National Park Service

Jean Lafitte Nation al Historical Park and Preserve

National Park Service
U.S. Department of the Interior

Wild Plants of Our Wetlands

Photo by NPS Ranger, Wanda Lee Dickey

Instructor's Guide

BTNEP
BARATARIA-TERREBONNE
NATIONAL ESTUARY PROGRAM

Wild Plants of Our Wetlands

Created by

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Funded by
The Barataria-Terrebonne National Estuary Program
Mini Grants Program

Special Thanks to
Annie Bergelin
AmeriCorps VISTA
Barataria-Terrebonne National Estuary Program

October 26, 2005

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Introduction

Jean Lafitte National Historical Park and Preserve was established to preserve significant examples of the rich natural and cultural resources of Louisiana's Mississippi River Delta region. The park seeks to illustrate the influence of environment and history on the development of a unique regional culture.

The park consists of six physically separate sites and a park headquarters located in southeastern Louisiana. The sites in Lafayette, Thibodaux, and Eunice interpret the Acadian culture of the area. The Barataria Preserve (in Marrero) interprets the natural and cultural history of the uplands, swamps, and marshlands of the region. Six miles southeast of New Orleans is the Chalmette Battlefield and National Cemetery, site of the 1815 Battle of New Orleans and the final resting place for soldiers from the Civil War, Spanish-American War, World Wars I and II, and Vietnam. At 419 Decatur Street in the historic French Quarter is the park's visitor center for New Orleans. This center interprets the history of New Orleans and the diverse cultures of Louisiana's Mississippi Delta region. The Barataria Preserve of Jean Lafitte National Historical Park and Preserve encompasses an area of 20, 000 acres of wetlands in Marrero, Louisiana. Three major ecosystems can be seen while visiting this national park. Bottomland hardwood forests (dominated by oaks, sweet gum trees hackberry trees) take root on the natural levee ridge of Bayous des Familles and Bayou Coquille. At a slightly lower elevation, and further away from the natural levee ridge, the habitat becomes more wet and changes to baldcypress/water tupelo swamp. Even more distant from the natural levee ridge along the bayous, and at lower elevation is the tree-less environment of marsh plants and fresh water, the freshwater marsh flotant.

The many ecosystems of park are home to a variety of native plants and animals. However, it is in the spring when the greatest display of wildflowers is on, and the magnificent native Giant Blue Louisiana Iris makes its appearance. It stands above the marsh on stalks 5' tall, and the blue/purple flowers are the earmark of spring here at the Preserve. To acknowledge the importance of this area for these magnificent natives, the National Park Service coordinates a spring Wild Iris festival! And in conjunction with the festival, the Education Center is offering the opportunity for you to bring you class out to the Preserve and learn about our native beauties.

General Field Trip Information

Visiting a National Park

This program involves a field trip to the National Park: Jean Lafitte National Historical Park and Preserve. This is one of three national parks located in Louisiana, the other two are Cane River Creole National Historical Park, and New Orleans Jazz National Historical Park. National parks are places set aside for all people to enjoy the cultural and natural resources of the area without causing damage to these resources. All plants, animals, and cultural resources in the park are protected. Review the enclosed list of rules with your students before your trip to the Preserve so that you and your students can help to protect these special resources.

Logistics

Prior to your field trip you will be provided with a detailed schedule and map of activities and their locations within Jean Lafitte National Historical Park & Preserve's Barataria Preserve. Your busload of students will be scheduled to participate in at least one trail hike and additional on-site activities. It is important that pre-visit activities are completed to make the on-site experience the best learning opportunity possible. On-site activities will take place at the National Park Environmental Education Center and trail.

Preparation

Use the enclosed curriculum materials to prepare your students for the educational field trip to the Barataria Preserve. There are pre-visit and post-visit activities to use before and after your field trip experience.

*Please notice that Louisiana State Standards and Grade Level Expectations, as well as Dr. Gardner's Multiple Intelligences are addressed within the curriculum and are listed in the materials.

What to wear

All program participants should come prepared with proper clothing and footwear for an outdoor experience. Light shirts and sneakers are best. Long, lightweight pants are recommended. Avoid using strong fragrances and perfumes during this day so not to attract more insects.

Safety

By staying on trails and paved areas you protect the park and the plants and animals that live next to trails, as well as protecting your students from coming in contact with poison ivy, swamp mud, and fire ants. Students may also wish to wear insect repellent, and suntan lotion. This is natural environment where wild animals will defend themselves if they feel threatened. Students should not harass or harm wildlife (including plants and insects). If needed, first aid is available at the Visitor Center and the Education Center. There will be park rangers and volunteers patrolling the trails to assist teachers and chaperones as needed. Do not bring food or drink, other than water, on the trails - it is illegal to feed or harass any wildlife.

The nearest hospital is West Jefferson Medial Center, located just off the intersection of Barataria Blvd and West Jefferson Hwy. Phone: 504/347-5511.

Image Credit: Government of Scotland

Weather

Check the local forecast to be prepared for the day's weather. Be prepared for rain showers or cool weather. Only during severe weather will School Days be cancelled. National Park Service staff will contact your school by 8:00 a.m. on Wednesday September 29th or Thursday September 30th if the program is cancelled due to weather. We will attempt to re-schedule at that time.

Supervision

Teachers and chaperones are expected to supervise children at all times. Please assist your chaperones and the park staff by providing nametags for your students (a piece of masking tape is fine). Review park rules and regulations before arriving at the Barataria Preserve. **We require 1 chaperone per 10 students.**

*Please note a sample chaperone letter has been enclosed for your convenience, and also please ensure that chaperons as well as students are familiar with the park rules.

Lunch

If you are planning to eat lunch here, all participants will need to bring a sack lunch and beverage. You may eat at the picnic areas of the park. Lunches should be left on the bus until your designated lunch time. Recycling facilities for aluminum and plastic bottles (labeled with a number one or two within the recycling triangle) are available in designated areas.

Transportation

Contact your school administration to arrange for bus transportation for the fieldtrip day. You will need a bus to drive your students to the Education Center in the Barataria Preserve. After you program you are welcome to picnic in designated areas, and check out some of the other trails in the park. Your school and students will need to pay for transportation. YOUR BUS AND DRIVER WILL NEED TO STAY ON SITE TO TRANSPORT STUDENTS TO ACTIVITIES, PICNIC LOCATIONS, AND TRAILHEADS. Please notify the Park Ranger, Allyn Rodriguez (504-689-7611 ext 14) as to which classes will ride the bus together (provide lead teacher name for each class) so that the schedule can reflect those classes being at the same destination at the same time.

The Environmental Education Center

An award winning facility located on Highway 45/Barataria Boulevard, just 2/10th of a mile away from the Visitor Center (on the opposite side of road). The Education Center hosts four different on-site activities that focus on animal and plant biology and habitat ecology. Details of activities are found within the on-site activities in this packet. The Education Center is within walking distance to the picnic area and Pecan Grove Trails.

A recycling station is available in the Center for aluminum cans, and plastic bottles.

A picnic area with 10 tables is within walking distance of the Education Center.

Date:

Dear Chaperone:

We are delighted that you will be escorting our students from

_____ (name of school) to the Barataria Preserve of Jean Lafitte National Historical Park and Preserve on the _____ (date of visit) for the School Day fieldtrip which is part of the Wild Plants of Barataria Study. You will be an important part of helping our students gain as much as possible from this unique educational opportunity. The program will enable students to gain a greater understanding of the unique adaptations of wetland plants, and to explore the wetland habitats of forests, swamps, and marshes.

We need your help. Please be ready to explain instructions to students, keep everyone focused on the activity, follow safety precautions, and direct student enthusiasm so that everyone can have the best learning experience possible. We are glad you are able to join us on this visit to one of your national parks, Jean Lafitte National Historical Park and Preserve. See you soon!

Sincerely,

(teacher and/or class name)

Directions for Visiting Barataria

DIRECTIONS TO THE PRESERVE:

From New Orleans:
Take 90 Business West over the Mississippi River Bridge (aka Crescent City Connection)
Follow in left lanes to continue on 90 B West
Follow to exit 4B- Barataria Boulevard
Go through the first traffic light, at the second light take a left
This will put you traveling south on Barataria Boulevard
Follow to the Lafitte-Larose highway (Highway 3134)- There will be a left turn lane and a sign directing you to the Preserve
Take a left onto Lafitte-Larose highway
Follow to the yellow flashing light
Take a right (onto Highway 45/Barataria Boulevard North) and follow the directions below to the site of your program

To the Education Center:
The first parking lot on your right leads to the Education Center/ Pecan Grove Trails.
After crossing the bayou follow the signs to the left into the Education Center parking lot.
Bus parking is available on either side of the parking lot.
The Education Center is difficult to see from the parking lot, follow the wooden walkway to the building. You may call the Barataria Preserve Education Center at (504) 689-7611 Monday- Friday 8:00 a. m. -3:00 p. m..

To Bayou Coquille Trail:
If you are attending a guided walk on the Bayou Coquille Trail continue driving North on Highway 45/Barataria Boulevard for 1.2 miles beyond the Education Center and follow the signs to the parking lot on the left.
Bus parking is located on the far side of the parking lot.
There are no restroom facilities at Bayou Coquille Trailhead.

To the Visitor Center:
Continue North on Highway 45 to the first parking area on the left, to the Visitor Center Buses can unload near the flagpole, parking for buses is on the far side of the lot. You may call the Visitor Center [(504) 589-2330] is open 9:00 a.m. to 5 p.m. daily. The Visitor Center houses an Eastern National bookstore outlet and exhibits on the cultural history of Louisiana.

To the Picnic Areas:
To find the picnic area, turn at the Pecan Grove/Education Center entrance and follow signs to the parking lot. Picnic tables are located in the adjacent woods. Look for short walking trails that lead to the tables. In case of rain, covered picnic tables are available in Rosethorn Park, south of the Preserve in the Town of Lafitte.

Restrooms are located at the Education Center, Visitor Center and in the picnic area of the Pecan Grove Trails.

The Visitor Center and Bayou Coquille Trail are wheelchair accessible.

Themes, Goals, and Objectives

Theme -
All plant organisms have special structural adaptations which enable them to live in a particular habitat. The plants that live in the Barataria Preserve have adapted to and helped create many different elements of the habitats here, and are critically important to the Preserve.

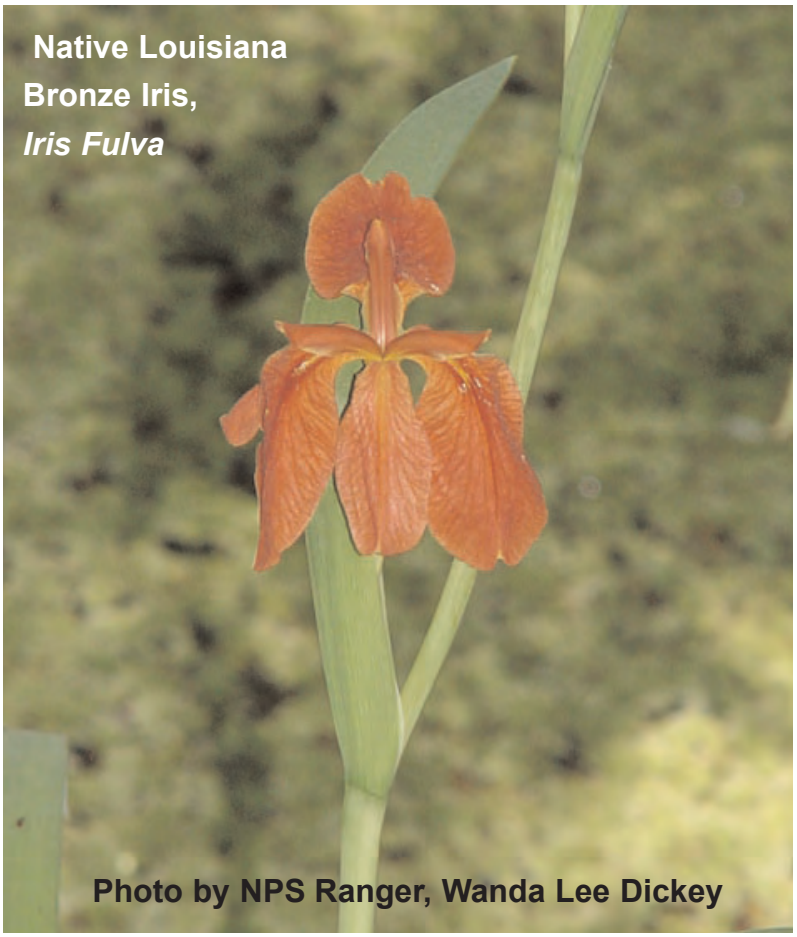
Goal -
Students should understand the general basics of plant adaptations, the issues facing coastal Louisiana today, and ways people are trying to improve the situation (including their own activities).

Objectives -
Students will be able to:

1. identify some plant adaptations (functions of roots, leaves, flowers, etc.)

2. explain at least one issue facing southern Louisiana (land loss, river diversion, and non-native eat-outs of native vegetation, competition from non-native invasive species, pollution, etc.) and how people are trying to improve the situation

3. explain food chains and how plants begin the vast majority of food webs on the planet.



Wildlife Viewing Code of Ethics

When you conduct a field trip with your classroom, please establish some guidelines that will promote caring for the environment. Here is a suggested code of ethics adapted from the American Birding Association's Code of Ethics. Discuss the code with your students and see if they have additional ideas.

1. **Wildlife viewers must always act in ways that do not endanger the welfare of any of the wildlife, including plants.**
   * Observe wildlife without disturbing them in any significant way.
   * Keep an appropriate distance from wild animals, even insects.
   * Avoid chasing any animal, including insects.

2. **Wildlife viewers must act in ways that do not harm the natural environment.**
   * Stay on existing roads and trails.
   * Leave all habitats as you found them.
   * If you notice an environment has been degraded, report it to the proper authorities.

3. **Wildlife viewers must respect the rights of others.**
   * Respect the privacy and property of others by observing "No Trespassing" signs and by asking permission to enter private or posted lands.
   * Observe all laws and rules which govern public areas.
   * Behave in a way that will enhance the image of wildlife viewers in the eyes of the public.

4. **Wildlife viewers in groups should assume special responsibilities.**
   * Be especially careful and quiet when in a group, many people often mean more noise.
   * Teach others wildlife viewing ethics by words and examples.

Source: These ethics are adapted from the American Birding Association's Code of Ethics. For more information about this organization, call: 1-800-850-2473.

Background Information for Teachers

HISTORY OF PLANTS

The history of plants and the production of oxygen.
Earth's early atmosphere was characterized by the lack of an atmosphere. The atmosphere began to form as volcanoes began to "outgas" the gases trapped in the interior of the planet's molten core - which still goes on today when volcanoes erupt. Most of the gas was carbon dioxide and water vapor. Life started to have a major impact on the enviroment once photosynthetic organisms evolved. These organisms, blue-green algae, fed off atmospheric carbon dioxide and converted much of it into marine sediments.
While photosynthetic life reduced the carbon dioxide content of the atmosphere, it also started to produce oxygen. For a long time, the oxygen produced did not build up in the atmosphere, since it was taken up rocks, as recorded in Banded Iron Fomations and continental red beds - iron exposed to oxygen, turns red! After a long time the reservoirs of oxidizable rock became saturated and the free oxygen stayed in the air.

The history of plants and the move onto land.
Once oxygen had been produced, ultrviolet light split the molecules, producing ozone UV shield as a by-product. Only at this point did life move out of the oceans and respiration begin. Plants evolved from green algae in the water to come onto the land.
Why Leave the Water:

- Too much competition
- Too many predators everything ate you
- More sunlight on land, because water blocks some sunlight
- More carbon dioxide, which is what plants need from the air, to produce food.


Image credit: Allan Gardens Conservatory, City of Toronto, Parks and Recreation

But there are lots of problems on land:

- There's a lot more sunlight - easy for you photosynthesize until it cooks you
- There's no water - and you are used to lots of water, you lived in it.
- Nutrients locked up in the rocks and soil on the land
- Lastly how are you going to reproduce? You were used to the water.

Land plants would overcome these issues, but they still need - sunlight, air, water, and nutrients from the soil. But first let's discovery exactly...

WHAT ARE PLANTS?

Plants make up an entire kingdom: Plantae, they are living organisms that make life on Earth, as we know it, possible. They produce oxygen, and form the basis of the vast majority of food chains on this planet. Plants not only begin, but also end most food chains. They define natural communities, and are used by scientists to identify different ecosystems. Almost everything uses plants - eating them, eating the animals that eat them, humans wear them as clothing and perfumes, many animals including us, build with them, we even use them for energy sources. Additionally, plants clean air and water, they prevent erosion with their root systems, and provide new medicines. In short Plants are practically perfect in every way.

Review the pre-visit activities you can do with your students to help prepare them for their visit to the Preserve, and introduce them to the wonderful world of plants.

WHAT ARE PLANTS? (continued)

Plants are unique among living things of the earth, starting with their cells. Most cells contain a nucleus, and a number of mitochondria, they float in a liquid jelly called cytoplasm, but plant cells have chloroplasts, which contain chlorophyll - used in making the plant's food, and they have rigid cell walls made of cellulose.

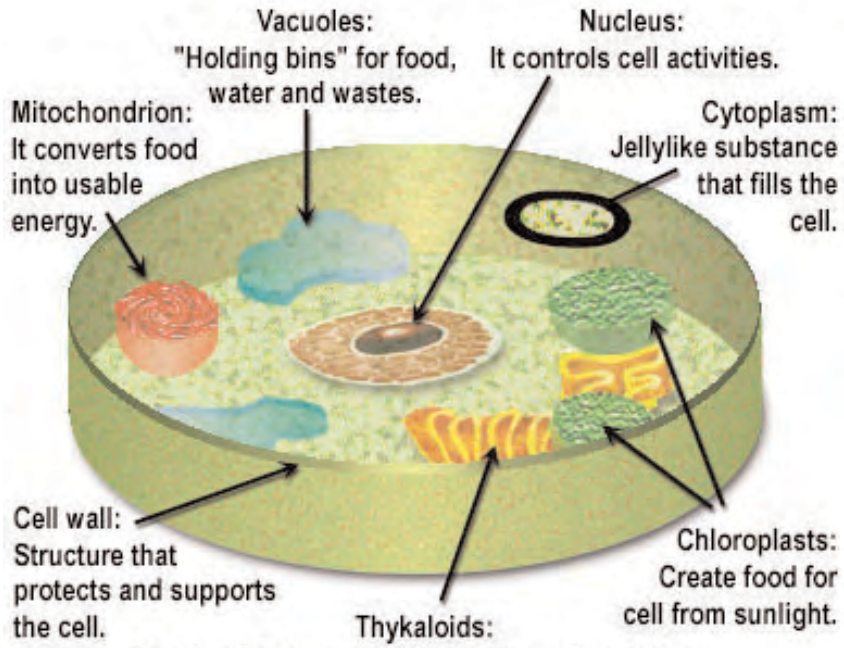


Image credit: NASA Bigelow Labratory Plant Cell

Later your students may begin their Hands-On exploration with plants using their Junior Explorer Guide and the Student Scientist Project 1 - making a model of a plant cell. There are instructions and details in the Student Scientist Section of this guide.

It may begin on the cellular level, but what most of us get from plants are oxygen and food, in a process called **Photosynthesis (light - putting together).**

Benchmarks K-4

A.Abilities Necessary to do Scientific Inquiry
SI-E-A1, SI-E-A2, SI-E-A3, SI-E-A6
B. Understanding Scientific Inquiry
SI-E-B1, SI-E-B4, SI-E-B5

A. Structure and Function in Living Systems
LS-M-A1, LS-M-A2

Grade Level Expectations

Science as Inquiry

K	1	2	3	4
1	1	1	1	1
2	2	2	2	2
4	5	6	6	7
7	8	9	9	10
8	9	10	10	12

Life Science
15, 16, and 17

PLANTS - BREATH OF FRESH AIR

As part of photosynthesis plants produce oxygen, and consume carbon dioxide. People breathe in (inhale) oxygen and breathe out (exhale) carbon dioxide - many cars and factories also produce carbon dioxide which is overwhelming the earth's capacity to handle it and we are seeing a "greenhouse" effect as the earth warms up. Your students will be able to study their own production of carbon dioxide as well as a plant's production of oxygen.

Your students may begin their Hands-On exploration with plants using their Student Scientist Project 2 identifying oxgen from plants.

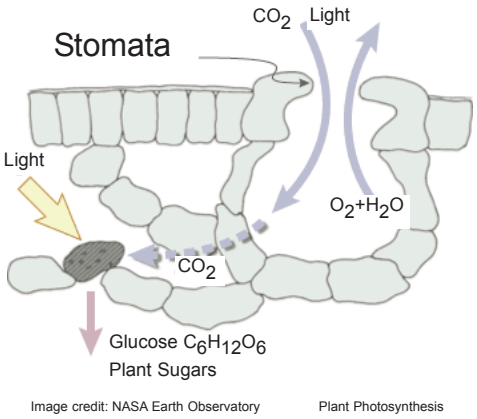


Image credit: NASA Earth Observatory

Plant Photosynthesis

Air is absorbed through the plant's stomata (minute openings in the leaf and stem)

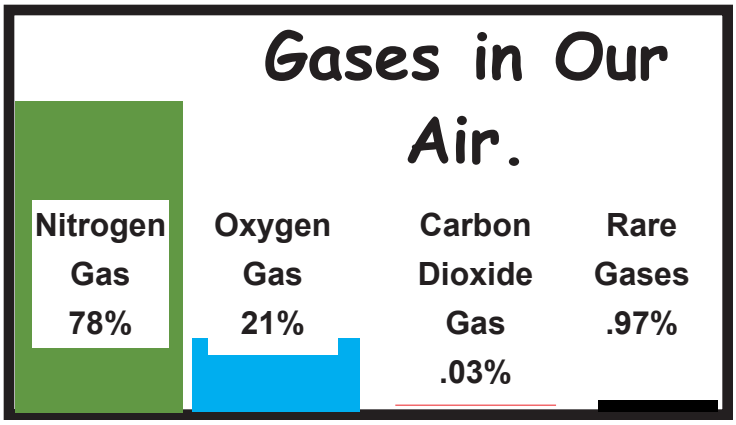
These cycles help balance the content of the air that we all breathe. The air in the atomosphere is made up of different gases in the following amounts:

Nitrogen: 78% (78 parts out of a hundred)

Oxygen: 21% (21 parts out of a hundred)

Carbon Dioxide: 0.03% (3 parts out of a thousand)

Rare Gases (Helium, Argon, Krypton, Neon, Xenon and Radon together make up 0.97%)



Benchmarks K-4

Grade Level Expectations

A.Abilities Necessary to do Scientific Inquiry		**Science as Inquiry**				
SI-E-A1, SI-E-A2, SI-E-A3, SI-E-A4,SI-E-A6, SI-E-A7	**K**	**1**	**2**	**3**	**4**	
B. Understanding Scientific Inquiry		**1**	**1**	**1**	**1**	**1**
SI-E-B2, SI-E-B3, SI-E-B4, SI-E-B5	**2**	**2**	**2**	**2**	**2**	
		4	**5**	**6**	**6**	**7**
		7	**8**	**9**	**9**	**10**
		8	**9**	**10**	**10**	**12**
A.Characteristics of Organisms	**9**	**10**	**11**	**11**	**13**	
LS-E-A1, LS-E-A2			**16**			
C. Organisms and their Environments			**47**			
LS-E-C2					**40**	
Physical Science						
Transformations of Energy						
ES-M-C6		**12**				
A. Structure and Function in Living Systems	**Life Science**					
LS-M-A1, LS-M-A2		**19**				

PLANTS - HOW IT ALL WORKS TOGETHER

Plants are extremely important to life on earth, but how do they do all the important things they do? Well it's all in the parts. Photosynthesis takes part in the leaves, but it can't happen without water from the root system and a transport system to get the water from the soil to the leaves.

Your students may begin their Hands-On exploration of how a plant's capilary action works, using their Student Scientist Project 3

The transport system in plants begins in the roots. Fine hairs on the tip of a plant's root (called a root hair) absorbs water and minerals, this is then transported throughout the plant. Roots grow in very interesting patterns, a seed will produce a primary root, but within a couple of weeks it produces a secondary root, then roots come off the sides as lateral roots. Things like amount of light, water, soil conditions, and predation by insects in the soil or on the plant all affect root growth. Root hairs absorb water and minerals from the soil, and send it up the xylem (pronounced ZEYE-luhm) through capillary action to the plant's leaves, for photosynthesis processing. Roots also anchor the plant into the ground, and can act as excess food storage facilities, when phloem (pronounced FLOW-uhm) sends food produced by photosynthesis in the leaves down to the roots. It's easy to remember as Zip it up (xylem=zip) and Flow-em' down (phloem=flow em').

