video demo of Inv. 3, Pt 2 <input type="checkbox"/> Review “Materials” and “Getting Ready” <i>TG p. 125-126</i>	Guiding the Investigation <input type="checkbox"/> “Part 2: Adaptations” Steps 1-6 <i>TG p. 127-128</i>		No Science Day		Guiding the Investigation <input type="checkbox"/> “Part 2: Adaptation” Steps 7-14 <i>TG p. 128-132</i> <input type="checkbox"/> Body of Evidence Prompt #7 <i>TG p. 132</i>

Pacing Guide – Investigation 3: Meet the Crayfish (continued)

Day 24		Day 25		Day 26	
Prep	Instruction	Prep	Instruction	Prep	Instruction
	Guiding the Investigation <input type="checkbox"/> “Part 2: Adaptation; Wrapping up Part 2” Steps 15-18 <i>TG p. 132-134</i>		Reading in Science Resources <input type="checkbox"/> Steps 19-20 <i>TG p. 135</i> Student Reading: Science Resources p. 115-120	<input type="checkbox"/> Watch Video demo of Inv. 3, Pt 3 <input type="checkbox"/> Review “Materials” and “Getting Ready” <i>TG p. 136-138</i>	Guiding the Investigation <input type="checkbox"/> “Part 3: Crayfish Territory” Steps 1-7 <i>TG p. 139-140</i>
Day 27		Day 28		Day 29	
Prep	Instruction	Prep	Instruction	Prep	Instruction
	No Science Day		Guiding the Investigation <input type="checkbox"/> “Part 3: Crayfish Territory; Wrapping up Part 3” Steps 8-13 <i>TG p. 141-143</i>		No Science Day
Day 30		Day 31		Day 32	
Prep	Instruction	Prep	Instruction	Prep	Instruction
	Reading in Science Resources <input type="checkbox"/> Steps 14-15 <i>TG p. 144</i> Student Reading: Science Resources p. 121-133		Concluding Investigation 3 <input type="checkbox"/> Steps 16-17 <i>TG p. 145</i> Student Reading: Science Resources p. 134-137		Concluding Investigation 3 <input type="checkbox"/> I-Check 3 Step 18 <i>TG p. 145, 284-291, 309-312</i>
Day 33					
Prep	Instruction				
	<input type="checkbox"/> Review <input type="checkbox"/> Interdisciplinary Extensions <i>TG p. 146-149</i> Student Reading: Science Resources p. 138				



Grade 3 – Structures of Life
Pacing Guide – Investigation 4: Meet the Land Snail

Investigation Overview

Investigation 4: Meet the Land Snail		
<p>Concept: Adaptations in physical structure of behavior may improve an organism’s chance for survival. Students study snail structures and behaviors and set up an appropriate habitat for the animals. They compare the structures and behaviors of the snail (a gastropod) to the crayfish (a crustacean). Through readings students study examples of organisms that change the environment. And they read about what can happen to organisms when environments change.</p>		
Part 1: Land Snails at Home	Part 2: Compare Crayfish and Snails	Part 3: Snail Races
<p><u>Summary</u> Students observe land snails and learn how to handle them carefully. They become familiar with snail structures and behaviors. They set up an appropriate habitat that will provide for the needs of the snails in the classroom. Students read about snail structures, natural history, and the diversity of snails.</p>	<p><u>Summary</u> Students observe and record the snail’s structures and behaviors. Using a Venn diagram, they compare crayfish and snail structures. Finally, they discuss the functions of the various structures they observe. Students read two articles about how organisms can change their environment, and how those changes can impact other organisms.</p>	<p><u>Summary</u> Students conduct snail races to find out if snails move at different speeds and to discover if any stimuli will increase the speed at which they move. Students measure the distance their snails travel and the time it takes the snail to travel the distance. They then calculate the snail’s speed. Students read about the La Brea Tar Pits and what this area tells us about past life in California.</p>
<p><u>Subconcepts</u></p> <ul style="list-style-type: none"> ▪ Land snails have a coiled shell, a large foot on which they glide, and a body with a variety of structures. ▪ Land snails need water, vegetables or fruit, air, and space to survive. 	<p><u>Subconcepts</u></p> <ul style="list-style-type: none"> ▪ An organism’s structures have functions that help it survive in its habitat. ▪ The structures found on different kind of organisms show some similarities and some differences. ▪ Organisms affect their environments in ways that are beneficial to some organisms and detrimental to others. 	<p><u>Subconcepts</u></p> <ul style="list-style-type: none"> ▪ Organisms that are unable to survive when their environment changes go extinct.
<p><u>Time Allocation</u> Active Investigation: 1 day Reading: 1 day</p>	<p><u>Time Allocation</u> Active Investigation: 2 days Reading: 2 days</p>	<p><u>Time Allocation</u> Active Investigation: 1 day Reading: 2 days Assessment: 3 days</p>
<p><u>CA Science Standards</u> LS3a</p>	<p><u>CA Science Standards</u> LS3a, LS3c, LS3d</p>	<p><u>CA Science Standards</u> LS3e, I&E5c</p>



