

RAISING BUTTERFLIES

BIG IDEA 16: HEREDITY AND REPRODUCTION

BENCHMARKS AND TASK ANALYSES

SC.2.L.16.1 Observe and describe major stages in the life cycles of plants and animals, including beans and butterflies.

The student:

- understands that all living things go through a life cycle.
- observes and describes major stages in the life cycle of a bean.
- observes and describes major stages in the life cycle of a butterfly.

SC.2.N.1.1 Raise questions about the natural world, investigate them in teams through free exploration and systematic observations, and generate appropriate explanations based on those explorations.

The student:

- raises questions about the natural world.
- investigates questions in teams through free exploration and systematic observations.
- generates appropriate explanations based on those explorations.

SC.2.N.1.3 Ask “how do you know?” in appropriate situations and attempt reasonable answers when asked the same question by others.

- asks “how do you know?” in appropriate situations.
- attempts reasonable answers when asked the same question by others.

KEY QUESTION

What is the life cycle of a butterfly?

TEACHER BACKGROUND INFORMATION

Butterflies go through 4 stages of development that begins with the adult female laying eggs. A caterpillar hatches out of the egg (larva stage). After a rapid growth period the caterpillar encases itself in a chrysalis (pupa stage) and begins a transformation process (metamorphosis). The adult butterfly emerges from the chrysalis. Butterflies make a chrysalis and moths make a cocoon.

MATERIALS

Per group

butterfly culture
butterfly habitat
cotton balls
dropper
sugar
water
pasta – orzo, small elbow, rotini, bow tie
milkweed plant and dill weed
glue
crayons/markers

Per Student

paper plate
hand lens
pencils
construction paper
scissors
copy of butterfly handout

SAFETY

Students should not handle caterpillar, chrysalis or butterfly.

TEACHING TIPS

- Determine whether monarch or swallowtail larvae will be ordered.
- Larva can be ordered through educational suppliers (check with Curriculum Resource Teacher, Scott Foresman coupons, Insect Lore, other suppliers) or purchased locally (Butterfly Man at the Winter Park Farmers Market, Lukas Nursery or any other nursery that sells butterflies).
- Milkweed plants (food source for monarch caterpillars) and dill plants (food source for swallowtail caterpillars) can be purchased at nurseries (Lukas is a good source).
- When caterpillars are purchased they are in a culture. Instructions are sent with the caterpillars and culture and you should follow these directions.
- Plan ahead for shipping time of larva when ordering.
- Set-up calendar at the first center for starting date and calculate the number of days for each phase.
- Set-up centers ahead of time.
- Gather books about butterflies (see Order of Instructions resource list. Supplement with books from school library if necessary).
- Be certain to release the butterflies at the end of the activity.

ENGAGE

1. Tell students they are going to observe an insect's life cycle.
2. Describe the insect in its adult form (e.g., as an adult it flies, when it hatches, it crawls) and ask what insect they think it might be.
3. You may want to give them hints such as, this insect flies when it is an adult and crawls in the larva stage. It also goes through four stages of development.

EXPLORE

Center 1 – The Butterfly Culture/Habitat

Center 2 – Make life cycle plate

Center 3 – Butterfly parts and labels

Center 4 – Books about butterflies

Center 1 – Butterfly Culture/Habitat

Materials

butterfly culture

butterfly habitat

hand lens

science notebooks

pencils

crayons

Student will be given time to observe the caterpillars as they eat. Encourage students to draw what they observe in their science notebooks. They should color their drawings as they see it not in imaginary colors. Tell them their drawings need to be scientific (no other drawings should be on this page). During

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a later observation, students may be able to see the caterpillar in the j-shape as they prepare to go in to the chrysalis stage. This center can be used weekly until the butterflies emerge. Once the butterflies emerge, have students draw one or more in their science notebooks.

Center 2 – Make a Life Cycle Plate

Materials

paper plates

markers

pasta (orzo-egg, small elbows-caterpillar, rotini-chrysalis, bow tie-butterfly)

white glue

In this center students will create a paper plate life cycle of the butterfly. Divide paper plate into four sections showing the four stages of the butterfly. Students are to label the sections with the words stage one, stage two, stage three, stage four – one stage per section. They are also to draw an arrow from the first stage to the second, from the second stage to the third, and from the third stage to the fourth stage. Display an example for the students to follow. Have students glue orzo pasta (egg) in the stage one section, small elbow pasta (caterpillar) in the stage two section, rotini (chrysalis) in the stage three section and bow tie pasta (butterfly) in the stage four section.

Center 3 – Butterfly parts and labels

Materials

construction paper

scissors

markers and/or crayons

handout of a butterfly

In this center students will label the parts of the butterfly. Make enough copies of the butterfly activity sheet for each student and put them the center. Instruct students to label (write in) the parts of a butterfly on the activity sheet. Display example for students.