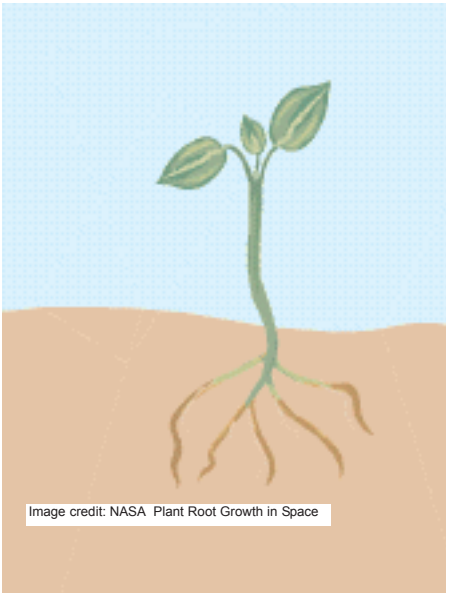


Image credit: NASA Plant Root Growth in Space

Benchmarks K-4

A.Abilities Necessary to do Scientific Inquiry
SI-E-A1, SI-E-A2, SI-E-A3, SI-E-A4,SI-E-A6, SI-E-A7
B. Understanding Scientific Inquiry
SI-E-B2, SI-E-B3, SI-E-B4, SI-E-B5

A.Characteristics of Organisms
LS-E-A1, LS-E-A3
Earth and Space Science
ESS-E-C2

Life Structure and Function in Living Systems
SI-M-A1, SI-M-A2, SI-M-A7, SI-M-A8
A. Structure and Function of Living Organisms
LS-M-A4
C. Earth in the Solar System
ESS-M-C6
Science and the Envrionment
SE-M-A7

Grade Level Expectations

Science as Inquiry

K	1	2	3	4
1	1	1	1	1
2	2	2	2	2
4	5	6	6	7
7	8	9	9	10
8	9	10	10	12
9	10	11	11	13
22	28			
		28	37	
			36	

PLANTS START FOOD CHAINS

Food production for the plant is the main reason for photosynthesis. It is this food production that starts food chains we can observe. A food chain models the movement of energy in an ecosystem. The energy for most systems on earth begins with the sun. Sunlight is captured and converted by plants into stored energy. As a plant sugar, that energy is then consumed by herbiovores or 1st level/primary consumers, then they in turn are consumed by 2nd level/secondary consumers on up to many levels. Some energy is lost along the way so you need many producers (plants) at the bottom and fewer consumers as you move up the food chain. Many food chains connect to form food webs, complex systems of energy movement throughout the entire system.

Image credit: Maryland Dept. of the Environment

Here is an example of a wetlands foodchain:

Plants (Louisiana wild rice) on the bottom - (Producers).

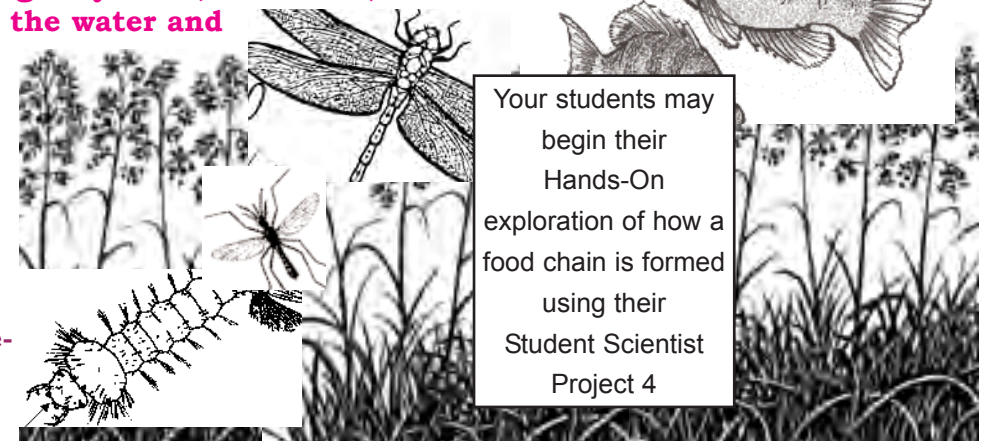
Mosquito larve eat algae - a green plant growing in water (Primary Consumer).

The larve are consumed by dragonfly larve, small fish, etc. As mosquitos mature, they leave the water and fly, where they become food for dragonflies or "Mosquito hawks" (Secondary consumers)

Fish like blue-gills eat the dragonflies, as do baby alligators, frogs, turtles, lizards, etc. (Tertiary consumers)

Bass eat smaller fish like blue-gills (Quaternary consumers)

Top consumers, like osprey will eat bass, and other fish, just as humans are top consumers, also eating bass and other fish.



Your students may begin their Hands-On exploration of how a food chain is formed using their Student Scientist Project 4

Benchmarks K-4

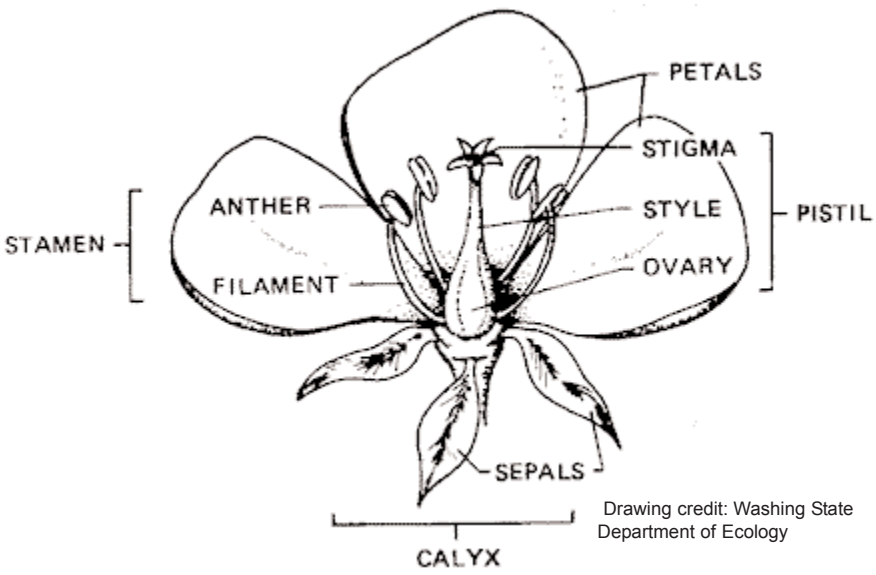
Grade Level Expectations

	Science as Inquiry				
A.Abilities Necessary to do Scientific Inquiry	K	1	2	3	4
SI-E-A1, SI-E-A2, SI-E-A3, SI-E-A4,SI-E-A6, SI-E-A7	1	1	1	1	1
B. Understanding Scientific Inquiry	2	2	2	2	2
SI-E-B2, SI-E-B3, SI-E-B4, SI-E-B5	4	5	6	6	7
	7	8	9	9	10
	8	9	10	10	12
A.Characteristics of Organisms	9	10	11	11	13
LS-E-A1, LS-E-A3	22	28			
C.Organisms and the Environment			27		
LS-E-C2				36	
Science and the Environment					
SE-E-A2					71

THE POWER OF FLOWERS

The main function of food production is for plant growth, and reproduction. All living things must reproduce, most plant species, about 90% (250,000 species), use flowers for reproduction - they are called angiosperms (Greek meaning “jar of seeds”). Some plants have big showy flowers, some have tiny almost invisible flowers, some smell sweet, but some smell like rotting flesh (it depends on what they are attracting to pollinate them). This is the true function of flowers, they are more than just pretty - they attract pollinators, and help the plant reproduce.
The flowers contain the reproductive organs of the plant -

petals, calyx (sepals), and pistil (stigma, style, ovary) - female
staymen (anther - holds the pollen) and the filament (holds the anther up) - male



Drawing credit: Washing State Department of Ecology

Your students may begin their Hands-On exploration of flowers using their Student Scientist Project 5

In this next project your students will get to make a model of a flower, and its parts and functions. Student Scientist Project 5 Flower Children - they will make models of flowers and understand the function of the parts of a flower to help the plant make seeds.

Benchmarks K-4	Grade Level Expectations				
A.Abilities Necessary to do Scientific Inquiry	Science as Inquiry				
SI-E-A1, SI-E-A2, SI-E-A3, SI-E-A4,SI-E-A6, SI-E-A7	K	1	2	3	4
B. Understanding Scientific Inquiry	1	1	1	1	1
SI-E-B2, SI-E-B3, SI-E-B4, SI-E-B5	2	2	2	2	2
	4	5	6	6	7
	7	8	9	9	10
	8	9	10	10	12
A.Characteristics of Organisms	9	10	11	11	13
LS-E-A1, LS-E-A3		26			
C.Organisms and the Environment		27			
LS-E-C2	22	28			
			28	37	
				36	
Life Cycle of Organisms					
LS-E-B1					45

FLOWERS AND THEIR PARTNERS

Most flowers can not self-pollinate, they need partners. Some attract insects like bees and butterflies, with big showy flowers, and nectar. Some attract insects like moths and flies, using flowers with foul smells like rotting flesh. Still others atrtract birds, like humming birds with cone shaped flowers and nectar. And then there are those that attract mammals, like bats with large open flowers for them to stick their entire face into it. Whatever partners flowers use, the bottom line is that pollen is transfered from the stamen and then delivered to the pistil where pollination, and hopefully fertilization occurs. Once fertilization occurs the plant drops the flower and begins to produce fruit to feed the seeds, or help the seeds get transported to another area with the help of animals. Animals eat the fruit, but can't digest the seeds, so they are deposited with waste materials, which helps the young seeds out with a ready supply of fertilizer!

Image credit: Tucson Agricultural Research Center

Your students may begin their Hands-On exploration of plants and their partners using their Student Scientist Project 6

Some plants, like the black-eyed Susan and the evening primrose, have markings leading to the nectar that work like landing lights on an airport runway. They're called nectar guides. Bees can see them, but they are invisible to us except under ultraviolet light.

In this next project your students will make bee models and observe how pollen is deposited onto their legs for re-deposit onto another flower.

Student Scientist Project 6 Flower Friends - they will make models of bees and have them get pollen from real flowers, in order to understand the function of the flower partners.

Benchmarks K-4

A.Abilities Necessary to do Scientific Inquiry
SI-E-A1, SI-E-A2, SI-E-A3, SI-E-A4,SI-E-A6, SI-E-A7
B. Understanding Scientific Inquiry
SI-E-B2, SI-E-B3, SI-E-B4, SI-E-B5

A.Characteristics of Organisms
LS-E-A1, LS-E-A3
B.Life Cycles of Organisms
LS-E-B1

Grade Level Expectations

Science as Inquiry

K	1	2	3	4
1	1	1	1	1
2	2	2	2	2
4	5	6	6	7
7	8	9	9	10
8	9	10	10	12
9	10	11	11	13
	26			
	27		37	
22	28	28	36	45

PLANT BABIES

After flowers are pollinated, with some luck, they become fertilized. Pollen (sperm containing the male flower's genetic information) from the anther or another flower's anther lands on the stigma, germinates and makes its way down into the ovary. Inside the ovary are ovules (eggs containing the female flowers genetic information). Each one of these that gets fertilized becomes a seed. The ovary becomes a fruit. In the science of botany, a fruit is a mature ovary containing seeds. Hence the name angiosperm (jar of seeds).

Your students may begin their Hands-On exploration of plant reproduction using their Student Scientist Project 7

Image credit: Ministry of Agriculture and Food, Ontario, Canada

Most plant seeds contain everything the young plant will need to grow. Inside the seed is food (endosperm), a root and leaves of the baby plant (embryo), and a protective covering (seed coat). The seed coat protects the plant from insects, drought, and disease.

Believe it or not some seeds have been sprouted from the tombs in Egypt, that are thousands of years old. But most seeds need to sprout within a year, there are exceptions though, like the water hyacinth, whose seeds can lie dormant for almost 20 years!

Student Scientist Project 7 Plant Babies - they will sprout seeds and watch them grow.

Benchmarks K-4

A.Abilities Necessary to do Scientific Inquiry
SI-E-A1, SI-E-A2, SI-E-A3, SI-E-A4,SI-E-A6, SI-E-A7
B. Understanding Scientific Inquiry
SI-E-B2, SI-E-B3, SI-E-B4, SI-E-B5

A.Characteristics of Organisms
LS-E-A1, LS-E-A3
B.Life Cycles of Organisms
LS-E-B1

Science and the Environment
SE-E-A1

Grade Level Expectations

Science as Inquiry

K	1	2	3	4
1	1	1	1	1
2	2	2	2	2
4	5	6	6	7
7	8	9	9	10
8	9	10	10	12
9	10	11	11	13
21				
28	30	33	47	
	26	34	45	45
22	27	28	37	
	28		36	
				70

Junior Explorer Guide

YOU AND I COULDN'T LIVE WITHOUT PLANTS!

WHY?

Well, we couldn't breathe, we wouldn't be able to eat, we'd have no water, and nothing would get broken down, waste would be everywhere!

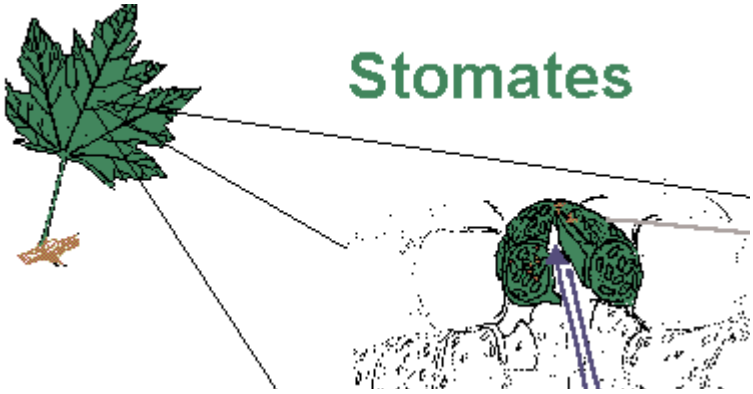
No WAY - you SAY!

Well, plants produce oxygen, they are the base of the food chain, they release water from the soil, and they get their nutrients from microbes in the ground - decomposers! And it all starts on the smallest level of the cell.

Still not sure, well check it out yourself!

Plants do all this - HOW?

It starts up in the air…



Plants produce oxygen!

There are little "breathing holes" on the bottom of leaves called STOMATA. The air flows into the stomata; the plant cells use the carbon dioxide in the air, that we and other animals breathe out. Then they release their waste product oxygen, and water when their stomata are open.

Plants are Super Green Machines!

Get your Project Sheet 2 and find out for yourself!

What do Plants do with their food?

It's all in our stomachs...

Here in Barataria - we have many food chains like this one starting with the wild iris:

Eaten by Alligators

Eaten by Nutria

Iris Plants

Plants are the base of the food chain. Plants use carbon dioxide and sunlight to produce sugar - plant sugars - not the white stuff, but even that starts out in plants (sugar cane plants)! We eat the plant parts, like leaves, stems, roots, and fruits - or eat the animals that ate the plants...

Color in the Barataria Food Chain.

Plants do all this - HOW?

It's the toil of soil...

Plants take up nutrients and water through their roots. These nutrients are derived from organic matter that's been rotting - different things called decomposers have been at work breaking everything down!

What kind of roots do you eat?

Flower Power!

Flowers are more than pretty - they're powerful...

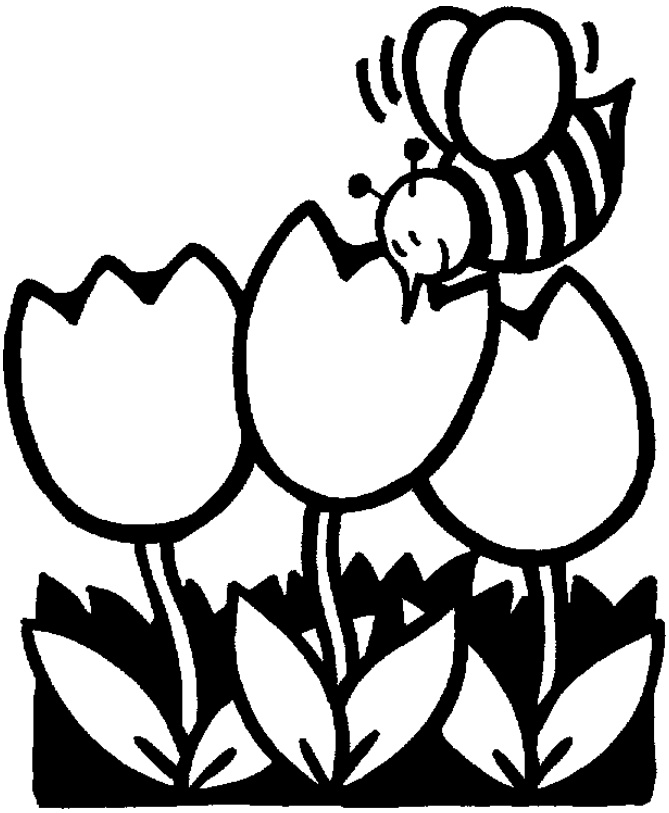
Plants, like all living things must reproduce. And most plants have developed ingenious ways to have babies they use flowers!

Most of us eat many flowers.

What kind of flowers do you eat?

Flower Friends!

Flowers need some help to make the seeds, and they have many friends...



Most flowers can not make seeds by themselves (self-pollinate), so they have friends that help. And most flowering plants use insects like bees to help!

Bees also make honey from the nectar in flowers. Different flowers make different tasting honey.

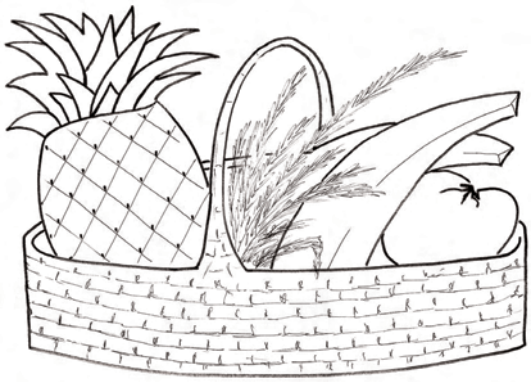
Have you ever tasted honey?

Plant Babies!

After flowers are fertilized they form seeds - baby plants!

Seeds have everything baby plants need to survive, food, protection, and roots and leaves to start growing! The food for baby plants are the fruits most of us like to eat, like pecans, apples, corn, strawberries, oranges, tomatoes, bananas, grapes, sunflower seeds, and watermelon!

Color in the fruits in the basket.



How many different baby plants do you eat?

Student Scientist Project 1

Instructor Sheet

Plants are Super Green Machines!

Plants are the only living things on Earth that make their own food and produce oxygen.

Leaflet is a character used to introduce kids to the concepts of what leaves do.

Cells in leaves contain chloroplasts that contain a green pigment called chlorophyll. This material gives leaves their green color. When light is absorbed the electrons in chlorophyll become filled with energy. The chlorophyll molecule loses an electron and is incomplete in this process, therefore it must gain one from the water taken up by its roots, and splits the molecule into oxygen and hydrogen. The plant releases the oxygen through its leaves, and uses the hydrogen to produce simple sugars - sucrose, glucose and fructose, these are then stored in the plant. In some plants these are stored as starch.

Super Scientist:

The students will be making a plant cell model.

To make the model give each student

1. A strip of paper for the plant Cell wall, this is to wrap around the rest of the cell strcture, like a bracelet.

2. A circle within a circle for the Nucleus (and inside the Nucleolus)

3. A strip of paper folded like a fan, back and forth for Thykaloids.

4. A strip of paper wrapped upon itself like a flower for the Mitochondrion.

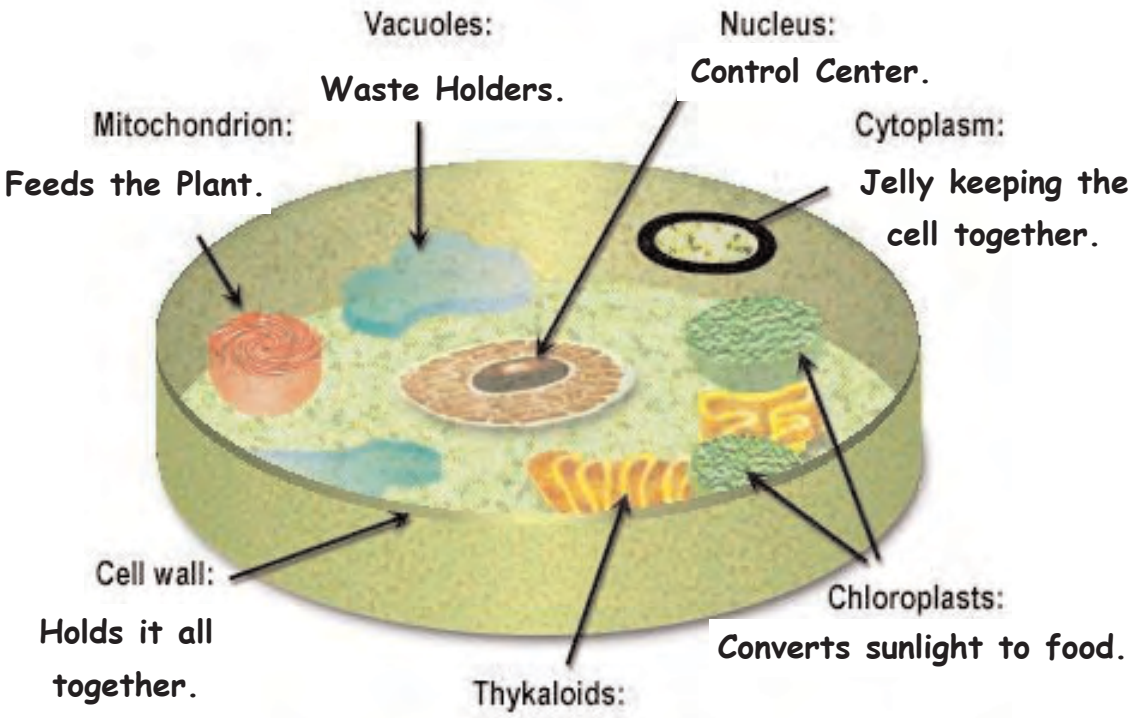
5. An oddly/unevenly cut circle or rectangle for Vacuoles.

6. A round/oblong green paper for Chloroplasts, the Thykaloids and the Chloroplasts should be glued together or otherwise attached.

Extensions -

1. If you have mesh sacks, from onions or limes, the kids could scrunch that up and use it as the Cytoplasm inside the cell wall, with everything else resting on it or in it.

2. You can also use other materials like sponge, under-inflated balloons, play-dough, styrofoam balls, plastic trays, yarn, aluminum foil, pencil erasers, etc. Let your imaginations go wild.



Benchmarks and Grade Level Expectations

Benchmarks K-4 Science as Inquiry

A. Abilities Necessary to do Scientific Inquiry

SI-E-A1	asking appropriate qustions about organisms and events in the environment
SI-E-A2	planning and/or designing and conducting a scientific investigation
SI-E-A3	communicating that observations are made with one's senses
SI-E-A6	communicating observations and experiments in oral and written formats

B. Understanding Scientific Inquiry

SI-E-B2	using appropriate experiments depending on the questions to be explored
SI-E-B4	developing explanations by using observations and experiments
SI-E-B5	presenting the results of experiments

Benchmarks 5-8

A. Structure and Function in Living Systems

LS-M-A1	describing the observable components and functions of a cell, such as the cell membrane, nucleus, and movement of molecules into and out of cells
LS-M-A2	comparing and contrasting the basic structures and functions of different plant and animal cells

Grade Level Expectations

Science as Inquiry

Ability to do Scientific Inquiry

Grade Level	Description
K 1 2 3 4	
1. 1. 1. 1. 1.	Ask questions about objects and events in the environment
2. 2. 2. 2. 2.	Pose questions that can be answered by using the student's own observations and scientific knowledge.
4. 5. 6. 6. 7.	Use the 5 senses to describe observations
7. 8. 9. 9. 10.	Express data in a variety of ways by conducting illustrations, graphs, charts, tables, concept maps, and oral and written explanations as appropriate.
8. 9. 10.10.12.	Use a variety of appropriate formats to describe procedures and to express ideas about deomonstrations or experiments (e.g. drawings, journals, reports, presentations, exhibitions, portfolios.)

Life Science

Structure and Function in Living Systems

Grade Level	Description
5-8	
15.	Identify the cell as the basic unit of life
16.	Observe, identify, and describe the basic components of cells and their functions (e.g. cell wall, cell membrane, cytoplasm, nucleus)
17.	Compare plant and animal cells and label cell components

Student Scientist Project 1

Plants are Super Green Machines!

Plants are the only living things on Earth that make their own food and produce oxygen.

