



Grade 2 Eco-Explorer Study Guide



Before the trip:

In order to have your students receive the maximum enjoyment and learning from their experience here, we recommend some pre-visit classroom preparation. Included in this packet is a test that should be administered before and after your field trip, background information about the topics to be studied, as well as lessons and activities linking our Eco-Explorers (grade 2) program with language arts, science, mathematics and art.

- ❑ Before the trip, administer the **Pre-test/Post Test**.
- ❑ Students must be divided into groups of 10 – 20 (see class list for exact number of groups according to your student total). Please use the **class list template** to separate your students into groups. This template can be found on our teacher webpage, <http://encenter.org/teacher-resources/>. Make a note of any medical conditions, physical challenges or language difficulties we should be aware of. Bring the class list on the day of your field trip.
- ❑ 1-2 adult chaperones are required per student group (i.e. 2 adults for the Coyotes, 2 adults for the Hawks, etc.) Admission is waived for required chaperones. Additional chaperones must pay the field trip fee.
- ❑ Download the **nametag template** on our teacher webpage. Create a nametag for each child, corresponding to the group they are in, and pin it on before they arrive for the hike. Please do not string the nametags around their necks.
- ❑ Remind students to wear comfortable clothes, closed-toed shoes, a hat, sunscreen, and layered clothing in cool weather. Remember — it is often cooler down here near the ocean!
- ❑ Children should eat a healthy breakfast on the day of the trip. They should **NOT** bring water bottles, food or backpacks.
- ❑ Directions to the ENC, information about green fundraising and other materials helpful to teachers are available on our special teacher webpage, <http://encenter.org/teacher-resources/>

When you get here:

- ❑ There are two parking spots for busses in the parking lot. If you are carpooling, please inform us ahead of time, as space is very limited.
- ❑ When you arrive, please keep students on the bus. The Naturalists will board the bus and ask ALL adults to disembark for an “adult meeting” with our Lead Naturalist. A staff Naturalist will do a student introduction on the bus, and then unload the students according to groups.
- ❑ Each group of 10 – 20 students will accompany a staff Naturalist on a hike through the Center, where they will rotate among six activities. Activities at each station will last approximately 15 minutes.
- ❑ Restrooms are available only in emergency situations. Have students use the restroom before leaving school.
- ❑ Students on field trips may not consume food at the ENC, unless a student has a medical reason for eating.

After your field trip:

- ❑ After the trip, administer the **Pre-test/Post Test** to gauge your students’ academic growth as a result of participating in our program. Send an email to lori@encenter.org with your class’s average score for the pre-test AND post-test.
- ❑ After your program we will send you a link to an online **teacher survey**. Please take the time to complete the online survey. It will help us gauge the needs of your school, teachers and students.
- ❑ Download the **student survey** on our teacher webpage. Have your students fill it out soon after their visit. Our Naturalists enjoy receiving feedback from the students they teach, and the survey can help you gauge the effect the program had on your students!
- ❑ Please return student surveys to: Environmental Nature Center, attn: Education Dept., 1601 16th St., Newport Beach, CA 92663
- ❑ The ENC will send an invoice after your field trip for the total amount of the program. If the invoice should go somewhere besides to YOU, please contact us with the appropriate contact information.

If weather is a concern:

In cases of *severe* weather, the ENC will call to cancel your program. If you are considering canceling, please call 949-335-8656 (cell) between 7:00 and 8:00AM.

State Science Standards Covered

- 2a Plants and animals have predictable life cycles. Organisms reproduce offspring of their own kind and the offspring resemble their parents and one another.
- 2b The sequential stages of life cycles are different for different animals, such as butterflies, frogs, and mice.
- 2c Students know many characteristics of an organism are inherited from the parents. Some characteristics are caused or influenced by the environment.
- 2d. Students know there is variation among individuals of one kind within a population.
- 3e. Students learn that rock, water, plants, and soil provide many resources, including food, fuel, and building materials, that humans use
- 3c. Students know that soil is made partly from weathered rock and partly from organic materials and that soils differ in their color, texture, capacity to retain water, and ability to support the growth of many types of plants.
- 4a. Make predictions based on observed patterns and not random guessing
- 4d. Write or draw descriptions of a sequence of steps, events and observations.
- 4f. Use magnifiers or microscopes to observe and draw descriptions of small objects or small features of objects.