Center 4 – Books about Butterflies

Materials

a variety of non-fiction and fiction books

EXPLAIN

Ask the students the following questions and have them respond in their science notebooks:

What did you observe in the first center?

What are the stages of the butterfly?

What did you learn about the life cycle of the butterfly?

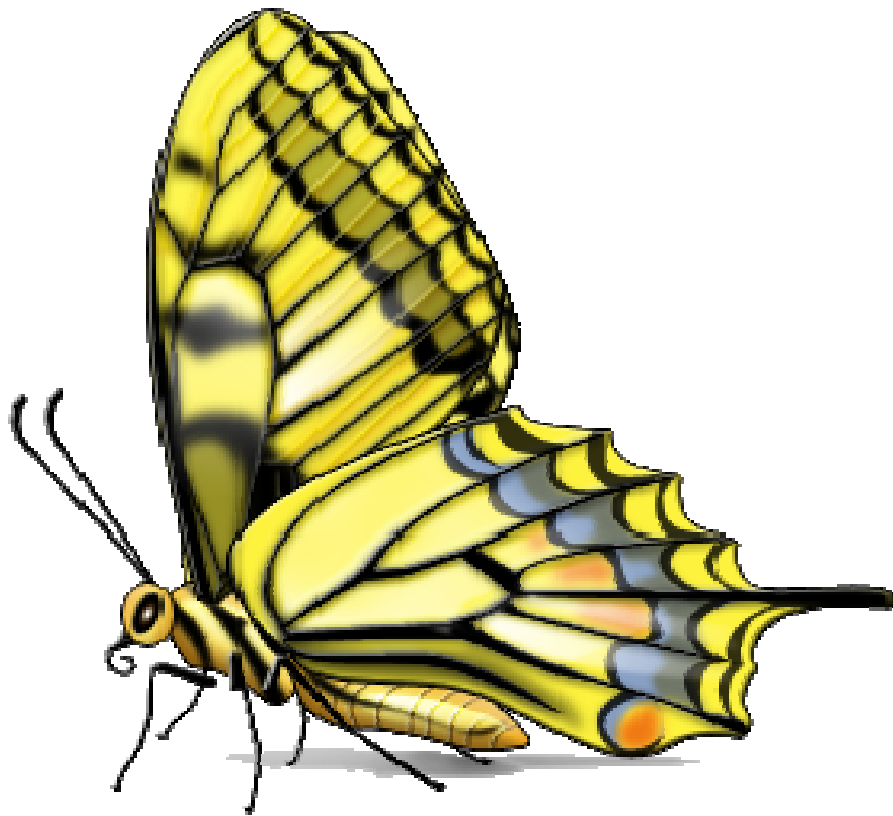
EXTEND AND APPLY

1. This lesson can be repeated to investigate the life cycle of frogs.
2. Students access <http://www.enchantedlearning.com/subjects/butterfly> to participate in a butterfly game.
3. Symmetry Mirror – students complete an activity sheet that has only one half of a butterfly by using the mirror to complete the blank side of the sheet paying attention to a butterfly's symmetry.

ASSESSMENT

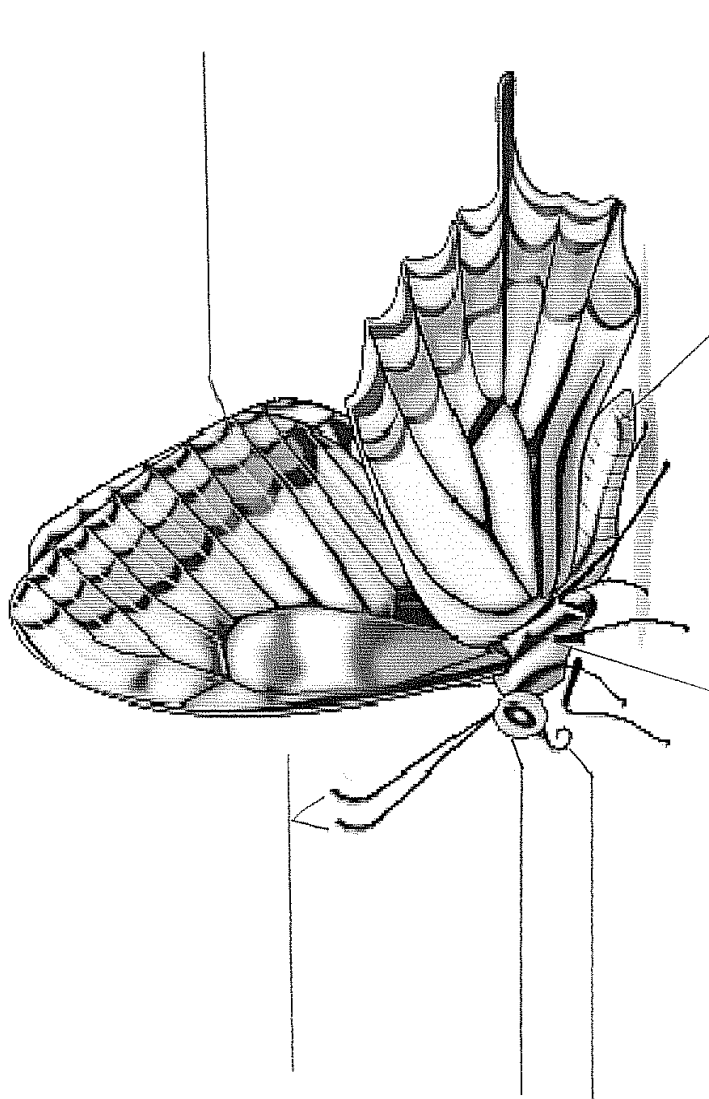
Scoring Rubric (from activity sheets 1 & 2 and written response)