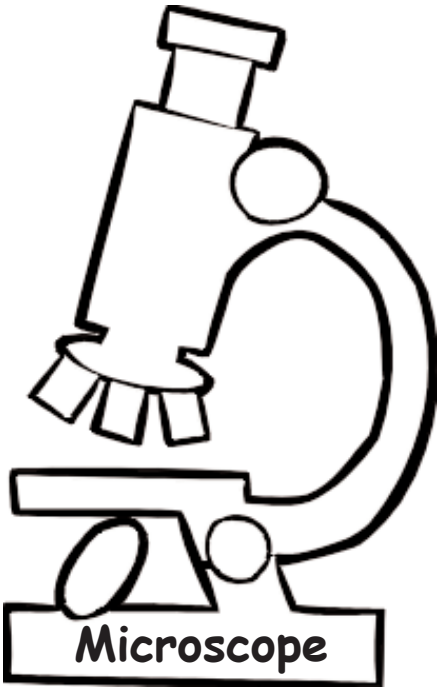
Hey there, I'm Leaflet and I'm here to tell you about... well about me! Leaves are super important, without us, most things on earth couldn't live. Here's my story...

DID YOU KNOW?
We eat lots of leaves:
Peppermint
Lettuce
Spinach
Celery
Artichoke Hearts
Onions
and many leaves are added to food:
Bay
Rosemary
Tarragon
Chives
Thyme
Oregano

Plants, and all living things are made up of cells, so small you need a machine called a microscope to see them. Plant cells are special because they have chlorophyll, which make leaves green and also allows the plant to create it's own food - glucose (sugar) just like what you eat! In the process of photosysthensis, the plant uses sunlight, water, and carbon dixoide, to make sugar and oxygen!

Super Scientist:

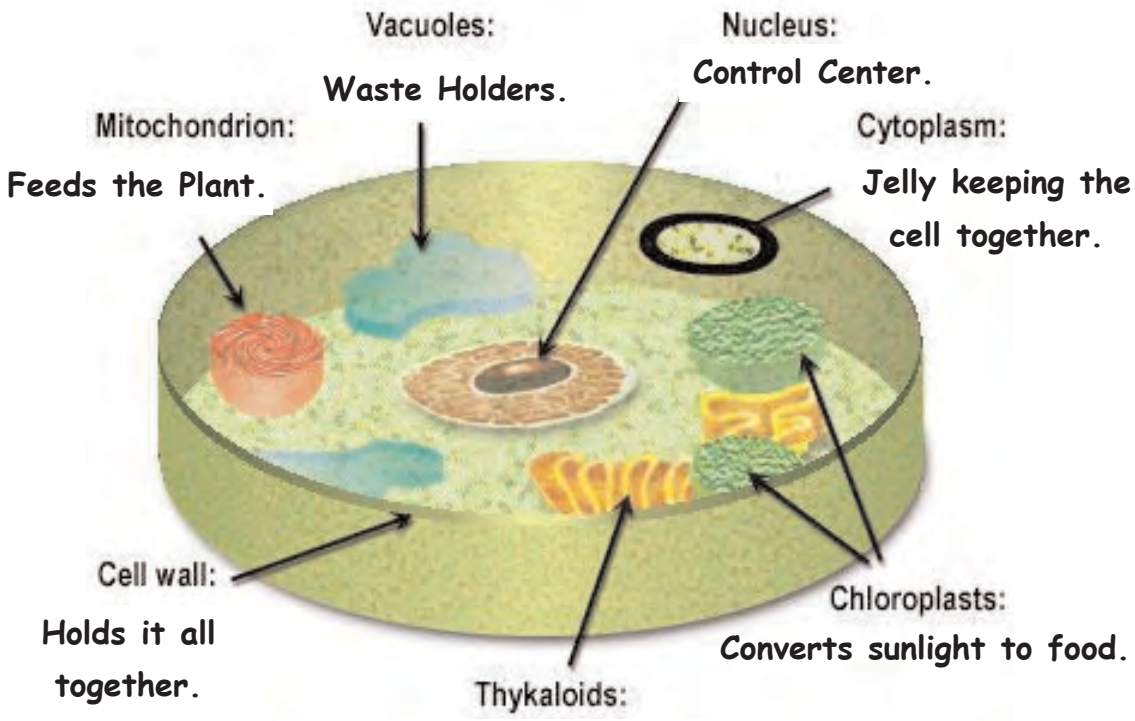
You can make a plant cell model.



How to be a scientist:

Frenquently scientists make models of things so other people can see what they're looking at, or studying. In this experiment - you scientists build your own model of a plant cell, because that's where it all begins!

Try to make a plant cell model using the picture below.



Student Scientist Project 2

Instructor Sheet

Seeing is Believing!

Plants are the only living things on earth that make their own food and produce oxygen.

Leaflet is a character used to introduce kids to the concepts of what leaves do.

Plants release oxygen as a by-product of photosynthesis. Oxygen is an invisible gas, however in this experiment, your scientists will get to see the oxygen gas bubbles being released from plants.

Super Scientist:

What you'll need:

Some aquatic plants (from the aquarium store like milfoil or elodea)
1 Broad-mouthed jar, like a baby food jar
1 2- liter soda bottle
scissors (kid friendly and safe, but strong enough to cut through the
stem of the plant) or you can do it.
BIG bucket or small aqarium
Access to water.
Baking soda
1 teaspoon measuring spoon

Image credit: King County Department of Natural Resources

Results of the Experiment:

The carbon dioxide from the baking soda will be used by the plant in combination with sunlight to perform photosynthesis. The oxygen bubbles that you and your students are seeing are the waste product of this process. And without it none of us could live!

Setting up the Experiment:

1. Fill the BIG bucket or better yet a small aquarium, so everyone in the class can watch, about ¾ full of water, let the student scientists fill it using the 2 liter water bottles. 1 of them, or you will have to keep track of how many bottles it took to fill the container ¾ full.

2. Add 2 teaspoons of baking powder for each 2 litter bottle full of water added to the bucket - have the other stu dents or you keep tract, and figure out fractions if neces sary. The baking soda - bicarbonate of soda is used as a source of carbon dioxide to speed up the plant's oxygen production.

3. Have a student scientist carefully submerge the jar, with the lid off, so it is completely filled, and have them put the lid on underwater, so no new air gets in. The bottle should stay submerged, if there are no air bubbles in it. This is a good test.

4. Have another student scientist take one of the aquari um plants, and gently shake it to remove any air bub bles.

5. While holding the plant under, you or them make a fresh cut on the stem with a pair of scissors.

6. Then place the plant in the submerged bottle/jar and put the lid on, do this all underwater.

7. Leave the bucket or aquarium in a sunny spot for a few hours, after a while, tiny bubbles of oxygen will begin to rise from the cut end of the stem.

8. Gently turn the bottle/jar over until you can see the bubbles of invisible gas!

Special Notes:

Elodea and milfoil plants are dangerous if they get into our waterways, be sure to dispose of them properly, in the garbage, please DO NOT put them outside or in a waterway!

Benchmarks and Grade Level Expectations

Benchmarks K-4 Science as Inquiry
A. Abilities Necessary to do Scientific Inquiry
SI-E-A1 asking appropriate qustions about organisms and events in the environment
SI-E-A2 planning and/or designing and conducting a scientific investigation
SI-E-A3 communicating that observations are made with one's senses
SI-E-A4 employing equipment and tools to gather data and extend the sensory observations
SI-E-A6 communicating observations and experiments in oral and written formats
SI-E-A7 utilizing safety procedures during experiments
B. Understanding Scientific Inquiry
SI-E-B2 using appropriate experiments depending on the questions to be explored
SI-E-B3 choosing appropriate equipment and tools to conduct an experiment
SI-E-B4 developing explanations by using observations and experiments
SI-E-B5 presenting the results of experiments
A. Characteristics of Organisms
LS-E-A1 identifying the needs of plants and animals, based on age-appropriate recorded observations
LS-E-A2 locating and comparing major plant and animal structures and their functions
C. Organisms and their Environments
LS-E-C2 describing how the features of some plants and animals enable them to live in specific habitats.
Benchmarks 5-8
A. The Abilities Necessary to do Scientific Inquiry
SI-M-A1 identifying questions that can be used to design a scientific investigation
SI-M-A2 designing and conducting a scientific investigation
SI-M-A7 communicating scientific procedures, information, and explanations
SI-M-A8 utilizing safety procedures during scientific investigations
A. Structure and Fuction in Living Organisms
LS-M-A4 describing the basic processes of photosynthesis and repiration and their importance to life
C. Earth in the Solar System
EsS-M-C6 modeling the describing how radiant energy from the sun affects phenomena on the Earth's surface, such as winds, ocean currents, and the water cycle.
Grade Level Expectations
Science as Inquiry
Ability to do Scientific Inquiry

Grade Level	Description
K 1 2 3 4	
1. 1. 1. 1. 1.	Ask questions about objects and events in the environment
2. 2. 2. 2. 2.	Pose questions that can be answered by using the student's own observations and scientific knowledge.
4. 5. 6. 6. 7.	Use the 5 senses to describe observations
7. 8. 9. 9. 10.	Express data in a variety of ways by conducting illustrations, graphs, charts, tables, concept maps, and oral and written explanations as appropriate.
8.9.10.11.12.	Use a variety of appropriate formats to describe procedures and to express ideas about deomonstrations or experiments (e.g. drawings, journals, reports, presentations, exhibitions, portfolios.)
9.10.11.11.13.	Identify and use appropriate safety procedures and equipment when conducting investigations

Physical Science
Properties of Objects and Materials Grade 1
16. Observe and describe common properties of solids, liquids, and gases
Earth and Space Science
Science and the Environment Grade 2
47. Identify the Sun as the primary energy source in a food chain
Life Science
Characteristics of Organisms Grade 4
40. Explain the functionsof plant structures in relations to their ability to make food through photosynthesis
Physical Science
Transformations of Energy Grades 5-8
12. Identify the Sun as the Earth's primary energy source and give examples (photosynthesis, water cycle)
Life Science
Structure and Function in Living Systems Grades 5-8
19. Describe the processes of photosynthesis and respiration in green plants.

Student Scientist Project 2

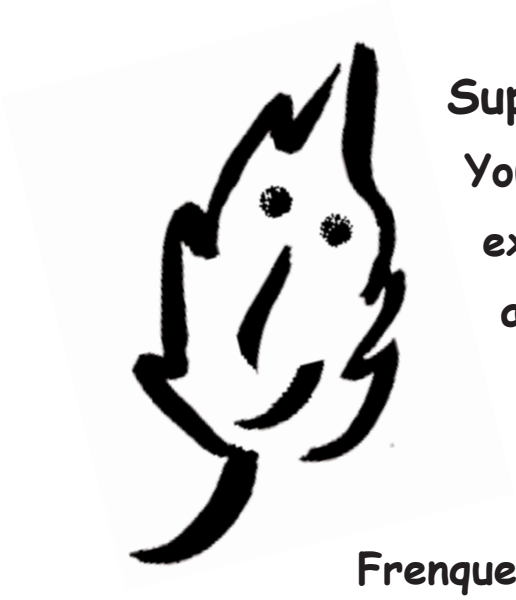
Seeing is Believing!

Plants are the only living things on earth that make their own food and produce oxygen.

Hey there, I'm Leaflet and I'm here to tell you about... well about me! Leaves are super important, without us, most things on earth couldn't live. Here's my story...

DID YOU KNOW?
We eat lots of leaves:
Peppermint
Lettuce
Spinach
Celery
Artichoke Hearts
Onions
and many leaves are added to food:
Bay
Rosemary
Tarragon
Chives
Thyme
Oregano

Plants, make food and release oxygen and water in a process called photosynthesis. Even though all animals need oxygen to live, we can't see it, it's invisible in the air. But in this experiment you will get to see oxygen bubbles that plants are releasing!



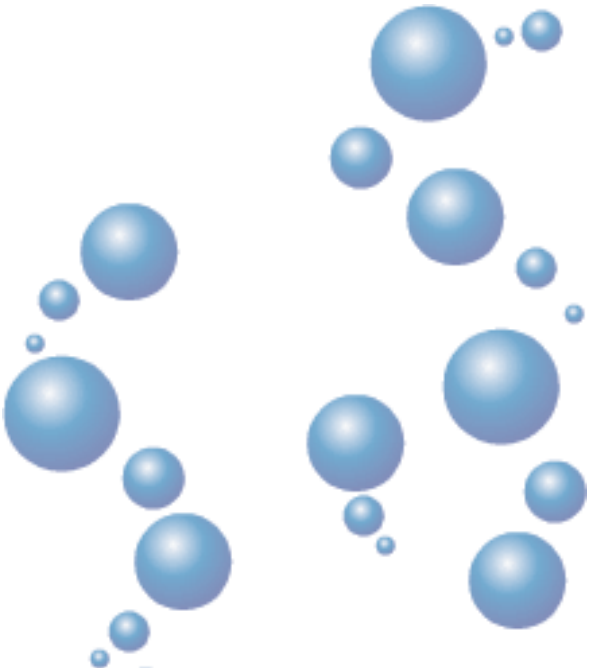
Super Scientist:

You can see an invisible gas - oxygen in this experiment! Since you can't see oxygen in the air - we're going to use a water plant and look for oxygen gas bubbles in the water.

How to be a scientist:

Frenquently scientists have to think of unusual ways to study what they're looking at - like you're going to do.

In this experiment you're going to add bicarbonate of soda to a container of water, so your plant will have plenty of carbon dioxide.



Then you're going to put an empty jar underwater, and then you fill it all the way up.

Then you or your teacher will cut a piece off of a water plant, and put that in the jar filled with the carbonated water, and put the lid on under water, so no air gets in.

Then you'll put your jar with carbonated water, and the water plant piece in a sunny window.

After an hour or so, you should start to see bubbles of oxygen.

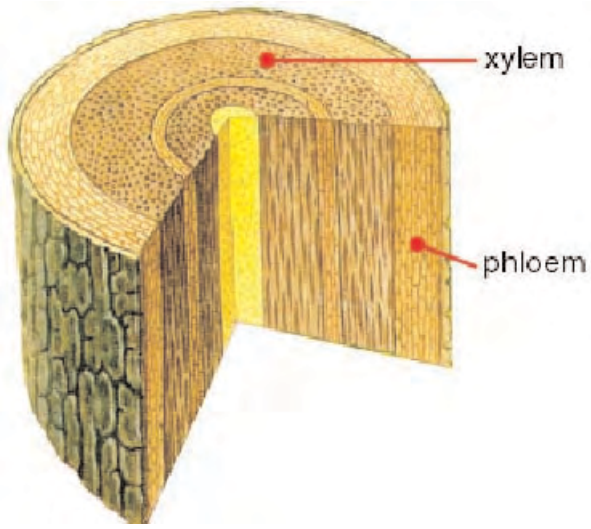
Student Scientist Project 3

Instructor Sheet

Plants drink through a straw?

Plants have special adaptations to survive, grow, and reproduce. And it's all in their parts...

Rootlet is a character used to introduce kids to the concepts of what roots do.



Vascular Tissue: xylem - located on the innermost ring of the stem/root; it carries water and minerals from the roots to the rest of the plant, using capillary action.

Super Scientist:

What you'll need:

7 White Carnations

7 Clear Glasses or plastic cups marked 1-7

Food Coloring - Red, Blue, and Yellow.

The student scientist sheet Project 3.

Setting up the Experiment:

1. Pass out the Student Scientist Sheet- Project 3 - "Plants Drink Through a Straw?".
2. Have the students use the Project sheets, to answer the questions.
3. Put 1 carnation in each cup of water.
4. Number the cups 1-7.
5. Have the students figure out how to make
   - Purple - Red and Blue
   - Orange - Red and Yellow
   - Green - Blue and Yellow

Results of the Experiment:

The flowers will each turn the color of the water, except for number 1, which has no color - this is your control. The students should conclude that xylem is bringing the colored water up to the flowers (through capillary action).

Extension...

Try to make up even more colors with your students -

- Brown - Red, Yellow, and Blue
- Black - Brown, with more Blue and Purple.
- Mauve - Red and Purple

Be sure to label your other cups and make room for them to record those colors on their student project sheets.

Benchmarks and Grade Level Expectations

Benchmarks K-4 Science as Inquiry
A. Abilities Necessary to do Scientific Inquiry
SI-E-A1 asking appropriate qustions about organisms and events in the environment
SI-E-A2 planning and/or designing and conducting a scientific investigation
SI-E-A3 communicating that observations are made with one's senses
SI-E-A4 employing equipment and tools to gather data and extend the sensory observations
SI-E-A6 communicating observations and experiments in oral and written formats
SI-E-A7 utilizing safety procedures during experiments
B. Understanding Scientific Inquiry
SI-E-B2 using appropriate experiments depending on the questions to be explored
SI-E-B3 choosing appropriate equipment and tools to conduct an experiment
SI-E-B4 developing explanations by using observations and experiments
SI-E-B5 presenting the results of experiments
A. Characteristics of Organisms
LS-E-A1 identifying the needs of plants and animals, based on age-appropriate recorded observations
LS-E-A3 locating and comparing major plant and animal structures and their functions
Earth and Space Science
A. Properties of Earth Materials
ESS-E-C2 observing and describing variations in soil

Benchmarks 5-8
A. The Abilities Necessary to do Scientific Inquiry
SI-M-A1 identifying questions that can be used to design a scientific investigation
SI-M-A2 designing and conducting a scientific investigation
SI-M-A7 communicating scientific procedures, information, and explanations
SI-M-A8 utilizing safety procedures during scientific investigations
A. Structure and Fuction in Living Organisms
LS-M-A4 describing the basic processes of photosynthesis and repiration and their importance to life
C. Earth in the Solar System
ESS-M-C6 modeling the describing how radiant energy from the sun affects phenomena on the Earth's surface, such as winds, ocean currents, and the water cycle.
Science and the Environment
SE-M-A7 demonstrating knowledge of the natural cycles, such as the carbon cycle, nitrogen cycle, water cycle, and oxygen cycle.

Grade Level Expectations
Science as Inquiry
Ability to do Scientific Inquiry

Grade Level	Description
K 1 2 3 4	
1. 1. 1. 1. 1.	Ask questions about objects and events in the environment
2. 2. 2. 2. 2.	Pose questions that can be answered by using the student's own observations and scientific knowledge.
4. 5. 6. 6. 7.	Use the 5 senses to describe observations
7. 8. 9. 9. 10.	Express data in a variety of ways by conducting illustrations, graphs, charts, tables, concept maps, and oral and written explanations as appropriate.
8.9.10.11.12.	Use a variety of appropriate formats to describe procedures and to express ideas about deomonstrations or experiments (e.g. drawings, journals, reports, presentations, exhibitions, portfolios.)
9.10.11.11.13.	Identify and use appropriate safety procedures and equipment when conducting investigations

Life Science
Characteristics of Organisms

Grade	
K 1 2 3	
22.28.	Classify objects in a variety of settings as living and nonliving
28.37.	Describe structures of plants (e.g. roots, leaves, stems, flowers, seeds) (and how for Grade3)
36.	Compare structures and their functions in a variety of plants

Life Science
Structure and Function in Living Systems Grades 5-8

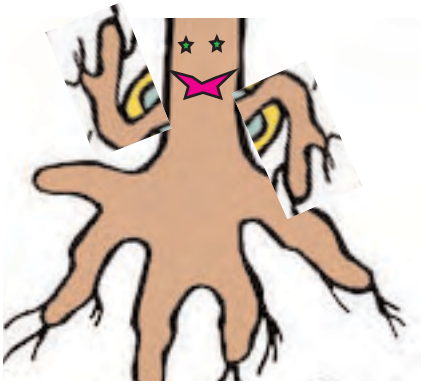
19.	Describe the processes of photosynthesis and respiration in green plants.

Student Scientist Project 3

Plants drink through a straw?

You know plants need **WATER** but how do they get it?

Hey there, I'm Rootlet and I'm here to tell you about... well about me! It's an underground operation that I run, I'm the part that holds the plant in the ground, and I'm the one that gets water out of the ground for the plant to use! Here's my story...



Plants get water and nutrients through their roots, and that gets transported throughout the plant by special tissues called xylem.

Super Scientist:

It's easy to remember if you think of the plant drinking through a straw of XYLEM -

How to be a scientist:

Sometimes scientists work on real objects and take notes on what happens as they change different elements of their experiments - one element called the "control" isn't changed at all, so they can compare what happens when they change one thing.

In this experiment - you scientists will look at how plants transport water, through the Xylem.

* Set up the white carnations with your teacher
* Each carnation should be numbered 1- 7
* Listen carefully and follow directions.

Setting up the Experiment:

Each plant will be different -

1. Flower has water with no food coloring
2. Flower has water with red food coloring
3. Flower has water with blue food coloring
4. Flower has water with yellow food coloring
5. Flower has water with purple food coloring (how do you make purple - you'll have to mix some colors - figure out which ones.)
   Purple is made by mixing _____ and _____ colors.
6. Flower has water with orange food coloring (how do you make orange - you'll have to mix some colors - figure out which ones.)
   Orange is made by mixing _____ and _____ colors.
7. Flower has water with green food coloring (how do you make green - you'll have to mix some colors - figure out which ones.)
   Green is made by mixing _____ and _____ colors.

Running the Experiment:

1. So what do you think? What color will each flower turn if they are using their xylem to transport water up?

   1. Flower _____
   2. Flower _____
   3. Flower _____
   4. Flower _____
   5. Flower _____
   6. Flower _____
   7. Flower _____

Why? _____

HYPOTHESIS - I think plant number _____ will turn _____

because _____

Running the Experiment:

2. So what do you think? Color the World - put the color of each flower on the line next to the number:

1. Flower _____
2. Flower _____
3. Flower _____
4. Flower _____
5. Flower _____
6. Flower _____
7. Flower _____

Setting up the Experiment:

Each flower will be different. Set up the flowers in this order with your teacher -

1. Flower has water, no food dye
2. Flower has water, red food dye
3. Flower has water, blue food dye
4. Flower has water, yellow food dye
5. Flower has water, purple food dye
6. Flower has water, orange food dye
7. Flower has water, green food dye

Running the Experiment:

3. So what do you think? Color the World - put the color of each flower, after 1 day on the line next to the number:

1. Flower _____
2. Flower _____
3. Flower _____
4. Flower _____
5. Flower _____
6. Flower _____
7. Flower _____

Concluding the Experiment:

4. So what happened? What color did each flower turn? Write the color on the line next to the Flower number:

1. Flower _____
2. Flower _____
3. Flower _____
4. Flower _____
5. Flower _____
6. Flower _____
7. Flower _____

CONCLUSION -Flower number _____ turned _____

because _____ moves water and minerals, and colors

from the roots _____ - Xylem UP!

Student Scientist Project 4

Instructor Sheet

You are what you eat!

Plants are the only living things on earth that make their own food and produce oxygen.

Leaflet is a character used to introduce kids to the concepts of what leaves do.

Plants begin almost all food chains on earth. You students will measure photosynthesis, the production of food in plants, with a number of leaves. They will then estimate the amount of food production in a tree.

Super Scientist:

What you'll need:

A number of leaves from a broad leafed tree species.
The student scientist sheet with a grid.
If you leaves are larger than the grid on the student sheet, you'll need large grid paper.
Pencils for your students to trace the leaves.

Setting up the Experiment:

1. Hand out the leaves you've collected to your students.
2. Have the students use the student sheet, or the grid paper you've provided, and trace around their leaves onto the sheet.
3. Have the student shade in the areas of the grid that the leaves covered.
4. Have the students count the number of squares in the grid that were completely or mostly covered by the leaf.
5. Ask the student scientists to add up the number of squares that were covered by the leaf.

Extension...

Have the students compare the areas of leaves from different trees. Remind them that pine needles are also leaves. Then ask them how pine trees can make up for having smaller leaves. (They have more leaves than broad leafed trees.)

Results of the Experiment:

The total number of squares is the approximate area for collecting sunlight for the plant, and the area of photosynthesis production.

Extension:

Have students examine a low hanging branch on the tree and count the number of leaves on a small part of the branch.
Then have them estimate the number of leaves on the whole branch, and write the number down.
Then have the students count or estimate the number of branches on the tree.
Help them to multiply the number of leaves on the entire tree! Now that's some PHOTOSYNTHESIS!

Food Chains!

In this section students will draw lines connecting parts of two food chains at Barataria - a land based, and an aquatic food chain. Food chains start with plants (producers) and energy moves up the chain 1st, 2nd, 3rd level consumers until you reach the top (top level consumers). Many food chains make up a food web, so both of these food chains would be part of the Barataria food web.

Draw lines connecting the food chain - what eats what?

