

Plant and Animal Populations

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About **Plant and Animal Populations**

DeltaScienceModules, THIRD EDITION

Students explore the differences between plants and animals by observing what happens to seeds and eggs. Then they lay the groundwork for defining and comprehending the concept of a population by conducting a field count of local plants and animals. The remaining nine activities build on that concept, revealing how and why populations interact and fluctuate. In classroom setups, students observe and count a number of different kinds of plants and animals growing, reproducing, and dying. By graphing the results of continuing observations, students discover that populations of ants, fruit flies, daphnia, and aphids increase and decrease. Their challenge is to find out why. Teams of four design and perform experiments testing single variables. They discover the impact of varying temperatures, foods, light levels, living spaces, and, finally, predators (damselflies and ladybugs) on population size.

In the Delta Science Reader *Plant and Animal Populations*, students read about different habitats where plant and animal populations live. They learn about what plants and animals need to survive and how adaptations help organisms live in their environments. Students find out about communities and how living and nonliving things interact in an ecosystem. They also learn about predators and prey and explore the concept of a food chain. In a People in Science reading, students are introduced to park naturalists. Finally, they discover how animal species become endangered or extinct.

Overview Chart for Hands-on Activities

Hands-on Activity	Student Objectives
1 Seeds or Eggs? <i>page 15</i>	<ul style="list-style-type: none"> • examine unidentified brine shrimp eggs • set up an experiment to see if the mystery objects will grow in salt water or in fresh water • observe and discuss the growth and development of brine shrimp • discuss the differences between plants and animals
2 Seeds and Plants <i>page 25</i>	<ul style="list-style-type: none"> • examine bean seeds closely and learn how seeds sprout • examine and plant a variety of seeds • compare the growth of different kinds of seedlings and plants
3 A Field Trip <i>page 35</i>	<ul style="list-style-type: none"> • review the differences between plants and animals • observe, identify, and record the numbers of various organisms in a designated area • compare the total numbers of different organisms present in the area (as preparation for the concept of populations to be introduced later)
4 An Ant Farm <i>page 43</i>	<ul style="list-style-type: none"> • examine the anatomy and observe the behavior of ants • observe the ants over time as they create a home for themselves in an ant farm • learn about the social life of an ant colony
5 Fruit Flies <i>page 51</i>	<ul style="list-style-type: none"> • observe the different stages in the life cycle of fruit flies in their vials • explore the concept of population • note that the fruit fly population increases as the larvae emerge from the eggs and metamorphose into pupae and then adults • watch the fruit fly population decrease as their food supply runs out
6 Aphids <i>page 59</i>	<ul style="list-style-type: none"> • examine the anatomy and observe the behavior of aphids • draw conclusions about aphid food preferences • observe and record changes in aphid populations over time
7 Daphnia <i>page 69</i>	<ul style="list-style-type: none"> • examine the anatomy and observe the behavior of daphnia • discover that daphnia eat green algae • record changes in daphnia populations over time
8 Graphing Population Data <i>page 77</i>	<ul style="list-style-type: none"> • learn about graphs • graph the data they have collected on their fruit fly, aphid, and daphnia populations • review the concept of population
9 Population Experiments <i>page 85</i>	<ul style="list-style-type: none"> • examine their team's daphnia population graphs and discuss how the populations are changing • set up experiments to find out what causes a daphnia population to increase or decrease • observe the results of their experiments and draw conclusions • graph the results of their experiments
10 Land Predators <i>page 95</i>	<ul style="list-style-type: none"> • examine the anatomy and observe the behavior of ladybugs • predict what ladybugs will eat • observe that the aphid population is reduced by a predator—the ladybug
11 Water Predators <i>page 103</i>	<ul style="list-style-type: none"> • examine the anatomy and observe the behavior of damselfly nymphs • discover another predator-prey relationship, this time in an aquatic environment • predict how a daphnia population will be affected by the introduction of a damselfly nymph • discuss what happens if a predator eats all its prey
12 The Changing Populations Game <i>page 111</i>	<ul style="list-style-type: none"> • act out the roles of aphids, ladybugs, and birds in a food chain • discuss the different challenges predators and prey must face in nature • discuss how predator and prey populations affect each other
Assessment <i>page 119</i>	<ul style="list-style-type: none"> • See page 119.