Aspects of this program also correlate with California's Environmental Principles and Concepts from the Education and the Environment Initiative (Assembly Bill 1548 and 1721). For more information on the "EPC's" visit www.calepa.ca.gov/education/eei

Environmental Principles and Concepts Covered in this Program:

- Explain why plant and animal reproduction is important in providing resources necessary for human survival.
- Identify reproductive cycles for different animals such as butterflies, frogs, and mice.
- Explain that, in order to reproduce, different animals such as butterflies, frogs, and mice have different needs met by the natural systems where they live (e.g., monarch butterflies need milkweed).
- Recognize that there is variation among individuals within a population.
- Explain that natural systems contain limited supplies of natural resources (e.g., water, soil nutrients).

Objectives

Students will be able to:

- Describe four groups of animals based on the food that they eat
- Focus a microscope and draw what they see.
- State that most organisms are born looking like their parents.
- State the ecological role of a decomposer
- Describe the life cycle of a butterfly or a toad.
- Name three natural resources that humans can use for building materials.

Vocabulary & Concepts to Review:

- Animals produce offspring of their own kind and they resemble their parents and one another.
- Life cycles are different for different animals, such as butterflies, frogs, and mice.

- There is variation among individuals of one kind within a population.
- Decomposer – a living thing that breaks down wastes and dead things.
- Herbivore – an animal that eats only plants.
- Carnivore – an animal that eats other animals.
- Omnivore – an animal that eats both animals and plants.
- Insectivore – An animal that eats only insects
- Metamorphosis - A change in the form of an animal throughout its life cycle. Metamorphosis includes, in insects, the transformation of a caterpillar into a butterfly.
- Chrysalis - The nonfeeding stage between the larva (caterpillar) and adult in the metamorphosis of some insects, during which the larva typically undergoes complete transformation within a protective hardened case. Moths generally create cocoons AROUND their chrysalis, or pupa.
- Natural Resources - things we find in nature that we need or want.
- Microscope – A tool used to increase the apparent size of something.



Name: _____

ENVIRONMENTAL NATURE CENTER**Second Grade "Post Test"****CIRCLE ONE RIGHT ANSWER FOR EACH QUESTION**

1. Circle the item that would NOT be good to use to construct a building.
 - a. Rock
 - b. Wood
 - c. Plastic
 - d. Meat

2. Do most animals have babies that look like their parents?
 - a. YES
 - b. NO

3. Decomposers break down wastes and dead materials. Which one of these is a decomposer?
 - a. Squirrel
 - b. T-rex
 - c. Invertebrates (like insects)
 - d. Mountain Lion

4. Animals that only eat plants are called:
 - a. Herbivore
 - b. Carnivore
 - c. Omnivore
 - d. Insectivore

5. Animals that only eat other animals are called:
 - a. Herbivore
 - b. Carnivore
 - c. Omnivore
 - d. Insectivore

6. Animals that eat both plants and other animals are called:
 - a. Herbivore
 - b. Carnivore
 - c. Omnivore
 - d. Insectivore

7. What do scientists call the change in the form that some animals go through, as they become adults?
 - a. Metamorphosis
 - b. Omnivore
 - c. Decomposer
 - d. Microscope

8. What hatches out of a butterfly egg?
 - a. Egg
 - b. Caterpillar
 - c. Bird
 - d. Worm

9. To look at the parts of a butterfly up close, you can use a:
 - a. Telescope
 - b. Microwave
 - c. Microscope



Name: _____

ENVIRONMENTAL NATURE CENTER

Second Grade "Post Test" ANSWER KEY**CIRCLE ONE RIGHT ANSWER FOR EACH QUESTION**

1. Circle the item that would NOT be good to use to construct a building.
 - a. Rock
 - b. Wood
 - c. Plastic
 - d. **Meat**

2. Do most animals have babies that look like their parents?
 - a. **YES**
 - b. NO

3. Decomposers break down wastes and dead materials. Which one of these is a decomposer?
 - a. Squirrel
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Introduction:

Students learn about the life cycle of toads or butterflies during a visit to our butterfly house (seasonal). They will use microscopes to observe small butterfly parts, and draw what they see. Students observe animal scat to learn the difference between **herbivores**, **carnivores**, and **omnivores**. They search for decomposers, and get an up-close look at a real, live decomposer! During their field trip, second grade students visit the ENC's new "green" building to learn about the natural resources that went into the building materials, and the ways that the building saves water and energy.