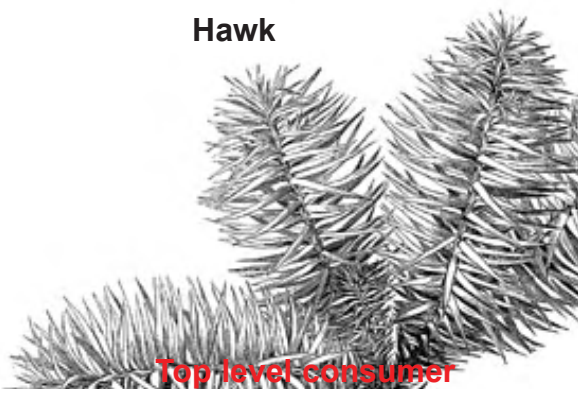
1st level consumer

Marsh Rabbit

Marsh Rabbit eats Grass

Hawk eats the Rabbit

Hawk



Top level consumer

Producer

Land Based Food Chain

Grass

Water Based Food Chain

2nd level consumer

Heron eats crab

Alligator eats Heron

Great Blue Heron

Marsh Crab

1st level consumer and Decomposer

Crab eats cattail and dead material

Producer

Cattail

Top level consumer

American Alligator

Benchmarks and Grade Level Expectations

Benchmarks K-4 Science as Inquiry
A. Abilities Necessary to do Scientific Inquiry

SI-E-A1	asking appropriate qustions about organisms and events in the environment
SI-E-A2	planning and/or designing and conducting a scientific investigation
SI-E-A3	communicating that observations are made with one's senses
SI-E-A4	employing equipment and tools to gather data and extend the sensory observations
SI-E-A5	using data, including numbers and graphs, to explain observations and experiments
SI-E-A6	communicating observations and experiments in oral and written formats
SI-E-A7	utilizing safety procedures during experiments

B. Understanding Scientific Inquiry

SI-E-B2	using appropriate experiments depending on the questions to be explored
SI-E-B3	choosing appropriate equipment and tools to conduct an experiment
SI-E-B4	developing explanations by using observations and experiments
SI-E-B5	presenting the results of experiments
SI-E-B6	reviewing and asking questions about the results of investigations

Life Science
A. Characteristics of Organisms

LS-E-A1	identifying the needs of plants and animals, based on age-appropriate recorded observations
LS-E-A3	locating and comparing major plant and animal structures and their functions

C. Organisms and Their Environment
LS-E-C2 describing how the features of some plants and animals enable them to live in specific habitats

Science and The Environment
SE-E-A2 understanding the components of a food chain

Grade Level Expectations
Science as Inquiry
Ability to do Scientific Inquiry

Grade Level	Description
K 1 2 3 4	
1. 1. 1. 1. 1.	Ask questions about objects and events in the environment
2. 2. 2. 2. 2.	Pose questions that can be answered by using the student's own observations and scientific knowledge.
4. 5. 6. 6. 7.	Use the 5 senses to describe observations
7. 8. 9. 9. 10.	Express data in a variety of ways by conducting illustrations, graphs, charts, tables, concept maps, and oral and written explanations as appropriate.
8.9.10.11.12.	Use a variety of appropriate formats to describe procedures and to express ideas about deomonstrations or experiments (e.g. drawings, journals, reports, presentations, exhibitions, portfolios.)
9.10.11.11.13.	Identify and use appropriate safety procedures and equipment when conducting investigations

Life Science
Characteristics of Organisms

Grade	
K 1 2 3 4	
22.28.	Classify objects in a variety of settings as living and nonliving
27.	Match the appropriate food source and habitat for a variety of animals
36.	Illustrate and describe a simple food chain located within an ecosystem

Earth and Space Science
Science and the Environment Grade 4
71. Describe and explain food chains/webs and the directional flow of energy in various ecosystems (construct a model)

Benchmarks and Grade Level Expectations

Benchmarks 5-8
A. The Abilities Necessary to do Scientific Inquiry
SI-M-A1 identifying questions that can be used to design a scientific investigation
SI-M-A2 designing and conducting a scientific investigation
SI-M-A7 communicating scientific procedures, information, and explanations
SI-M-A8 utilizing safety procedures during scientific investigations

C. Populations and Ecosystems
LS-M-C2 modeling and interpreting food chains and food webs

Science and the Environment
SE-M-A5 tracing the flow of energy through an ecosystem and demonstrating a knowledge of the roles of producers, consumers, and decomposers
SE-M-A7 demonstrating knowledge of the natural cycles, such as the carbon cycle, nitrogen cycle, water cycle, and oxygen cycle.

Grade Level Expectations
Life Science
Populations and Ecosystems Grades 5-8
23. Construct a food chain that would be found in ponds, marshes, oceans, forests, or meadows
24. Describe the role of producers, consumers, and decomposers in a food chain
25. Compare food chains and food webs

Student Scientist Project 4

You are what you eat!

Plants are the only living things on earth that make their own food and produce oxygen.

Hey there, I'm Leaflet and I'm here to tell you about... well about me! Leaves are super important, without us, most things on earth couldn't live. Here's my story...

DID YOU KNOW? Plants produce food for everything else, in a process called photosynthesis. Almost every place on earth has plant based food webs, from deserts to the frozen artic. Almost everything starts out eating plants, sometimes large plants that you can see with your eyes and sometimes with plants so small you need a special machine called a microscope to see them.

Plants, make food in a process called photosynthesis. Photosynthesis means "light gets put together" - because plants use sunlight and water from the soil to make sugar - just like the kind you eat! In most trees the process of photosynthesis takes place in the leaves - like me!

Super Scientist:

You can figure out how much food a tree is making in this experiment!

How to be a scientist:

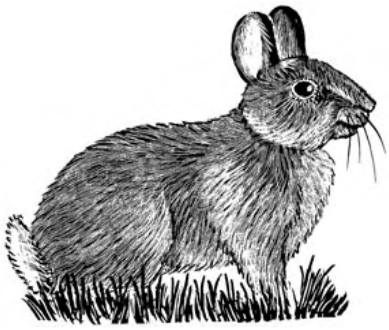
Sometimes scientists can't count the exact number of what they're studying, so they estimate, by counting the number of one area and then estimating for the entire area.

In this experiment you're going to put a leaf on this square of graph.

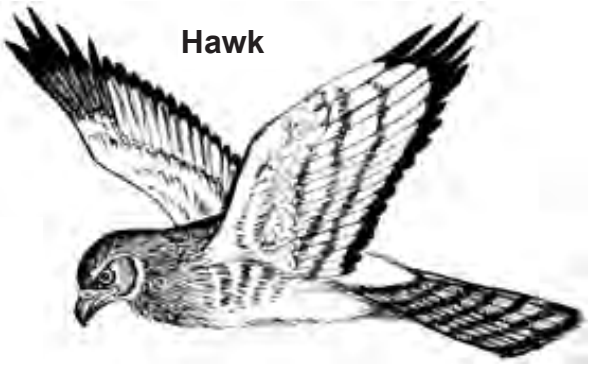
Then you're going to trace around the leaf and count the number of squares the leaf covers completely or almost completely.

Food Chains!

Draw lines connecting the food chain - what eats what?



Marsh Rabbit

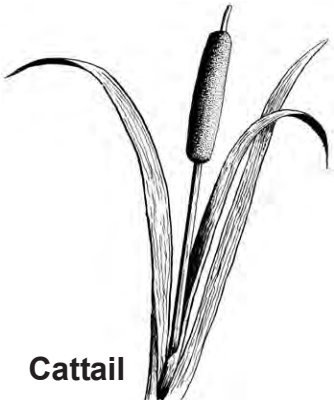


Hawk

Grass

Land Based Food Chain

Water Based Food Chain



Cattail

Marsh Crab

American Alligator

Great Blue Heron

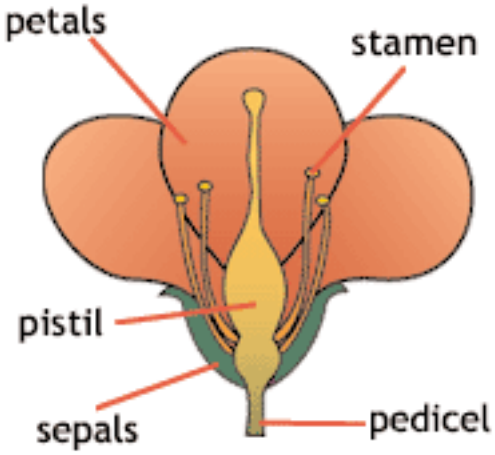
Student Scientist Project 5

Instructor Sheet

Flower Children!

All living things must reproduce, and most plants use flowers to help them reproduce.

Flower is a character used to introduce kids to the concepts of what flowers do.

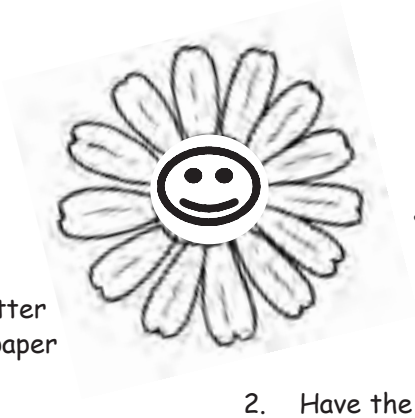


Plants like all living things must reproduce. Your students will make a model of a flower and color it in to better understand the functions of a flower.

Super Scientist:

What you'll need:

Construction paper, scissors, and glue.
The Student Project Sheet 5, "Flower Children."
Possibly other supplies like glitter for the pollen, tissue paper for the petals, etc.



Setting up the Experiment:

1. Hand out the the Student Project Sheet 5 "Flower Children".

2. Have the students use the student sheet, to begin to create their models.

3. Have the students label their model.

Extension...

Have the students make different types of flowers, different petal shapes, cone shaped flowers versus flat flowers, so that you have as many different species of flowers represented as you have students in your class.

Results of the Experiment:

The model should help the students understand what the different structures in flowers do, and how they help the plant produce seeds.

Extension:

Have students use recycled material to make a 3-dimensional model of a flower and label all the parts! You can use egg cartons, carboard tubes, plastic milk rings (streched out to represent the anther and filament of the stamen), let your imaginations go wild.

Benchmarks and Grade Level Expectations

Benchmarks K-4 Science as Inquiry
A. Abilities Necessary to do Scientific Inquiry

SI-E-A1	asking appropriate qustions about organisms and events in the environment
SI-E-A2	planning and/or designing and conducting a scientific investigation
SI-E-A3	communicating that observations are made with one's senses
SI-E-A4	employing equipment and tools to gather data and extend the sensory observations
SI-E-A6	communicating observations and experiments in oral and written formats
SI-E-A7	utilizing safety procedures during experiments

B. Understanding Scientific Inquiry

SI-E-B2	using appropriate experiments depending on the questions to be explored
SI-E-B3	choosing appropriate equipment and tools to conduct an experiment
SI-E-B4	developing explanations by using observations and experiments
SI-E-B5	presenting the results of experiments

Life Science
A. Characteristics of Organisms

LS-E-A1	identifying the needs of plants and animals, based on age-appropriate recorded observations
LS-E-A3	locating and comparing major plant and animal structures and their functions

B. Life Cycles of Organisms

LS-E-B1	observing and describing the life cycles of some plants and animals

Benchmarks 5-8
A. The Abilities Necessary to do Scientific Inquiry

SI-M-A1	identifying questions that can be used to design a scientific investigation
SI-M-A2	designing and conducting a scientific investigation
SI-M-A7	communicating scientific procedures, information, and explanations
SI-M-A8	utilizing safety procedures during scientific investigations

Science and the Environment
SE-M-A7 demonstrating knowledge of the natural cycles, such as the carbon cycle, nitrogen cycle, water cycle, and oxygen cycle.

Grade Level Expectations
Science as Inquiry
Ability to do Scientific Inquiry

Grade Level	Description
K 1 2 3 4	
1. 1. 1. 1. 1.	Ask questions about objects and events in the environment
2. 2. 2. 2. 2.	Pose questions that can be answered by using the student's own observations and scientific knowledge.
4. 5. 6. 6. 7.	Use the 5 senses to describe observations
7. 8. 9. 9. 10.	Express data in a variety of ways by conducting illustrations, graphs, charts, tables, concept maps, and oral and written explanations as appropriate.
8.9.10.11.12.	Use a variety of appropriate formats to describe procedures and to express ideas about deomonstrations or experiments (e.g. drawings, journals, reports, presentations, exhibitions, portfolios.)
9.10.11.11.13.	Identify and use appropriate safety procedures and equipment when conducting investigations

Life Science
Characteristics of Organisms

Grade	
K 1 2 3	
26.	Describe the difference betweeen plants and animals
27.	Identify what aminals and plants need to grow and develop
22.28.	Classify objects in a variety of settings as living and nonliving
28.37.	Describe structures of plants (e.g. roots, leaves, stems, flowers, seeds) (and how for Grade3)
36.	Compare structures and their functions in a variety of plants

Life Cycles of Organisms Grade 4

45.	Identify reproductive structures in plants and describe the functions of each

Student Scientist Project 5

Flower Children!

Flowers are the parts of a plant that make babies.
Plant babies are called seeds.

Hey there, I'm Flower and I'm here to tell you about... well about me! Flowers are super important, without us, there would be no baby plants. Here's my story...

DID YOU KNOW?
Plants produce flowers so they can have babies. There are over 250,000 kinds of flowering plants. Flowering plants are called Angiosperm - it comes from the Greek language
Angio = jar
Sperm = seed
So the word angiosperm means _____ of _____.
Because after flowers are pollinated, they produce baby plants - called seeds.

Every living thing needs to produce babies, even plants! Plants make flowers and attract pollinators so they can help the plant make seeds. Some flowers are big, beautiful, and smell wonderful, but some are small, ugly, and stink!

Super Scientist:

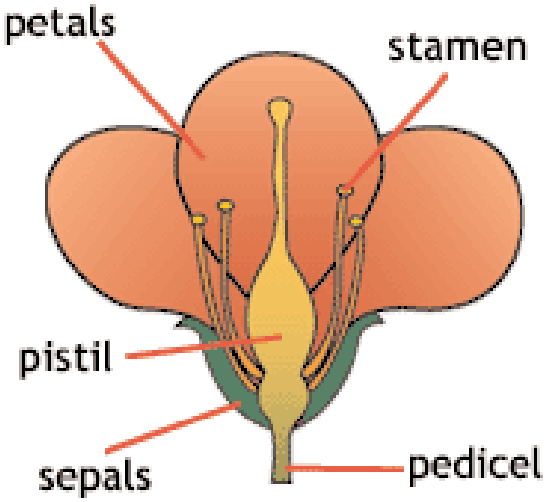
You can identify the parts of a flower in this experiment!

How to be a scientist:

Sometimes scientists have to make models of what they're studying to better understand it.

In this experiment you're going to build a model of a flower.

Try to make a flower model using the picture on the right.



You will need to color in the different parts of the flower, because each part has an important job to help the plant make babies (seeds).

Male parts of the flower - stamen make pollen - that's the dad's part. Pollen is the yellow dust from flowers that can make you sneeze! Color that part yellow!

Female parts of the flower - pistil make the eggs - that's the mom's part. Pistils are sticky so the pollen from the dad stick! Color that part blue. The petals help animals find their way inside the flower, where they get nectar - sweet sugary water, and pick up pollen. On the next flower when they go to get nectar, they drop off some of the pollen onto the pistil, and a baby is formed - or a seed in this case! Color the petals red.

After the seeds are formed, the petals fall off, the pistil enlarges, and the sepals cover the fruit that holds the seeds of the plant.

Student Scientist Project 6

Instructor Sheet

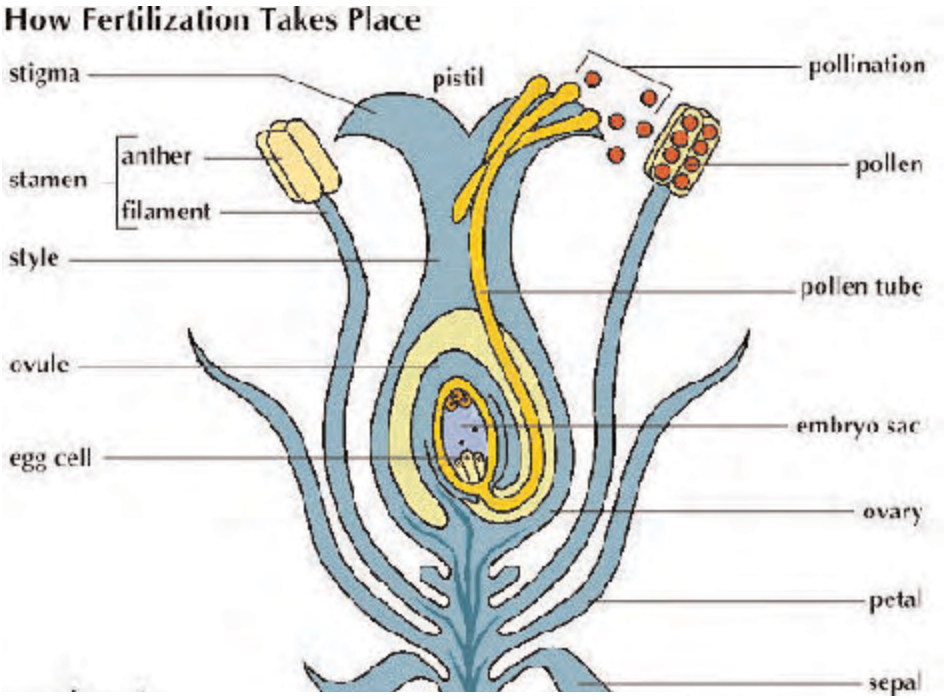
Flower Friends!

Most flowers do not self pollinate they need partners, the most notable is the honey bee.

Graphic credit: Braintree District Council, UK

Busybee is a character used to introduce kids to the concepts of how flowers are pollinated.

Plants like all living things must reproduce, but most need help to transfer pollen to the pistil. Your students will make a model of a bee and use a real flower, to see how the bee picks up the pollen and later redistributes it.



Graphic credit: Wa Goverment, Austrailia

Super Scientist:

What you'll need:

Construction paper (in black and yellow), scissors, and glue, or you may have your students cut out Busybee.

Chenille stems (or pipe cleaners) to attach to the bees for legs, DARK COLORS work best.

The Student Project Sheet 6, "Flower Friends."

Possibly other supplies like glitter, tissue paper for the wings, etc.

Setting up the Experiment:

1. Hand out the the Student Project Sheet 6 "Flower Friends".

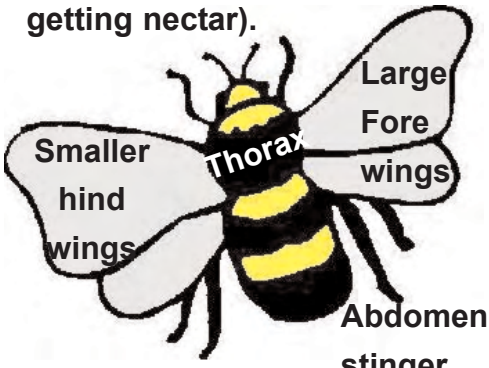
2. Have the students use the student sheet, to begin to create their models.

3. Have the students add the chenille stem legs.

4. Have the students brush real flowers, like daisies, with their bee models, and see the pollen collected.

5. Black chenille stem legs show the yellow pollen particles best, but any dark color will do.

Head, antennae, compound eyes, and proboscis (for getting nectar).



Abdomen, stinger

Legs with pollen sacs

Extension...

Have the students label their model bee, using the diagram to the left.

Results of the Experiment:

The model should help the students see the pollen that is on the other tips of flowers, and how bees collect it.

Extension:

Have students use the bee models and see if they can then deposit some of the pollen they've collected off of one flower onto another, just like a real bee pollinating a flower!

Benchmarks and Grade Level Expectations

Benchmarks K-4 Science as Inquiry
A. Abilities Necessary to do Scientific Inquiry

SI-E-A1	asking appropriate qustions about organisms and events in the environment
SI-E-A2	planning and/or designing and conducting a scientific investigation
SI-E-A3	communicating that observations are made with one's senses
SI-E-A4	employing equipment and tools to gather data and extend the sensory observations
SI-E-A6	communicating observations and experiments in oral and written formats
SI-E-A7	utilizing safety procedures during experiments

B. Understanding Scientific Inquiry

SI-E-B2	using appropriate experiments depending on the questions to be explored
SI-E-B3	choosing appropriate equipment and tools to conduct an experiment
SI-E-B4	developing explanations by using observations and experiments
SI-E-B5	presenting the results of experiments

Life Science
A. Characteristics of Organisms

LS-E-A1	identifying the needs of plants and animals, based on age-appropriate recorded observations
LS-E-A3	locating and comparing major plant and animal structures and their functions

B. Life Cycles of Organisms

LS-E-B1	observing and describing the life cycles of some plants and animals

Benchmarks 5-8
A. The Abilities Necessary to do Scientific Inquiry

SI-M-A1	identifying questions that can be used to design a scientific investigation
SI-M-A2	designing and conducting a scientific investigation
SI-M-A7	communicating scientific procedures, information, and explanations
SI-M-A8	utilizing safety procedures during scientific investigations

Science and the Environment
SE-M-A7 demonstrating knowledge of the natural cycles, such as the carbon cycle, nitrogen cycle, water cycle, and oxygen cycle.

Grade Level Expectations
Science as Inquiry
Ability to do Scientific Inquiry

Grade Level	Description
K 1 2 3 4	
1. 1. 1. 1. 1.	Ask questions about objects and events in the environment
2. 2. 2. 2. 2.	Pose questions that can be answered by using the student's own observations and scientific knowledge.
4. 5. 6. 6. 7.	Use the 5 senses to describe observations
7. 8. 9. 9. 10.	Express data in a variety of ways by conducting illustrations, graphs, charts, tables, concept maps, and oral and written explanations as appropriate.
8.9.10.11.12.	Use a variety of appropriate formats to describe procedures and to express ideas about deomonstrations or experiments (e.g. drawings, journals, reports, presentations, exhibitions, portfolios.)
9.10.11.11.13.	Identify and use appropriate safety procedures and equipment when conducting investigations

Life Science
Characteristics of Organisms

Grade	
K 1 2 3	
26.	Describe the difference betweeen plants and animals
27.	Identify what aminals and plants need to grow and develop
22.28.	Classify objects in a variety of settings as living and nonliving
28.37.	Describe structures of plants (e.g. roots, leaves, stems, flowers, seeds) (and how for Grade3)
36.	Compare structures and their functions in a variety of plants

Life Cycles of Organisms Grade 4

45.	Identify reproductive structures in plants and describe the functions of each

Student Scientist Project 6

Flower Friends!

Flowers are the parts of a plant that make babies, or in a plant's case seeds, but most plants need a little help.

Hey there, I'm Busybee and I'm here to tell you about... well about me! Flowers need some help to make baby plants, and that's where I come in. Here's my story...

DID YOU KNOW?
In the United States alone, it is estimatedthat honeybees accomplish 1/4 of the pollination needed for all fruit produced for human consumption - an estimated $10 billion worth of work!
Without plants and their friends there would be no fruits, like apples, bananas, and watermelon.
The honeybee is also Louisiana's state insect!

Every living thing needs to produce babies, even plants! Plants make flowers and attract pollinators so they can help the plant make seeds. Some flowers are big, beautiful, and smell wonderful, but some are small, ugly, and stink! Some small flowers can use small insects or even the wind, stinky flowers use insects like flies, but most flowers use bees!

Super Scientist:

You can actually pollinate a flower in this experiment!

How to be a scientist:

Sometimes scientists have to make models of what they're studying to better understand it.

In this experiment you're going to build a model of a bee.

Try to make a bee model using the picture of Busybee.

You will need to cut out construction paper in black and yellow for the body.
REMEMBER: Insects have 3 body parts - Head, Thorax, and Abdomen.

You need to add 3 pairs of Chenille stem legs, you may bend the stems in half and attach them to the bottom of your model.

Once your model is complete with wings, attach Chenille stem legs with glue or tape.

After the legs are attached fly your bee over a flower, like a daisy, and see how much pollen your bee can pick up.

Student Scientist Project 7

Instructor Sheet

Plant Babies!

Your students will be able to watch the growth of a seed in this experiment.

Graphic credit: Michigan Department of Agriculture

Seedling is a character used to introduce kids to the concepts of how seeds grow into plants.

After the flower has been fertilized the plant begins to produce seeds. The seeds are contained in fruit - protective housing of food for the developing young. When an animal eats the fruit it can digest the fruit but not the seed, that is deposited in a rich fertilizer provided by the animal's waste!

Graphic credit: Michigan Department of Agriculture

Super Scientist:

What you'll need:

Some seeds, like lima beans or alfalfa work well (you may soak them over night to help prep them for sprouting).

Paper Towels

A plastic closing bag like a "ziplock baggie."

Water

The Student Project Sheet 7, "Plant Babies."