Plant and Animal Populations

Process Skills	Vocabulary	Delta Science Reader
observe, predict, experiment, communicate	brine shrimp, egg, fresh water, predict, salt water, seed	pages 2–3, 8–9
observe; compare; measure; collect, record, display, or interpret data	seed coat, seedling, sprout	pages 4–5
collect, record, display, or interpret data; classify	organism	pages 2–3, 8–9, 14
observe, use numbers, infer	abdomen, ant, antenna(e), colony, head, insect, mandible, thorax	pages 6–7
observe; define based on observations; use numbers; collect, record, display, or interpret data	fruit fly, larva(e), life cycle, population, pupa(e)	pages 6–7
observe; infer; collect, record, display, or interpret data	aphid, exoskeleton, molt, reproduce	pages 6–7
observe; infer; collect, record, display, or interpret data	algae, daphnia, digestive tract	pages 6–7, 8–9
collect, record, display, or interpret data	graph	pages 8–9, 15
hypothesize, experiment, use variables, infer	control, experimental setup, variable	pages 14, 15
observe; predict; collect, record, display, or interpret data; infer	ladybug, predator, prey	pages 10–11, 12–13
observe; predict; collect, record, display, or interpret data; infer	damselfly nymph	pages 10–11, 12–13
make and use models, communicate, infer		pages 14, 15

See the following page for the Delta Science Reader Overview Chart.

Overview Chart for Delta Science Reader

Plant and Animal Populations

Selections	Vocabulary	Related Activity
Think About...		
What Is a Population? <i>page 2</i>	habitat, living, organism, population, species	Activities 1, 3
What Do Plants Need? <i>page 4</i>	adaptations, nutrients	Activity 2
What Do Animals Need? <i>page 6</i>		Activities 4, 5, 6, 7
What Is an Ecosystem? <i>page 8</i>	community, ecosystem, interact, nonliving	Activities 1, 3, 7, 8
What Are Predators and Prey? <i>page 10</i>	camouflage, mimicry, predator, prey	Activities 10, 11
What Is a Food Chain? <i>page 12</i>	carnivore, consumer, decomposer, energy, food chain, herbivore, omnivore, producer	Activities 10, 11, 12
People in Science		
• Park Naturalists <i>page 14</i>		Activities 3, 9
Did You Know?		
• About Endangered Species <i>page 15</i>	endangered, extinct	Activities 8, 9, 12

See pages 127–135 for teaching suggestions for the Delta Science Reader.

