Lesson 4.5 – Flower Power

Preface

The flower industry in the United States earns over five billion dollars each year. Although there is plenty of money to be made from the sale of flowers, the purpose of the flower has far greater implications for the survival of a plant species.

Lesson 4.5 Flower Power is designed to provide basic knowledge and terminology of flower parts that students will need in future lessons, such as sexual propagation of plants. The PowerPoint® presentation Flower Parts and Function will serve as an introductory guide for students to acquire knowledge regarding the parts of the flower as well as the terminology they will need. During Project 4.5.1 Flower Model, students will explore the parts of a flower and learn through a hands-on experience how the parts contribute to the overall function of a flower.

Pollination and fertilization are introduced in this lesson and will be explored in detail in Unit 7 Sexual Reproduction. It is important students establish a basic understanding of plant parts and their respective functions. To avoid students developing misconceptions, it is necessary that you check for student understanding since future lessons are designed to build upon this foundation knowledge.

SAE Connections

Flowers provide students with many Supervised Agricultural Experience (SAE) opportunities from production of agronomic and floral crops to sales and service involving fresh flowers. The market for flower related products can be explored by the following examples of SAE experiences:

- Grow chrysanthemums or poinsettias in a home or school greenhouse for seasonal retail sales.
- Work with a local florist to develop skills creating and marketing floral designs to the public.
- Work with horticultural researchers to develop new varieties of plants by cross-pollinating varieties in an effort to alter the natural color of a flower.

For more information regarding opportunities related to Supervised Agricultural Experience, view the webpage at the following URL: http://www.ffa.org/index.cfm?method=c_programs.SAE
The Floriculture Career Development Event is an opportunity to put knowledge of flowers and potted plants to practice. This team activity includes identification of plants and activities involved with marketing floral crops to the public. Use the National FFA Organization website to research information related to this Career Development Event and discuss the opportunities for participation with students today.

This lesson will provide conceptual and procedural knowledge required for participation in the following FFA activities:

- **Agricultural Proficiency**
  - Floriculture
  - Landscape Management
  - Nursery Operations
- **National Floriculture Career Development Event**
- **National Nursery & Landscape Career Development Event**

For more information about the National FFA Organization, visit the following website: [http://www.ffa.org/](http://www.ffa.org/).

**LifeKnowledge® Connections**

The LifeKnowledge® Connection presented in this lesson aligns with Precept D6 “Value service to others”.

We depend on others in our lives to help us in many ways. It is easy sometimes to fall into the mode of receiving help and advice from others and not share our talents and gifts to better their lives.

Teach students to value service to others, and show appreciation for their kindness by giving back to others. Flowers depend upon insects, birds, and other creatures to spread their pollen from flower to flower. Flowers provide nectar as a food source for the animal. In return, the task of distributing pollen is accomplished for the flower by the animal.

Encourage students to foster more symbiotic relationships in their life to improve others. Every good deed done to you deserves several more done to others.

A variation of Cartographer E-Moment is incorporated in Activity 4.5.2 Flower Concept Map, in which students construct a flower concept map illustrating the relationships among the various parts of the flower.
For more about LifeKnowledge® and E-Moments® review the information found at the following URL: [http://www.ffa.org/ageducators/lifeknowledge/index.html](http://www.ffa.org/ageducators/lifeknowledge/index.html).

**Concepts**

1. Flowers are classified as either complete or incomplete based on the inclusion of either male or female parts, or both.
2. The parts of the flower are the mechanisms for pollination and fertilization and are used by a plant to complete sexual reproduction.
3. Concept maps assist in structuring ideas or concepts and illustrating the various connections between those ideas.

**Standards and Benchmarks Addressed**

*AFNR Career Cluster – Plant Systems Career Pathway*

**Content Standards**

Lesson 4.5 will address part of the following performance element:

PS.01. **Performance Element:** Examine plant anatomy and plant physiology.