Setting up the Experiment:

1. Hand out the the Student Project Sheet 7 "Plant Babies".

2. Have the students use the student sheet, to begin the experiment.

3. Take a paper towel and lay it out on a flat surface (that can be wetted).

4. Fold the paper towel in half twice so it's a quarter of it's original size.

5. Wet the paper towels (while they are folded). The paper towels should be wet, but not soaking with a puddle of water.

6. Open the wet paper towel in half.

7. Arrange the seeds on the wet half of the paper towel.

8. Fold the other wet half on top of the seeds.

9. Place the wet paper towels with the seeds inside a plastic bag.

10. Seal the plastic bag.

11. Keep the seeds at room temperature.

12. After a few days you should see the seeds sprout.

Results of the Experiment:

The seeds should show growth, and begin to sprout after a few days to a week.

Extension...

Have the students draw the seeds at the beginning of the experiment, and then draw them again after they've sprouted, and note any changes.

Extension:

Take one of the seeds before sprouting, but after soaking overnight, and cut it in half, the students should see all the seed parts, embryo, endosperm, and seed coat.

Also you can have your studends compare seeds that were soaked overnight versus some that were not. Try sprouting some that were not, and see if they can observe any difference (it should take longer).

Benchmarks and Grade Level Expectations

Benchmarks K-4 Science as Inquiry
A. Abilities Necessary to do Scientific Inquiry
SI-E-A1 asking appropriate qustions about organisms and events in the environment
SI-E-A2 planning and/or designing and conducting a scientific investigation
SI-E-A3 communicating that observations are made with one's senses
SI-E-A4 employing equipment and tools to gather data and extend the sensory observations
SI-E-A6 communicating observations and experiments in oral and written formats
SI-E-A7 utilizing safety procedures during experiments
B. Understanding Scientific Inquiry
SI-E-B2 using appropriate experiments depending on the questions to be explored
SI-E-B3 choosing appropriate equipment and tools to conduct an experiment
SI-E-B4 developing explanations by using observations and experiments
SI-E-B5 presenting the results of experiments
Life Science
A. Characteristics of Organisms
LS-E-A1 identifying the needs of plants and animals, based on age-appropriate recorded observations
LS-E-A3 locating and comparing major plant and animal structures and their functions
B. Life Cycles of Organisms
LS-E-B1 observing and describing the life cycles of some plants and animals

Benchmarks 5-8
A. The Abilities Necessary to do Scientific Inquiry
SI-M-A1 identifying questions that can be used to design a scientific investigation
SI-M-A2 designing and conducting a scientific investigation
SI-M-A7 communicating scientific procedures, information, and explanations
SI-M-A8 utilizing safety procedures during scientific investigations
Grade Level Expectations
Science as Inquiry
Ability to do Scientific Inquiry
Grade Level Description
K 1 2 3 4
1. 1. 1. 1. 1. Ask questions about objects and events in the environment
2. 2. 2. 2. 2. Pose questions that can be answered by using the student's own observations and scientific knowledge.
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7. 8. 9. 9. 10. Express data in a variety of ways by conducting illustrations, graphs, charts, tables, concept maps, and oral and written explanations as appropriate.
8.9.10.11.12. Use a variety of appropriate formats to describe procedures and to express ideas about deomonstrations or experiments (e.g. drawings, journals, reports, presentations, exhibitions, portfolios.)
9.10.11.11.13. Identify and use appropriate safety procedures and equipment when conducting investigations
Life Science
Characteristics of Organisms
Grade
K 1 2 3 4
21. Record observations on the growth of plant seeds
Life Cycles of Organisms
28. Observe life cycles and describe changes
30. Record and share observations of changes in developing plants
33. Compare the life cycles of selected organisms
34. Describe inherited characteristics of living things
45. Identify reproductive structures in plants and describe the functions of each
47. Sequence stages in the life cycles of various organism, including seed plants
26. Describe the difference betweeen plants and animals
27. Identify what aminals and plants need to grow and develop
22.28. Classify objects in a variety of settings as living and nonliving
28.37. Describe structures of plants (e.g. roots, leaves, stems, flowers, seeds) (and how for Grade3)
36. Compare structures and their functions in a variety of plants
Science and the Environment
70. Design an ecosystem that includes living and nonliving components and illustrates interdependence

Student Scientist Project 7

Plant Babies!

Flowers are the parts of a plant that make babies, well in a plant's case seeds. Once seeds are made they begin to grow.

Hey there, I'm Sprout and I'm here to tell you about... well about me! I'm a baby plant, little seeds can make giant oak trees or grass, or in my case a bean plant. Here's my story...

DID YOU KNOW?
Some seeds make fruits, and some things we think of as vegetables, like beans, corn, and tomatoes. Some seeds make grasses, like the kind in a yard, and some make huge trees like oaks and maple trees. Some seeds even make something adults like to drink... Coffee!

Every living thing needs to produce babies, even plants! Some plants make huge seeds, like the coconut, or tiny seeds, so small you need a microscope to see them! But every seed has one job, to make a new plant! Most of us, like you have some genetic information from our mom and some genetic information from our dad.

Super Scientist:

You can actually watch a seed grow in this experiment!

How to be a scientist:

Sometimes scientists work with the real thing that they're studying to better understand it.

In this experiment you'll grow your own baby plant.

You will need:

Some paper towels

Seeds

Water

Plastic bags

Put the seeds in wet paper towels and put the entire thing in a plastic sealing bag.

After a few days look at your seeds and see if you can see a baby plant!

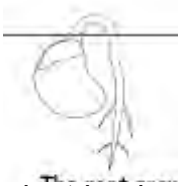
Draw your baby plant here.

1. 

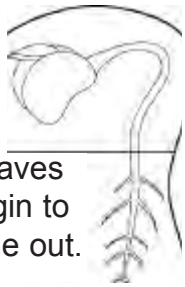
The seed waits for the perfect time to begin to grow.

2. 

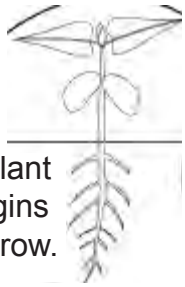
The seed sends out a root, first.

3. 

The plant begins to push through the soil.

4. 

Leaves begin to come out.

5. 

A plant begins to grow.

See if you can draw all the steps of a seed growing, in the right order.

1.

2.

3.

4.

5.

These On-site Activities will help bring the learning in class alive and help connect your students to the exciting environments they've been studying.

ON-SITE ACTIVITY

NON-NATIVE PLANT DISSECTION

Location: Lab

Purpose:

Students will dissect a non-native plant to better understand plant adaptations, and compare to native plants to observe differences between them.

Objective:

Students will understand that non-native plants disrupt the food web here in Barataria. And this type of habitat disturbance is detrimental for the survival of many species.

Materials:

Non-native plant material, tweezers, microscopes, dissection sheets, glue, and pencils.

Procedure:

1. Distribute various plant materials, and have students work in small groups to determine some of the special adaptations that allow non-natives to out compete native species.

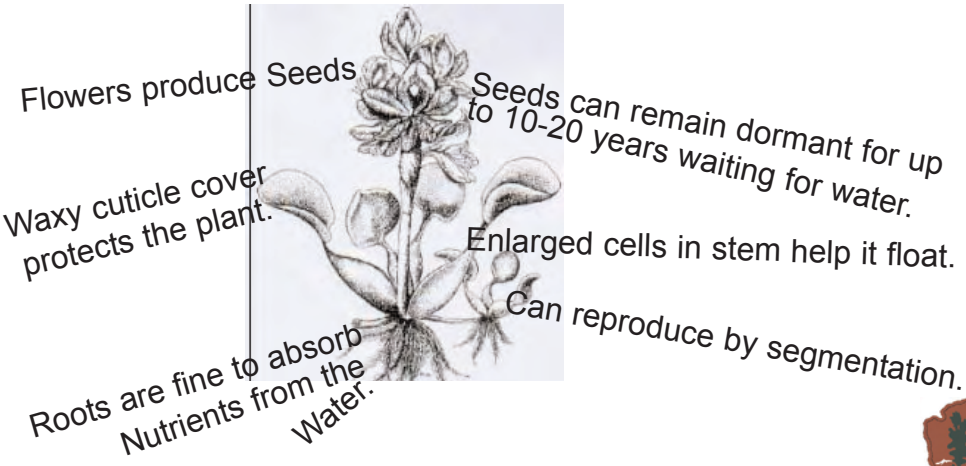
2. Have students fill in thier Student Dissection sheets using the plant materials, microscopes, and pencils.

Image Credit: NOAA Restoration

A quote by Doug Larson humorously characterizes weeds as: "A weed is a plant that has mastered every survival skill except for learning how to grow in rows."

Some of the special adaptations of Non-native Invasive Water Hyacinth that help this plant survive and out compete native plants.

Image Credit: Washington State Department of Ecology



Benchmarks and Grade Level Expectations

Benchmarks K-4 Science as Inquiry

A. Abilities Necessary to do Scientific Inquiry

SI-E-A1	asking appropriate qustions about organisms and events in the environment
SI-E-A2	planning and/or designing and conducting a scientific investigation
SI-E-A3	communicating that observations are made with one's senses
SI-E-A6	communicating observations and experiments in oral and written formats

B. Understanding Scientific Inquiry

SI-E-B2	using appropriate experiments depending on the questions to be explored
SI-E-B4	developing explanations by using observations and experiments
SI-E-B5	presenting the results of experiments

Benchmarks K-4 Life Science

A. Characteristics of Organisms

LS-E-A3	Locating and comparing major plant and animal structures and their functions
LS-E-A4	Recognizing that there is a great diversity among organisms

B. Life Cycles of Organisms

LS-E-B1	Observing and describing the life cycles of some plants and animals

C. Organisms and Their Environments

LS-E-C1	Examining the habitats of plants and animals and determing how basic needs are met within each habitat
LS-E-C2	Describing how the features of some plants and animals enable them to live in specif ic habitats
LS-E-C3	Observing animals and plants and describing interaction and interdependence

Grade Level Expectations

Grade Level Expectations

Science as Inquiry

Ability to do Scientific Inquiry

Grade Level	Description
K 1 2 3 4	
1. 1. 1. 1. 1.	Ask questions about objects and events in the environment
2. 2. 2. 2. 2.	Pose questions that can be answered by using the student's own observations and scientific knowledge.
4. 5. 6. 6. 7.	Use the 5 senses to describe observations

Life Science

Characteristics of Organisms

Grade	
K 1 2 3 4	
25	Identify easily observable variations within types of plants and animals
26	Describe the difference betweeen plants and animals
27	Identify what aminals and plants need to grow and develop
28.37.	Describe structures of plants (e.g. roots, leaves, stems, flowers, seeds) (and how for Grade3)
29	Compare differences and similarities among a variety of seed plants
30	Identify physical characteristics of organisms
36.	Compare structures and their functions in a variety of plants
37	Describe how plant structures enable the plant to meet is basic needs
39	Compare organisms of different groups
40	Explain the function of plant structures and their ability to make food through photosynthesis

Life Cycles of Organisms

Grade	
K 1 2 3 4	
46.	Explain how some plants can be grown from a plant part instead of a seed

Organisms and their Environment

Grade	
K 1 2 3 4	
50	Explain how some organisms in a given habitat compete for the same resources
52	Describe how some plants and animals have adapted to their habitats
54	Describe the effect of sudden increases or decreases in one group of organ isms in the environment.

Plant Dissection Sheet

Measure the Plant Parts:

What is the Length _____
What is the Width _____

What is the Length _____
What is the Width _____

What is the Length _____
What is the Width _____

What is the Length _____
What is the Width _____

What is the Length _____
What is the Width _____

Draw the shape of the Leaf

Draw the shape of the Roots

Draw the shape of the Flower

Draw the shape of the Fruit/Seed:

Draw the shape of the Stem

ON-SITE ACTIVITY

NATURE HIKE

Location:

Bayou Coquille/Ed Center Trail

Purpose:

Students will hike trails, and discover plant communities, and the animals that live within them.

Objective:

Students will understand plant species here in Barataria, form communities that define habitats. They will explore native and non-native vegetation, and the associated animals that live in these communities.

Materials:

Nature Scavenger Hunt pages, and pencils.

Procedure:

1. Distribute Scavenger Hunt, and have students work in small groups to observe and write about the plants and animals they will see on the trails here at Barataria.

2. If students are unable to write, they may draw instead.

3. Students should also be looking for changes in the habitat as they notice dominant plant species changing along the way.

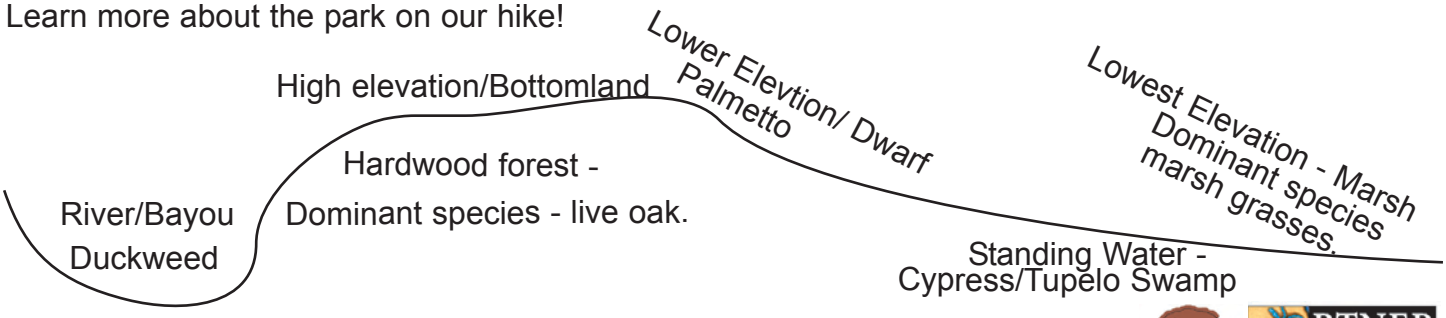
Image Credit: National Park Service

Saving the Bayou
By Lawrence Wells
Nov 01 '00
"On the boardwalk at Louisiana's Barataria Preserve, the prehistoric quiet of the swamp muffles the sound of vehicles passing on a nearby highway. I stand listening to palmetto blades rustling like scratchy wind chimes. Green water snakes sun themselves on islands of water lilies. Grey lizards scramble on the boardwalk built along roots of moss-bearded cypress..."

Background Information: **http://www.nps.gov/jela/Baratariapreserve.htm**

Barataria Preserve encompasses almost 20,000 acres of habitat. Large oaks and Maple trees dominated the bottom-land hardwood forest. Then gently slopping away leading down to the water, grows Dwarf Palmetto trees that can reach over 300 years old. As we descend even further, we find ourselves in a flooded swamp dominated by Cypress and Tupelo, draped in Spanish Moss. Just before the canal, a marsh emerges with cat-tails and wild-rice. Look on the blades for tree frogs, and anole lizards. In the canal look for our tiny native duckweed, the world's smallest flowering plant and baby alligators hiding in the shadows.

Learn more about the park on our hike!



Benchmarks and Grade Level Expectations

Benchmarks K-4 Science as Inquiry

A. Abilities Necessary to do Scientific Inquiry
SI-E-A3 communicating that observations are made with one's senses
SI-E-A6 communicating observations and experiments in oral and written formats

Life Science
A. Characteristics of Organisms
LS-E-A3 locating and comparing major plant and animal structures and their functions
B. Life Cycles of Organisms
LS-E-B1 observing and describing the life cycles of some plants and animals
LS-E-B2 observing,comparing, and grouping plants and animals according to likeness and/or differences
C. Organisms and their environment
LS-E-C1 examing the habitats of plants and animals and determining how basic needs ard met within each habitat
LS-E-C2 describing how the features of some plants and animals enable them to live in specific habitats
LS-E-C3 observing animals and plants and describing interaction and interdependence

Benchmarks 5-8
A. The Abilities Necessary to do Scientific Inquiry
SI-M-A1 identifying questions that can be used to design a scientific investigation
SI-M-A2 designing and conducting a scientific investigation
SI-M-A7 communicating scientific procedures, information, and explanations
SI-M-A8 utilizing safety procedures during scientific investigations
Science and the Environment
SE-M-A7 demonstrating knowledge of the natural cycles, such as the carbon cycle, nitrogen cycle, water cycle, and oxygen cycle.

Grade Level Expectations
Science as Inquiry
Ability to do Scientific Inquiry

Grade Level	Description
K 1 2 3 4	
1. 1. 1. 1. 1.	Ask questions about objects and events in the environment
2. 2. 2. 2. 2.	Pose questions that can be answered by using the student's own observations and scientific knowledge.
4. 5. 6. 6. 7.	Use the 5 senses to describe observations

Life Science
Characteristics of Organisms

Grade	
K 1 2 3 4	
25	Identify easily observable variations within types of plants and animals
26	Describe the difference betweeen plants and animals
27	Identify what aminals and plants need to grow and develop
27	Match the appropriate food source and habitat for a variety of animals
22.28.	Classify objects in a variety of settings as living and nonliving
28.37.	Describe structures of plants (e.g. roots, leaves, stems, flowers, seeds) (and how for Grade3)
29	Compare differences and similarities among a variety of seed plants
30	Identify physical characteristics of organisms
36.	Compare structures and their functions in a variety of plants
38	Classify groups of organisms based on common characteristics
39	Compare organisms of different groups

Organisms and their Environment

Grade	
K 1 2 3 4	
34	Record evidence of plants and animals in other environments
45	Locate and identify plants and animals within an ecosystem
50	Explain how some organisms in a given habitat compete for the same resources
52	Describe how some plants and animals have adapted to their habitats
53	Identify the habitat in which selected organisms would most likely live and explain how specific structures

Life Cycles of Organisms Grade

Grade	
K 1 2 3 4	
45.	Identify reproductive structures in plants and describe the functions of each

Nature Scavenger Hunt

See how many you can find...

A seed from a tree:

Draw the shape:

A leaf from a tree:

Draw the shape:

A flower: What color is it?_____

Draw the shape:

Nature Scavenger Hunt

See how many you can find...

A plant in the water:

Draw the shape:

A plant with an insect on it:

Draw the shape:

An animal near/on a plant:
What is it doing?_____

Draw the shape:

ON-SITE ACTIVITY

FOOD CHAIN GAME

Location: Atrium

Purpose: Students will play a game that will help them understand the parts of a Barataria food chain.

Objective: Students will understand that plant species here in Barataria, form food chains, through which energy passes from the plants to the many levels of consumers.

Materials:
Food chain tags.

Procedure:

1. Pass out food chain tags or colored stickers.

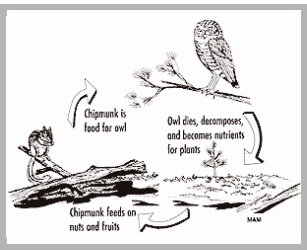
2. Divide students by tags/colored stickers into
   a. Producers (plants)
   b. Herbivores (plant eaters)
   c. Omnivores (all eaters)
   d. Carnivores (meat eaters)
   e. Decomposers (break down materials)

3. Hold two students out for non-native invasives

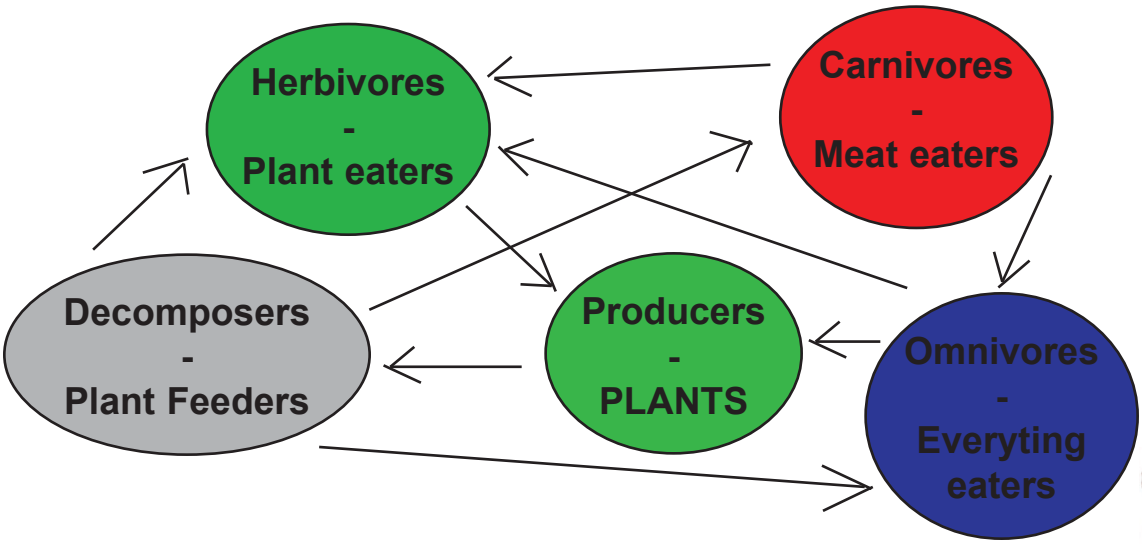
4. Play tag with Plants being eaten - turned into Herbivores, Herbivores being turned into Omni or Carnivores, and Decomposers turning Carnivores, Herbivores and Omnivores into Decomposers, and plants absorbing Decomposers.

5. After the students have played for a while, with the students passing from plants to herb, omni, carnivores, and decomposers, introduce the two students as non-native invasives. They turn everyone into non-natives - Game soon ends.

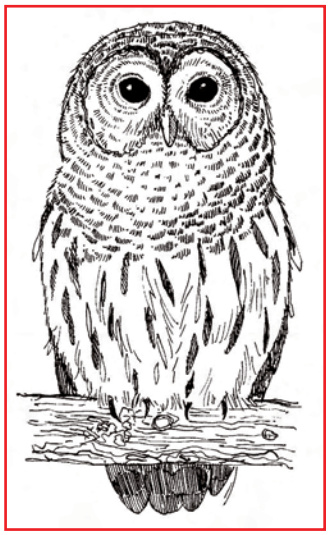
Image Credit: National Interagency Fire Center



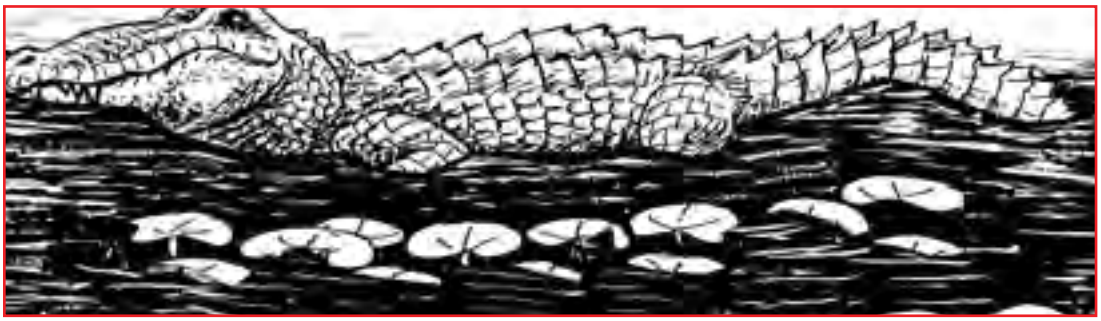
The Food Chain:
An ecosystem is a living community which depends on each member and its surrounding environment.
The living part of an ecosystem is sometimes called a food chain.
Planetpals.com
OR
John Muir said, "When we try to pick anything out by itself, we find it hitched to everything else in the universe."



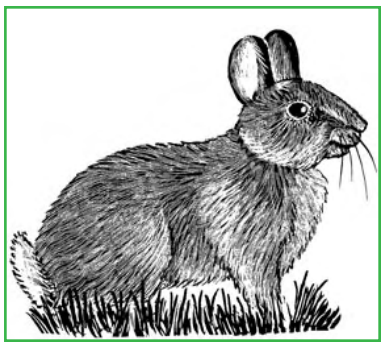
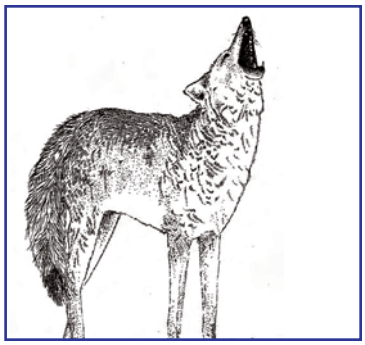
Sample Food Chain

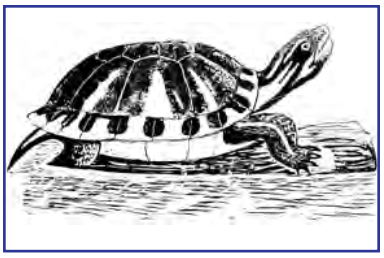



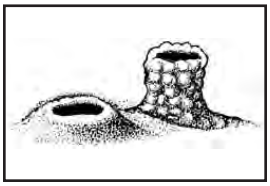









COLOR KEY

Producer - plants produce food to begin food chain
Carnivore - eats meat, fish, insects, etc.
Herbivore - eats plants, roots, leaves, etc.
Omnivore - eats both meat and plants.
Detritivore - breaks down dead things to feed plants.

