

Tree Walk Grade Level K -6 Activity Suggestions

How to use this guide

The Tree Walks for the nine Goleta Union School District campuses can be found on the website www.yourchildrentrees.org. A digital copy is also being provided to each school. The tree walks are intended to provide students with an introduction to the diversity of trees that exist on their campus and to use technology to explore these differences further.

One of every different species of tree on each campus has a metal tree tag with a QR (Quick response) code. The QR code, when read with a smart phone scanner, takes you to the Selectree website (<http://selectree.calpoly.edu/>) database for that particular tree. The database has a wealth of information about the tree species, including its common and botanical names, how big it gets, where it grows best, photographs and much more.

A tree walk route is suggested for each campus. The tree walk route can be found on the brochure on the www.yourchildrenstrees.org website, or on a metal tree tag on the first tree of the tree walk.

The tree tags are normally placed high on the tree to deter vandalism. If a tree tag is missing, you can make a replacement, by printing out a brochure, cutting out the qr code for the tree, and taping it to a tree tag.

Volunteers from Your Children's Trees hope to update the Tree Walks periodically. If you find that there are additions, deletions or revisions to the Tree Walk tags or brochure, please send them care by e-mail to the Tree Walk Coordinator/Technical Advisor at yourchildrenstrees@gmail.com.

The attached grade level activities are suggestions from the interns at Your Children's Trees as to how the Tree Walks may supplement your classroom activities, or just for fun. Since this is a non-educator approach to using this guide, we would appreciate feedback on how to make future versions of this guide more usable. An excellent source of curriculum and professional development for educators can be found at the Project Learning Tree website www.plt.org.

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KINDERGARTEN

PHYSICAL SCIENCES

Objective: to describe trees' physical properties via shape and color

The Shape of Things

Choose several trees from the walk and have students answer the questions below.

- What is the shape and color of the leaf?
- What is the vein pattern of the leaf?
- Is the tree tall or short? Which of the trees is tallest? Shortest?
- What is the shape of the tree?
- What is the shape and color of the seed?

LIFE SCIENCES

Objectives: to observe and describe similarities and differences in the appearance of plants; to understand diversity among species

The Closer You Look

The questions allow students to understand the amount of diversity among species from large to small organizational levels. Bring students on walk to answer last two questions.

1. What are the differences between a plant and an animal?

- *Plants*
 - *Leaves*
 - *Stems*
 - *Roots*
 - *Stationary*
 - *Produce own food*
 - *Use CO₂ and produce O₂*
- *Animals*
 - *Legs*
 - *Sensory organs (e.g. eyes, ears, mouths, noses, skins/scales/hairs)*
 - *Mobile*
 - *Can think*
 - *Need to eat food*
 - *Use O₂ and produce CO₂*

2. What are the differences between a flower and a tree?

- *Flowers*
 - *Petals*
 - *Small (relatively)*
 - *Colorful*
- *Trees*
 - *Bark*

- *Trunk*
- *Branches*
- *Tall (usually)*

3. What are the differences between two species of trees (e.g. pines vs. oaks)? *Compare shapes, colors, and textures of:*

- *Leaf*
- *Bark*
- *Branch*
- *Seed*

4. What are the differences between two types of the same tree species (e.g. coast live oak vs. island oak)? *Compare shapes, colors, and textures of:*

- *Leaf*
- *Bark*
- *Branch*
- *Seed*

INVESTIGATION AND EXPERIMENTATION

Get in Touch With Trees

Objective: to observe common objects using the five senses

Choose several trees from the walk and have students participate in the activities below.

- Sight: look at texture, shape, and color of bark, leaves, and seeds/flowers
- Touch: feel texture of bark, leaves, and seeds/flowers
- Scent: smell leaves; compare fruit trees to other trees
- Sound: listen to leaves rustling in wind/leaves crunching under feet; knock on bark
- Taste (in classroom): eat samples of fruits and nuts

Tree Art

Objective: to communicate observations orally and in drawings

Complete the walk and have students participate in the activities below. This program can be completed on its own or after another program.

- Draw your favorite tree (s) from the tour and explain why you liked them
- Draw a leaf, seed, or flower from your favorite tree and explain an unique characteristic of it
- Do a print of the bark texture from your favorite tree and explain the texture

1st Grade

Life Sciences Standard 2a:

“Different plants and animals inhabit different kinds of environments and have external features that help them thrive in different kinds of places.”

- Looking at the different leaves on each tree can be used to facilitate a discussion about the variety of features they have that allow them to thrive in their environments.
- Plants that grow in different environments have different characteristics that increase their ability to survive and thrive.
- Example: Deciduous plants drop their leaves seasonally. This allows them to survive in dry weather by helping the plant conserve water.
- Example: The Coast Live Oak leaves have small hairs on their underside that act to conserve water and keep the trees cool. They act like an air conditioner. This allows them to survive in this environment, which is prone to water-stressed conditions.

