

Plants are a challenge to define, even for scientists. Plants are alive. That means:

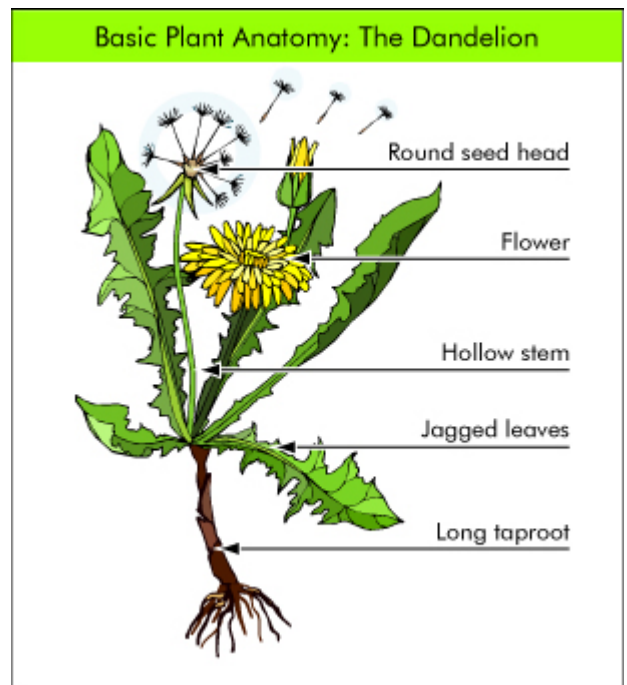
- Plants grow and die.
- They reproduce.
- Plants need nutrients, including food and water.
- Plants produce waste: Plants produce oxygen, which for plants is waste, even though oxygen is beneficial to humans.
- They respond to their environment. For example, a plant can turn to face the sun.

In general, plants are different from animals because most plants have the following characteristics:

- Plants can make their own food.
- They never stop growing, as long as environmental conditions are sufficient. They continue to grow until they die.
- Plants are rooted and cannot move over distances. They have evolved an amazing array of different adaptations that allow them to get what they need to survive, including water, nutrients and sunlight. Because plants cannot move, one protective mechanism creates chemicals that can deter other plants, animals or fungi from attacking a plant.
- Plants can reproduce, through either the dispersal of fertilized seeds or the regeneration of one part of the plant, such as a leaf cutting.

Is a Weed a Plant?