Natural Resources

State Standards: 3e

Natural Resources are the things that humans use that come from nature. They are things like plants, animals, water, air, sun, wind, minerals, oil, etc. It is important to use our resources wisely that that we do not run out and so that there will be plenty for future generations. We use them for food, fuel and building materials. Our building at the ENC is made out of recycled materials. That means that instead of going to a landfill, we took plastic bags, bottles, old paper and metal and even old blue jeans and used them to make our building. These items will not end up in a landfill!

Basic Vocab and Concepts:

- Natural Resources - things we find in nature that we need or want.
- Landfill – A place where trash ends up if it is not recycled or reused.

Recommended Books to Read:

Fighting for the Forest Gloria Rand

Water/an Amazing Pop-Up, Pull-Tab, Lift-The-Flap Guide to Our Most Valuable Natural Resource by François Michel

The Great Trash Bash Loreen Leedy

Suggested Classroom activity: Trash Crafts**Materials:**

(Clean!) trash from home
glue, scissors, paint, markers

Purpose:

Your students will learn that there are lots of things you can do with trash besides putting it in the trashcan. You can recycle it, reuse it and make amazing things out of it! By reducing what we put in the trashcan, we are making our world a cleaner, healthier place.

Procedure:

Check out one of these websites, or find one of your own to discover the many creations that can be made out of trash and recyclables.

- <http://www.favecrafts.com/Earth-Day-Crafts/16-Recycle-Crafts-for-Kids>
- <http://familyfun.go.com/crafts/cosmic-crafts-the-trash-masters-666336/>
- <http://www.pbs.org/parents/special/article-earthday-greencrafts.html>

Wrap-up:

More and more often, you can find products at stores that are made out of recycled items. There are usually recycled alternatives to most things if you look hard enough. Have your students find something in the store or in their home that is made of recycled items. They can take a picture or bring it in to show the class! If more people buy “green”, more manufacturers will start thinking green too!

Microscopes

State Standards: 2d, 4d, 4f

Microscopes are tools that are used to help our eyes see very small things up close and in detail. A slide is placed on the base of the microscope and light is directed onto the slide. By looking through the eyepiece and focusing the microscope, one is able to see microscopic objects in great detail. At the ENC, your students will be looking at butterfly parts such as legs, wings, antennae, and heads. They will make a sketch of what they see. Butterflies look VERY different through a microscope.

Basic Vocab and Concepts:

- Microscope – A tool used to increase the apparent size of something.

Recommended Books to Read:

Microscopic Life Walker, Richard.

Hidden Worlds: Looking Through a Scientist's Microscope (Scientists in the Field Series) by Stephen P. Kramer
Greg's Microscope Millicent E. Selsam (Author), Arnold Lobel (Illustrator)

Suggested Classroom Activity: Microscopic World (adapted from Joseph Cornell's Micro-Hike)

Materials:

Magnifying glass for each student (optional)

String or hula-hoop to designate space of microscopic world.

Purpose:

Your students will learn that the world is full of details, some very small. There are many tools that we can use to see these details more closely, like microscopes and magnifying glasses, but sometimes there is nothing better than getting up close with your eyes.

Procedure:

- Have each student find a spot that looks interesting (inside or outside) and lay down their string (like a trail) or lay down the hula-hoop. Give them a magnifying glass if you have them.
- Tell each student that you are going to shrink them down to the size of an ant. Tell them that they are going to spend at least five minutes exploring their tiny world. Have them get down on their stomachs. Tell them that their eyes must stay no more than one foot away from the floor.
- Ask them some questions to get them started. What kind of a world are you traveling through right now? What kinds of creatures are your neighbors and friends? Are they friendly? How do they spend their days? What kinds of things are dangerous? What can you do for fun?
- You can even have them draw their mini world and what happens in it.