Grade 3 – Structures of Life
Pacing Guide – Investigation 4: Meet the Land Snail

Pacing Guide – Investigation 4: Meet the Land Snail

Day 34		Day 35		Day 36	
Prep	Instruction	Prep	Instruction	Prep	Instruction
<input type="checkbox"/> Read “At a Glance” <i>TG p. 152-153</i> <input type="checkbox"/> Read “Background for the Teacher” <i>TG p. 154-157</i> <input type="checkbox"/> Read “Teaching Children About Snails” <i>TG p. 158-159</i> <input type="checkbox"/> Watch Video demo of Inv. 4, Pt 1 <input type="checkbox"/> Review “Materials” and “Getting Ready” <i>TG p. 160-161</i>	Guiding the Investigation <input type="checkbox"/> “Part 1: Land Snails at Home; Wrapping up Part 1” Steps 1-14 <i>TG p. 162-165</i> <input type="checkbox"/> Body of Evidence Prompt #8 <i>TG p. 162-163</i>		Reading in Science Resources <input type="checkbox"/> Step 15 <i>TG p. 166</i> Student Reading: Science Resources p. 139-140	<input type="checkbox"/> Watch Video demo of Inv. 4, Pt 2 <input type="checkbox"/> Review “Materials” and “Getting Ready” <i>TG p. 167-168</i>	Guiding the Investigation <input type="checkbox"/> “Part 2: Compare Crayfish and Snails” Steps 1-9 <i>TG p. 169-171</i>
Day 37		Day 38		Day 39	
Prep	Instruction	Prep	Instruction	Prep	Instruction
	Guiding the Investigation <input type="checkbox"/> “Part 2: Compare Crayfish and Snails; Wrapping up Part 2” Steps 10-15 <i>TG p. 171-173</i> <input type="checkbox"/> Body of Evidence Prompt #9 <i>TG p. 172</i>		Reading in Science Resources <input type="checkbox"/> Steps 16-17 <i>TG p. 174</i> Student Reading: Science Resources p. 141-144		No Science Day

Pacing Guide – Investigation 4: Meet the Land Snail (continued)

Day 40		Day 41		Day 42	
Prep	Instruction	Prep	Instruction	Prep	Instruction
	Reading in Science Resources <input type="checkbox"/> Steps 18-19 <i>TG p. 175</i> Student Reading: Science Resources p. 145-148	<input type="checkbox"/> Watch Video demo of Inv. 4, Pt 3 <input type="checkbox"/> Review “Materials” and “Getting Ready” <i>TG p. 176-177</i>	Guiding the Investigation <input type="checkbox"/> “Part 3: Snail Races; Wrapping up Part 3” Steps 1-8 <i>TG p. 178-180</i>		Reading in Science Resources <input type="checkbox"/> Steps 9-10 <i>TG p. 181</i> Student Reading: Science Resources p. 149-153
Day 43		Day 44		Day 45	
Prep	Instruction	Prep	Instruction	Prep	Instruction
	Concluding Investigation 4 <input type="checkbox"/> Steps 11-12 <i>TG p. 182</i> Student Reading: Science Resources p. 154-156		Concluding Investigation 4 <input type="checkbox"/> I-Check 4 Step 13 <i>TG p. 182, 292-295, 313-314</i>		<input type="checkbox"/> Review <input type="checkbox"/> Interdisciplinary Extensions <i>TG p. 183-184</i> Student Reading: Science Resources p. 157-159

NOTE: Return to Investigation 2, Part 2 (p. 10 in Unit of Study) and continue with Days 46 – 51 of instruction.