Benchmarks and Grade Level Expectations

Benchmarks K-4 Science as Inquiry
A. Abilities Necessary to do Scientific Inquiry
SI-E-A1 asking appropriate qustions about organisms and events in the environment

B. Understanding Scientific Inquiry
SI-E-B4 developing explanations by using observations and experiments
SI-E-B5 presenting the results of experiments
SI-E-B6 reviewing and asking questions about the results of investigations

Life Science
A. Characteristics of Organisms
LS-E-A1 identifying the needs of plants and animals, based on age-appropriate recorded observations
LS-E-A3 locating and comparing major plant and animal structures and their functions

C. Organisms and Their Environment
LS-E-C2 describing how the features of some plants and animals enable them to live in specific habitats

Science and The Environment
SE-E-A2 understanding the components of a food chain

Grade Level Expectations
Science as Inquiry
Ability to do Scientific Inquiry

Grade Level	Description
K 1 2 3 4	
1. 1. 1. 1. 1.	Ask questions about objects and events in the environment
2. 2. 2. 2. 2.	Pose questions that can be answered by using the student's own observations and scientific knowledge.
8.9.10.11.12.	Use a variety of appropriate formats to describe procedures and to express ideas about deomonstrations or experiments (e.g. drawings, journals, reports, presentations, exhibitions, portfolios.)

Life Science
Characteristics of Organisms

Grade	
K 1 2 3	
22.28.	Classify objects in a variety of settings as living and nonliving
27.	Match the appropriate food source and habitat for a variety of animals
36.	Illustrate and describe a simple food chain located within an ecosystem

Earth and Space Science
Science and the Environment Grade 4
71. Describe and explain food chains/webs and the directional flow of energy in various ecosystems (construct a model)

Benchmarks and Grade Level Expectations

Benchmarks 5-8
A. The Abilities Necessary to do Scientific Inquiry
SI-M-A1 identifying questions that can be used to design a scientific investigation
SI-M-A2 designing and conducting a scientific investigation
SI-M-A7 communicating scientific procedures, information, and explanations
SI-M-A8 utilizing safety procedures during scientific investigations

C. Populations and Ecosystems
LS-M-C2 modeling and interpreting food chains and food webs

Science and the Environment
SE-M-A5 tracing the flow of energy through an ecosystem and demonstrating a knowledge of the roles of producers, consumers, and decomposers
SE-M-A7 demonstrating knowledge of the natural cycles, such as the carbon cycle, nitrogen cycle, water cycle, and oxygen cycle.

Grade Level Expectations
Life Science
Populations and Ecosystems Grades 5-8
23. Construct a food chain that would be found in ponds, marshes, oceans, forests, or meadows
24. Describe the role of producers, consumers, and decomposers in a food chain
25. Compare food chains and food webs

ON-SITE ACTIVITY

TREE FUNCTION GAME

Location: Atrium or Parking Area

Purpose: Students will play a game that will help them understand the functions of the part of a plant.

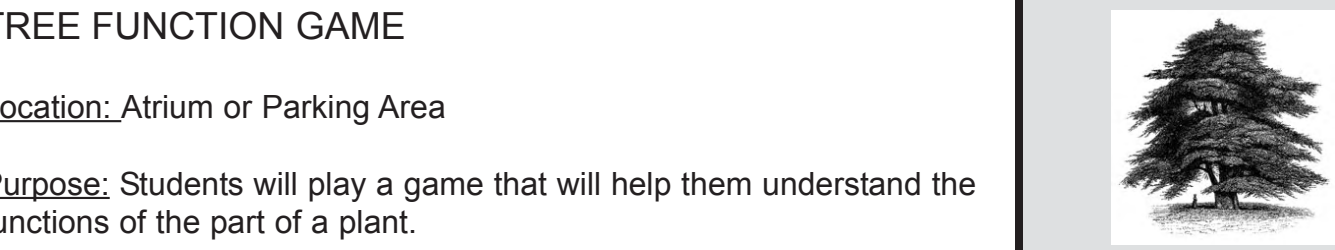
Objective: Students will understand that plant parts each serve an important fuction to help the plant survive.

Materials:
None - Adapted from Project Learning Tree's "Plant Factory" activity.

Procedure:

Have each student act out part of the tree: Students may make sounds and actions.

Number of Students	Part	Action/Sound
1	Heartwood	Make a heart beat sound
3-5	Xylem (Sapwood)	Make a zipping sound from low to high
5	Cambium	Say "grow" - making new cells for plant
6	Phloem	Say "flow down" - storing food
7	Bark	Make a barking sound - protects tree
8	Roots	Students with white shoe laces untied and sitting on the ground around the tree make slurpping sounds
Total 30-32 students		



I think that I shall never see
A poem as lovely as a tree. . .

Poems are made by fools like me,
But only God can make a tree.

(Alfred Joyce Kilmer)

The students make their tree model with heartwood in the middle then each layer of students surrounding them, so the last layer is roots, with their root-hair shoe laces. Have everyone make their sounds, individually and then all together, you then try to be an insect, or an animal breaking through the bark to get into the tree - you can not succeed!

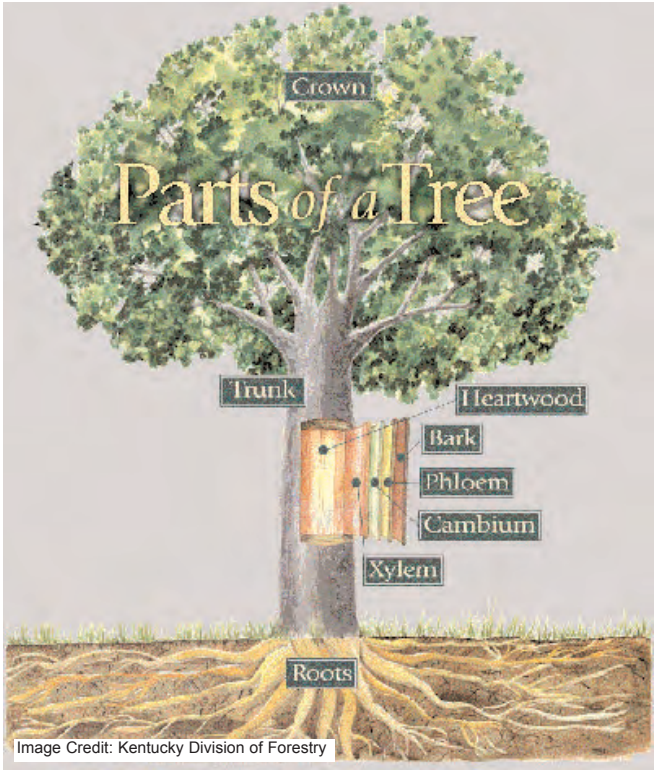


Image Credit: Kentucky Division of Forestry

Benchmarks and Grade Level Expectations

Benchmarks K-4 Science as Inquiry
A. Abilities Necessary to do Scientific Inquiry
SI-E-A1 asking appropriate qustions about organisms and events in the environment

B. Understanding Scientific Inquiry
SI-E-B4 developing explanations by using observations and experiments
SI-E-B5 presenting the results of experiments
SI-E-B6 reviewing and asking questions about the results of investigations

Life Science
A. Characteristics of Organisms
LS-E-A1 identifying the needs of plants and animals, based on age-appropriate recorded observations
LS-E-A3 locating and comparing major plant and animal structures and their functions

C. Organisms and Their Environment
LS-E-C2 describing how the features of some plants and animals enable them to live in specific habitats

Science and The Environment
SE-E-A2 understanding the components of a food chain

Grade Level Expectations
Science as Inquiry
Ability to do Scientific Inquiry

Grade Level					Description
K	**1**	**2**	**3**	**4**	
1.	1.	1.	1.	1.	Ask questions about objects and events in the environment
2.	2.	2.	2.	2.	Pose questions that can be answered by using the student's own observations and scientific knowledge.
8.9.10.11.12.					Use a variety of appropriate formats to describe procedures and to express ideas about deomonstrations or experiments (e.g. drawings, journals, reports, presentations, exhibitions, portfolios.)

Life Science
Characteristics of Organisms

Grade					
K	**1**	**2**	**3**	**4**	
22.28.					Classify objects in a variety of settings as living and nonliving
				40	Explain the function of plant structures in relation to their ability to make food throught phtot synthesis
			36		Compare structures(e.g. roots, leaves, stems, flowers, seeds) and their functions in a variety of plants
			37		Describe how plant structures enable the plant to meet its basic needs
		28			Describe structures of plants (e.g. roots, leaves, stems, flowers, seeds)

Earth and Space Science
Science and the Environment

Grade					
K	**1**	**2**	**3**	**4**	
				71.	Describe and explain food chains/webs and the directional flow of energy in various ecosys tems (construct a model)

Now that your students have a good understanding of plants, their biology and physiology, and have been in the field on a fantastic field trip to the Barataria Preserve, it's time to bring together all they have learned.

POST-VISIT ACTIVITY

YOUR FOOD CHAIN - MAKING HEALTHY CHOICES

Purpose:

Healthy lifestyles are formed very young, eating at least 5-9 portions of fruits and vegetables everyday is an important part of a healthy lifestyle. We need to eat more plants!

Objective:

Students will understand that they too are part of a food chain, and the closer they can get down to the producers, the healthier food choices they will have.

Materials:

Colored paper clips, magazines or web pictures of fruits and vegetables

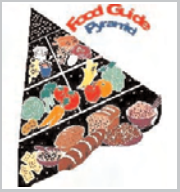
Procedure:

1. Have students cut out pictures of fruits and vegetables (talk about the difference between a fruit - the reproductive part of a plant that contains seeds, and a vegetable - part of the plant - leaves, stems, roots, etc)

2. Have them attach their pictures to the matching color of paper clip.

3. String the paper-clips together to create a necklace of good for you food!

Image Credit: President's Council on Physical Fitness and Health



Help Your Kids Eat Healthier
By: Kathy Isoldi, MS, RD, CDE

Americans are plagued with concerns about impending heart disease, obesity, diabetes, cancer, and osteoporosis. We consider most of these diseases adult illnesses. Although you are at greater risk for developing these diseases as you age, the seeds from which many of the most devastating diseases grow often begin decades before diagnosis.

Evidence shows that atherogenesis (the beginning of artery plaque formation) has its origin in childhood. Currently, obesity and obesity induced type 2 diabetes in children are reported at epidemic levels. If obesity begins in childhood, there is a great likelihood that it will continue into adulthood. Researchers estimate that 50% of cancer incidence and 35% of adult cancer mortality in the United States are associated with western dietary habits. Research has also supported a relationship between low calcium intake during childhood and an increased risk of osteoporosis in adulthood.

http://nydailynews.healthology.com/nydailynews/15366.htm

Extension:

Engage the students in a discussion about nutritious food chains by offering the following questions for them to answer in their journals-

* **Why are plants important to your health?**
* **How many plants do you eat right now?**
* **What kind of plants would you like to eat more of? Why?**

Background Information: http://www.5aday.com/pdfs/educators/classpack05_activity.pdf

The American Academy of Pediatrics, the National Academy of Sciences, the U.S. Departments of Health and Human Services, the U.S. Department of Agriculture, the California Department of Health Services, and the California Department of Education all recommend that kids eat 5 servings or more of fruits and vegetables every day. These pages are a fun way to introduce kids to the concept of better eating, and healthier life styles.

Benchmarks and Grade Level Expectations

Benchmarks K-4 Science as Inquiry

A. Abilities Necessary to do Scientific Inquiry
SI-E-A2 planning and/or designing and conducting a scientific investigation
SI-E-A3 communicating that observations are made with one's senses
SI-E-A6 communicating observations and experiments in oral and written formats
B. Understanding Scientific Inquiry
SI-E-B2 using appropriate experiments depending on the questions to be explored
SI-E-B4 developing explanations by using observations and experiments
SI-E-B5 presenting the results of experiments
Life Science
A. Characteristics of Organisms
LS-E-A6 Recognizing the food groups necessary to maintain a healthy body.

Grade Level Expectations K-4 Science

Grade Level Expectations

Science as Inquiry
Ability to do Scientific Inquiry

Grade Level	Description
K 1 2 3 4	
1. 1. 1. 1. 1.	Ask questions about objects and events in the environment
2. 2. 2. 2. 2.	Pose questions that can be answered by using the student's own observations and scientific knowledge.
4. 5. 6. 6. 7.	Use the 5 senses to describe observations
7. 8. 9. 9. 10.	Express data in a variety of ways by conducting illustrations, graphs, charts, tables, concept maps, and oral and written explanations as appropriate.
8.9.10.11.12.	Use a variety of appropriate formats to describe procedures and to express ideas about deomonstrations or experiments (e.g. drawings, journals, reports, presentations, exhibitions, portfolios.)
9.10.11.11.13.	Identify and use appropriate safety procedures and equipment when conducting investigations

Life Science
Characteristics of Organisms

Grade		
K 1	**2**	**3**
	31	Identify and discuss the arrangement of the food pyramid
	32	Analyze selceted menus to determine whether they include representatives of all the required food groups
		42 Describe the relationship between eating habits and maintaining a healthy body
		43 Identify a meal that includes representatives from each group of the food pyramid

Post Visit Student Scientist Project Instructor Sheet

Plants Need A Lot!

Plants help us survive by producing oxygen and food, but they need some things too!

Image Credit: US EPA

Little Green and his frinds Sunny, Droplet, and Cool CO2 will introduce the kids to the basics of what plants need to survive.

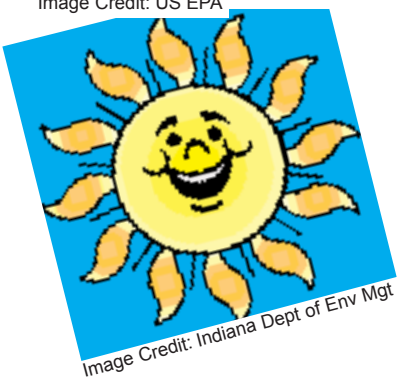
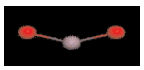


Image Credit: Indiana Dept of Env Mgt



CO2

Carbon Dioxide Atom - (1 Carbon 2 Oxygen)
Image Credit: Atomospheric Radition Measurement Program, Dept of Energy

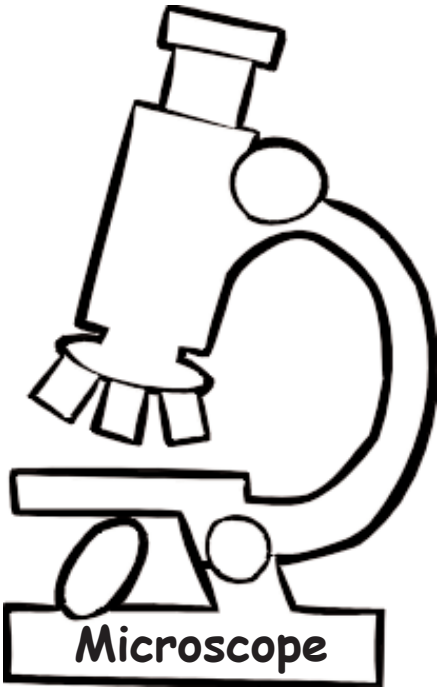
DID YOU KNOW?
That although plants help almost everything on Earth survive, we need a little help to survive ourselves! And that's where my friend come in!

Image Credit: USGS

Plants, as you know, produce oxygen, and food in a process called photosynthesis! But plants need some things too, like my friend Sunny, the sunshine, Droplet, a drop of water to drink, and Carbon Dioxide (Cool CO2) that animals breathe out. Everything works together, and that's how we can all live and grow. Here's an experiment you can do with some plants of your own to find out what happens if we don't get all the things we need...

Super Scientist:

The students will run an experiment with live plants in order to investigate what plants really need to survive (Sun, Water, and Carbon Dioxide) without these components plants can not perform photosynthesis.



How to be a scientist:

In this experiment - you will need 8 identical plants, plastic bags, paper bags, and rulers.

All plants should be near a window to get sunlight

Check all plants after few days, for growth - measure with a ruler.

Setting up the Experiment:

Each plant will be different -

1. Plant 1 has water, light, and air

2. Plant 2 has water, light, and no air

3. Plant 3 has water, no light, and no air

4. Plant 4 has water, no light, and air

5. Plant 5 has no water, light and air

6. Plant 6 has no water, no light and air

7. Plant 7 has no water, light, and no air

8. Plant 8 has no water, no light and no air

Running the Experiment: Your students will fill out these sheets based on their observations from the experiments.

1. So what do you think? Which plant will grow best? Put a check mark by the number of plant you think will grow the most:

1. Plant _____
2. Plant _____
3. Plant _____
4. Plant _____
5. Plant _____
6. Plant _____
7. Plant _____
8. Plant _____

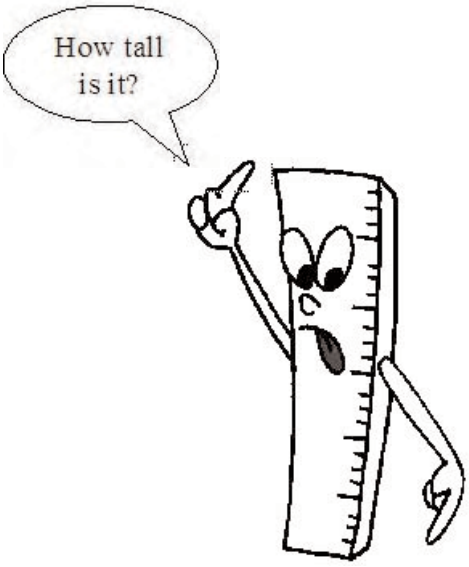
Why? _____

_____

HYPOTHESIS - I think plant number _____ will grow the best because _____

Running the Experiment:

2. So what do you think? Measuring up - measure each plant and record its height on the line next to the number:



1. Plant _____ cm tall
2. Plant _____ cm tall
3. Plant _____ cm tall
4. Plant _____ cm tall
5. Plant _____ cm tall
6. Plant _____ cm tall
7. Plant _____ cm tall
8. Plant _____ cm tall

Measure from the base of the plant in the pot to the top - do not stretch the plant.

Setting up the Experiment:

Each plant will be different. Set up the plants in this order -

1. **Plant 1 has water, light, and air**

This plant is not covered, and is watered regularly - this is your control.

2. **Plant 2 has water, light, and no air**

This plant is covered in plastic, be sure to add plenty of water before you seal it in the bag, then put by a sunny window

3. **Plant 3 has water, no light, and no air**

This plant is covered in plastic, be sure to add plenty of water before you seal it in the bag, then cover with a paper bag, so no light gets in

4. **Plant 4 has water, no light, and air**

This plant is covered in a paper bag, and is watered regularly

5. **Plant 5 has no water, light and air**

This plant is not covered, and is not watered at all

6. **Plant 6 has no water, no light and air**

This plant is covered in a brown paper bag, and is not watered at all

7. **Plant 7 has no water, light, and no air**

This plant is covered only in a plastic bag, and is not watered at all, should be dry when you put it into the plastic bag, and put in a sunny window

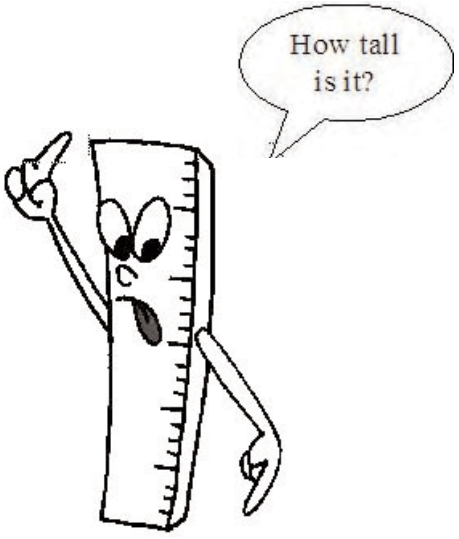
8. **Plant 8 has no water, no light and no air**

This plant is covered in a plastic bag, and is not watered at all, should be dry when you put it into the plastic bag, and then put in a paper bag - it get's nothing!

Concluding the Experiment:

3. So what do you think? Measuring up - measure each plant, after a week and record its height on the line next to the number:

1. Plant _____ cm tall
2. Plant _____ cm tall
3. Plant _____ cm tall
4. Plant _____ cm tall
5. Plant _____ cm tall
6. Plant _____ cm tall
7. Plant _____ cm tall
8. Plant _____ cm tall



Measure from the base of the plant in the pot to the top - do not stretch the plant.

Concluding the Experiment:

4. So what happened? Which plant grew the best? Put a check mark by the number of plant that grew the most:

1. Plant _____
2. Plant _____
3. Plant _____
4. Plant _____
5. Plant _____
6. Plant _____
7. Plant _____
8. Plant _____

CONCLUSION -Plant number _____ grew the best, because

Plants need Water, Light, and Air to grow.

Benchmarks and Grade Level Expectations

Benchmarks K-4 Science as Inquiry

A. Abilities Necessary to do Scientific Inquiry
SI-E-A2 planning and/or designing and conducting a scientific investigation
SI-E-A3 communicating that observations are made with one's senses
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B. Understanding Scientific Inquiry
SI-E-B2 using appropriate experiments depending on the questions to be explored
SI-E-B4 developing explanations by using observations and experiments
SI-E-B5 presenting the results of experiments
Life Science
A. Characteristics of Organisms
LS-E-A1 Identifying the needs oif plants (and animals), based on age appropriate recorded observations
LS-E-B1 Observing and describing the life cycle of some plants (and animals)

Grade Level Expectations K-4 Science

Grade Level Expectations

Science as Inquiry
Ability to do Scientific Inquiry

Grade Level	Description
K 1 2 3 4	
1. 1. 1. 1. 1.	Ask questions about objects and events in the environment
2. 2. 2. 2. 2.	Pose questions that can be answered by using the student's own observations and scientific knowledge.
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7. 8. 9. 9. 10.	Express data in a variety of ways by conducting illustrations, graphs, charts, tables, concept maps, and oral and written explanations as appropriate.
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9.10.11.11.13.	Identify and use appropriate safety procedures and equipment when conducting investigations

Life Science
Characteristics of Organisms

Grade	
K 1 2 3	
29	Record and share observations of changes in developing Plants
27	Identify what plants (and animals) need to grow and develop
21	Record observations on the growth of plant seeds

Post Visit Student Scientist Project

Plants are Need A Lot!

Plants help us survive by producing oxygen and food, but they need some things too!

Image Credit: US EPA

Hey there, I'm Little Green and I'm here with my frinds Sunny, Droplet, and Cool CO2 and we're going to tell you about... well about us!

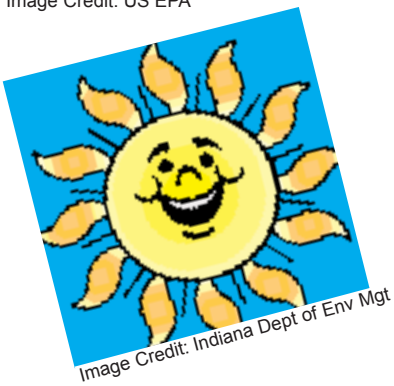


Image Credit: Indiana Dept of Env Mgt

CO2

Carbon Dioxide Atom (1 carbon, 2 Oxygen)
Image credit:Atomospheric Radition Measurement Program - Dept of Energy

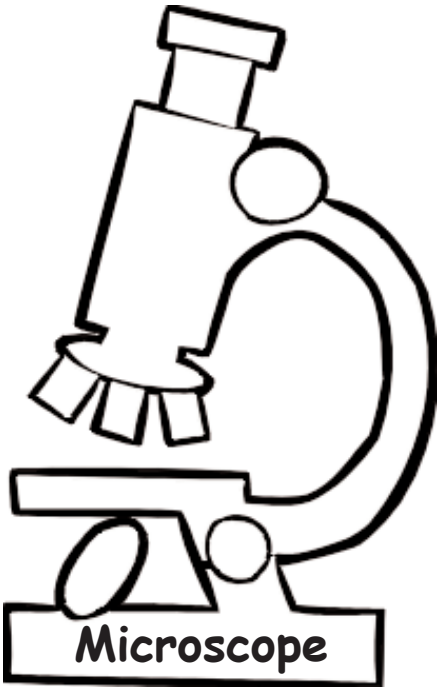
DID YOU KNOW?
That although plants help almost everything on Earth survive, we need a little help to survive ourselves! And that's where my friends come in!