Wrap-up:

There are lots of tools that people use to help us see things. Who can think of something else? Glasses, binoculars, telescopes, microscopes and magnifying glasses.

Decomposers

3/25/2013

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State Standards: 3e, 3c

Decomposers are fungus, bacteria and invertebrates. They eat dead plants, animals and scat and turn them into soil. They clean up our planet and make the soil that plants need to get their nutrients. Without decomposers, this world would be a pretty messy place and there would be no plants. We need decomposers to survive! At the ENC, your students will get to meet a real decomposer and have a chance to say thank you!

Basic Vocab and Concepts:

- Decomposer – a living thing that breaks down wastes and dead things.
- Fungus – Living organisms like mushrooms. They absorb nutrients from dead things and scat and turn it into soil.
- Bacteria – Tiny organisms, often single celled.
- Invertebrates – Any animal that does not have bones, such as insects, crabs, worms, slugs, etc.

Recommended Books to Read:

Compost Critters Bianca Lavies

A Slug's Life John Himmelman

Suggested Classroom Activity: Make Your Own Compost

Materials:

Yogurt container with lids

dried leaves

green waste (grass clippings, etc.)

water

garden soil

spoons

permanent markers

banana chips

Purpose:

- Your students will learn that, in order to make soil, decomposers need several different things. Your students will make a decomposer habitat and observe it over several days or weeks to see if the decomposers are doing their job. Compost needs five things to become soil: Decomposers (in the soil), Green waste (moist/fresh cut) provides nitrogen, Brown waste (dry) Provides carbon, water and air.

Composting organisms require four equally important things to work effectively:

- Carbon — for energy; the microbial **oxidation** of carbon produces the heat. High carbon materials tend to be brown and dry.
- Nitrogen — to grow and reproduce more organisms to oxidize the carbon. High nitrogen materials tend to be green (or colorful, such as fruits and vegetables) and wet
- Oxygen — for oxidizing the carbon, the decomposition process.
- Water — in the right amounts to maintain activity without causing anaerobic conditions.

Procedure:

- Before your students arrive, gather a container of brown waste, green waste, soil, and water and put them somewhere with easy access with measuring devices in them.
- Split your students into six teams. Give each team a spoon, a yogurt container with a lid and give them an ingredients list.

Container 1: No water

3/25/2013

1. Write your names and the number 1 on your container.
2. Add one cup of dried leaves.
3. Add one cup of green waste.
4. Add ½ cup of garden soil.
5. Add banana chip
6. Mix to add oxygen.
7. DO NOT add water.
8. Place lid (with holes) on container

Container 2: No air

1. Write your names and the number 2 on your container.
2. Add one cup of dried leaves.
3. Add one cup of green waste.
4. Add ½ cup of garden soil.
5. Add ½ cup of water.
6. Add banana chip
7. Compress the contents and DO NOT stir.
8. Place lid on container tightly.

Container 3: No green waste

1. Write your names and the number 3 on your container.
2. Add 2 cups of dried leaves.
3. Add ½ cup of garden soil.
4. Add ½ cup of water.
5. Add banana chip
6. Mix to add oxygen.
7. Place lid (with holes) on container

Container 4: No brown waste

1. Write your names and the number 4 on your container.
2. Add two cups of green waste.
3. Add ½ cup of garden soil.
4. Add ½ cup of water.
5. Add banana chips
6. Mix to add oxygen.
7. Place lid (with holes) on container

Container 5: No Decomposers

1. Write your names and the number 5 on your container.
2. Add one cup of dried leaves.
3. Add one cup of green waste.
4. Add ½ cup of water.
5. Add banana chips.
6. Mix to add oxygen.
7. Place lid (with holes) on container

Container 6: All Ingredients

1. Write your names and the number 6 on your container.

2. Add one cup of dried leaves.
 3. Add one cup of green waste.
 4. Add ½ cup of garden soil.
 5. Add ½ cup of water.
 6. Add banana chips
 7. Mix to add oxygen.
 8. Place lid (with holes) on container
- Allow your students to gather their ingredients and mix them in their cups.
 - Put the cups somewhere out of the way, in a warm, sunny spot. Check your banana chips at least once a week to see their levels of decomposition. You can even chart the progress.

