A Flower Study

Topic
Parts of a flower and seed development

Key Question
How do flowers, seeds, and fruit develop in a plant?

Learning Goal
Students will identify parts of a flower and their function in developing seeds.

Guiding Documents
Project 2061 Benchmark
- *Scientific investigations may take many different forms, including observing what things are like or what is happening somewhere, collecting specimens for analysis, and doing experiments. Investigations can focus on physical, biological, and social questions.*

NRC Standard
- *Each plant or animal has different structures that serve different functions in growth, survival, and reproduction. For example, humans have distinct body structures for walking, holding, seeing, and talking.*

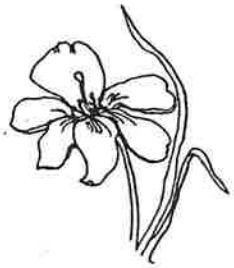
*NCTM Standard 2000**
- *Select and apply appropriate standard units and tools to measure length, area, volume, weight, time, temperature, and the size of angles*

Math
Measurement
length

Science
Life science
botany

Integrated Processes
Observing
Collecting and recording data
Comparing and contrasting

Materials



For each group:
1 flower (see *Management 1)*
hand lens (or field microscope)
small square of black paper
metric ruler

For the class:
overhead transparency of *Parts of a Flower*
1 or more pea pods

Background Information
The flower is the reproductive part of a plant. Most flowers have four main parts: the sepals, petals, stamens, and pistils. If a flower has all four parts, it is complete. If it does not have these four parts, it is considered to be an incomplete flower. All flowers have the same basic function—to produce seeds and so preserve the species. The colors, shapes, and fragrance of flowers help the plant to reproduce itself.

Botanists define fruit as the ripened ovary and seed of a flowering plant. Fruits have many different structures. Some are fleshy, like peaches, grapes, squash, and tomatoes. Others are hard and dry, like sunflower seeds, corn, and wheat. Others have nothing to do with food, like the prickly burs on a puncture vine or the wispy parachutes of dandelions. The function of fruit is to protect the seeds and to assist with dispersal.

Management
1. Obtain complete flowers, preferably of the same variety. It is easiest to see the ovary and seeds in tulips, daffodils, gladioli, lilies, and gloxinia.
2. After students have dissected a flower and are acquainted with its parts, have them bring in other varieties of flowers for comparison.
3. The pistil needs to be split lengthwise. Perhaps an adult will need to do the cutting.

Procedure

1. Ask students to brainstorm the names of all the flowers they know. Record the names on chart paper, a transparency, or the board.
2. Discuss why plants have flowers. [reproduction] Talk about all the colors of flowers and why colors are necessary to flowers. [pollination by birds and insects]
3. Use the *Parts of a Flower* transparency to introduce the name, location, and function of each part.
   - Sepals: leaflike parts at the base of the flower, usually green, that protect it before it opens
   - Petals: brightly colored to attract insects or birds
   - Stamen: makes pollen (male part)
   - Pistil: produces seeds (female part)
   - Receptacle: base where the flower is attached, supports the flower
   - Stem: supports the flower and transports water and food
4. Give each group a flower and hand lens and each student the first observation sheet. Have them carefully study the flower, record their observations, and write a detailed description.
5. Distribute the second observation sheet. Have students remove the sepals, then sketch, count, and measure them.
6. Direct students to remove the petals and record their observations.
7. Have students detach the stamens, identify the anther (top part) and filament (stalk-like part), and record their observations.
8. Explain that the anther contains the grains of pollen or male cells needed to fertilize flowers. Pollen is carried from flower to flower by bees, wasps, birds, wind, etc. To make a pollen print, press the anthers against a piece of black paper.
9. Review the three parts of the pistil—the stigma, style, and ovary. Seeds are produced in the ovary.
10. Have students remove the pistil and record their observations. Tell them the stigma is the sticky upper end to which pollen grains cling. After the stigma receives the pollen, the pollen grains grow tubes down through the narrow style into the ovary. The ovary has ovules containing the egg cells. Fertilization occurs when a male pollen grain and a female egg cell unite. A seed begins to develop and grow.
11. Split the pistil lengthwise and instruct students to look for the ovules inside the ovary. Inform them that, after fertilization, the ovary ripens into a fruit that helps protect the seeds that develop from the ovules. Open a pea pod; the pod is the ovary and the peas are the mature ovules.
12. Have students use the back of the paper to explain the function of each part of the flower.

