



Classroom Adventures

TEACHER ENRICHMENT RESOURCE PACKET



Amazing Animals

A Classroom Adventure for Grades K-4

Identify many different types of animals through the examination of specimens and live animals. Understand animal traits and characteristics and how they are adapted to their environments.

Think it.
Try it.
Explorit.

what's inside

Welcome	1
Learning Objectives	1
Background Information	2
Vocabulary	4
Classroom Activities	5
Supplemental Resources	7
Science Standards	8

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Welcome

Thank you for choosing Explorit Science Center's *Classroom Adventures* to supplement your ongoing science curriculum. Whether you use the program to kick off a new unit, wrap up a nearly completed unit, or purely to excite and interest your students in the wonderful world of science, advance preparation and follow up with your students are critical to achieve the greatest educational benefit from this unique science experience.

Explorit provides two resources to help prepare you and your students for *Classroom Adventures*. First, simple logistics of the program are detailed in the confirmation letter. Second, this **Teacher Enrichment Resource Packet** outlines appropriate science content and processes to help you:

- successfully prepare your students prior to Explorit's visit;
- participate fully in *Classroom Adventure* yourself; and
- follow-up with your students after Explorit leaves.

Learning Objectives

Learning objectives provide a broad overall guide to what students will begin to experience and understand through participation in Explorit's **Amazing Animals** *Classroom Adventure* designed for Grades K-4. During this program, students will:

- identify and describe similarities and differences in the structures and behaviors of various animals;
- understand the components of an animal's habitat, such as food, water, shelter or cover, and space;
- recognize examples of diverse life forms and the variety of environments that they inhabit, such as oceans, deserts, tundra, forests, grasslands, and wetlands; and
- discover how animals are adapted to their different environments/habitats.

Science Standards

Explorit Science Center's *Classroom Adventures* programs address concepts teachers need to teach under the California Science Content Standards. The alignment of *Classroom Adventures* with the science standards allows you, the teacher, to bring exciting fun-filled science experiences to your students while at the same time fulfilling your requirement to teach particular science content and processes. For specific science standard concepts covered by **Amazing Animals**, refer to Science Standard Alignment, page 8.

Our Mission:

To involve people in science experiences that touch our lives.

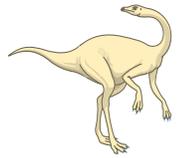
Background Information

Young scientists find the study of **animals** fascinating. Just imagine encounters with creatures who have no legs and those who have hundreds! Many animal wonders await your students in Explorit's **Amazing Animals Classroom Adventure** program. The body of scientific knowledge about animals is vast, yet students today may be inspired by the fact that this body of knowledge is ever-changing. While scientists continue to identify new animal **species**, they also investigate reasons for the extinction of other species. The study of animals provides an opportunity for students to practice the processes used by scientists. As part of this program, students will use some or all of the following science skills: observing, communicating, comparing, ordering, categorizing, and relating.

WHO'S WHO IN THE ANIMAL WORLD?

No one knows exactly how many animal species exist. New species are found every year. So far, scientists have identified about 1.25 million animal species. Almost 1 million of these are insects. There are about 30,000 fish species, 10,000 bird species, 8,000 reptile species, 5,700 amphibian species, and 5,400 mammal species. Scientists believe that there are millions of other animals that are not yet identified. Additionally, some animals which used to live on Earth, such as dinosaurs and dodo birds, have now become **extinct**.

Each animal species displays different characteristics and has different needs. Animals come in many shapes and sizes. Most species are actually less than one inch long. Many are so tiny they can only be seen with a microscope. On the other hand, the approximate length of the largest animal, a blue whale, is about equal to the length of five elephants in a row.



WHAT ARE HABITATS AND ECOSYSTEMS?

Animals live in many kinds of places. The place where each animal lives is called its **habitat**. Within an animal's habitat it must find all it needs to survive. The things animals need to survive are food, water, shelter or cover, and space. An animal's habitat includes an appropriate arrangement of all of these items.