MATERIALS LIST

Plant and Animal Populations

Quantity	Description	Quantity	Description
1.	ant farm	1.	Living Material Card 1*
1.	baster		Shipment includes:
1.	brine shrimp eggs, vial*	1 jar	algae
1.	chart, Aphid Population Data*	100	aphids
1.	chart, Changing Populations Game*	200	daphnia
1.	chart, Daphnia Population Data*		daphnia water
1.	chart, Fruit Fly Population Data*	8 vials	fruit flies
1.	chart, How Many Organisms?*	1.	Living Material Card 2*
1.	chart, Plant or Animal?*		Shipment includes:
3.	charts, Population Data Graph*	16	damselfly nymphs
32.	containers, 10-oz	200	daphnia
50.	cups, foam		daphnia water
32.	cups, plastic, 1-oz	32	ladybugs
16.	daphnia counters	1.	Living Material Card 3*
16.	droppers		Shipment includes:
1.	index cards, p/100*	1 vial	ants
32.	lids, with holes, for 10-oz containers	TEACHER-PROVIDED ITEMS	
16.	magnifiers	18.	bags, paper
1.	pipe cleaners, p/36*	16.	bags, plastic, reclosable, 1-gal
50.	planter sticks	2.	bowls, large
1.	salt, non-iodized, 1 lb*	33.	candies, chocolate
2.	seeds, clover, 25 g*	33.	cashews, whole
2.	seeds, fava bean, p/100*	4.	containers, 1-L
1.	seeds, grass, p/1,000*	-	crayons
1.	seeds, pea, p/2,000*	1.	hole punch
4.	soil, potting, 4 qt*	17.	markers, felt-tip
1.	tape, masking*	-	newspaper
1.	transparency, Ant	1.	overhead projector
1.	transparency, Aphid	330.	paper clips, small
1.	transparency, Damselfly Nymph	-	paper towels
1.	transparency, Daphnia	33.	pasta, shell
1.	transparency, Fruit Fly Life Cycle	33.	peanuts, in shell
1.	transparency, Ladybug	11.	pen caps
8.	trays, plastic	32.	pencils
16.	vial holders	1.	popcorn, unpopped, bag
32.	vials, with caps	33.	raisins, seedless
1.	yarn, red, skein	88.	rubber bands
1.	Teacher's Guide	8.	rulers, metric
8.	Delta Science Readers	8.	scissors
		10.	spoons, large
		2.	spoons, measuring
		-	sugar
		33.	sunflower seeds, in shell
		-	water, spring
		-	water, tap
		* = consumable item † = in separate box	

ACTIVITY SUMMARY

In this Delta Science Module, students are introduced to the concepts of population and population change. By observing and counting a number of different kinds of plants and animals as they grow, reproduce, and die, students learn what a population is and how populations fluctuate and interact.

ACTIVITY 1 Students discuss the differences between seeds and eggs. They then examine unidentified brine shrimp eggs and set up an experiment to discover whether they are seeds or eggs. When the tiny brine shrimp hatch out, students observe them and conclude that the mystery objects must have been eggs, since they developed into animals.

ACTIVITY 2 Students examine fava beans and other seeds and plant them to determine whether they are really seeds that will grow into plants. They measure and compare the growth of the various plants that develop from their seeds.

ACTIVITY 3 Students go into the field to inventory the organisms they find in an outdoor area. They make one list of plants and another of animals, naming or describing each type they find and estimating their number in a given area. This differentiating and counting exercise provides the groundwork for their later introduction to the concept of a population.

ACTIVITY 4 Students examine ants and set up an ant farm. They observe the social behavior of the ants in the colony as they build their tunnels and consume the food and water that students provide for them.

ACTIVITY 5 Students meet a population of animals that are capable of reproducing in the classroom. They study fruit flies as they hatch and develop, counting them as they multiply. They learn to define *population* as the total number of a particular kind of plant or animal in a particular area.

ACTIVITIES 6 and 7 Students set up populations of aphids and daphnia, observing and counting them as they first increase through reproduction and then decrease as they begin to run out of food or space.

ACTIVITY 8 Students use their collective data to graph the changing classroom populations of fruit flies, aphids, and daphnia. They discuss the possible causes for the increases and decreases in the various populations they have been observing.

ACTIVITY 9 Students set up experiments with daphnia and algae to try to determine what causes daphnia populations to decrease. They test to see how variations in temperature, food supply, or living space impact the size of a daphnia population.

ACTIVITY 10 Students observe ladybugs and discover that they prey on aphids. Students then set up experiments to discover how an aphid population is affected by the presence of a predator.

ACTIVITY 11 Students are introduced to a water-dwelling predator, the damselfly nymph. Based on their experience with the ladybugs and the aphids, they predict the effect a damselfly nymph might have on a population of daphnia. They set up experiments and observe the results of placing the two animal populations in contact with each other.

ACTIVITY 12 Students role-play a game of tag called the Changing Populations Game, in which they mimic the behavior of three different animals in a food chain. By exchanging roles of predator and prey as the game progresses, students act out some of the effects that populations have on one another.