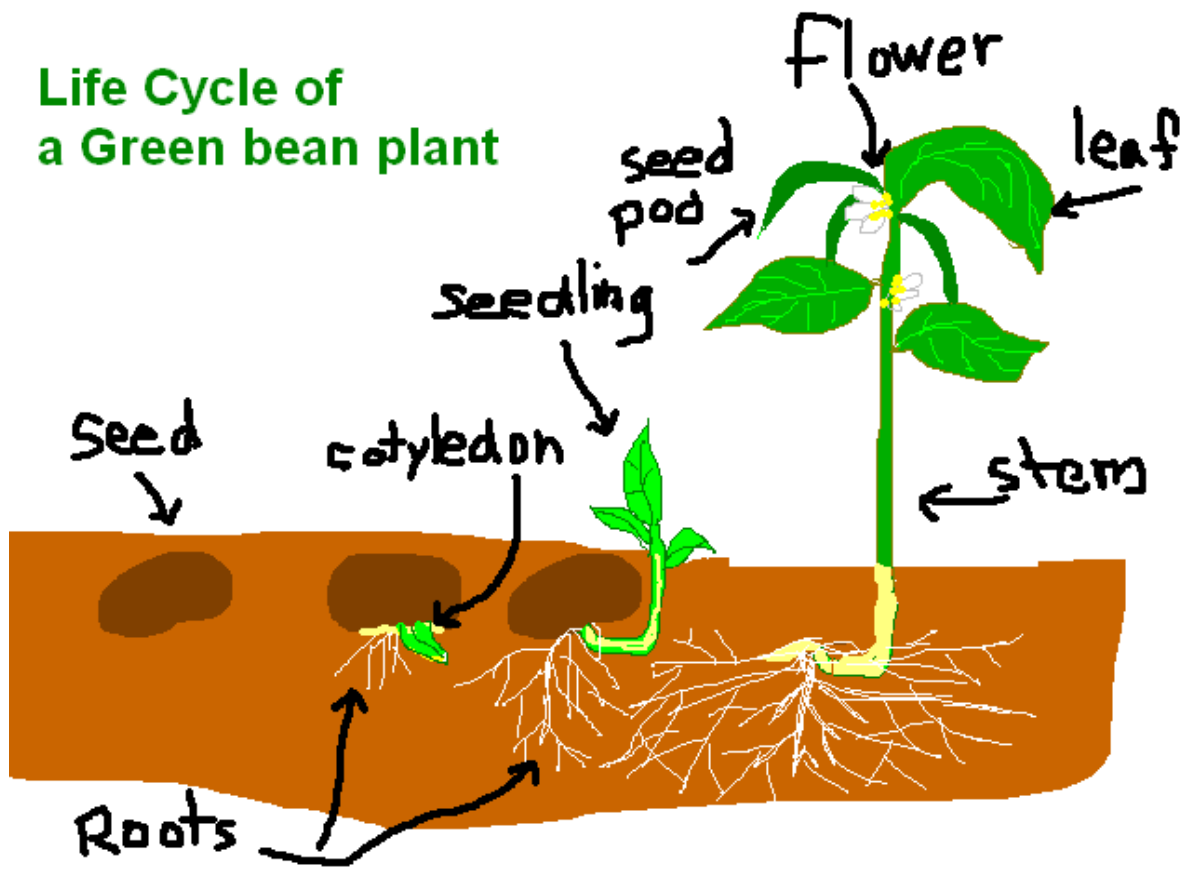
It is important to remember that a dandelion and other weeds are still plants. They have roots, stems, leaves and flowers, and they produce seeds. Weeds are “super plants” – they are especially good at spreading and growing everywhere. Usually, plants are considered weeds when they are not planted by humans or they “bully” other plants around them, taking over an area.



Source: http://www.naturewatch.ca/english/plantwatch/dandelion/dandelion_id.html

Flowering plants go through a predictable life cycle. It begins with a seed. The seed grows into a plant and produces a flower. Once the flower's pollen reaches the stage of becoming an ovule or egg, a seed is formed. Thus, the flower enables the plant to make seeds. Usually it takes more than one flower for this process, which is called pollination, to occur. The flower's partners in this process are pollinators. Different pollinators are matched with different flowers to help a plant make the seed and help the pollinators to get food. A good example of a pollinator is the Monarch Butterfly, which uses the milkweed plant to complete part of the insect's life cycle. After pollination, the inside of the flower swells into a fruit. When environmental conditions are right, a seed is released from the fruit, and a new plant will begin to grow.