When we consider habitats on a large scale, we call them **ecosystems**. An ecosystem includes living and nonliving components that interact with each other in a stable system. Each ecosystem provides habitats for many different animals.

Varied ecosystems are found throughout the world. We are lucky enough to have many of those diverse ecosystems right here in California. Just think of the differences between the Pacific Ocean, the Sierra Nevada mountains, the Great Central Valley and the Mojave Desert.

The nonliving and living parts of an ecosystem are all connected. For example, animals within a habitat are linked through the foods they eat. Animals eat

Amazing Animals Trivia:
A tiny hummingbird's wings can beat 70 times per second.

Background Information

continued

Amazing Animals Trivia:

Insects range in length from less than 1/100th of an inch to over 14 inches.

Amazing Animals Trivia:

Almost one million species of insects have been discovered, about 3 times the number of all other animal species combined!

plants, other animals, or both plants and animals. Animals that eat only plants are called **herbivores**, while animals that eat only other animals are called **carnivores**. Those animals that eat both plants and animals are called **omnivores**.

The relationship between animals and the food they eat is called a food chain. A food chain involves the flow of energy from the sun to green plants to animals. A simple food chain might look like sun->grass->mouse->hawk. Usually, the relationships are not as simple. Rather they are complex networks of intertwined food chains, called **food webs**. All living organisms are interdependent.



HOW DO ANIMALS ADAPT TO VARYING HABITATS?

Only certain animals can survive in each habitat. It takes different features to survive in the freezing Arctic tundra versus the blazing hot desert. Special features, called **adaptations**, come from the ability animals have to adapt over time to changes in their surroundings. Animals must adapt to their habitat to survive.

Different adaptations are appropriate for different habitats. For example, several Arctic animals, such as the hare, fox and ptarmigan (a bird), are white in winter to blend with their snowy surroundings; in summer these animals turn a darker color to blend with the plants and soil. In any habitat, **camouflage** helps animals to avoid being seen by their **predators** or their **prey**.

An animal's teeth and mouthparts are another important adaptation. Many animals have teeth. Sharp teeth help animals like mountain lions and coyotes cut and tear meat. Deer and cows have flat teeth to help them chew plants. Birds don't have teeth at all. Instead, they have widely varied beaks to help them obtain food. For example, hummingbirds have long hollow beaks to probe flowers for nectar, while pelicans have long, flat pouch like beaks to scoop up fish and other aquatic creatures.

Animals must be able to take in oxygen in order to survive. Depending where they live, animals have vastly differing breathing adaptations. Animals that always live in water must be able to breathe in water. Fish have gills which allow them to absorb oxygen from the water. Whales, on the other hand, have lungs. Whales must be able to hold their breath for long periods of time so they can obtain food, but still must come up to the surface to breathe. Frogs present an interesting example of an animal that breathes in water with gills in its early stages, but later loses the gills and as an adult develops lungs to breathe outside of the water.



CONCLUSION

Through Explorit's **Amazing Animals** program, students will explore a wide array of animals with their vastly differing features and unique adaptations to various habitats. Students naturally seem to enjoy investigating animal life. Let's all help build upon this existing interest in the animal world.



Vocabulary

This list includes words that may be used during *Classroom Adventures*. Specific vocabulary used depends on students' grade level and prior knowledge.

Adaptation - modification of a species' characteristics over time in a way that increases its chances of survival in a particular habitat.

Animal - an organism that can usually move freely and obtains food from other organisms or their byproducts.

Aquatic - living in water.

Backbone - the column of vertebrae encasing the spinal cord. Also called spine.

Camouflage - coloration, shape, or behavior that allows an animal to be hidden against its surroundings.

Carnivore - animal that eats other animals.

Domesticated - raised or used by humans.