Wrap-up:

In which container did the banana chips decompose the best? What happened in the other containers? Were there any unexpected results? Mix all of your compost together and let it continue to decompose until you have soil. Now plant some plants. You just made your very own garden from scratch!

Scat

State Standards: 2d, 4a

Animal droppings are a natural part of this world. Another word for animal dropping is SCAT. There are even scientists, called scatologists, who study scat all day long. There is a lot you can tell about an animal by looking at its scat. You can tell what kind of animal left it, how big it was, if it was healthy and what it has been eating. Scientists split animals into different categories based on what they eat. Animals that only eat meat are called CARNIVORES. Animals that only eat plants are called HERBIVORES. Animals that eat both meat and plants are called OMNIVORES. Animals that only eat insects are called INSECTIVORES. At the ENC, your students will get to see some real scat and see if they can figure out which animal it belongs to.

Basic Vocab and Concepts:

- Herbivore – an animal that eats only plants.
- Carnivore – an animal that eats other animals.
- Omnivore – an animal that eats both animals and plants.
- Insectivore – An animal that eats only insects
- Scat – The scientific word for animal droppings.

Recommended Books to Read:

Who Pooped in the Park? Yellowstone National Park: Scat and Tracks for Kids by Gary D. Robson

Get the Scoop on Animal Poop: From lions to tapeworms, 251 cool facts about scat, frass, dung and more! by Dawn Cusick

Suggested Classroom Activity: Make Your Own Edible or Clay Scat

Adapted From: (http://events.nationalgeographic.com/media/files/Animal_Grossology_Teacher_Guide.pdf)

Materials:

Animal Scat ID cards

Plate per student

Oatmeal, water, coco powder, coconut, berries, etc. OR

Different colors of clay.

Purpose:

Your students will learn that you can tell what an animal eats by looking at its scat. Students will make their own fake scat and add the things to it that their animal would have eaten. Even the shape of the scat is unique to each animal!

Procedure:

- Give each student a plate and an animal scat card (available on the website listed above, or you can find your own!)
- Pass out whatever types of materials you are using to make your scat. Give your students time to make a couple of different kinds of scat. Have them pay attention to the shape as well as what is in the scat.
- Coconut makes good bones or fur, nerds make good seeds, nuts are good additions, bits of berries are always nice, pretzels make good insect parts, the list goes on and on!
- If you made clay scat, let it dry and hang it on a string for a wonderful ornament or necklace.
- If you made food scat, allow the kids to eat it.

Wrap-up:

What do you call animals that eat only meat? CARNIVORES. Plants? HERBIVORES. Meat and plants? OMNIVORES. Insects? INSECTIVORES. The next time you are out hiking and you see scat, look at it closely. Don't touch it! Can you tell what animal left the scat?

Eggs

State Standards: 2a, 2b, 2c, 2d

Some creature lay eggs and some do not. Some examples of creatures that lay eggs are insects, birds, fish, reptiles, amphibians and crustaceans. Mammals do not lay eggs. Most animals are born looking just like their parents, whether they come out of an egg or not. There are a couple types of creatures that come out of eggs that DO NOT look like their parents: butterflies (and many other types of insects) and frogs (and many other types of amphibians). They hatch out of their eggs looking very different from their parents. Your students will come to the ENC and look at looks of pictures of baby animals and see if they can match them to their parents.

Basic Vocab and Concepts:

- Animals produce offspring of their own kind and they resemble their parents and one another.
- Life cycles are different for different animals, such as butterflies, frogs, and mice.
- There is variation among individuals of one kind within a population.