**National Science Education Standards**

Unifying Concepts and Processes: As a result of activities in grades K-12, all students should develop understanding and abilities aligned with the following concepts and processes:

- **Systems, order, and organization**
- **Evidence, models, and explanation**

Life Science – Content Standard C: As a result of their activities in grades 9-12, all students should develop understanding of

- **Matter, energy, and organization in living systems**

**Standards for the English Language Arts**

**Standard 12** Students use spoken, written and visual language to accomplish their own purposes (e.g. for learning, enjoyment, persuasion, and the exchange of information).

**Performance Objectives**

*It is expected that students will*

- Identify the parts of a flower and explain the function for each part.
- Construct a model representing the parts of a flower.
- Develop a concept map to illustrate understanding of related ideas and nomenclature necessary to discuss the parts and functions of a flower.
Critical Thinking and Application Extensions

**Perspective**

1. Students will develop a paper discussing the key differences between complete and incomplete flowers and explain the differences in the pollination processes required for plants with incomplete flowers compared to plants with complete flowers.

**Self-Knowledge**

2. Students will develop a list of plants grown in their local area that have complete and incomplete flowers. Students will include this list in their Grower’s Handbook.

**Essential Questions**

1. What are the parts of a flower?
2. Why are the parts of a flower important?
3. How does knowing the parts of the flower affect you in learning about plants?
4. What are the mechanisms required for pollination?
5. What are the mechanisms required for fertilization?
6. What constitutes a perfect flower?
7. What is the difference between a complete or incomplete flower?
8. What is the true purpose of showy petals of a flower?

**Key Terms**

<table>
<thead>
<tr>
<th><strong>Anther</strong></th>
<th><strong>Calyx</strong></th>
<th><strong>Complete Flower</strong></th>
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<tr>
<td>The saclike part of the stamen on seed-producing plants, which develops and contains the pollen.</td>
<td>The outer, usually green, leaflike parts of a flower.</td>
<td>A flower containing sepals, petals, stamens, and at least one pistil.</td>
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<thead>
<tr>
<th><strong>Corolla</strong></th>
<th><strong>Fertilization</strong></th>
<th><strong>Filament</strong></th>
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<tr>
<td>In flowering plants, the inner circle or second whorl of floral envelope; if parts are separate, they are petals.</td>
<td>Union of pollen with the ovule to produce seeds.</td>
<td>The part of the stamen of a flower that is below the anther and supports it.</td>
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<tr>
<td><strong>Flower</strong></td>
<td><strong>Incomplete Flowers</strong></td>
<td><strong>Imperfect Flower</strong></td>
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<td>The reproductive structure of a seed-bearing plant, consisting of the male and/or female organs that are surrounded by one or two series of outer coverings (calyx and corolla).</td>
<td>A flower that lacks one or more of the four organs: sepals, petals, stamens, or pistils.</td>
<td>Flowers lacking either stamens and pistils.</td>
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<thead>
<tr>
<th><strong>Ovary</strong></th>
<th><strong>Ovule</strong></th>
<th><strong>Perfect Flower</strong></th>
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<tr>
<td>The portion of the pistil or carpel of a flower that contains one or more ovules.</td>
<td>The body that, after fertilization, becomes the seed; the egg-containing unit of the ovary.</td>
<td>A flower with both stamens and a pistil or pistils.</td>
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<tr>
<th><strong>Petal</strong></th>
<th><strong>Pistil</strong></th>
<th><strong>Pistillate</strong></th>
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<tr>
<td>A division of a flower inside the calyx; a unit of the corolla, consisting of petioles, which usually surrounds the pistils and stamens.</td>
<td>The female element of a flower; composed of stigma, style, and ovary.</td>
<td>Designating a flower that has a pistil or pistils but lacks stamens; an imperfect flower.</td>
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<tr>
<th><strong>Pollen</strong></th>
<th><strong>Pollen Tube</strong></th>
<th><strong>Pollination</strong></th>
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<td>The male element that carries the spores in the fertilization of the egg nucleus in the ovule of a flower. The pollen is borne by the anthers and is usually a yellowish, dustlike mass of separate grains.</td>
<td>Tube formed following the germination of a pollen grain, when the grain resides on the stigma of a flower. The tube carries the male gametes to the ovule.</td>
<td>The transfer of the pollen from the anther to the stigma of a flower, the first step in producing a fruit or seed.</td>
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<tr>
<th><strong>Sepal</strong></th>
<th><strong>Stamen</strong></th>
<th><strong>Staminate</strong></th>
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<tr>
<td>One of the separate units of a calyx, usually green and foliaceous.</td>
<td>The organ of a flower which bears the pollen (microspores) consisting of the stalk (filament) and the anther.</td>
<td>Designating a flower that has stamens but no pistil and hence is imperfect.</td>
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<th><strong>Stigma</strong></th>
<th><strong>Style</strong></th>
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<td>The receptive surface of the female organ of a flower that receives the pollen.</td>
<td>In the pistil of a flower, the part between the ovary and the stigma; if the style is lacking, the stigma is sessile on the ovary.</td>
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Day-to-Day Plans
Time: 6 days