Ecologist - a scientist who studies the interrelationships of living things to one another and their environment.

Ecosystem - an interacting system of living organisms and nonliving parts of the environment; the place where these interactions take place.

Ectothermic - an animal that cannot internally maintain a constant body temperature and thus must move between warm and cold places to regulate their body temperature. Also called cold-blooded.

Endothermic - an animal that can maintain a constant body temperature independent of the outside temperature. Also called warm-blooded.

Extinct - no longer exists.

Food chain - the transfer of food energy from one organism to another.

Food web - a network of interconnected food chains.

Habitat - an animal's immediate natural surroundings or environment, containing an arrangement of food, water, shelter or cover, and space that meets the animal's needs.

Herbivore - animal that eats plants.

Invertebrate - animal that does not have a backbone.

Omnivore - animal that eats both plants and animals.

Predator - an animal that kills and eats other animals.

Prey - animals that are killed and eaten by other animals.

Species - a distinct kind of animal that is able to breed and produce fertile offspring under natural conditions.

Terrestrial - living on land.

Vertebrate - animal with a spinal column (backbone) and a cranium (brain case). Fish, amphibians, reptiles, birds and mammals are all vertebrates.

Wild - not raised by humans.

Amazing Animals Trivia:

A snake's flexible spine contains 200-400 vertebrae, each attached to a pair of ribs; the human body has only 24 movable vertebrae.



Classroom Activities

For your convenience, the following activities can be used as you deem most appropriate to integrate Explorit's **Amazing Animals** into your ongoing curriculum. The activities are grade-level appropriate, but please note that this program is designed for a broad grade range (K-4) and thus all activities may not be appropriate for every group of children. Choose those activities that will work well for your students.

ACTIVITY #1: "SO MANY ANIMALS, SO MANY PLACES"

Objective: To compare and classify various animals in different environments; to discuss how animals adapt to their environment for survival.

Procedure:

1. Have students cut out as many pictures of animals as possible from magazines or the internet. Try to be sure the animals come from all over the world and from as many habitats/environments as possible.
2. Once you have a large collection of animal pictures, talk about how the animals are the same or different. Depending on your students' grade level, classify (group) the animals according to whether they are: 1) wild or domestic; 2) terrestrial or aquatic; 3) mammals, birds, fish, amphibians, reptiles or invertebrates (older students can further classify the invertebrates, too); or 4) cold-blooded or warm-blooded. Consider finding a place in your classroom to display your animal groups throughout your entire unit.
3. These same animal pictures may be used to discuss the various habitats/environments in which the animals live, the adaptations each animal has to survive, etc. Once you talk about habitats and adaptations you may wish to combine animals together according to their habitat and/or adaptation. For example with respect to habitats, you may wish to create separate groups for oceans, deserts, tundra, forests, grasslands and wetlands. For adaptations, you might make groups for camouflage, breathing with gills, etc.

ACTIVITY #2: "AMAZING ANIMAL ADAPTATIONS"

Objective: To understand animal adaptation and discuss the variety in animal life.

Procedure:

1. Talk with your students about the variety of animal life. Animals come in all shapes and sizes, with all kinds of adaptations to help them survive. Don't forget to remind the students that humans are animals, too.
2. Have a "contest" to see how your students stack up against some other animals. Here are some events to have in your "contest." Feel free to add other events as you learn about many other animals.
 - a. *Wing Workout:* Have the students hold out their arms to the sides as if they were birds' wings. Make sure the students have plenty of room so that they do not bump into each other. Have the students flap their arms as fast as they can. How fast can they flap? Time them to see how many flaps they can make in ten seconds. Talk with your students about how a crow flaps its

Materials:

old magazines
scissors

Science Standards:

Life Science
K: 4 a, c
First: 2 a, c
Second: 2 c
Third: 3 a, b
Investigation & Experimentation
K: 4 a
Second: 4 g

Materials:

clock
tape measure
scales

Science Standards:

Life Science
First: 2 a
Second: 2 c, d
Third: 3 a, b
Investigation & Experimentation
First: 4 b
Second: 4 g



Classroom Activities

continued

Materials:

paper or journal

pencils

crayons

sculpting materials: clay,
paper, glue, pipe cleaners
(optional)

Science Standards:

Life Science

First: 2 a, b

Third: 3 a

Investigation & Experimentation
K - Fourth 1.

wings about 20 times every 10 seconds, a pigeon 30 times in 10 seconds and a chickadee 270 times in 10 seconds. Try flapping again. Can your students flap as fast as these birds? Now let your students know that a hummingbird flaps 700 times every 10 seconds. Can you imagine?

b. *Flea Jump*: Have your students try a standing broad jump (i.e., jump as far as they can from a standstill). Measure how far each student jumps. Compare the ratio of the jump length to the student's height. You may even want to take an average of all the students' jump lengths and compare it to their average height. Now let your students know that a tiny flea can jump about 200 times the length of its body. How do your students' jumps compare to a flea's jump?

c. *Weight-a-Minute*: Talk with your students about which animals they think might be some of the heaviest animals in the world. Let them know that the largest land mammal is the African elephant, which weighs up to 6.5 tons (13,000 lbs). Weigh each student in your class. Have the students add all their weights together. Does the whole class weigh as much as an African elephant? Do all the students in their grade level weigh as much as the elephant? All the students in the school? What are the advantages of being so large? Disadvantages?

3. This activity helps students understand some amazing animal adaptations. Clearly, humans cannot hold their breath as long as a whale, flap their arms as fast as birds can flap their wings, jump comparatively as far as a flea, or weigh remotely as much as an elephant. Talk with your students about whether humans need to be able to do these things. What human adaptations allow us to survive in our habitat/environment?

ACTIVITY #3: "INVENT AN ANIMAL"

Objective: To invent an animal, considering its adaptation, behavior, and environment.

Procedure:

1. Have your students write or draw about: 1) an imaginary animal; 2) the habitat in which it lives; and 3) adaptations that allow it to live in that habitat. Encourage creativity in your students. Even though they create an imaginary animal, they must justify why their animal has the particular adaptations it has and what in its habitat makes it necessary to have these adaptations.
2. For younger students, working with just one adaptation will be enough. For older students, you may encourage them to describe more than one adaptation. You may wish to focus your students on a particular aspect of animal survival; you could have your students focus on an adaptation that will allow the animal to find food, or an adaptation that will allow the animal to move about.
3. After the drawings/writings are complete, have your students choose a name for their animal that relates to the animal's unique adaptation.
4. As an extension, you may wish to have your students create a "sculpture" of their animal.



Supplemental Resources

BOOKS

- Burnie, David. **How Nature Works: 100 Ways Parents and Kids Can Share the Secrets of Nature.** The Reader's Digest Association, 1991. *Contains easy to follow instructions along with clear illustrations of activities.*
- GEMS Series. **Terrarium Habitats.** Lawrence Hall of Science, 2000. *Excellent unit for grades K-6; www.lhs.berkeley.edu/GEMS. See also Aquatic Habitats for grades 2-6. Spanish version available for some units.*
- Kneidel, Sally. **Creepy Crawlies and the Scientific Method: Over 100 Hands-on Science Experiments for Children.** Fulcrum Publishing, 1993. *Great resource to teach children ages 5-12 about the scientific method.*
- National Wildlife Federation. **Ranger Rick's NatureScope.** Learning Triangle Press, 1998. *Contains many ready-to-use activities.*
- Project WILD K-12 Curriculum & Activity Guide,** 2000. *Creative activities to teach about animals/habitats. Only available through workshops contacting Department of Fish and Game, Project WILD Coordinator. See below.*
- Taylor, Barbara. **Animal Hide and Seek.** Dorling Kindersley, 1998. *Depicts differing habitats and the animals that live in them.*
- VanCleave, Janice. **Ecology for Every Kid: Easy Activities That Make Learning Science Fun.** John Wiley & Sons, 1996. *Easy-to-do activities.*
- Visual Dictionary of Animals.** Dorling Kindersley, 1991. *Excellent photos.*

WEB SITES

Kid's Planet ESPECIES Web Site

<http://www.kidsplanet.org/factsheets/map.html>

Factsheets on over 50 different animal species in the world. Information regarding the Endangered Species Act.