Recommended Books to Read:

First the Egg (Caldecott Honor Book and Theodor Seuss Geisel Honor Book (Awards)) by Laura Vaccaro Seeger

An Extraordinary Egg by Leo Lionni

Guess What Is Growing Inside This Egg by Mia Posada

Suggested Classroom Activity: Who Came Out of That Egg?**Materials:**

Three pictures of each stage of several animals of your choice: ie: a frog egg, a tadpole and a frog. A butterfly egg, a caterpillar and a butterfly. A hummingbird egg, a hummingbird chick and an adult hummingbird bird, a penguin egg, chick and adult, an eagle egg, chick and adult etc. Print enough pictures that each child in your class will get one.

Purpose:

Your students will learn that not all eggs look alike, many different animals come from eggs and not all animals look like their parents, but some do!

Procedure:

- Before your students arrive print out pictures of the various stages of several different types of animals that come from eggs.
- Pass out a picture to each student and tell them that they must find their matching partners (they will have two). If you have an egg, what came out of that egg? If you are a baby, what egg did you come out of? What will you grow up to look like? If you are an adult, what kind of egg do you lay and what did you look like as a baby?

Wrap-up:

Did you all find your partners? How could you tell? Size, shape, color, where the eggs were laid. When you go to the grocery store and buy eggs, what kind of animal do they come from? A chicken! Not all eggs look the same.

Metamorphosis

State Standards: 2a, 2b, 2c, 2d

What did you look like when you were born? Did you have a tail? Wings? Did you look like a human? YES. Most animals are born looking like their parents, but some animals do not. When an animal must change through it's life by growing new body parts, we call this metamorphosis. Butterflies and Toads go through metamorphosis and both have four stages. A butterfly starts as an egg, hatches as a caterpillar, makes a chrysalis and emerges as a butterfly. A toad starts as an egg, hatches as a polliwog, grows small legs, but still has a tail and is called a toadlet and finally absorbs the tail to become a toad. At the ENC, your students will get to visit our butterfly house (May through October) OR visit a live toad!

Basic Vocab and Concepts:

- Metamorphosis - A change in the form of an animal throughout its life cycle. Metamorphosis includes, in insects, the transformation of a caterpillar into a butterfly.
- Chrysalis - The nonfeeding stage between the larva (caterpillar) and adult in the metamorphosis of some insects, during which the larva typically undergoes complete transformation within a protective hardened case. Moths generally create cocoons AROUND their chrysalis, or pupa.

Recommended Books to Read:

Houdini the Amazing Caterpillar by Janet Pedersen

Velma Gratch and the Way Cool Butterfly by Alan Madison

Growing Frogs: Read and Wonder by Vivian French

Suggested Classroom Activity: Metamorphosis Rock, Paper, Scissors**Materials:**

A wide, open space

Purpose:

Your students will become creatures that go through metamorphosis by playing Rock, Paper, Scissors. They will learn all four stages of metamorphosis.

Procedure:

- Teach your students how to play rock, paper, scissors if they do not already know how.
- In an open area, tell your students that instead of humans, they are going to be a butterfly or a frog, going through metamorphosis. The only way to get to the next stage is by playing another butterfly or frog who is in the same stage as you. Ie. An egg can only play an egg, a caterpillar with a caterpillar, etc.
- Turn them all into eggs. Butterfly eggs are usually laid on the leaf of their favorite plant and frog eggs are in the water. Have all of your students crouch on the ground in a ball. Play rock, paper, scissors with another egg! If you don't win, try again with another egg.
- If you win, it's time to hatch! Caterpillars like to munch the leave the just hatched on and they get bigger and bigger. Tadpoles like to swim around with their tail and eat water plants and sometimes bugs. Have your kids wiggle around to act like caterpillars or tadpoles.
- If you win, it's time for stage three! Butterflies build a chrysalis around their caterpillar bodies and frogs grow small legs, but keep their tail. They are called froglets! Have your students act like froglets or chrysalis while they play rock, paper, scissors.
- If you win, you become an adult butterfly or an adult frog.

Wrap-up:

Were there any students who got stuck at a stage and could not turn into butterflies? This happens in nature too! Some eggs don't hatch, caterpillars and tadpoles get eaten, chrysalis can get too hot or too cold, froglets may not get enough to eat. Metamorphosis can be perilous!

