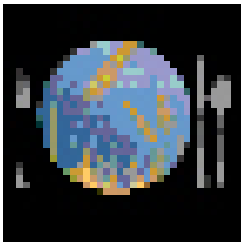




Discovery Lesson

TEACHER ENRICHMENT RESOURCE PACKET



Beyond the Table: A Look at Agriculture and You

Follow your food from where it is grown all the way to your plate! explore the equipment and techniques of conventional, local, organic, and sustainable farming while discovering how weather and water affect agriculture. Witness a garden in action and dig deeper into the science of California agriculture.

Learning objectives:

- Explore different foods and their nutritional information,
- Explore several different soil types,
- Investigate the equipment used in the agricultural industry,
- Follow grain from the field through processing stages to the supermarket.

Think it.
Try it.
Explorit.

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Background Information "Following Food"



Thank you for choosing Explorit Science Center's new *Discovery Lesson* program to supplement your ongoing science curriculum. Whether you use the program to kick off a new unit, wrap up a nearly completed unit, or purely to excite and interest your students in the wonderful world of science, advance preparation and follow up with your students are critical to achieving the greatest educational benefit from this unique science experience.

Explorit provides two resources to help prepare you and your students for the *Discovery Lesson*. First, simple logistics of the program are detailed in the confirmation letter. Second, this Teacher Enrichment Resource Packet outlines appropriate science content and processes to help you:

- successfully prepare your students prior to visiting Explorit;
- participate fully in the *Discovery Lesson* yourself; and
- follow-up with your students back in the classroom.

Food is any substance consumed by living organisms that offers a source of nourishment. Every living organism needs food for energy. Some organisms such as plants (**producers**) produce their own food through photosynthesis; other organisms, like humans (**consumers**), rely on plants and animals to supply nutrition. Food is obtained through farming, ranching, fishing, hunting and foraging. Some food is consumed raw, but many foods require some sort of **preparation**. Preparation can include heating, cooling, fermenting and preserving. Food preparation is done for reasons of safety, taste and even presentation.

Processed food is prepared food. Food processing is the act of turning raw food into consumable food. The benefits of food processing are that it removes toxins, improves taste and can increase food consistency. The major drawback of processed foods is that they have been stripped of many vitamins and minerals. Other drawbacks include higher calorie to essential nutrient ratio, and addition of preservatives, which can cause health problems.

Agriculture is a major industry in the United States. Tomato crops, wheat and corn fields, rice, soybeans, beef cattle, dairy cattle, chickens, and hogs are a few agricultural products in the US.

Farming is important for the production of plants. Eating the recommended serving of fruits and vegetables would be difficult without farming. Soil type is very important for farming. Soil texture indicates the amount of sand, silt and clay in the soil. Phosphorous stimulates seed growth. Nitrogen is the most important nutrient for a plant. Humus indicates the amount of organic matter in soil, which provides carbon. Different crops require different recipes of soil texture, phosphorous, nitrogen and carbon. Soil with too much clay could become saturated and drown roots. Soil with too much sand might not retain enough water to provide to the roots. There are several soil tests that can be conducted in order to determine



soil type.

Residual Soil forms in place directly from the mechanical and chemical weathering of bedrock. Transported Soil is the result of erosion of soil or weathered rock and its re-deposition elsewhere. Many soils are a mixture, with some material coming from far away and some material developing on site.

A large percentage of total soil volume, especially at the top layers, is actually accounted for by the living organisms (usually microscopic) that dwell in the soil. It has been said that if you add together all of the bacteria, fungi, plants, nematodes and other organisms in one gram of soil, the total number of living creatures in that one gram will be much larger than the total human population (ca. more than 6 billion)!

The Earth's surface is constantly changing, shaped by the movement of wind, water and ice as well as by the internal processes of the Earth like plate tectonics and volcanism. Weathering is the name scientists give to the process of soil or rock being breaking down by chemical or physical means. Erosion describes the transportation of the weathered material away from where it formed.