3 points	Detailed drawings were kept in the science notebook. Body parts were correctly labeled and the life cycle was put into correct order. Responses to the questions in Explain and Apply were detailed and correct.
2 points	Drawings contained some detail. Some body parts were labeled and the life cycle put into correct order. Responses to the questions in Explain and Apply contained some detail.
1 point	Drawings lacked detail. Labeling of body parts was not complete and there were limited responses to the questions in Explain and Apply.



Label the parts of a butterfly.

1. antennae
2. thorax
3. abdomen
4. head
5. wings
6. proboscis or feeding tube



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2. thorax
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SPROUTING BEANS?

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KEY QUESTION

What is a life cycle of a plant?

TEACHER BACKGROUND INFORMATION

The life cycle of the bean plant is fast. Water, air, and sunlight are important to the growth of a bean. The bean seed needs water to make it swell, soften the coat and help the embryo grow (germination). Once the bean begins to sprout, it starts to grow into a plant. This is a rapid process in comparison to animals and humans. The flowering process occurs during the reproductive stage. Once it becomes an adult, it produces new seeds.

MATERIALS

Teacher

bag of large lima beans
box of Ziploc bags
roll of paper towels
water
tape
calendar

Per student

1 Ziploc bag
2 lima beans
1 wet paper towel

SAFETY

Do not eat the beans.

TEACHING TIPS

- This is an ongoing lesson that requires multiple days.
- Write students name on a plastic bag ahead of time so students can find their experiment more easily.
- Set-up calendar with starting date and document the number of days for each phase.
- Pinto beans can also be used for this activity

ENGAGE DAY 1

1. Tell students they will observe the life cycle of a lima bean.
2. Hand each student a dry lima bean and discuss what they see (color, texture, firmness, etc.). Have students measure and draw their lima bean in their science notebook.
3. Have the students put the lima bean in a cup with water to soak over night.
4. Have the students predict in their science notebooks what they think happens in the life cycle of a lima bean.

EXPLORE DAY 2

1. Have students tell what they observed when the bean was soaked overnight and draw a picture in their science notebooks.
2. Have students take the bean out of the water and pull the seed coat off and observe what they see. Have students draw a picture in their science notebooks.
3. Have the students open the bean, look inside and discuss what they see. Have students draw a picture in their science notebooks.
4. Students can write/draw observation in science notebook.

EXPLORE DAY 3

1. Give each student a plastic bag, 2 lima beans, and a paper towel.
2. Have each student wet his/her paper towel and squeeze excess water out.
3. Fold the paper towel in half and place the paper towel and both lima beans in the plastic bag.
4. Discuss the use of the wet paper towel (moisture).
5. Tape the Ziploc bag to the window.
6. Have students record their observations and take a growth measurement in their science notebooks daily.

EXPLAIN

Ask:

Why did we put a wet paper towel in the plastic bag?

Why was the bag placed in the window?

What do living things need to survive?

What did you observe about your bean?

What did you observe about your classmates bean?

What stages do you observe in the life cycle of your bean plant?

How long did it take for your bean to sprout?

EXTEND AND APPLY

1. Have students repeat activity and place beans in the dark to see how this affects the growth.
2. Place the beans in a Ziploc bag with a dry paper towel to see how this affects the growth.
3. Place the beans in a Ziploc bag with a wet paper towel and add additional water to the bag to see how this affects the growth.
4. Plant beans in a school garden and observe their growth.
5. Compare and contrast the life cycle of the bean to that of a butterfly.

ASSESSMENT

Scoring Rubric (from activity sheets 1 & 2 and written response)

3 points	Daily data have been collected and recorded clearly in the notebook. Detailed drawings were kept. Predictions were in keeping with the activity.
2 points	Some data have been collected and recorded, but not presented clearly in their notebooks. Drawings contained some detail. An attempt at a prediction was made.
1 point	Data was lacking. Drawings lacked detail. No prediction provided.