Project Wild Web Site

<http://www.projectwild.org>

Excellent K-12 curriculum on wildlife and their habitats. Includes, aquatic life.

World Almanac For Kids Web Site

<http://www.worldalmanacforkids.com/explore/animals.html>

Includes a directory on various animals; good background information regarding animals and their habitats.

National Zoo Web Site

<http://nationalzoo.si.edu>

Includes information on all of the zoo's animals, and some live animal webcams!



Science Standards Alignment

Below is the exact language of California's science standards that Explorit's **Amazing Animals** program addresses either during our visit to your classroom or through materials in this Teacher's Packet that you may use.

CALIFORNIA SCIENCE CONTENT STANDARDS

Life Sciences

Grade K: 2. Different types of...animals inhabit the Earth. As a basis for understanding this concept, students know: a. how to observe and describe similarities and differences in the appearance and behavior of...animals (e.g., birds, fish, insects). c. how to identify major structures of common...animals (e.g., arms, wings, legs)."

Grade 1: 2. [A]nimals meet their needs in different ways. As a basis for understanding this concept, students know: a. different...animals inhabit different kinds of environments and have external features that help them thrive in different kinds of places. b. animals...need water; animals need food.... c. animals eat plants or other animals for food and may also use plants or even other animals for shelter and nesting. d. how to infer what animals eat from the shapes of their teeth (e.g., sharp teeth: eats meat; flat teeth: eats plants).

Grade 2: 2. [A]nimals have predictable life cycles. As a basis for understanding this concept, students know: c. ...Some characteristics are caused by, or influenced by, the environment. d. there is variation among individuals of one kind within a population.

Grade 3: 3. Adaptations in physical structure or behavior may improve an organism's chance for survival. As a basis for understanding this concept, students know: a. animals have structures that serve different functions in growth, survival, and reproduction. b. examples of diverse life forms in different environments, such as oceans, deserts, tundra, forests, grasslands, and wetlands. c. living things cause changes in the environment where they live; some of these changes are detrimental to the organism or other organisms, whereas others are beneficial. d. when the environment changes, some...animals survive and reproduce, and others die or move to new locations. e. some kinds of organisms that once lived on Earth have completely disappeared; some of these resembled others that are alive today.

Investigation and Experimentation

Grades K-2, Concept 4 / Grade 3, Concept 5 / Grade 4, Concept 6:

Scientific progress is made by asking meaningful questions and conducting careful investigations. As a basis for understanding this concept, and to address the content in the other three strands, students should develop their own questions and perform investigations.

Explorit's Classroom Adventures involve students' use of many science process skills. For grade level specific skills, see California Science Content Standards at www.cde.ca.gov/board.

Explorit Programs for Schools and Groups

At Explorit's Site

Discovery Lessons & Labs Visit one or more of the Changing Exhibitions throughout the year
Nature Safaris & Labs Visit Explorit's outdoor spaces at Mace Park Branch

Explorit in Your Classroom

Classroom Adventures Explorit educators visit your classroom for hour-long presentations
Young Scientist Series Science investigations through multiple visits

For the Whole School

Health in Your World Learn about keeping your body and the world healthy and safe
Science in Your World The ultimate family science night
Science Assembly A multimedia presentation for the whole school

Reservations required.
For information please call
530.756.0191

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HOW TO CONTACT US



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