Drawing Plants with Plant Studio Freeware Lesson

http://www.kurtz-fernhout.com/PlantStudio/requirements see Plant Studio Web site for downloading to Windows systems, requirements, and help. *(This lesson can also be done on a field trip to the Illinois State Museum's Research & Collections Center in Springfield, where the Technology Learning Center, Herbarium, and Prairie Garden are located. Phone the Technology Learning Center Coordinator, Brian Bisbee, at 217-557-6093 or Educator Sue Huitt at 217-524-7910 for information.)*
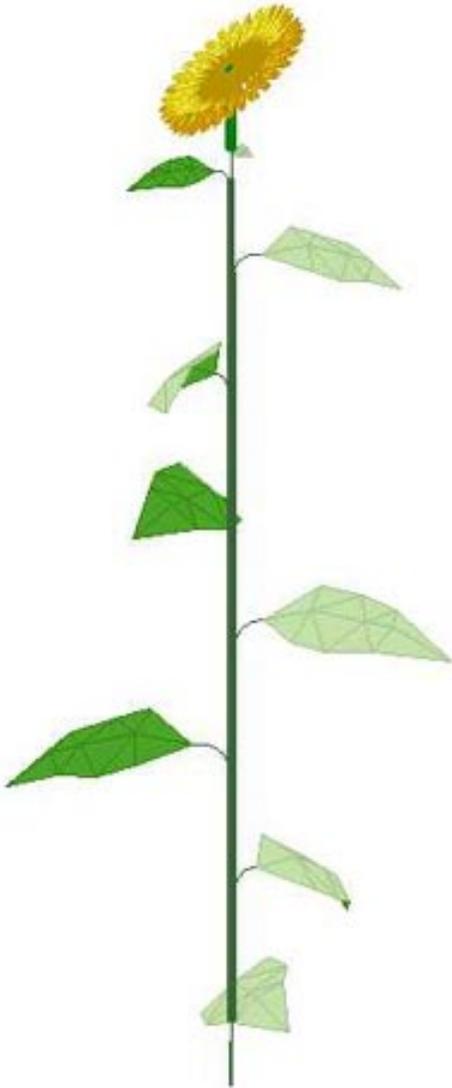
Objective:
Students will be able to identify by name the parts of plants and the relationship among these parts as they use Plant Studio Freeware Wizard and tools on the computer to draw a particular plant from life or from a picture. They will understand how the anatomy and appearance of plants varies with the size and shape and color differences among the same set of parameters. They will also be able to describe how generations of plants may vary in appearance as the parameters vary by using the breeding tool of the freeware. They will be able to edit their drawings by chagning the parameters. They can artistically pose their plants using the posing tool.

Grade Level: 4th and up, adjusting the number and depth of parameters when editing

Time Required: 60 - 90 minutes on the computer

Motivation: Computer graphics and science are being used together in science, art, and museum careers. Science students who do not consider themselves artists can use these graphics tools to study, illustrate reports, make diagrams, and create landscape elements. It is important for scientists and illustrators to know the names of parts of plants and their relationships to one another in order to understand how plants grow and breed. Software designers have created a freeware program for botanists and graphic designers called Plant Studio. This program allows users to create a digital plant in a Wizard by making choices about how plant parts should look, for example, by using a photograph of a plant and making choices of parameters by eye. It also has a tool for breeding generations of plants to show how different parameters become dominant. Users can tweak the parameters of the plant individually to correct the wizard, and can pose the plant before exporting or printing it to use elsewhere.

Materials:
Plant Studio Freeware for Windows – see their Web site for requirements:
http://www.kurtz-fernhout.com/PlantStudio/requirements.htm
Computer (PC)
Printer (optional)

Vocabulary: Have students supply a definition at their level of language and concepts.

    Flower
        Pistil
        Stamen
        Sepal
        Bud
        Bract
    Primary
    Secondary
    Inflorescence
    Fruit
    Root top
    Meristem – (cell groups that grow into a leaf on a stem or another branch)
    Internode – (stem)
    Leaf
    Seedling leaf
    Monocot
    Dicot
    Parameter
    Pose

Procedure:

Outdoors if possible: examine the plants in a garden to identify the parts of plants (listed above) and how the many species of plants differ in appearance although they are made up of the same parts. Students note that the size, length, color, and number of plant parts create different appearances.

Use actual plants as models for the Plant Studio modeling if possible. If impossible, have each student have a photograph or picture (not drawing or painting) of a plant specimen.

Students will open Plant Studio Freeware and be led through its tools briefly (**parameters** will be used to edit, **breed** (in top pull down PLANT menu) is another tool, **pose** is used to edit, **age** lets one view an animation of plant growth.)

Students will start the Plant Wizard; teacher leads students through their choices; results are displayed. Discuss whether the result is an accurate portrayal of the model plant. (as choices are often **short, medium, long**, for example, rather than direct measurements, plants may display legginess or compact-ness compared to the model.

Editing begins by using the parameters screen on the right. If internodes are too short, they can be length-ened; if petals are too large, they can be decreased in size, etc.

After editing, plants can be posed to rotate to the best-looking side or hidden branches can be rotated to show.

When plant is satisfactory, SAVE on disk and/or print it out.

To BREED plant, click on the PLANT item in the top menu and choose BREED. A screen will open and a new generation of variants will appear. Breeding variation (the blue flower icons below the top menu on this screen) can be adjusted from none to high) Discuss which parameters of the parent plant are dominant in each offspring and why that happens. Select any offspring and click on BREED again, etc.

Assessment:
Students will use their vocabulary of plant part names to describe the plant they created. (ten points or fewer)
Students will produce a plant that is recognizable as the species of the model plant. (ten points or fewer)
(To edit their initial Wizard result successfully, they will have to negotiate the terms in the parameters.)
Students will increase their proficiency from novice to beginner or intermediate with the software.

Illinois State Board of Education Goals:
Science: Late Elementary:
12.A.2a Describe simple life cycles of plants and animals and the similarities and differences in their offspring.
12.A.2b Categorize features as either inherited [or learned (e.g., flower color or eye color is inherited; language is learned)].
13.B.2a Explain how technology is used in science for a variety of purposes (e.g., sample collection, storage and treatment; measurement; data collection, storage and retrieval; communication of information).
13.B.2b Describe the effects on society of scientific and technological innovations (e.g., antibiotics, steam engine, digital computer).