Grade 3 – Structures of Life 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 that demonstrate a student's level of proficiency. The FOSS pre-assessment given at the beginning of the unit, I-Checks given after each investigation, and Grade 3 DISTRICT Life Science Benchmark Assessment given at the end of the unit (post-assessment) may also be included in the body of evidence. Download samples of proficient work at <https://eteams.sandi.net/sites/sbrc>

Recommended Body of Evidence – Grade 3 Life Science

Concept #1

Adaptations in physical structure or behavior may improve an organism's chance for survival. (LS3a, LS3b, LS3c, LS3d, LS3e)

Prompt 1: FOSS: Structures of Life: Investigation 1: Origin of Seeds – Part 1: Seed Search (I&E5c, I&E5e)

(TG p. 185 Comparing Seeds – No. 1 – Science Notebook)

Have students record the following information about the pods they just opened. Record the name of the fruit (bean or pea). Count and record the number of seeds inside one of the pods. Record several properties of the seed. Draw a picture of the seed.

Prompt 2: FOSS: Structures of Life: Investigation 1: Origin of Seeds – Part 2: The Sprouting Seed (I&E5c)

(TG p. 175 Origin of Seeds – No. 3– Science Notebook)

A group of students in a third-grade class went on a seed hunt. After they opened several fruits, they made a chart with the names of the fruits and the number of seeds they found inside. When their teacher looked at their chart, she thought the students didn't count accurately. The students insisted that they counted correctly. What do you think happened? Can you make a chart that accurately shows the number of seeds in each fruit?

Prompt 3: FOSS: Structures of Life: Investigation 1: Origin of Seeds – Part 3: Seed Soak (I&E5a, I&E5c, I&E5d)

(TG p. 186 The Soaked Seed – No. 4 – Science Notebook)

Teacher Observation, TG pp.74-75. Put five seeds here. Add mass pieces here. Day 1 Mass of five dry seeds _____. Day 2 Mass of five soaked seeds _____. How much water did the seeds soak up? _____ Open a soaked seed. What is inside? Draw the inside of a soaked seed.

Prompt 4: FOSS: Structures of Life: Investigation 2: Growing Further – Part 1: Germination (I&E5a, I&E5e)

(TG p. 215 Comparing Germinated Seeds – No. 3 – Teacher Sheet)

Teacher Observation, TG p. 91. Find an example of a seedling that has each property or structure. Place each example in the box below.

Prompt 5: FOSS: Structures of Life: Investigation 2: Growing Further – Part 2: Life Cycle of the Bean (I&E5a, I&E5e)

(TG p. 190 Bean Plant Life Cycle – No. 6 – Science Notebook; No. 4 – Teacher Sheet)

Tape or glue the pictures onto the Bean Plant Life Cycle sheet in order to show the bean plant life cycle sequence. Next to each picture, write a brief description of what happens in that stage.

Recommended Body of Evidence – Grade 3 Life Science (continued)

Prompt 6: FOSS: Structures of Life: Investigation 3: Meet the Crayfish – Part 1: Crayfish Structures

(TG p. 191 Crayfish Structures – No. 7 – Science Notebook)

Do crayfish have: eyes, ears, walking legs, antennae, tail flaps, pincers, joints, mouthparts, tail joints, bristles, bumps and joints – how many, where? What other crayfish structures did you observe? List three crayfish structures. Describe each one's function..

Prompt 7: FOSS: Structures of Life: Investigation 3: Meet the Crayfish – Part 2: Adaptation

(TG p. 194 Crayfish Behavior– No. 10– Science Notebook)

Look at the organisms in one of the organism-card sets. What adaptations do the organisms have for movement, getting food, protection, and raising young? Write the names of four organisms and their adaptations in the chart.

Prompt 8: FOSS: Structures of Life: Investigation 4: Meet the Land Snail – Part 1: Land Snails At Home

(TG p. 220 Land Snail Log – No. 8– Teacher Sheet)

Teacher Observation, TG pp. 162 – 163 How many ways are the two snails different? Have you felt them with your eyes closed? Do they make any sounds? Do they have a scent? How do they move? In what ways were the two snails in your group the same, and how did they differ? What do we need to know about land snails in order to keep them in our classroom?

Prompt 9: FOSS: Structures of Life: Investigation 4: Meet the Land Snail – Part 2: Compare Crayfish and Snails

(TG p. 197 Comparing Structures – No. 13– Science Notebook)

TG. P 171 Tell students they will use a Venn diagram to record their comparisons of land snail and crayfish structures. In the snail circle they record structures that are unique to the snail. In the crayfish circle they record structures that are unique to the crayfish. If a structure is common to both animals, they write it in the intersecting area.