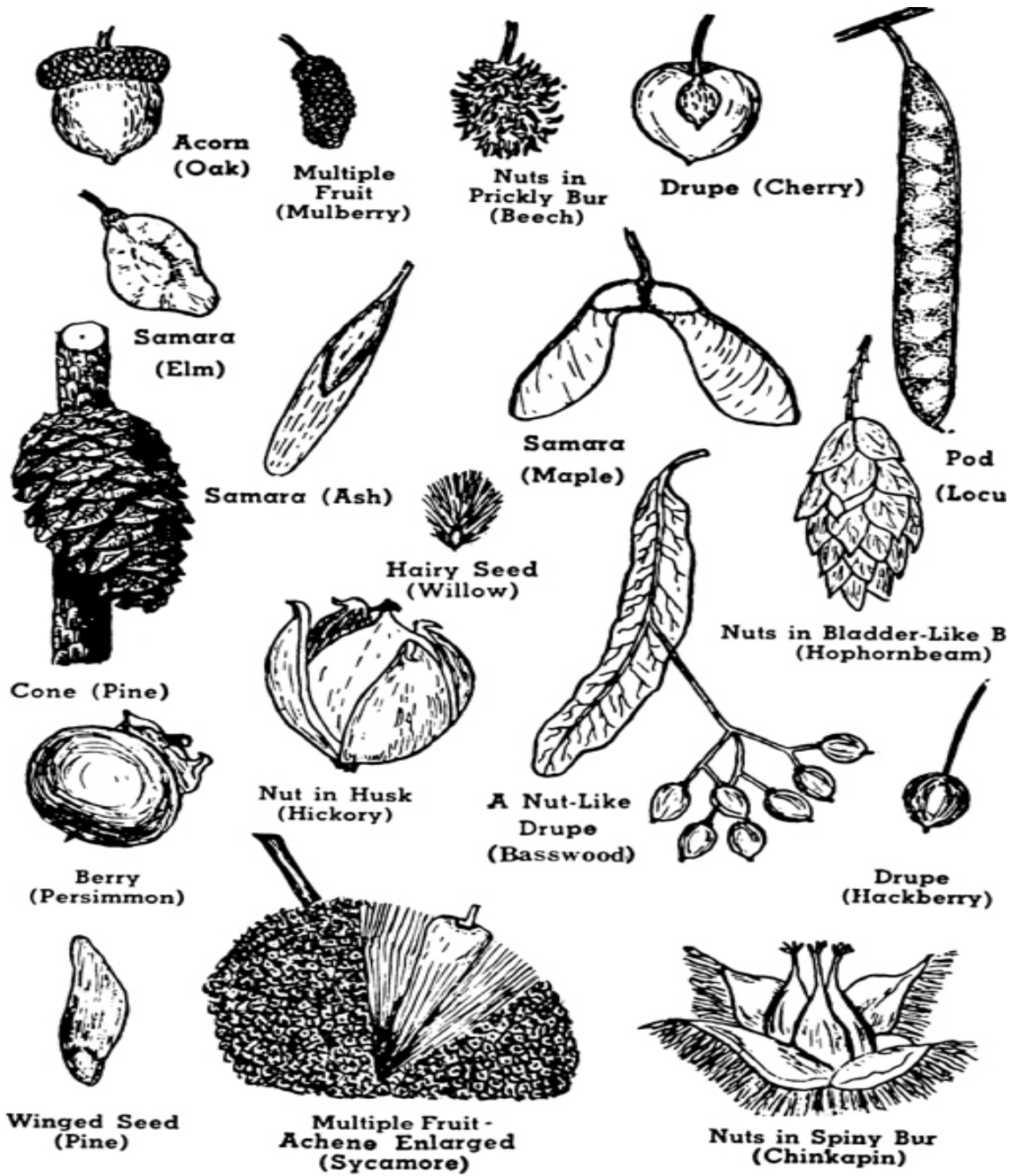
Life Cycle of a Green bean plant



Source: www.norman.k12.ok.us

What is a fruit?

The fruit that the plant produces helps to protect the seed and then helps spread it far and wide. Fruit comes in many shapes and sizes, depending on the plant that produces it. Dry fruit tends to spread via wind and by sticking to animal fur. Fleshy fruit is designed to be eaten by animals. When they eat the fruit, animals produce poop, which contains the seeds and thus helps to disperse it.



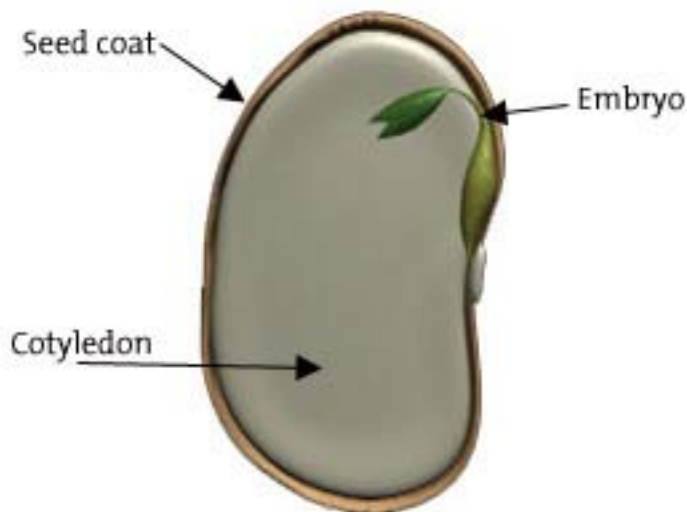
Source: http://forestry.about.com/library/tree/blpart_fruit.htm

What is a seed?

