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Lesson 1: Invention Investigation

To prepare, read [Background Information](#)

Objectives

Students will:

- Study the characteristics of a plant to come up with ideas about how it was used historically or is now used.
- Discover that plants play an important role in history.
- Learn about less obvious but important contributions plants make to their lives.

Central Concepts

- Plants are a part of our daily lives.
- Plants provide important economic products other than food and landscaping.

Standards addressed: [click here](#)

Materials

- Background information
- Examples of plants listed in the background information (gourds, horsetail, papyrus, lamb's ear, indigo, willow, soybeans, cotton, corn, cockleburrs. Feel free to substitute other useful or significant plants you have access to.)

Discussion Questions

- 1. Before beginning the activity, ask students to list ways that they interact with plants. Why are plants important to humans?** (We use plants in our daily lives for food and shelter. They are an important part of our environment/landscapes, and we depend on them for the air we breathe, too. There are a number of plant-derived products we use each day, such as paper and cotton.)
- 2. How do people discover new inventions?** (They use observation skills to identify problems/needs and develop solutions. They use the scientific process to pose a question/hypothesis, research possible solutions, create ways to test their solutions, and then present their results.)
- 3. Each year, plant species disappear and become extinct as humans alter the environment. Why should we be concerned? Do you think we have discovered all the useful plants on earth?** (We may lose plants that possess valuable characteristics, perhaps one containing disease-fighting compounds. Also, losing a species can alter the balance in the environment and impact the ecosystem -- for instance, a lost plant may be the sole food source for a certain animal species, and consequently that species' existence will be threatened.)

In-Class Activity: Invention Investigation

1. Collect as many sample plants listed in the Materials section as you can.
2. Break the class into small groups and give each group one of the plant samples.
3. Tell students that each of these plants has a use or was used by earlier cultures, or is the source of material or inspiration for a product other than food. Give them time to discuss and formulate ideas about the use of their plants.
4. Let each group present their conclusions and their reasoning process. Some plant uses will be harder than others to discover through observation alone, so be sure to give positive reinforcement for all conclusions. Encourage students to be creative in their inquiry process, and provide hints and clues as needed.
5. Next, share use the Background information to share the historical or present use of each plant.
6. Ask students to think about the process of discovery and invention that might have led to current uses

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COMMENTS?

We welcome your questions and comments about this newsletter or

of these plants, and to create a "timeline of discovery" based on their ideas.

Extensions

Science: The cocklebur was George de Mestral's inspiration for the development of Velcro. You can download an information sheet about his discovery at his [company's Web site](#). Distribute the article to your students and then have them answer the following questions:

- What first intrigued George about the cocklebur?
- What kind of questions did George ask about the cocklebur (hypothesis)?
- What did he do to answer his questions (data collection)?
- Once he discovered how the hook and loop worked, what did he do to create Velcro (scientific process)?
- Approximately how many years did it take between his original question and the introduction of Velcro?

Use these materials to introduce the subject of scientific inquiry, and to demonstrate its use in a real-world application. Express to students the importance of learning from nature, and the concept that scientific discovery is not instantaneous -- it doesn't happen overnight. By honing their observation skills and creating experiments to test ideas, they could make a great discovery one day, too!

English and History: Assign students to write a research paper on a famous inventor or scientist who worked with plants or ecosystems. Give them time to share their findings with the class. Older students can develop a monologue for presentation to the class -- they can even dress like the inventor! Some options for inventors in the realm of plant and agricultural products include: Eli Whitney (cotton gin), Eliza Pinckney (indigo in United States), George Washington Carver (peanuts), Norman Borlaug (Green Revolution) and Carl Linnaeus (scientific classification), Rachel Carson (field scientist and environmental philosopher).

Art: Before the design of synthetic dyes, plants were important in creating color for textiles and art work. Investigate plant dyes and give students a chance to create something using these dyes (the dyes can be used to bring color to cloth, yarn, eggs, paper, and so on.) You'll find a wealth of information here: [Dyeing to Find Out: Extracting nature's colors](#).

The Bakkan Library and Museum in Minneapolis also has two excellent lessons on plant dyes. Click here for [Lesson 1](#) and here for [Lesson 2](#).

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