Crayfish have: Land snails have:



**Grade 3 – Structures of Life
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.

Investigation 1: Origin of Seeds	Investigation 2: Growing Further	Investigation 3: Meet the Crayfish	Investigation 4: Meet the Land Snail
<ul style="list-style-type: none"> ▪ Bleach- 50 Mil ▪ Flip chart or chart paper ▪ Fruit, including bean pods ▪ White Glue ▪ Marking Pen ▪ Newspaper ▪ 16 Plastic or paper plates ▪ Paper towels ▪ 1 pitcher or bucket (optional) 	<ul style="list-style-type: none"> ▪ Cart on Wheels (optional) ▪ White glue ▪ 1 Lamp 75 watt bulb (optional) ▪ Paper towels ▪ 32 Scissors ▪ String ▪ Transparent Tape 	<ul style="list-style-type: none"> ▪ Computer with CD-Rom Capability (optional) ▪ 1 Ice (optional) ▪ 1 Marking Pen, permanent, fine-tip ▪ 1 Overhead projector (optional) ▪ 1 Overhead-transparency pen (optional) ▪ Paper Towels ▪ Transparency (optional) ▪ VCR and Monitor ▪ Aged Water 	<ul style="list-style-type: none"> ▪ Carrots, spinach, or apple ▪ Chalk, eggshells or cuttlebone (optional) ▪ 16 flashlights (optional) ▪ 1 knife ▪ 1 marking pen ▪ Unlined paper ▪ Paper towels ▪ 4 Rubber bands, large ▪ 1 roll of transparent tape ▪ 1 watch with second hand



San Diego Unified School District
Science Department

Grade 3 – Structures of Life Caring for Live Materials



Live Materials Used in This Module

Crayfish
Elodea
Land snails

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.

CRAYFISH

Crayfish are marvelous classroom organisms. They are exciting and easy to care for. Through close observation, students can learn interesting details about animal structures while developing sensitivity to the needs of living organisms. Crayfish can act like living magnets, keeping students in at recess and drawing students into your classroom from all over school. In short, crayfish can bring new life to your classroom.

Crayfish like it dark and cool, and during much of the daylight they will be found alone, withdrawn under a rock or a clump of vegetation, waiting for dark, at which time they come out to forage for food. Crayfish are omnivorous, eating just about anything they can find or catch, dead or alive. Large food is held and torn to pieces in the large pincers and conveyed to the mouth by the smaller specialized legs near the head. That's what crayfish mostly do: loaf all day and look for food all night.

Crayfish are terrific animals for your students to study. They walk, swim, eat, hide, breathe, mate, molt, and die right in the classroom. Your crayfish container is a microcosm of life on Earth, and students will learn a lot by sharing time with crayfish.

Molting. Another ponderable: think about the problem of living inside a suit of armor. Crayfish can't grow unless the shell (comprising the carapace, or main body shell, tail shell, and leg shells) can be removed. And this is exactly what crayfish do. Periodically (quite often early in life) the crayfish slides out of its old, hard shell in a process called molting. The "naked" crayfish that emerges is actually covered in a complete and perfect shell, but it is soft and flexible, allowing the crayfish to expand and grow. After a day or so the new shell will become hard, again affording the animal the protection of an armored exterior.

In preparation for molting the crayfish withdraws most of the calcium from its shell, and stores it in two white "tablets" in the sides of its head. Calcium is a major hardener in the crayfish shell, as it is in strong human bones and teeth. With this precious supply of calcium the new shell can harden in a matter of hours instead of days or weeks.

Preparing for crayfish arrival. A day or two before you expect the crayfish to arrive, prepare their habitat. Fill two bus trays about one-third full of cold tap water (3–4 cm deep). Keep the trays out of sight in a cool, dark place. Let the water sit for a day or more to release chlorine from the water.

What to do when they arrive. The crayfish will arrive in a cardboard box packed with damp paper or moss. Alert the school secretary to notify you as soon as they come. Immediately upon arrival, cut open plastic bag to provide air. Keeping bag upright, float entire contents in prepared bus tray for 15 to 30 minutes to equalize water temperatures. Carefully remove crayfish from the bag, grasping each from behind to avoid the strong pincers. Aquatic plants shipped with the crayfish can be rinsed in clean dechlorinated or spring water and used as both food and "hiding" places for the crayfish. Maintain at cool room temperatures, out of direct sunlight.

Find a place for the crayfish. Plan where the two bus trays with the crayfish will reside in your room for up to several months. They need to be cool, out of direct sunlight, and safe from being spilled.

Prepare for care and feeding. Crayfish need ample clean, cool water and sufficient food in order to be healthy in your classroom. It is virtually impossible to get the water too cold (short of freezing), but it is easy for it to get too warm. Try to keep the temperature between 5°C (41°F) and 20°C (68°F).

