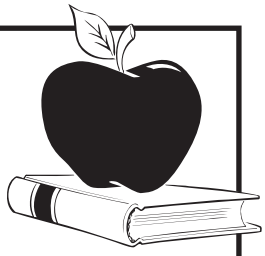
GRADE LEVELS: 1, 3

CORRELATION TO NEXT GENERATION SCIENCE STANDARDS: 1-LS3-1, 3-LS1-1, 3-LS3-1

SKILLS/PROCESSES: observation, data collection & interpretation, analysis, fact finding, evaluation, computation/calculation, charting/graphing

OBJECTIVES: Students will become familiar with the processes of mammalian birth and nurturing.

TEACHER'S GUIDE



UNIT ONE ■ LESSON FOUR

Raising Mammal Young

BACKGROUND

Most mammals are **viviparous**, which means they give birth to living young, as opposed to hatching their young from eggs. (Exceptions are the duck-billed platypus and the echidna of Australia. These mammals lay eggs.) Some young mammals, like mice, rabbits and bats, are born blind and totally hairless, while others, such as deer, are developed enough to move about with the parent soon after birth.

After birth, all newborn mammals are nourished with milk produced in the mother's **mammary glands**, (see Unit 1, Lesson 1). This milk is composed of water, fats, proteins, sugars and mineral salts. Mammals whose young grow the fastest produce milk with the highest protein content.

Weaning generally occurs after the young can eat solid food. Small rodents generally nurse for a week and a half to three weeks. Badgers can eat solid food in the first month but are suckled for four or five weeks.

As physical development progresses, behavioral development also occurs. Behavior patterns are either instinctive, learned or a combination of both. **Instinctive behavior** is automatic and triggered internally, while **learned behaviors** are picked up through imitation of the parent and through play among siblings or other young.

As young mammals mature, their dependency on parents decreases, and they become independent.

RACCOON WITH YOUNG

PROCEDURE AND DISCUSSION

Review the student information with the class. Emphasize in general the mammalian nurturing process and variations from species to species.

1. **What characterizes a viviparous animal?**
   A viviparous animal gives birth to live young (not hatched from eggs).

2. **What do newborn mammals eat? Where does it come from? What is it made of?**
   Newborn mammals drink milk produced in the mammary glands of the mother. This milk is composed of water, fats, proteins, sugars and mineral salts.

3. **What two kinds of behavior do young mammals develop?**
   Young mammals develop both instinctive and learned behavior.

4. **How do young mammals learn those behaviors which are not instinctive?**
   Young mammals learn by imitating their parents and playing with other young.

VOCABULARY

instinctive behavior—an inborn, automatic response or behavior pattern

learned behavior—behavior acquired through imitation and play

mammary gland—a specialized gland in female mammals which produces milk to feed the young

viviparous—giving birth to live young (not hatched from eggs)

wean—the progression of a young mammal from dependence on its mother's milk to independent eating

CHALLENGE YOURSELF EVALUATION

1. Viviparous means giving birth to live young. No, the duck-billed platypus and echidna are egg-laying mammals.
2. Newborn mammals drink milk as their food. The milk is produced by the female's mammary glands. It is made of water, fats, proteins, sugars and mineral salts.
3. The two types of behaviors young mammals develop are called instinctive and learned.

ACTIVITY PAGE EVALUATION

Numbers correspond to paragraphs.

1. See "Species Sheets" for information about each mammal. Students should develop a table to record the information.
2. total offspring which could be produced in one year = litter size x number of litters per year; total offspring which could be produced in two years = litter size x number of litters per year x 2
3. Students should make a graph to illustrate the requested information per species. A line graph is probably their best choice since they will be graphing three different features (weight, litter size and age at maturity) on the same graph.
4. a: least b: fastest c: 40
   d: Many of the young die before reaching maturity. Many others are eaten by other species.
   e. Answers will vary.

EXTENSIONS

Raise a family of mice or other small mammal in the classroom. Record and chart their progress.

Have students conduct more research about instinctive versus learned behaviors in mammals.

Raising Mammal Young

STUDENT'S GUIDE

Most mammals are **viviparous**. That means they give birth to living young. (Exceptions are the duck-billed platypus and the echidna in Australia. These species lay eggs.)

Just how fully developed these newborn mammals are depends on the particular species. Some, like mice, rabbits, squirrels and bats, are born blind and hairless. They must be kept warm, carefully protected and fed by their mother or parents until they grow enough to care for themselves.

Others, like deer, are developed enough at birth to walk around with their parents almost immediately.

All mammals feed on milk produced in the mother's **mammary glands**. This milk is made of water, fats, proteins, sugars and mineral salts.

Some mammals nurse for only a few days (like field mice) and some for a few weeks (like bobcats and coyotes). Sometime after the young begin to eat solid food, the mother's mammary glands no longer produce milk and the young are **weaned**, meaning they no longer depend on their mother's milk.

As the young grow, they also begin to develop the behavior patterns they will need to survive on their own, such as how to find food or build a shelter. These behavior patterns are either **instinctive** or **learned**. Instinctive behavior is "built in," which means the animal is born knowing how to do it. Learned behaviors are picked up from imitating the parents or playing with other young.

As the mammal matures, its dependency on its parents decreases, and eventually it strikes out on its own.

CHALLENGE YOURSELF

1. What does **viviparous** mean? Are all mammals viviparous?

2. What do newborn mammals eat? Where does it come from? What is it made of?

3. What two kinds of behavior do young mammals develop?

VOCABULARY

instinctive behavior
learned behavior
mammary gland
viviparous
wean

EASTERN COTTONTAIL WITH YOUNG

ACTIVITY PAGE:
Graphing Mammal Reproduction

What you will need
- paper or graph paper
- ruler
- writing implements (colored pencils, too, if possible)
- copies of Species Sheets

WHAT YOU DO

Use the "Species Sheets" to gather the following information about each mammal: weight; age at maturity; gestation period; litter size; number of litters per year. Record the information in a table. Leave two columns open at the end of the table. Label one of them "Number of Offspring After One Year" and label the other one "Number of Offspring After Two Years."

Calculate the total offspring that could be produced in one year for an individual mammal of each species. Now find the total offspring that could be produced in two years. (Some of these species do not live for two years but calculate the numbers anyway.)

Make a graph to show the differences in weight for each species. On the same graph, using a different color, show the litter size for each species. Be sure to put a key on your graph to show what the colors stand for. Now add a third color for age at maturity.

Study your table and graph, then answer the following questions.

a) Which mammals produced the most offspring: those that weighed the most or the least?

b) Which mammals produced the most offspring: those that matured the fastest or the slowest?

c) How many white-footed mice offspring were possible after two years?

d) Why do you think that the actual numbers of white-footed mice in nature are lower than in your results?

e) Write a paragraph explaining the trends you observed.