The teacher should refer to the Teacher Resources section for specific information on teaching this lesson, in particular, Lesson 4.5 Teacher Notes, Plant Glossary, Lesson 4.5 Materials List, and other support materials.

Day 1:
- The teacher will present Concepts, Performance Objectives, Key Terms, and Essential Questions in order to provide a lesson overview.
- The teacher will distribute Presentation Notes pages to be completed and inserted in the Agriscience Notebook.
- The teacher will present PowerPoint® Flower Parts and Function.
- Students will take notes during the presentation on the Presentation Notes pages provided and insert these pages into the appropriate section of their Agriscience Notebook.
- The teacher will provide students with a copy of Project 4.5.1 Flower Model and review the procedures and expectations for Part 1 of the project.
- Students will complete the labels required for identifying the structures for Part 1 of Project 4.5.1 Flower Model.

Day 2:
- The teacher will distribute one complete flower to each student for students to reference during Part 2 of Project 4.5.1 Flower Model.
- Students will work individually to complete Part 2 of Project 4.5.1 Flower Model.
- Students will set aside the models to dry overnight.

Day 3:
- Students will complete Part 3 of Project 4.5.1 Flower Model and set the models aside to dry.
- The teacher will assign reading of pages 48-57 of Plant and Soil Science: Fundamentals and Applications textbook.
- Students will use the remaining time in the class period to read textbook pages and finish as homework.

Day 4 – 5:
- The teacher will provide students with a copy of Activity 4.5.2 Flower Concept Map.
- The teacher will distribute Presentation Notes pages to be completed and inserted in the Agriscience Notebook.
- The teacher will present the PowerPoint® Concept Mapping or demonstrate how to create a concept map (see Teacher Notes for ideas).
- Students will take notes during the presentation on the Presentation Notes pages provided and insert these pages into the appropriate section of their Agriscience Notebook.
- Students will work individually to complete Activity 4.5.2 Flower Concept Map.

Day 6:
• Students will use **Project 4.5.1 Flower Model Rubric** to peer-assess a flower model according to Part 4 of **Project 4.5.1 Flower Model**.
• Students will submit their model and scored rubric to the teacher for grade verification and recording.
• The teacher will distribute **Lesson 4.5 Check for Understanding**.
• Students will complete **Lesson 4.5 Check for Understanding** and submit for grading.
• The teacher will assess student work using **Lesson 4.5 Check for Understanding Key**.

**Instructional Resources**

PowerPoint® Presentations
- **Flower Parts and Function**
- **Concept Mapping**

Student Support Documents
- **Presentation Notes**
- **Project 4.5.1 Flower Model**
- **Project 4.5.1 Flower Model Rubric**
- **Activity 4.5.2 Flower Concept Map**

Teacher Resources
- **Lesson 4.5 Teacher Notes**
- **Lesson 4.5 Materials List**
- **Lesson 4.5 Check for Understanding**

Answer Keys and Assessment Rubrics
- **Lesson 4.5 Check for Understanding Key**

**Reference Sources**


