CCBER: Flower Morphology

Next Generation Science Standards

2-LS4-1. Make observations of plants and animals to compare the diversity of life in different habitats. [Clarification Statement: Emphasis is on the diversity of living things in each of a variety of different habitats.] [Assessment Boundary: Assessment does not include specific animal and plant names in specific habitats.]

3-LS1-1. Develop models to describe that organisms have unique and diverse life cycles but all have in common birth, growth, reproduction, and death. [Clarification Statement: Changes organisms go through during their life form a pattern.] [Assessment Boundary: Assessment of plant life cycles is limited to those of flowering plants. Assessment does not include details of human reproduction.]

3-LS3-2. Use evidence to support the explanation that traits can be influenced by the environment. [Clarification Statement: Examples of the environment affecting a trait could include normally tall plants grown with insufficient water are stunted; and, a pet dog that is given too much food and little exercise may become overweight.]

3-LS4-2. Use evidence to construct an explanation for how the variations in characteristics among individuals of the same species may provide advantages in surviving, finding mates, and reproducing. [Clarification Statement: Examples of cause and effect relationships could be plants that have larger thorns than other plants may be less likely to be eaten by predators; and, animals that have better camouflage coloration than other animals may be more likely to survive and therefore more likely to leave offspring.]

3-LS4-3. Construct an argument with evidence that in a particular habitat some organisms can survive well, some survive less well, and some cannot survive at all. [Clarification Statement: Examples of evidence could include needs and characteristics of the organisms and habitats involved. The organisms and their habitat make up a system in which the parts depend on each other.]

4-LS1-1.Construct an argument that plants and animals have internal and external structures that function to support survival, growth, behavior, and reproduction. [Clarification Statement: Examples of structures could include thorns, stems, roots, colored petals, heart, stomach, lung, brain, and skin.] [Assessment Boundary: Assessment is limited to macroscopic structures within plant and animal systems.]

Lesson Plan: Flower Morphology

Objective: Students will learn about the anatomy and morphology of flowers. Students will learn about the structures and processes involved in the reproduction of flowering plants. Students will learn about the process of pollination and explore the reasons for such diverse shapes, sizes, colors, etc. of flowers. Students will also learn the ecological significance of flowers and pollinators as well as their importance to humans. Students will know why flowers produce nectar and pollen.

Materials: Collect a large number of diverse flowers and fruits, Dissecting microscope, Flower anatomy model, KIN Journals, Colored pencils, Rulers

Preparation: Display an array of flowers of different shapes, sizes and colors. Collect some anthers with pollen grains from one of the flowers and set them up on a slide or piece of white paper under the dissecting scope. Locate and set up the flower anatomy model and have colored pencils ready.

Introduction: Gather a small group of students around the flower morphology station to closely observe the diverse array of flowers. To begin a discussion on the importance of flowers, ask students: What did you have for breakfast this morning? *Answers may be fruit, cereals, donuts, or Cheetos*. *Whatever they ate, it most likely came from flowering plants*. Reinforce the fact that flowering plants are the main source of food for many animals including humans. Some other questions to lead into the discussion may be: Do all plants flower? *No.* Why have flowering plants evolved such complex structures? *Reproduction*. *Flowers are reproductive plant structures (as opposed to vegetative).* Are there boy plants and girl plants? *Yes, some plants are male and others female. Some plants are both and have male flowers and female flowers. Others have both male and female reproductive structures on the same flower!*

Procedure: Continue the discussion by having students open their KIN Journals to pg. 2 to label the structures of the flower diagram. The flower model can be used to help show the parts. Make clear what parts of the flower are male and female. Explain that in order for sexual reproduction to occur, pollen grains from the anther (male) must be transported to the stigma (female). This process is called pollination and can be caused by wind, water, or animals. Ask students: Why do you think animals might want to visit flowers? *Nectar is a sweet liquid exuded by many flowers to attract pollinators and is a major source of food for many animals (hummingbirds, butterflies, etc.)* This can be shown by letting the students get a taste of nectar from collected flowers, if and only if you are sure that the flowers are safe and clean. Use some examples of flowers along with the fruit they develop into (i.e. tomato flowers and a tomato). Show that flowers develop from buds and into fruits. Ask students: What do fruits contain? *Seeds*. Make it clear that seeds will grow into new plants with flowers that develop into fruits with seeds, completing the reproductive cycle.

Conclusion: To conclude, ask students to turn back to pg. 2 of their KIN Journals and hand out colored pencils. Ask students to pick their favorite flower from the table and make a colored sketch. Ask them to be sure to pay attention to detail and label any parts of the flower they can. If time permits, students can turn to pg. 3 of their KIN Journals and answer some short questions.