Connecting Learning

1. What is the purpose of a flower? [to produce seeds]
2. In what part of the flower do seeds develop? [ovary]
3. What is the male part of the flower? [stamen] How does it help with reproduction? [produces pollen]
4. Name some ways pollen is scattered to other flowers. [bees, wind, wasps]
5. How do petals help? [The color attracts insects and birds that might brush against the pollen and carry it to another flower.]
6. What is the female part of the flower? [pistil] How does it help with reproduction? [Pollen clings to the sticky stigma. It travels down the style to the ovary where it joins with the ovule to produce a seed.]
7. Why is it an advantage for the stigma to be sticky? [Pollen will cling better.]
8. If you took a flower apart, what four parts might you find? [sepals, petals, stamens, and pistils]
9. What are you wondering now?

Extensions

1. Cut an apple and have students observe. Explain that the seeds are in the ovary and the receptacle, or base of the flower, is the fleshy part we eat.
2. Cut open and have students compare the undeveloped ovary of a rose with the mature ovary of a rose hip, the fruit of the rose.
3. Encourage students to collect other flowering plants and identify the major parts.
4. Plant seeds of flowering plants and observe how the plants grow.
5. Discuss and list everyday uses for flowers.

Curriculum Correlation

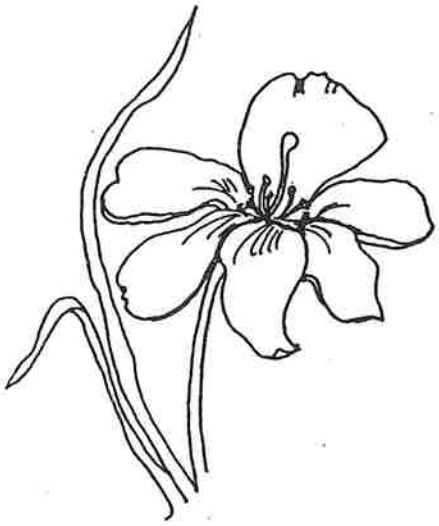
Art

Press some flowers. When they are dry, glue them to a piece of tagboard and cover with clear cellophane wrap. They can also be enclosed in two sheets of clear contact paper. Hang in a window.

A Flower Study

Key Question

How do flowers, seeds, and fruit develop in a plant?

