It's Alive!
Life Science in the Elementary Classroom

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PROGRAM OBJECTIVES

It's Alive! Life Science in the Elementary Classroom is a hands-on approach to teaching the life sciences in an ongoing, yearlong format. The program is presented in three units, utilizing a classroom frog habitat, ant farm, and butterfly pavilion. During the frog unit, the students will be introduced to the concept of metamorphosis. They will learn the necessity of providing for the biological needs of the tadpole, and will observe the influence of available space in a habitat on tadpole growth. Butterfly metamorphosis will be observed during the butterfly unit, and students will observe the different nutritional needs of different species of caterpillars. During the ant unit the students will observe these social insects at work and be introduced to the importance of accurate record keeping during a scientific investigation.

Countless informative books are available on the topics of frogs, butterflies, and ants. These books serve as a valuable resource, but nothing can compare to the wonder and excitement of observing live specimens in the classroom.

SKILLS

It's Alive! Life Science in the Elementary Classroom addresses the Sunshine State Standards for Processes of Life, How Living Things Interact with Their Environment and The Nature of Science. Specific Benchmarks addressed include but are not limited to:

SC.F.1.1.1 The student knows the basic needs of all living things
SC.F.1.1.3 The student describes how organisms change as they grow and mature.
SC.G.2.1.1 The student knows that if living things do not get food, water, shelter, and space, they will die.
SCH.1.1.1 The student knows that in order to learn, it is important to observe the same things often and compare them.
Tadpole metamorphosis

Sunshine State Standards:

SC.F.1.1.3 The student describes how organisms change as they grow and mature
SC.G2.1.1 The student knows that if living things do not get food, water, shelter and space, they will die.

Objectives:

To introduce the concept of metamorphosis as a tadpole transforms into a frog.
To meet the biological needs of the tadpole, involving food, water and shelter.
To observe the influence of available space in the habitat on tadpole growth.

Materials:

Three one-gallon flex-tank aquariums
Tadpole food
Individual student journals and charts
Large supply of locally available newly hatched tadpoles (if the teacher does not know where to obtain tadpoles, check with fourth and fifth grade students. They are usually a good source for obtaining tadpoles.)

Procedure:

1. Fill three one-gallon flex tank aquariums with three quarts of pond water. Maintain equal water levels in the three tanks throughout experiment.
2. Place one tadpole in the first tank, three tadpoles in the second tank, and approximately 20 tadpoles in the third tank. Provide food as needed. Each week, estimate the sizes of the tadpoles in each tank. Record observations in charts and journals. As the weeks progress, discuss why the tadpoles in the third tank are much smaller that those in tanks one and two.
3. As the tadpoles transform into frogs, release them back to the exact location from which they came. This is the perfect opportunity to discuss specific environmental conditions required by animals, and the differences that exist in habitats just a few miles apart.
LESSON PLAN 2

Butterfly Pavilion

Sunshine State Standards:

SC.F.1.1.1 The student knows the basic needs of all living things.
SC.F.1.1.3 The student describes how organisms change as they grow and mature.

Objectives:

To construct a butterfly pavilion to observe butterfly metamorphosis
To observe the life cycle changes of the butterflies.
To observe the different nutritional needs of two species of caterpillars

Materials:

1 butterfly pavilion or ten gallon aquarium with screen top
10 painted lady caterpillars
ground malva leaves (for use as food for painted lady caterpillars)
1 or more monarch caterpillars
milkweed leaves (for use as food for monarch caterpillars)
construction paper, markers, art supplies to illustrate observations

Procedure:

1. Set up butterfly pavilion according to instructions
2. Introduce painted lady caterpillars to pavilion. Provide ground malva leaves sent with caterpillars.
3. Introduce monarch caterpillar to pavilion (these can be found locally in fields of milkweed plants in early spring in Central Florida.) Provide fresh milkweed leaves daily.
4. Observe which food each species of caterpillar eats. Discuss the danger in removing a caterpillar from it's natural habitat. It is very difficult to determine what type of leaf each species of caterpillar needs to survive.
5. Observe behavior as caterpillar prepares to pupate (form a chrysalis).
6. Record and compare time needed for each species of caterpillar to emerge from chrysalis. Within 48 hours of emerging, release butterflies to natural habitat.
7. Illustrate through various art media the four stages of the butterfly's life cycle.
Ant Observation

Sunshine State Standards:

SC.F.1.1.1 The student knows the basic needs of all living things.

SC.H.1.1.1 The student knows that in order to learn, it is important to observe the same things often and compare them.