Image Credit: USGS

Plants, as you know, produce oxygen, and food in a process called photosynthesis! But plants need some things too, like my friend Sunny, the sunshine, Droplet, a drop of water to drink, and Carbon Dioxide (Cool CO2) that animals breathe out. Everything works together, and that's how we can all live and grow. Here's an experiment you can do with some plants of your own to find out what happens if we don't get all the things we need...

Super Scientist:

You will investigate what plants really need…



How to be a scientist:

In this experiment - you scientists will look at what plants need to survive - Air, Water, and Light.

Set up the plants with your teacher

Listen carefully and follow directions.

All plants should be near a window to get sunlight

Check all plants after few days, for growth - measure with a ruler.

Setting up the Experiment:

Each plant will be different -

1. Plant 1 has water, light, and air

2. Plant 2 has water, light, and no air

3. Plant 3 has water, no light, and no air

4. Plant 4 has water, no light, and air

5. Plant 5 has no water, light and air

6. Plant 6 has no water, no light and air

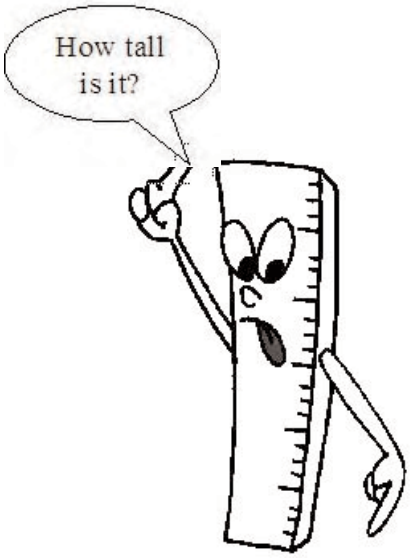
7. Plant 7 has no water, light, and no air

8. Plant 8 has no water, no light and no air

Running the Experiment:

1. So what do you think? Which plant will grow best? Put a check mark by the number of plant you think will grow the most:

1. Plant _____
2. Plant _____
3. Plant _____
4. Plant _____
5. Plant _____
6. Plant _____
7. Plant _____
8. Plant _____



Why? _____

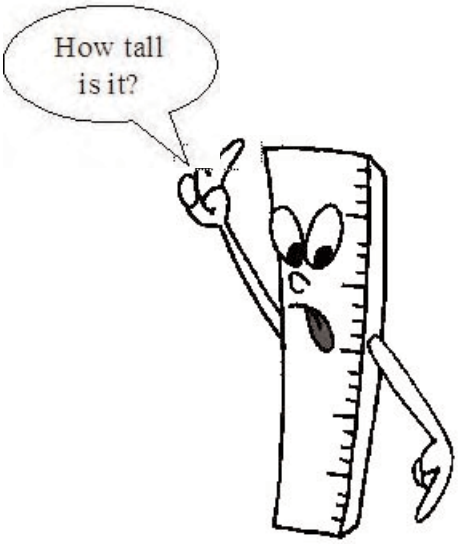
_____

HYPOTHESIS - I think plant number _____ will grow the best because _____

_____

Running the Experiment:

2. So what do you think? Measuring up - measure each plant and record its height on the line next to the number:



1. Plant _____ cm tall
2. Plant _____ cm tall
3. Plant _____ cm tall
4. Plant _____ cm tall
5. Plant _____ cm tall
6. Plant _____ cm tall
7. Plant _____ cm tall
8. Plant _____ cm tall

Measure from the base of the plant in the pot to the top - do not stretch the plant.

Setting up the Experiment:

Each plant will be different. Set up the plants in this order with your teacher -

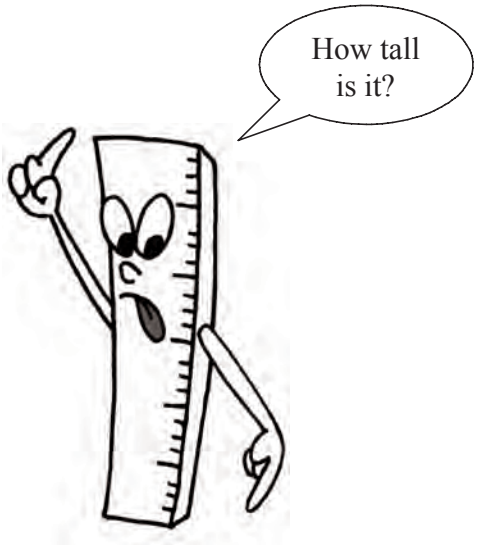
1. **Plant 1 has water, light, and air**
2. **Plant 2 has water, light, and no air**
3. **Plant 3 has water, no light, and no air**
4. **Plant 4 has water, no light, and air**
5. **Plant 5 has no water, light and air**
6. **Plant 6 has no water, no light and air**
7. **Plant 7 has no water, light, and no air**
8. **Plant 8 has no water, no light and no air**

Listen Carefully and Follow Directions

Concluding the Experiment:

3. So what do you think? Measuring up - measure each plant, after a week and record its height on the line next to the number:

1. Plant _____ cm tall
2. Plant _____ cm tall
3. Plant _____ cm tall
4. Plant _____ cm tall
5. Plant _____ cm tall
6. Plant _____ cm tall
7. Plant _____ cm tall
8. Plant _____ cm tall



Measure from the base of the plant in the pot to the top - do not stretch the plant.

Concluding the Experiment:

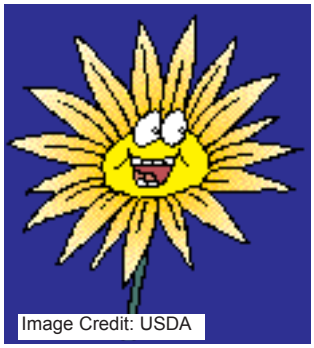
4. So what happened? Which plant grew the best? Put a check mark by the number of plant that grew the most:

1. Plant _____
2. Plant _____
3. Plant _____
4. Plant _____
5. Plant _____
6. Plant _____
7. Plant _____
8. Plant _____

CONCLUSION -Plant number _____ grew the best, because

Plants need _____, _____ and _____ to grow.

Visual/Spatial Intelligence



People with a high level of Visual/Spatial Intelligence have a well developed sense of "seeing is believing."

Programs that will appeal to students with a high level of Visual/Spatial Intelligence:

1. Junior Explorer Guide - Reading the Junior Explorer Guide
2. Student Scientist Project 1 - Plants are Super Green Machines - Building a cell.
3. Student Scientist Project 2 - Seeing is Believing - Seeing the oxygen bubbles.
4. Student Scientist Project 3 - Plants drink through a Straw - Seeing the flowers change color.
5. Student Scientist Project 4 - You are what you eat - Drawing the lines for the food chains.
6. Student Scientist Project 5 - Flower children - Making the models.
7. Student Scientist Project 6 - Flower friends - Making the models.
8. Student Scientist Project 7 - Plant babies - Watching the seeds sprout.
9. On -site Activity - Plant Dissection - Seeing the inside of a plant and its adapta tions.
10. On -site Activity - Nature Hike - Finding the many elements of Barataria Preserve.
11. On -site Activity - Food Chain Game - Seeing the elements of a food chain.
12. On -site Activity - Tree Function Game - Seeing the parts of a tree and its func tions.
13. Post-visit Activity - Your Food Chain - Seeing the images of foods from plants.
14. Post-visit Activity - Student Scientist Project - Seeing how plants handle stress es.
15. Assessment Activity - Puzzles - Putting the pieces of the puzzles together.
16. Assessment Activity - Paths of A Tree - Seeing where the path leads.
17. Assessment Activity - Plant Unscramble - Manipulating the parts of the puzzle.
18. Assessment Activity - Helping Plants - Researching on the computer or books.

Verbal/Linguistic Intelligence

Image Credit: US Dept Education

People with a high level of Verbal/Linguistic Intelligence have a well developed sense of language they love to talk, and usually love to read and write.

Programs that will appeal to students with a high level of Verbal/Linguistic Intelligence:

1.Junior Explorer Guide - Reading the Junior Explorer Guide

2. Student Scientist Project 1 - Plants are Super Green Machines - Reading about plant cells.

3. Student Scientist Project 2 - Seeing is Believing - Reading about oxygen production.

4. Student Scientist Project 3 - Plants drink through a Straw - Reading about how plants move water and nutrients through their system.

5. Student Scientist Project 4 - You are what you eat - Reading about the function of food chains.

6. Student Scientist Project 5 - Flower children - Reading about flowers and their function.

7. Student Scientist Project 6 - Flower friends - Reading about how flowers have partners.

8. Student Scientist Project 7 - Plant babies - Reading about seed production

9. On -site Activity - Plant Dissection - Hearing the discussion about plants.

10. On -site Activity - Nature Hike - Hearing the sounds of Barataria Preserve.

11. On -site Activity - Food Chain Game - Discussing food chains.

12. On -site Activity - Tree Function Game - Sounding out the functions of trees.

13. Post-visit Activity - Your Food Chain - Discussing the plants they eat.

14. Post-visit Activity - Student Scientist Project - Discussing how plants handle stresses.

15. Assessment Activity - Puzzles - Discussing the pieces of the puzzles.

16. Assessment Activity - Paths of A Tree - Discussing where the path leads.

17. Assessment Activity - Plant Unscramble - Discussing the puzzle.

18. Assessment Activity - Helping Plants - Discussing what how we can help plants.

Kinesthetic Intelligence

Image Credit: US Dept Health and Human Services

People with a high level of Kinesthetic Intelligence have a well developed sense of their bodies, they dance and move amazingly.

Programs that will appeal to students with a high level of Kinesthetic Intelligence:

1.Junior Explorer Guide - Reading the Junior Explorer Guide

2. Student Scientist Project 1 - Plants are Super Green Machines - Physically creating plant cell models.

3. Student Scientist Project 2 - Seeing is Believing - Putting the pieces of the experi ment together.

4. Student Scientist Project 3 - Plants drink through a Straw - Setting up the exper iment.

5. Student Scientist Project 4 - You are what you eat - Cutting and putting together.

6. Student Scientist Project 5 - Flower children - Putting the flower model together.

7. Student Scientist Project 6 - Flower friends - Creating the models.

8. Student Scientist Project 7 - Plant babies - Setting up the experiment.

9. On -site Activity - Plant Dissection - Dissecting the plant.

10. On -site Activity - Nature Hike - Hiking the trails of Barataria Preserve.

11. On -site Activity - Food Chain Game - Playing the game.

12. On -site Activity - Tree Function Game - Playing the game.

13. Post-visit Activity - Your Food Chain - Cutting and putting together.

14. Post-visit Activity - Student Scientist Project - Setting up the experiment.

15. Assessment Activity - Puzzles - Drawing the puzzles.

16. Assessment Activity - Paths of A Tree - Walking where the path leads.

17. Assessment Activity - Plant Unscramble - Drawing the puzzle.

18. Assessment Activity - Helping Plants - Performing research about what how we can help plants.

Logical/Math Intelligence

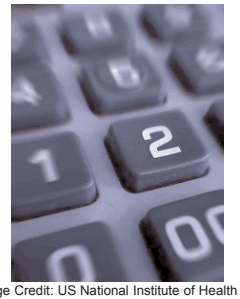


Image Credit: US National Institute of Health

People with a high level of Logical/Mathematical Intelligence have a well developed sense of reason and logic.

Programs that will appeal to students with a high level of Logical/Mathematical Intelligence:

1. Junior Explorer Guide - Reading the Junior Explorer Guide
2. Student Scientist Project 1 - Plants are Super Green Machines - Physically creating plant cell models.
3. Student Scientist Project 2 - Seeing is Believing - Putting the pieces of the experiment together.
4. Student Scientist Project 3 - Plants drink through a Straw - Setting up the experiment.
5. Student Scientist Project 4 - You are what you eat - Cutting and putting together.
6. Student Scientist Project 5 - Flower children - Putting the flower model together.
7. Student Scientist Project 6 - Flower friends - Creating the models.
8. Student Scientist Project 7 - Plant babies - Setting up the experiment.
9. On -site Activity - Plant Dissection - Dissecting the plant.
10. On -site Activity - Nature Hike - Hiking the trails of Barataria Preserve.
11. On -site Activity - Food Chain Game - Playing the game.
12. On -site Activity - Tree Function Game - Playing the game.
13. Post-visit Activity - Your Food Chain - Cutting and putting together.
14. Post-visit Activity - Student Scientist Project - Setting up the experiment.
15. Assessment Activity - Puzzles - Drawing the puzzles.
16. Assessment Activity - Paths of A Tree - Walking where the path leads.
17. Assessment Activity - Plant Unscramble - Drawing the puzzle.
18. Assessment Activity - Helping Plants - Performing research about what how we can help plants.

Intrapersonal Intelligence

Image Credit: US NOAA

People with a high level of Intrapersonal Intelligence have a well developed sense of themselves.

Programs that will appeal to students with a high level of Intrapersonal Intelligence:

1.Junior Explorer Guide - Reading the Junior Explorer Guide with a group
2. Student Scientist Project 1 - Plants are Super Green Machines - Creating plant cell models.
3. Student Scientist Project 2 - Seeing is Believing - Perform the experiment.
4. Student Scientist Project 3 - Plants drink through a Straw - Performing the exper iment.
5. Student Scientist Project 4 - You are what you eat - Cutting and putting together.
6. Student Scientist Project 5 - Flower children - Putting the flower model together.
7. Student Scientist Project 6 - Flower friends - Creating the models.
8. Student Scientist Project 7 - Plant babies - Setting up the experiment.
9. On -site Activity - Plant Dissection - Dissecting the plant.
10. On -site Activity - Nature Hike - Hiking the trails of Barataria Preserve.
11. On -site Activity - Food Chain Game - Playing the game.
12. On -site Activity - Tree Function Game - Playing the game.
13. Post-visit Activity - Your Food Chain - Cutting and putting together.
14. Post-visit Activity - Student Scientist Project - Setting up the experiment.
15. Assessment Activity - Puzzles - Drawing the puzzles.
16. Assessment Activity - Paths of A Tree - Walking where the path leads.
17. Assessment Activity - Plant Unscramble - Drawing the puzzle.
18. Assessment Activity - Helping Plants - Performing research about what how we can help plants..

Interpersonal Intelligence

Image Credit: NASA

People with a high level of Interpersonal Intelligence have a well developed sense of people and their needs, they make friends easily.

Programs that will appeal to students with a high level of Interpersonal Intelligence:

1.Junior Explorer Guide - Reading the Junior Explorer Guide with a group

2. Student Scientist Project 1 - Plants are Super Green Machines - Working togeth er creating plant cell models.

3. Student Scientist Project 2 - Seeing is Believing - Working together to perform the experiment.

4. Student Scientist Project 3 - Plants drink through a Straw - Setting up the exper iment with a team.

5. Student Scientist Project 4 - You are what you eat - Cutting and putting together.

6. Student Scientist Project 5 - Flower children - Putting the flower model together with a team.

7. Student Scientist Project 6 - Flower friends - Creating the models.

8. Student Scientist Project 7 - Plant babies - Setting up the experiment.

9. On -site Activity - Plant Dissection - Dissecting the plant.

10. On -site Activity - Nature Hike - Hiking the trails of Barataria Preserve.

11. On -site Activity - Food Chain Game - Playing the game.

12. On -site Activity - Tree Function Game - Playing the game.

13. Post-visit Activity - Your Food Chain - Cutting and putting together.

14. Post-visit Activity - Student Scientist Project - Setting up the experiment.

15. Assessment Activity - Puzzles - Drawing the puzzles.

16. Assessment Activity - Paths of A Tree - Walking where the path leads.

17. Assessment Activity - Plant Unscramble - Drawing the puzzle.

18. Assessment Activity - Helping Plants - Performing research about what how we can help plants with a group.

Naturalist Intelligence

Image Credit: NPS Ranger
Wanda Lee Dickey

People with a high level of Naturalist Intelligence have a well developed sense of nature.

Programs that will appeal to students with a high level of Naturalist Intelligence:

1.Junior Explorer Guide - Reading the Junior Explorer Guide.
2. Student Scientist Project 1 - Plants are Super Green Machines - Creating plant cell models.
3. Student Scientist Project 2 - Seeing is Believing - Performing the experiment.
4. Student Scientist Project 3 - Plants drink through a Straw - Performing the exper iment.
5. Student Scientist Project 4 - You are what you eat - Cutting and putting together.
6. Student Scientist Project 5 - Flower children - Putting the flower model together.
7. Student Scientist Project 6 - Flower friends - Creating the models.
8. Student Scientist Project 7 - Plant babies - Setting up the experiment.
9. On -site Activity - Plant Dissection - Dissecting the plant.
10. On -site Activity - Nature Hike - Hiking the trails of Barataria Preserve.
11. On -site Activity - Food Chain Game - Playing the game.
12. On -site Activity - Tree Function Game - Playing the game.
13. Post-visit Activity - Your Food Chain - Cutting and putting together.
14. Post-visit Activity - Student Scientist Project - Setting up the experiment.
15. Assessment Activity - Puzzles - Drawing the puzzles.
16. Assessment Activity - Paths of A Tree - Walking where the path leads.
17. Assessment Activity - Plant Unscramble - Drawing the puzzle.
18. Assessment Activity - Helping Plants - Performing research about what how we can help plants..

ASSESSMENT ACTIVITY

Plant Puzzles

Purpose: Review the adaptations, and functions of plants.

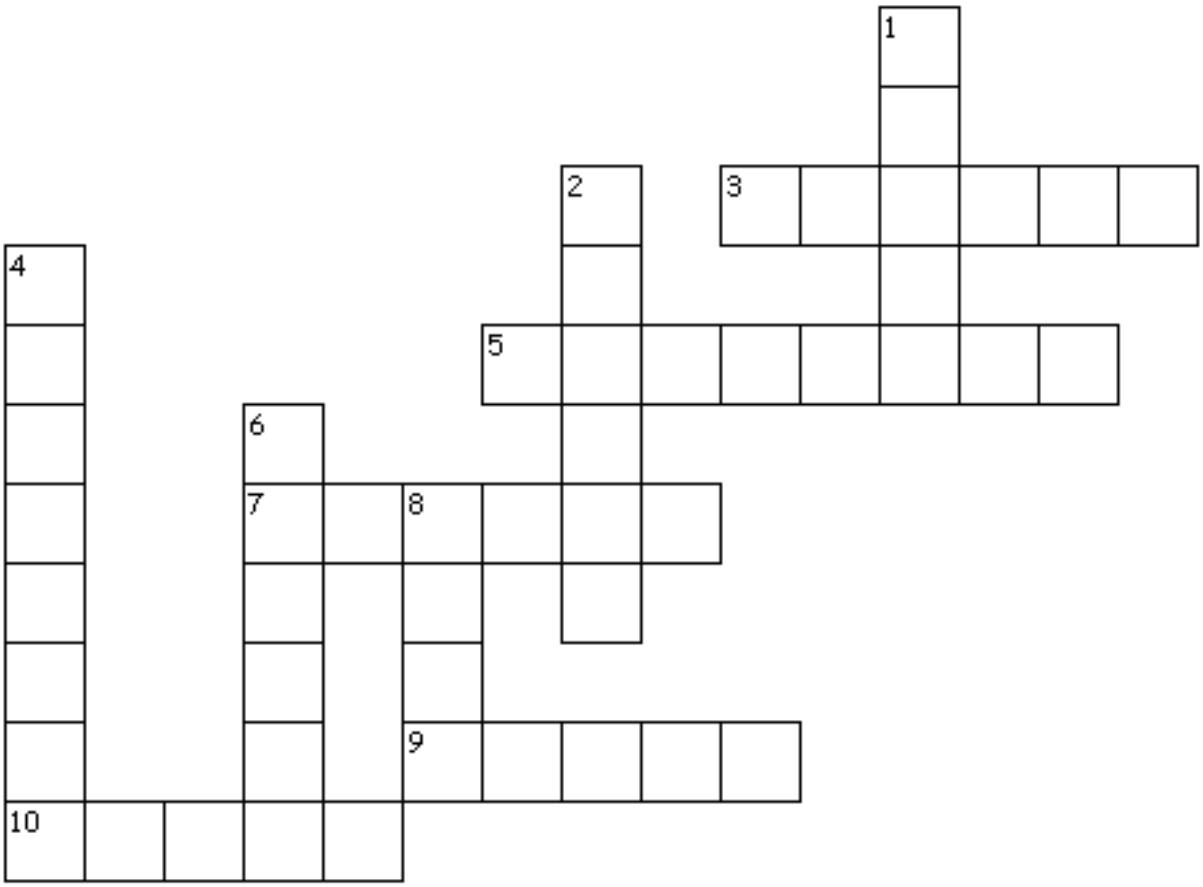
Objective: Students will successfully complete worksheets from the knowledge gained about plants and their functions, and adaptations for survival.

Materials:
1. Plant Puzzles, crossword, maze, word find sheets.
2. Plant Puzzle Answer sheets.

Procedure:
Ask students to complete the worksheet to help re-enforce and assess their learning.

ASSESSMENT ACTIVITY

Cross Word Puzzle



Directions for Cross Word Puzzle

Figure out and then fill in the words that are defined below.

Across

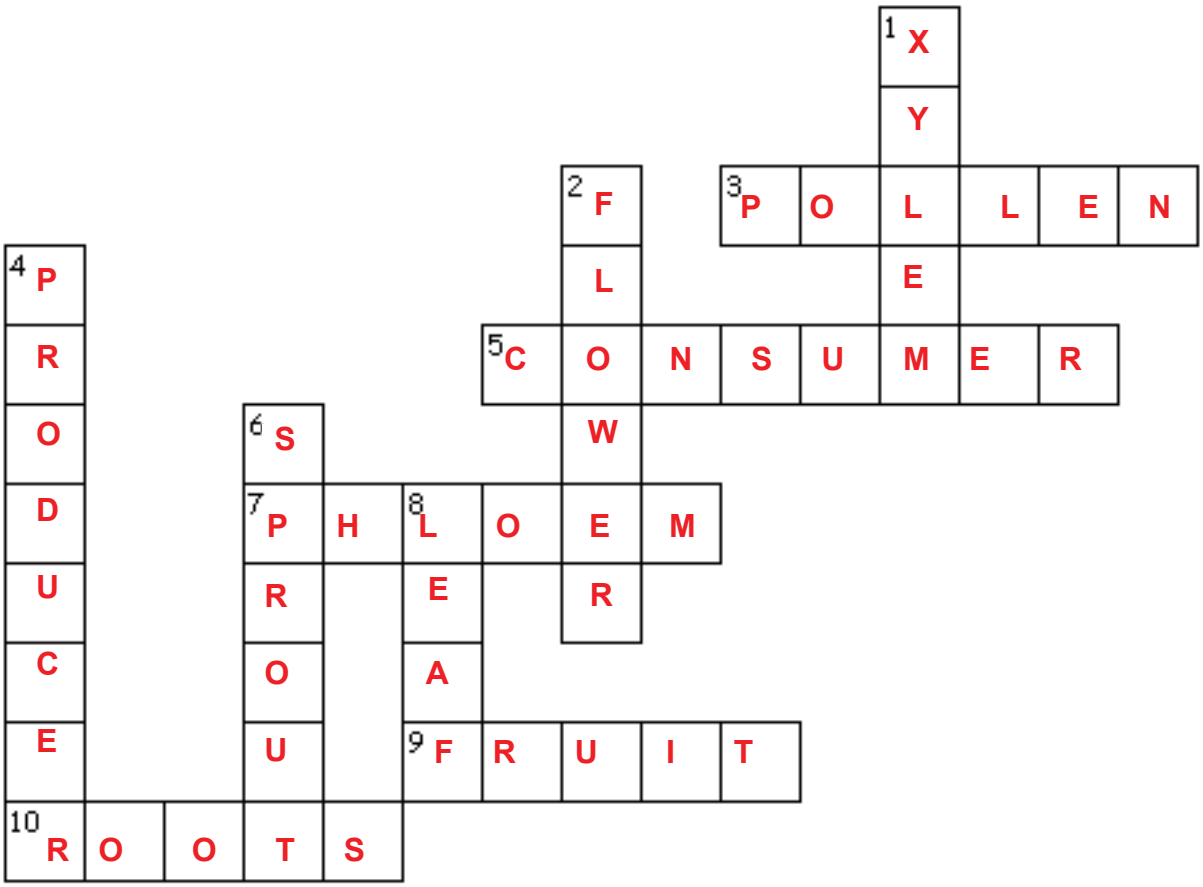
3. male flower part that's yellow
5. part of the foodchain that eats
7. flow em' down stores food from photosynthesis down to roots
9. after pollination part that keeps seeds safe and feeds them until they sprout
10. plant part that gets water and nutrients

Down

1. zip it up, brings water and nutrients throughout the plant
2. plant part that attracts pollinators to help make baby plants
4. part of the foodchain that makes food
6. when a baby plant starts to grow
8. plant part that collects sunlight for photosynthesis