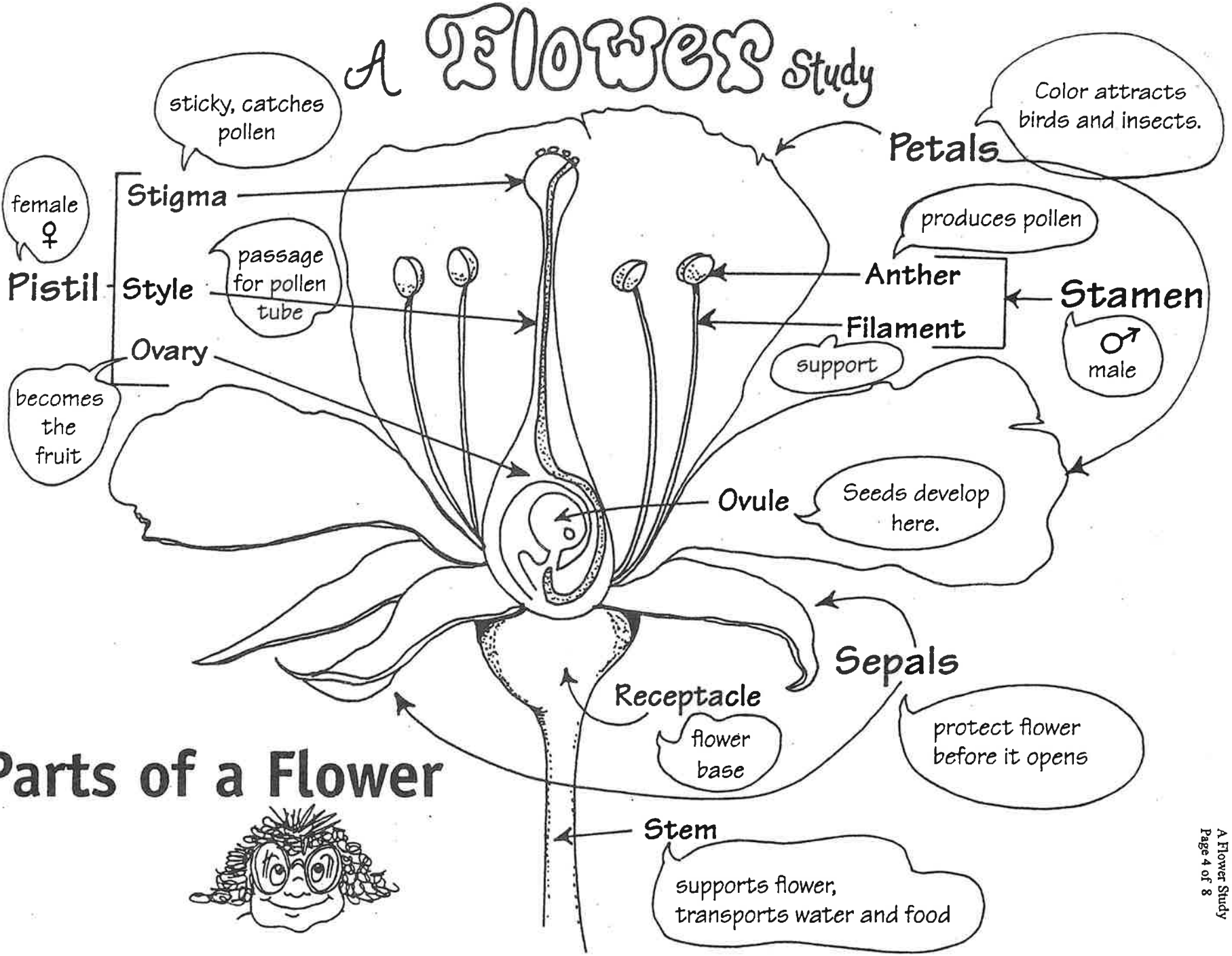


Learning Goal

Students will:

- identify parts of a flower and their function in developing seeds.

A Flower Study



Parts of a Flower

A Flower Study

1. Get a close-up look at a flower. Study the flower from all angles with a hand lens.

Observations:

2. Use pencil and colors to sketch your flower.

Top View

Side View

3. Use your notes to write a description of your flower so that anyone could pick it out from a bunch.

A Flower Study

Carefully remove each flower part.
Sketch, count, and measure.

Flower Part		Sketch	Number (count)	Color	Length (average)
Sepals					
Petals					
Stamen	anther				
	filament				
Pistil	stigma				
	style				
	ovary				
Receptacle					
Stem					

What is the function of each part of the flower?

A Flower Study

1. What is the purpose of a flower?
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4. Name some ways pollen is scattered to other flowers.
5. How do petals help?
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Plants

are made of cells, the basic unit of life.

produce food by photosynthesis

carbon dioxide + water —(sunlight, chlorophyll)→ glucose (sugar) + oxygen + water

Seed Plants

develop from embryo in seed

Flowering Plants Angiosperms

produce protected seeds in fruits

Seeds

dicotyledon | monocotyledon

Conifers Gymnosperms

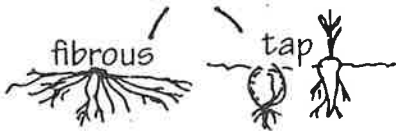
produce uncovered seeds in cones

Seed

have structures that help the plant live and grow in its environment

Roots

- can store food
- anchor plants
- take in water and minerals

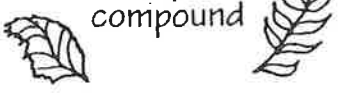


Stem

- acts as a transport system for water, nutrients, food
- supports leaves and flowers

Leaves

- come in many shapes and sizes
- main food-making part of the plant
- can be simple or compound



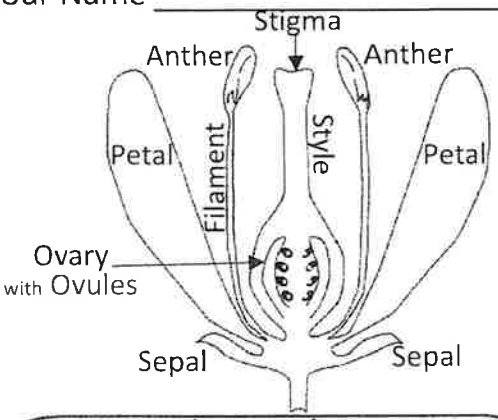
Flowers

- reproductive part of the plant
- produces seeds in fruits

. *Write the type of flower to be dissected and your name.*
'. *As you carefully dissect the flower, place each part of the flower in the correct box with its name.*
'. *Then label the diagram with the matching letter.*

Your Name _____

'ype of Flower: _____



a. **Petal**

b. **Sepal**

STAMEN (male)

PISTIL (female)

c. **Filament**

d. **Anther**

e. **Pollen Grains**

f. **Style**

g. **Stigma**

h. **Ovary** with **Ovules**

PARTS OF A FLOWER