Objectives:

To construct an ant habitat to observe the ants on a regular basis.

To determine if ants prefer one food to another.

Materials:

Ant Factory

Supply of live ants

Various bits of food

Ant Observation Chart

Procedure:

1. Construct Ant Factory and add the live ants according to directions.

2. Have students bring small food samples from home. Be sure to include some that are sweet, salty, and sour.

3. Select two different-tasting foods per day. Put a small amount of each side by side in the Ant Factory.

4. Observe and record which food the ants touched first. Which was carried away first? Were either of the foods ignored?

5. Repeat the next day with two different foods. Be sure to include some of the same foods on different days. Did the ants react the same way each time to that particular type of food?

6. Record all observations daily on the Ant Observation Chart.
Tadpole Transformation (Art, Science)

Students make a paper tadpole puppet that turns into a frog and learn the meaning of the term metamorphosis.

Make a copy of page 23 for each student. Begin by discussing a frog's metamorphosis, the process of changing from a larva (tadpole) into an adult (frog). **Meta** means “change” and **morph** means “shape.” Show students pictures of frog eggs, tadpoles in various stages, froglets, and full-grown frogs.

Explain that once the tadpoles hatch from the eggs, they have gills to breathe with and a long tail. Eventually, the tadpole transforms into a froglet, a small adult frog with four legs, no gills, and no tail.

After kids have colored the frog and tadpole body parts on page 23, help them fill in the blanks to spell **metamorphosis**. Then help them cut out the pieces along the solid lines. (To make the pieces sturdier, glue them to thin cardboard before cutting them out.) The spots marked with an asterisk show where to punch holes for the paper fasteners. Guide students through the stages of assembling the tadpole and frog:

1. Attach the tail to the body as shown to make the tadpole.
2. Attach the two hind legs in the same place as the tail.
3. Attach the two front legs.
4. Remove the tail to make the froglet.

Invite students to arrange puppets in various stages of frog development and line them up in the correct sequence.

**BOOK BREAK**

*Frogs* (First Discovery Book) by Daniel Moignot (Scholastic, 1997) will come in handy when discussing metamorphosis. The see-through pages and detailed art make the progression from egg to tadpole to frog easy for children to follow.
Tadpole Transformation

Color the pieces and cut them out.

When a tadpole changes into a frog, the process is called _________________
Cut out the frogs.
Paste the big frog on the lily pad.
Paste the little frog on the log.
Trace the path from the log to the lily pad.

Frogs can live in the _______________________.

Frogs can live on _______________________.

________________________ are amphibians.

Word Bank
land  
water  
frogs
Laying Eggs

Name ____________________________

Cut out the frog’s eggs. Paste them in the water.

The frog lays her _______________ in the spring.

She lays the eggs in the _______________.

Word Bank
water
eggs
Tadpoles

Name ____________________

Cut out the tadpole. Paste it in the water.

The eggs hatch into ________________.

They breathe with ________________ like fish.

Word Bank

- gills
- tadpoles
Growing

Cut out the changing tadpole. Paste it in the water.

The tadpole grows ____________________________

Its ______________ becomes smaller.

The tadpole still lives in the ______________________

It can live on land when it becomes a ______________

Word Bank

- tail
- water
- legs
- frog
The Life Cycle of a Frog

Name ____________________________

Cut out the pictures.
Paste them in order.
Write the name of each picture.

Word Bank
egg
adult
tadpole

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1. Provide each child with a copy of page 11, the patterns on page 12, scissors, crayons or markers, glue, and access to a stapler.

2. Instruct the youngster to cut out the booklet pages along the heavy solid lines.

3. Then direct the child to sequence the numbered pages behind the cover and staple the minibooklet along the left margin.

4. Read the minibooklet aloud to your students as they follow along. During your reading, guide students to notice the shaded areas on each booklet page. Encourage the student to determine which pattern from page 12 should be glued in the shaded area on each page.

5. Direct students to cut out the patterns from page 12 and then glue them in the correct places on each booklet page. (See the key on page 10.)

6. If desired, have students color the minibooklet pages.
How a Butterfly Grows

by

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1. A caterpillar grows inside an egg.

2. The caterpillar hatches and eats leaves.

3. The caterpillar makes a chrysalis to live in while it becomes a butterfly.

4. The butterfly begins to come out of the chrysalis. Now it will eat nectar.

5. The butterfly flies away.
Butterfly Book

Color, cut, and staple to make your own mini-book.