Water responds to gravity, constantly moving down the landscape. As it moves, it rubs against solid materials (rock, soil etc.) and tends to pick up or push material down slope. This material in turn rubs against or abrades other solids and enhances the erosive power of the water. Very small grains (clay and silt) can be carried great distances even by slow moving water. Large grains (boulders) tend to move only in response to large volumes of fast-moving water. Mid-sized grains (sand, pebbles, cobbles) tend to fall somewhere between.

Classroom Activity #1

CHEMICAL EROSION

Background: Some rocks, most notably limestone but also various mineral salts, are water-soluble—they dissolve in water. This activity looks at the way this affects the landscape and how it changes overtime.

Materials: Brown sugar or sugar cubes, pitcher of water or squirt bottle, baking sheet or pan, modeling clay.

1. Build a landscape out of brown sugar or sugar cubes.
2. Pour water across the landscape and observe the changes. How did the water affect the landscape?
3. Build a second landscape and cover part of it with modeling clay. Pour water again and compare the region where clay is covering the sugar with the region where there is sugar at the surface.
4. Now poke some holes through the clay to allow the water to seep through.

Classroom Activity #2

What is happening beneath the clay?

Follow up: Karst landscapes like those of southern China have been shaped by chemical erosion. Subterranean caverns are often created by limestone erosion. What would happen if you built a house on top of a layer of water-soluble rock? What if there was a layer of water-soluble rock 100 feet below your house?

CABBAGE JUICE INDICATOR

Background: Foods are either acidic, basic or neutral. Cabbage juice can be used to determine the pH of a food. Cabbage contains anthocyanins, a naturally occurring pH indicator. If a base is added to the indicator, the cabbage juice will turn green, when an acid is added, the juice will turn pink.

Advanced Preparation: Make cabbage juice indicator prior to classroom activity. Grate one head of red cabbage into a large cooking pot. Add enough water to cover cabbage, bring to a boil. Boil mixture for 20-30 minutes. Strain mixture into a jar. Mixture should be dark purple in color.

Materials: cabbage juice, household items (i.e. baking soda, vinegar, toothpaste, juices, soap), small cups, measuring spoons.

1. Begin with some cabbage juice indicator in a cup. Have students predict what will happen when item is added. Add a small amount (1/8-1/2 teaspoon) of item being tested. Note color change.
2. Experiment with several of the items. Try starting with some baking soda (base), turning the solution green. Then add some vinegar (acid), which will bring indicator back to red-purple. What will happen if more vinegar is added?

Follow up: Have students brainstorm other items not tested and create a prediction list. Conduct experiment again or encourage kids to think about acids and bases at home.

Or check out these websites for more fun activities to try:

http://www.ehow.com/how_2308285_make-mini-habitat.html#ixzz28yG9DSDDe

<http://blog.brightnest.com/2012/05/30/learn-to-make-a-pallet-garden-in-7-easy-steps/>

<http://www.agclassroom.org>



Science Standards

CA STANDARDS

Kindergarten: 2c, 3b, 3c, 4d

1st: 1b, 2b, 2e, 3b, 3c

2nd: 1d, 1e, 2e, 2f, 3c, 3e, 4a, 4f, 4g

3rd: 1f, 3a, 3c, 5a, 5c, 5d

4th: 2a, 2b, 3a, 5a, 5c, 6b, 6d, 6f

5th: 2e, 2f, 3b, 3c, 4a

6th: 2a, 2b, 4d, 5e

Explorit Programs for Schools and Groups

At Explorit's Sites

Discovery Lessons & Inquiry Labs Visit one or more of the Changing Exhibitions throughout the year or engage in team challenges in a lab setting
Nature Safaris Spring visits to Explorit's outdoor spaces at Mace Ranch Park

Explorit in Your Classroom

Classroom Adventures Host a mini travelling exhibition in your classroom

For the Whole School

Health in Your World Learn about keeping your body and the world healthy and safe
Science in Your World The ultimate family science night

Reservations required.
For information please call
530.756.0191

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