A seed has three main parts:

- The **seed coat** is an outer covering that protects the developing plantlet, or baby plant.
- The **embryo** consists of a young root and stem. The embryo grows out of the seed, eventually becoming an adult plant.
- The **cotyledon**, or food source, provides enough energy for the young plant to mature until it can use its roots to absorb nutrients and water and its leaves to produce food through photosynthesis.

When a seed starts to grow, this early stage is called **germination**. To germinate, a seed needs an adequate supply of water and oxygen and a suitable temperature.

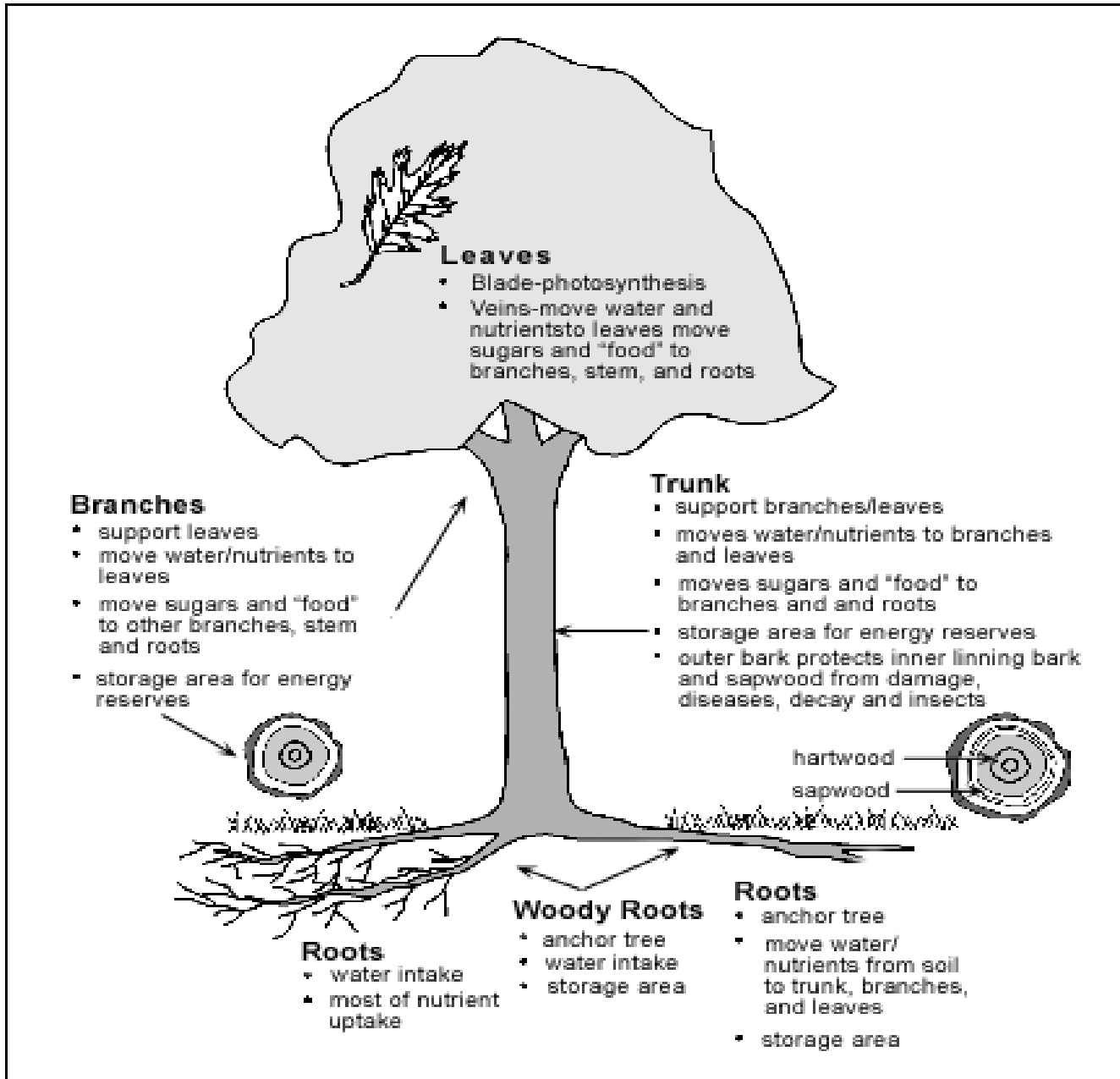


Source: <http://www.learner.org/channel/courses/essential/life/session4/closer5.html>



Source: <http://www.uky.edu/Ag/Horticulture/kytreewebsite/Propagation/schoolprojects/seedling%20emergence%20project.htm>

What are the parts of a tree?



Source: <http://www.na.fs.fed.us/spfo/pubs/uf/treeguidehtm/chapter4.htm>



**YEAR 2 / Grade 1: Celebration of Plants, Animals & Diversity
Content Information**

What is the difference between needle-leaf and broadleaf trees?

**Needle-like leaves
(GYMNOSPERMS)**

- Gymnosperm means “naked seed” in Greek
- First plants to be seen on earth
- Lack flowers
- Bear naked, exposed seeds on scales of cones
- Pollinated by wind
- Bear no fruit
- Most remain green year-round
- Shed their leaves, but not all at once
- Make and store food year-round since they do not shed their leaves during colder, less sunny seasons
- Examples: Pines, Firs, Spruces, Hemlocks, Ginkgo

**Broad, flat leaves
(ANGIOSPERMS)**

- Angiosperm means “covered seed” in Greek
- Evolved from Gymnosperms