ASSESSMENT ACTIVITY

Cross Word Puzzle



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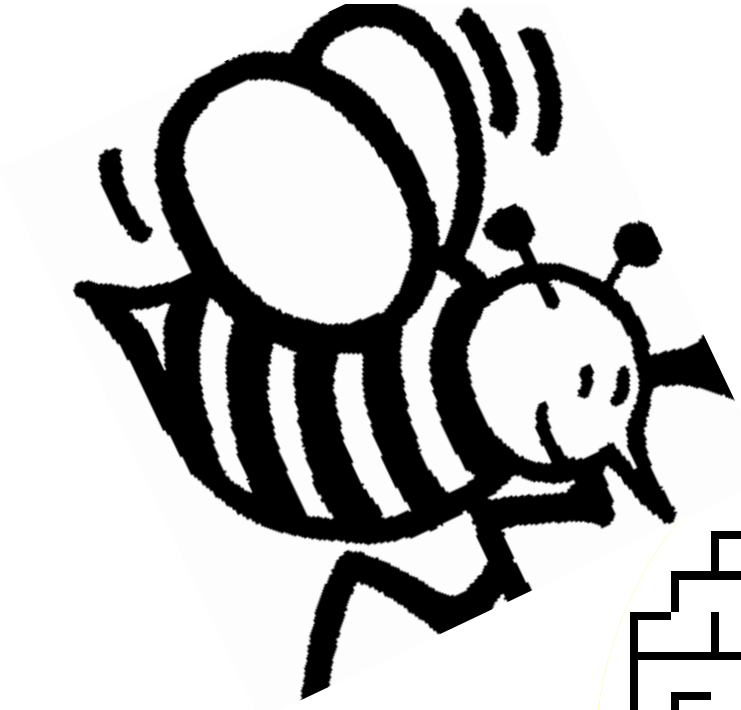
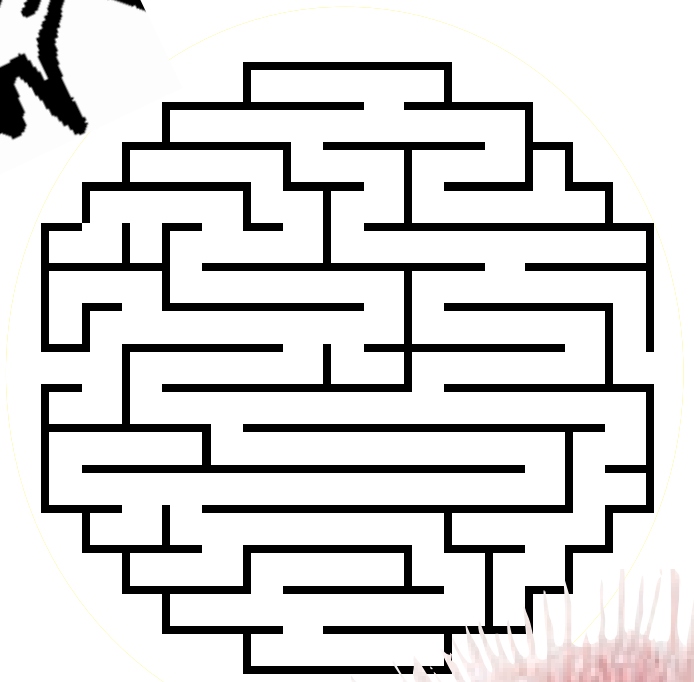
ASSESSMENT ACTIVITY

Insect to Flower Maze Puzzle



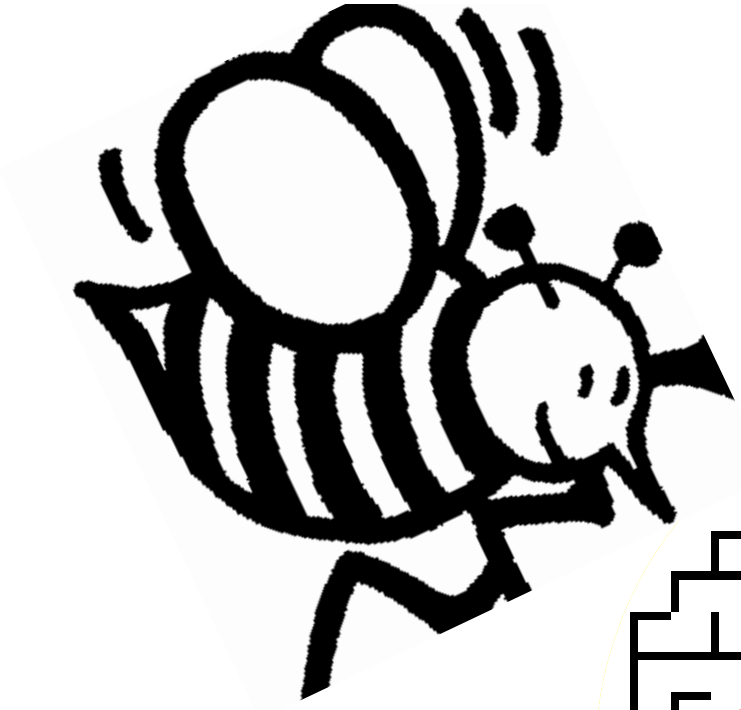


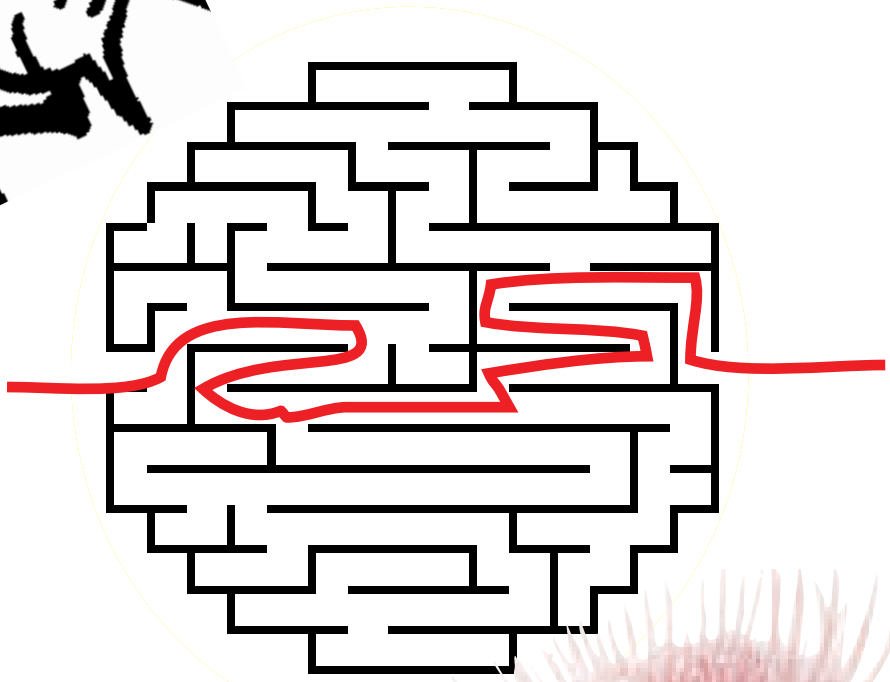
Directions for Insect Maze Puzzle

See you can get the _____ safely to the _____, so she can drink some _____, and _____ the thistle flower!

ASSESSMENT ACTIVITY

Insect to Flower Maze Puzzle





Directions for Insect Maze Puzzle

See you can get the **bee** safely to the **flower**, so she can drink some **nectar**, and **pollinate** the thistle flower!

V N E G T M I N F L
F N E I T N W E L E
B O U G S V C L O A
I R O E Y N H L W F
F J C D S X U O E R
Q T F V C E O P R A
P E T A L H E I B R
R A T C E N A D H J
T O O R T P Y I S K
A R B C W R R P N O

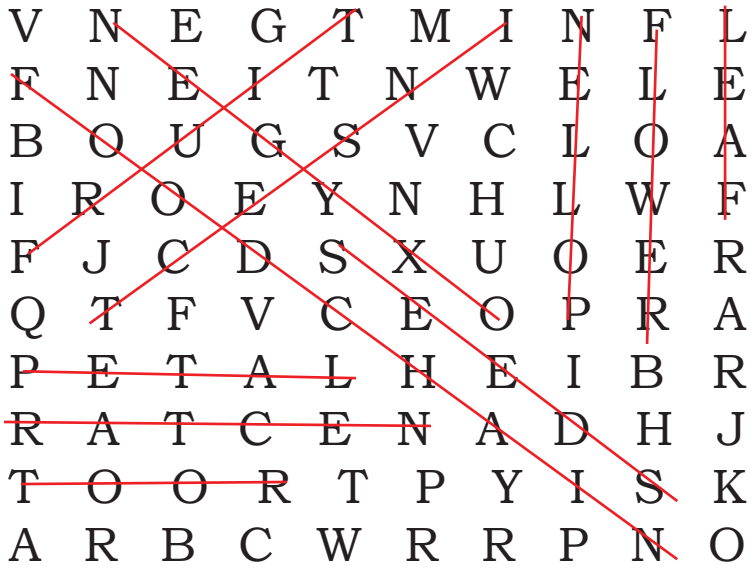
Directions for Word Search Puzzle

Find the words, listed below, in the puzzle.
The words are given with a short definition.

FLOWER - plant part used to reproduce
FOODCHAIN - who eats what
FRUIT - keeps plant seeds safe and food
INSECT - plant pollinator
LEAF - plant part that collects sunlight
NECTAR - sweet stuff attracts pollinators
OXYGEN - released by plants, used by us
PETAL - helps pollinators find nectar
SEEDS - baby plants
PHOTOSYNTHESIS - process, plants make food
POLLEN - male flower part, makes plant babies
ROOT - plant part that gets water/nutrients

ASSESSMENT ACTIVITY

Word Search Puzzle



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ASSESSMENT ACTIVITY

Word Search Puzzle

D E C O M P O S E R M Z S S T
R R Z N I P N F T E R H R I F
F Z E S E E X U T C K E X S O
A T T M G L O S A J E R W E F
E I K Y U R L R C R P B Y H L
L N X F P S N O O A E I E T O
X O P S O I N V P T T V R N W
L Y E S V O I O A C A O O Y E
M S L O T T D T C E L R V S R
Y F R E I A V C I N F E I O W
K E Q R M Y M P H U Z U N T Z
F A T P H L O E M A R E M O M
R E C U D O R P N Z I F O H D
D R O O T S A T C E S N I P O
E Q N M M W P S D E E S G I Y

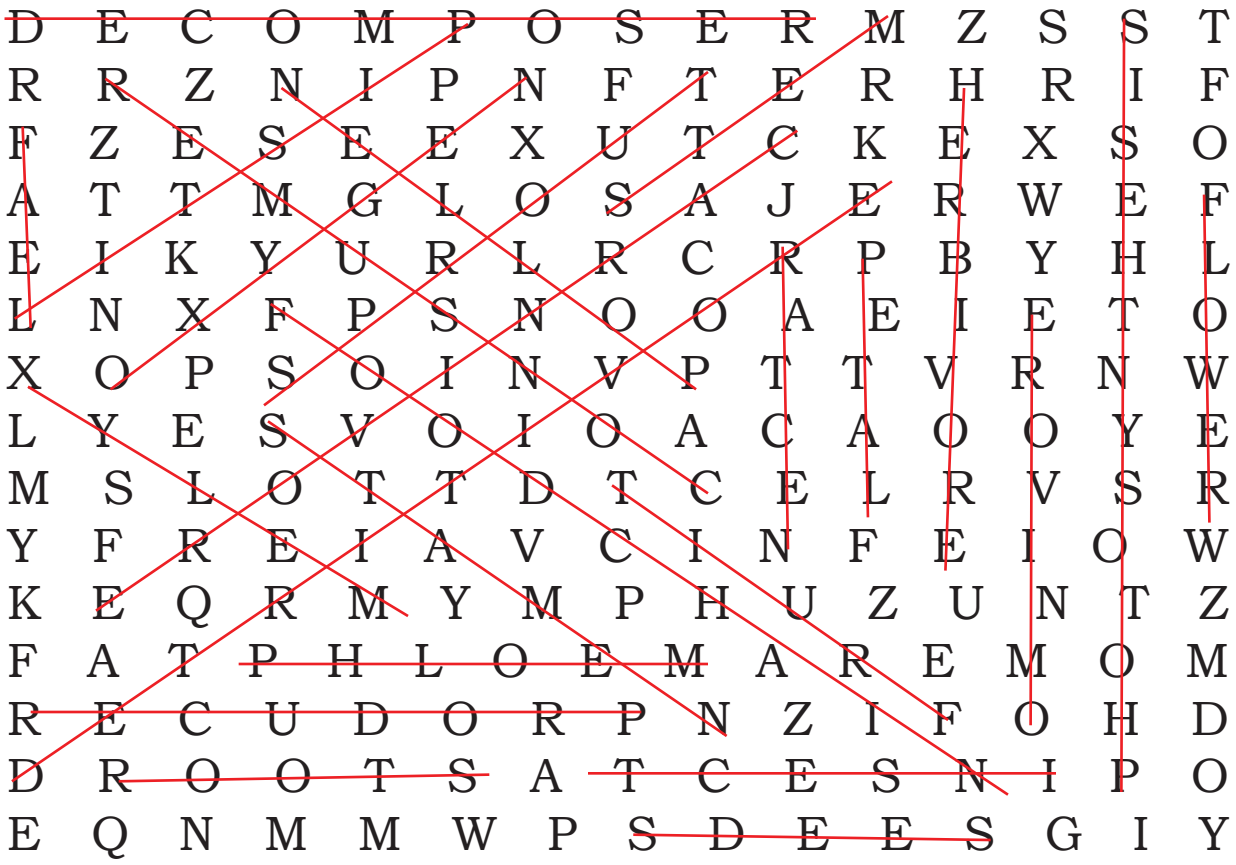
Directions for Word Search Puzzle

Find the words, listed below, in the puzzle.
The words are given with a short definition.

CARNIVORE - eats only meat
CONSUMER - part of the foodchain
DECOMPOSER - breaks down dead stuff
DETRITIVORE - eats dead stuff
FLOWER - plant part used to reproduce
FOODCHAIN - who eats what
FRUIT - keeps plant seeds safe and food
HERBIVORE - eats plants
INSECT - plant pollinator
LEAF - plant part that collects sunlight
NECTAR - sweet stuff attracts pollinators
OMNIVORE- eats everything
OXYGEN - released by plants, used by us
PETAL - helps pollinators find nectar
PHLOEM - flow em' down, stores food
PHOTOSYNTHESIS - process, plants make food
PISTIL - stores eggs for flowering plants
POLLEN - male flower part, makes plant babies
PRODUCER - plant part of foodchains
ROOTS - plant part that gets water/nutrients
SEEDS - baby plants
SPROUT - baby plant growing
STAMEN - male part of flower
XYLEM - zip it up, brings water/nutrients from roots to the rest of the plant.

ASSESSMENT ACTIVITY

Word Search Puzzle



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STAMEN - male part of flower
XYLEM - zip it up, brings water/nutrients from roots to the rest of the plant.

ASSESSMENT ACTIVITY

Paths of a Tree

Purpose: Review the adaptations, and functions of plants.

Objective: Students will successfully complete Paths of a Tree game from the knowledge gained about plants and their functions, and adaptations for survival.

Materials:
1. Paths of a Tree Game sheet.
2. Paths of a Tree Answer sheet.

Procedure:
Ask students to complete the Game sheet to help re-enforce and assess their learning.

ASSESSMENT ACTIVITY

Paths of a Tree

Purpose: Review the adaptations, and functions of plants.

Objective: Students will successfully complete Paths of a Tree game from the knowledge gained about plants and their functions, and adaptations for survival.

Materials:
1. Paths of a Tree Game sheet.
2. Paths of a Tree Answer sheet.

Procedure:
Ask students to complete the Game sheet to help re-enforce and assess their learning.

Paths of a Tree

See if you are a Tree-rific Plant Explorer by making your way from the crown of the tree to the roots!!

ASSESSMENT ACTIVITY

Plant Unscramble Puzzle

Purpose: Review the adaptations, and functions of plants.

Objective: Students will successfully complete worksheets from the knowledge gained about plants and their functions, and adaptations for survival.

Materials:
1. Plant Unscramble Worksheet.
2. Plant Unscramble Answer sheet.

Procedure:
Ask students to complete the worksheet to help re-enforce and assess their learning.

Unscramble the Plant Terms

1. Photosynthesis means putting together of light, plants use sunlight to make? _____ (OODF)

2. Plants begin most food-_____ and that is why they are known as producers. (HCIASN)

3. Animals that eat plants or other animals in the food-chain are known as _____. (SUMCONSRE)

4. Plants absorb carbon dioxide, and release _____? (YXNEGO)

5. Plant roots absorb _____ (ARTWE) and nutrients from the _____ (OILS), then use capillary action to send them throughout the plant.

Most plants belong to this group, angiosperm, meaning they produce:

_____	_____	_____	_____	_____	_____	_____
1st Letter 1st Word	4th Letter 6th Word	1st Letter 4th Word	1st Letter 5th Word	7th Letter 3rd Word	8th Letter 3rd Word	6th Letter (last) 2nd Word

Use the directions above to solve this puzzle.

Unscramble the Plant Terms

1. Photosynthesis means putting together of light, plants use sunlight to make? **FOOD** (1) (OODF)

2. Plants begin most food-**CHAINS** (2) and that is why they are known as producers. (HCIASN)

3. Animals that eat plants or other animals in the food-chain are known as **CONSUMERS** (3) (SUMCONSRE)

4. Plants absorb carbon dioxide, and release **OXYGEN**? (4) (YXNEGO)

5. Plant roots absorb **WATER** (5) (ARTWE) and nutrients from the **SOIL**, (6) (OILS), then use capillary action to send them throughout the plant.

Most plants belong to this group, angiosperm, meaning they produce:

F	L	O	W	E	R	S
_____	_____	_____	_____	_____	_____	_____
1st Letter 1st Word	4th Letter 6th Word	1st Letter 4th Word	1st Letter 5th Word	7th Letter 3rd Word	8th Letter 3rd Word	6th Letter (last) 2nd Word

Use the directions above to solve this puzzle.

ASSESSMENT ACTIVITY

Helping Plants

Purpose: Allow students to do research, and discover that plants need help too, and empower them to know they can help.

Objective: Students will successfully complete worksheets from their research about plants, and think of ways they can help plants survive.

Materials:
1. Helping Plants Worksheet.
2. Helping Plants Answer sheet.

Procedure:
Ask students to complete the worksheet to help re-enforce and assess their learning.

ASSESSMENT ACTIVITY

How to Help Plants Research Form

Plant	Issue	How can you help?
Cypress Trees	Very Few Old Ones Left after Logging.	Look for alternatives to cypress wood. Plant cypress trees for the future. Recycle so we don't use new trees.

1. Find a native plant species here in Louisiana.
2. Do Research and list the problems-issues-challenges your plant is facing.
3. List ways that you or others can make the situation better.

ASSESSMENT ACTIVITY

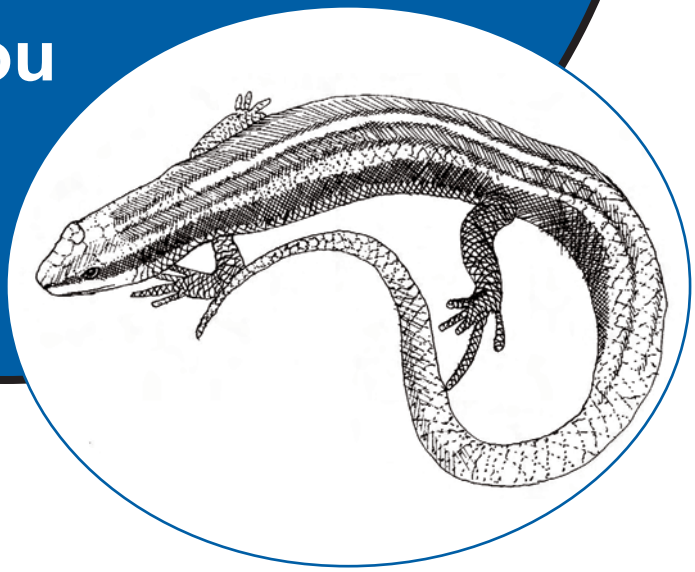
How to Help Plants Research Form

Plant	Issue	How can you help?
Cypress Trees	Very Few Old Ones Left after Logging.	Look for alternatives to cypress wood. Plant cypress trees for the future. Recycle so we don't use new trees.
		Recycle, Clean up areas, Plant trees, etc. are all good answers.

1. Find a native plant species here in Louisiana.
2. Do Research and list the problems-issues-challenges your plant is facing.
3. List ways that you or others can make the situation better.

Now that your students have a good understanding of plants, their biology and physiology, in the field on a fantastic fieldtrip to the Barataria Preserve, it's time to assess what they've learned - in a fun and easy way!

Now that your students have studied plants, their biology and physiology, and have been in the field on a fantastic fieldtrip to the Barataria Preserve, it's time to for you and them to tell us what you think.



Wild Plants of the Wetlands Evaluation

School: _____

Teacher: _____

1. Did you use the pre-visit materials sent to your school?

2. If these pre-visit materials could have been sent to you earlier, what would be the earliest date you would utilize them in the classroom?

3. Which of the educational materials did you use with you class?
   - > Background Information for Teachers
   - > Background Information for Students
   - > Student Scientist sheets
   - > Pre-visit experiments
     - > Plants are Super Green Machines
     - > Seeing is Believing
     - > Plants Drink Through a Straw
     - > You are What you Eat
     - > Flower Children
     - > Flower Friends
     - > Plant Babies

4. Which of the pre-visit curriculum activities were the most useful for your class? Why?

5. What recommendations would you offer to make the pre-visit materials more useful to your class?

6. What disciplines would you like to see represented within the pre-visit educational materials:
   - > science
   - > language arts
   - > social studies
   - > mathematics
   - > creative arts
   - > history
   - > other_____

7. Did the pre-visit materials compliment your school curriculum? How could it be tied closer?

8. While on site at the Barataria Preserve, what activities were most beneficial to your class?

> Non-native plant dissection
> Plant Hike
> Food chain Game
> Tree Function Game

9. Which activities were least beneficial to your class? Please explain your response.

> Non-native plant dissection
> Plant Hike
> Food chain game
> Tree Functions game

10. What recommendations do you have to improve the activities offered while on site?

11. Did you attend the teacher workshop before this fieldtrip? Did you find it helpful? Why/why not please explain.

12. What recommendations would you make to improve the schedule of activities?

13. What would you like to see different for next year's event?

14. Which of the post-visit educational activities did you use with you class? Which did you find the most useful? Please explain.

Post-visit activities:

> Your Food Chain - Making Healthy Choices
> Plants Need A Lot - Science Experiment

15. Which of the assessment activities were the most useful for your class? Why?

> Puzzles - crossword, word search, maze
> Paths of a Tree - Functions game
> Plant Unscramble
> Helping Plants research project

16. What recommendations would you offer to make the post-visit materials more useful to your class?

17. Did you find the Benchmarks/Grade Level Expectations useful for your class, easy to use, and helpful to you as an instructor? Please explain if not - how could they be improved?

18. Will you consider returning next year to Wild Plants of the Wetlands? Why/why not?

20. Did you find the Student Evaluations useful? Why/why not?

19. Please share other comments and ideas.

Thank you very much for taking the time to give us this detailed feedback. It will be used to improve and evaluate this program for next year

Allyn Rodriguez, Park Ranger

Wild Plants of the Wetlands Student Evaluation

School Name:

Rate the Activities you did:
(1 lowest = didn't like it - 10 highest = really liked it)
Pre-visit Activities:

Plants are Super Green Machines _____

Seeing is Believing _____

Plants Drink Through a Straw? _____

You Are What You Eat! _____

Flower Children _____

Flower Friends _____

Plant Babies _____

Overall experience. _____

Please explain what your enjoyed, or didn't.

Rate the Activities you did:
(1 lowest = didn't like it - 10 highest = really liked it)
On-site Activities:

Non-Native Plant Dissection _____

Nature Hike _____

Food Chain Game _____

Tree Function Game _____

Overall experience. _____

Please explain what your enjoyed, or didn't.

Rate the Activities you did:
(1 lowest = didn't like it - 10 highest = really liked it)
Post-visit Activities:

Your Food Chain _____

Student Scientist What Plants Need _____

Overall experience. _____

Please explain what your enjoyed, or didn't.

Rate the Activities you did:
(1 lowest = didn't like it - 10 highest = really liked it)
Assessment Activities:

Puzzles _____

Paths of a Tree _____

Plant Unscramble _____

Helping Plants _____

Overall experience. _____

Please explain what your enjoyed, or didn't.