1. A female butterfly lays some eggs.
2. A tiny caterpillar, or larva, crawls out of an egg.
3. The larva eats and eats. It sheds its skin and grows.
4. The caterpillar becomes a pupa covered by a hard shell called a chrysalis.
5. A new butterfly breaks out of the chrysalis. Soon it will fly away.
Follow the Butterflies

- How do we know where monarchs go each autumn? People around the country tell scientists when they see traveling monarchs.

- Connect the dots from A to F to show the path some monarchs take. Then use the map and the key to answer the questions below.

1. On what date were the monarchs seen in Iowa?

2. In which state were the monarchs on October 1?

3. In which direction did the monarch butterflies travel?

4. In how many states were the monarchs seen before reaching Mexico?
Can You Spot the Imposter Ant?

Adapted from Scholastic's SuperScience Blue, May 1995.

Experiment to find out how earth's atmosphere traps the sun's heat.

Welcome to "Lifestyles of the Strange and Shrimpy." These weird ants are real — except for one. Your job is to expose the imitation ant! How? Read the descriptions carefully. Do any clash with what you know about insects?

- **DAIRY ANTS** keep herds of aphids, like farmers keep herds of cows. The ants "milk" the aphids by stroking them with their antennae. That signals the aphids to release a sweet treat called honeydew. The ants get a tasty meal — and the aphids get protection from predators.

- Tiny **SHAMPOO ANTS** earn their living from the beauty business. These ants set up shop near the home of some larger ants. When the big ants return from gathering food, the little ants set to work. They clean and massage their clients all over. After the pampering is done, the big ants pass some food to their groomers!

- Gardening comes naturally to **LEAFCUTTER ANTS**. But instead of vegetables, these ants grow fungus to eat. They fertilize their garden by chewing up leaves and dropping them into the fungus. Nutrients from the leafy mush help the garden grow. The ants can carry pieces of leaf 10 times heavier than they are. Each colony is so big that it can strip a tree bare in one night!

- **LEAPING ANTS** catch their food in midair. Eight legs give them extra bounce. These ants begin hopping as babies. But when they mature into larvae, they lose their springy step. Look for leaping ants in cold climates. The lower the temperature, the quicker they jump.

- Building a home is a big job. So **WEAVER ANTS** use teamwork. First, they have to pull two leaves together. If the leaves are far apart, the ants line up and form a chain. Ants at both ends grab a leaf, and the group pulls the leaves close. Other ants then use sticky silk thread — made by ant larvae — to "sew" the leaves together. By adding more and more leaves, the ants can make a house the size of a football.

Answer: The Leaping Ants are the imposter ants! Why?

1. Insects have **SIX** legs, not eight;
2. "Larvae" is the term for an insect in its **early stage**, **not** in its maturity;
3. Bugs are more active in warmer climates, not colder;
Ant Hill
A book for individual student stories

Layer 1 - green cover with ants and ant hole entrance
Layer 2 - inside of ant hill
Layer 3 - writing lines
Back cover - background sheet of green paper

Writing Suggestions
Students write on a 7" x 11" (18 x 28 cm) piece of writing paper cut to match the ant hill shape.

All About Ants
The Adventures of Arnold/Amelia Ant
Down Into an Ant Hill--Pretend you have shrunk to the size of an ant. Describe what you discover/experience when you crawl down into an ant hill.
Attack of the Nine-Foot Ant
Re-tell or continue I Can't said the Ant.

Steps
1. Reproduce the ant hill pattern on page 46. Cut it out. Draw in ants or use the patterns provided. (See page 47.)
2. Cut a green construction paper cover the same size as the ant hill.
3. Cut the writing paper in the same shape as the ant hill.
4. Cut the background sheet from 9" x 12" (22.8 x 30.5 cm) green construction paper.
5. Staple all the layers together along the bottom.
6. Use a hole punch to make an "ant hole door" in the green ant hill cover. Add some ants climbing in or out of the opening.
Ant Hill Pattern
Layer 2
Patterns
Ant Manipulatives

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Butterfly pavilion w/ certificate for caterpillars #181
Live Butterfly Activity Book #7025
Caterpillar to Butterfly Puppet #599
Painted Lady Butterfly Life Cycle Stages #476
Frogs - A First Discovery Book #858
Frogs Undercover Book #897
I Toad You So Curriculum Guide #891
Ant Homes Under the Ground #29
Face to Face with the Ant #41
Shipping @ 15%

Frog Hatchery Kit SB13623M
1 Gallon Flex-Tank w/Cover SB19272M 3 @ $3.60
Ant Factory w/certificate for live ants SB25337M
Shipping on 6.25 pounds

TOTAL