- Bear developed flowers
- Hold eggs within ovary of the flower
- Pollinated by insects and other animals
- Ovary becomes fruit, which contain fertilized eggs (seeds)
- Lose chlorophyll (green pigment) as summer fades
- Shed leaves all at once (deciduous)
- Make and store food for 6 months of the year, before they shed their leaves in preparation for colder, less sunny seasons

Examples: Oaks, Willows, Maples, Birches, Palms



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References

Hunken, J. (1993). Botany for all ages: Discovering nature through activities for children and adults. Old Saybrook, CT: The Globe Pequot Press.

Loewer, H. P. (1995). Seeds: The definitive guide to growing, history and lore. Cambridge, MA: Timber Press.

Parramon Studio, ed. (2002). The essential atlas of botany (Barron's essential atlas series). Hauppauge, NY: Barron's Educational Series, Inc.

Pettie, D. (1977). A natural history of trees: Of eastern and central north america. Boston: Houghton, Mifflin Co.

Russell, Helen Ross. (1973). Ten-minute field trips, using the school grounds for environmental studies; a teacher's guide. Washington D.C.: National Science Teachers Association.

Images

About.com

http://forestry.about.com/library/tree/blpart_fruit.htm

Dandelion Watch

http://www.naturewatch.ca/english/plantwatch/dandelion/dandelion_id.html

Essential Life Science for Teachers

<http://www.learner.org/channel/courses/essential/life/session4/closer5.html>

Norman Public Schools

<http://www.norman.k12.ok.us/092/techscope/lifecycles.htm>

Seedling Emergence Patterns

<http://www.uky.edu/Ag/Horticulture/kytreewebsite/Propagation/schoolprojects/seedling%20emergence%20project.htm>