Plan for a new crayfish home. When you have completed the activities, there are several options for disposing of the crayfish. Discuss the options with students and together come up with a plan.

- * Set up an aquarium and make the crayfish permanent members of your classroom community.
- * Another class might like to have them for a science resource.
- * If some of the students would like to take them home, send them off, with parental permission, of course.
- * If the crayfish were not collected locally, they should not be released into the local environment.

Resolving the question of what to do with the crayfish can be turned over to students. They can do research by writing or calling local experts to find out what they recommend. One expert to talk to might be the company that supplied the crayfish. Local fish and game biologists would be another resource for students to contact.

FOSS does not advocate the release of organisms (plant or animal) into the environment if they were not collected from that environment. In some states, it is illegal to release organisms, even those indigenous to the area, without a permit. For the most humane disposal of the live organisms it is suggested that you place this organism into a paper bag and into the freezer over night, and then discarded into the trash.

ELODEA (ANACHARIS)

Plants occupy the base of the food pyramid in aquatic systems just as they do in terrestrial systems. Inconspicuous single-celled algae that turn your aquarium green capture the sun's energy and provide food for countless minute animals in the water. If you want to stimulate an algae bloom (population explosion), put a goldfish in an aquarium, place it where it will get direct sun several hours a day, and provide the fish with plenty of food. When you see the water turn green, it's a sign that your aquatic plants are growing beautifully.

FOSS activities also use vascular aquatic plants. The popular goldfish-bowl plant that looks like a green feather boa is Elodea (or sometimes Anacharis). In nature it is usually rooted to the bottom of a stream or pond, but in your aquarium it can just float around. It is a good food source for amphipods, fish, and crayfish and will contribute to the oxygen in the water as it photosynthesizes. It also provides crannies where small animals can hide from predators.

Care of aquatic plants is easy. Keep plenty of water in their container.

What to do when the plants arrive. Open bag and rinse plants in dechlorinated or spring water. Keep Elodea floating in bowl of dechlorinated or spring water to avoid drying out until it's ready to use.

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LAND SNAILS

The land snail is one of nature's marvels. But many of its finer attributes go unrecognized because of its reputation as a garden raider. Because it takes a toll on our spinach, cabbage, and lettuce as it goes about its business of survival, we find ourselves in a conflict relationship. In the classroom, however, traditional animosities are put aside in the interest of learning more about the diversity of life.

What to do when they arrive. The largest and friendliest land snail for the classroom is the escargot snail that is naturalized in California, *Helix aspersa*. If you live in a region where *Helix* has become established in local gardens, collect them locally. If you cannot collect them locally, order them from Delta Education. Land snails are quite hardy and can survive for many days with little food or water. In your classroom, they will live in two clear terrariums with covers (the same type of basins as used for the hydroponic plants). Once the snails arrive, place moist paper towels on the floor of each terrarium and spray the interior walls with water. Distribute the snails into the terrariums and provide a few small pieces of carrot or other vegetable for them to eat. Snails are strong! Secure the cover with two large rubber bands stretched around the terrariums.

Maintenance. In a natural habitat, land snails eat leaves, mushrooms, fruit, and many other kinds of plant material they find. In the classroom, they must be fed and their habitat must be cleaned. Here's the weekly care and feeding routine.

- * Clean the habitat once or twice a week. Gently remove the snails by sliding them off the walls of the terrarium. If they look messy, rinse them quickly under cool water. Spray the walls of the habitat and wipe them clean with paper towels. If you are using paper on the floor of the habitat, replace it with new paper towels.
- * Feed the snails twice a week. Replace any old food with new food. Snails eat fruits and vegetables. Place pieces of chalk or cuttlebone in each habitat to provide calcium, which snails need for shell growth and repair.
- * Spray the walls of the habitat with water two or three times a week.
- * Always keep the cover on the habitat, with two rubber bands (at least) holding it on.
- * If you don't keep the habitat moist or feed the snails, they will estivate for days or weeks at a time. This is not harmful to the snails and makes for a very low maintenance organism.

The question of what to do with the snails when the investigations are complete is a sensitive one and in part is determined by where and how you obtained the land snails. Potentially, the best solution is to keep them in the classroom and institutionalize their care, continually creating an ever more complex and interesting environment for them to live in. Continue informal investigations, particularly watching for life cycle. If you obtained the land snails from a supplier out of state with a USDA permit process, you must comply with the federal regulations on what to do with the snails. For snails that are not collected locally, release into the environment is never an option. If no other option is possible, the most humane thing to do is euthanize the snails by collecting them in a bag and placing them in the freezer. Then dispose of them in the trash.