Tree Trust

<http://www.na.fs.fed.us/spfo/pubs/uf/treeguidehtm/chapter4.htm>



YEAR 2 / Grade 1: Celebration of Plants, Animals & Diversity Content Information

Resources

BOOKS FOR STUDENTS AND TEACHERS

- Barnard, E. (2002). *New York City Trees: A Field Guide for the Metropolitan Area*. New York: Columbia University Press.
- Behn, H. (1992). *Trees*. New York: Henry Holt and Co.
- Brandenberg, A. (1988). *A Weed is a Flower*. New York: Simon & Schuster.
- Bunting, E. (2000). *Flower Garden*. New York: Voyager Books.
- Chalufour, I. and Worth, K. (2003). *Discovering Nature with Young Children*. St. Paul, MN: Redleaf Press.
- Cornell, J. (1994). *Journey to the Heart of Nature: A Guided Exploration*. Nevada City, CA: Dawn Publications.
- Doris, E. (1991) *Doing What Scientists Do: Children Learn to Investigate Their World*. Portsmouth NH: Heinemann.
- Elhert, L. (1991). *Red Leaf, Yellow Leaf*. New York: Harcourt Brace & Co.
- Fleisher, P. and Cassels, J. (1998). *Oak Tree (Webs of Life)*. Tarrytown, NY: Benchmark Books.
- French, V. (1995). *Oliver's Vegetables (Venture – Health & the Human Body)*. New York: Orchard Books.
- Gibbons, G. (1990). *From Seed to Plant*. New York: Holiday House.
- Gibbons, G. (1984). *The Seasons of Arnold's Apple Tree*. New York: Harcourt Brace Jovanovich.
- Glock, J., Wertz S. and Meyer M. (1999). *Discovering the Naturalist Intelligence: Science in the Schoolyard*. Tucson AZ: Zephyr Press.
- Harlow, W. (1941). *Fruit Key and Twig Key to Trees and Shrubs*. New York: Dover Publications.
- Heller, R. (1983). *The Reason for a Flower (Ruth Heller's World of Nature)*. New York: Grosset & Dunlap.
- Horsfall, J. (1997). *Play Lightly on the Earth: Nature Activities for Children Ages 3 to 9*. Nevada City, CA: DAWN publications.
- Lewis, R. (2005). *A Tree Lives*. New York: Touchstone Center Publications.
- Martin, A. (1987). *Weeds (A Golden Guide from St. Martin's Press)*. New York: Golden Press.
- Mitchell, J., Ed., Massachusetts Audubon Society, Corp. Author (1980). *The Curious Naturalist*. Englewood Cliffs, NJ. Prentice Hall, Inc.
- Sohi, M. (1993) *Look What I Did with a Leaf!* New York: Walker and Company.
- Thomson, R. (1980). *Trees (Usborne First Nature Series)*. Tulsa, OK: EDC Publishing.
- Watts, M. (1963). *Tree Finder: A Manual for the Identification of Trees by Their Leaves*. Rochester, NY: Nature Study Guild.



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Resources

WEB RESOURCES

Botany Basics

<http://extension.oregonstate.edu/mg/botany/index.html>

Cliff Notes

<http://www.cliffsnotes.com/WileyCDA/CliffsReviewTopic/What-Is-a-Plant-.topicArticleId-23791,articleId-23653.html>

Essential Life Science for Teachers

<http://www.learner.org/channel/courses/essential/life/session4/closer5.html>

Fullerton Arboretum

<http://arboretum.fullerton.edu/educ/tchr.asp>

MSN Encarta: Fruit

http://encarta.msn.com/encyclopedia_761576964/Fruit.html

MSN Encarta: Seeds

http://encarta.msn.com/encyclopedia_761557802/Seed.html

MSN Encarta: Flowers

http://encarta.msn.com/encyclopedia_761564653_2/Flower.html#p19

MSN Encarta: Trees

http://encarta.msn.com/encyclopedia_761577657_2/Tree.html

Tree Trust

<http://www.na.fs.fed.us/spfo/pubs/uf/treeguidehtm/chapter4.htm>