Life Sciences Standard 2c:

“Animals eat plants or other animals for food and may also use plants or even other animals for shelter and nesting.”

1.

- Look at the various fruit trees on campus (Apple, Lemon, Fig) and explain how animals and humans use them for food.
- A simple example would be the squirrels on campus, which eat the fruit from the trees and then spread the seeds.

2.

- Direct students to seek out large holes in the trunks of trees, or nests among the branches.
- These features are examples of animals using the trees for shelter and nesting.
- Many types of birds utilize natural crevices in trees to build their nests. Others such as Woodpeckers excavate their own holes, usually a few meters from the ground. These cavities can then be used by other species when the woodpeckers abandon their nest.

Life Sciences Standard 2e:

“Roots are associated with the intake of water and soil nutrients, green leaves with

making food from sunlight.”

- Some trees along the walk have more prominent roots extending from the base along the ground – point them out to facilitate discussion about the role of roots in the growth of the tree (intake of water and soil nutrients)
- Roots grow through the soil, soaking up water and transporting it to the other parts of the tree.
- The depth, length, and other variations of roots are different for each tree and reflect its needs.

Investigation and Experimentation Standard 4a & 4b:

a) “Draw pictures that portray some features of the thing being described.”

b) “Record observations and data with pictures, numbers, and/or written statements.”

1.

- Students can draw their favorite tree and produce a written statement describing their favorite feature (and why).
- Students can use the pictures to identify some key features of the trees that they have identified on the Tree Walk (roots, trunk, branches, leaves)

2.

- Teachers can gather leaf samples from each tree along the Tree Walk (Not more than 1-2 leaves per tree) and have the students try to identify and/or sort them based on the type of leaves they have.
- Students can attempt to sort leaves between those that are from conifers (mostly evergreen) and those that are broadleaf (mostly deciduous)
 - Conifer leaves are needle-like, while broadleaf leaves are typically flat.

2nd Grade

Helpful Websites:

Project Learning Tree Activity Guide Link:

<https://www.plt.org/environmental-curriculum-resources-for-teachers?guide=10338>

Selectree Website: <https://selectree.calpoly.edu/>

- Selectree can be used to examine leaves, flowers, seeds, fruits, etc. when they are not in season

Life Sciences:

- Plants and animals have predictable life cycles:
 - o Organisms reproduce offspring of their own kind. The offspring resemble their parents and each other.
 - Once identifying a certain tree species with their teacher, students can observe smaller / younger trees of the same species and compare the two, they can collect samples from the first tree (leaves, seeds, fruits, bark) and compare it with samples from other trees of the same species
- Characteristics are either inherited from parent or influenced by the environment
 - o How are trees influenced by the environment?
 - o Adopt a Tree – Activity 21
 - Have students adopt a tree and observe how it changes over the year, certificate of adoption, and journal format available online at Project Learning Tree link
- There is variation among individuals of one kind in a population
 - o Seen through observation and the first activity
- Flowers and fruits are associated with reproduction
 - o Collect fruits and flowers from trees around campus: have the students look for the similarities and differences between fruits and flowers of different species, then explain how each part is used for reproduction on the collected examples.
- What do plants need to grow?
 - o Teachers can ask students to identify the things that trees need to grow while on the tree walk (oxygen, water, sunlight). This is a chance for teachers to explain carbon sequestration in a manner that they deem appropriate for the skill level of the class – anything from saying that trees clean the air and they need air to grow to trees clean the air by taking carbon out of the air and using it to grow – to a more advanced definition
 - A tree can absorb as much as 48 pounds of carbon dioxide per year, and can sequester one ton of carbon dioxide by the time it reaches 40 years old

Investigation and experimentation:

Scientific progress is made by asking meaningful questions and conducting careful investigations. As a basis for understanding this concept, and to address the content the other three strands, students should develop their own questions and perform investigations. Students will:

- Make predictions based on patterns of observation rather than guessing
- Compare and sort common objects based on two or more physical attributes (color, shape, texture, size, weight)
 - o Have Seeds, Will Travel (43) Looking at Leaves (64) Name That Tree (68)
- Construct bar graphs to record data using appropriately labeled axis
 - o Students could create different types of graphs by counting the number of each species of tree on campus and graphing their results
 - For example: students can look for Torrey Pine Trees, Coast Live Oak, and Western Sycamore. The teacher can bring the class to the tree that is labeled and show the class characteristics of the labeled tree (found on the tree map) then the students, in groups or as a class, can walk around the campus and try to identify other trees of that species. Once they identify other trees they can count them and go back to the classroom and create a graph comparing the numbers of different tree species on their campus. Students can ask questions about how those trees got there and why there are different number of trees (most were planted).
- The Appreciation of Trees (adapted from Activity 13 We all Need Trees)
 - o Take a walk with children, and bring along a few tree products, for example, fruit (e.g., apple, orange, mango), a pencil and a journal or a book, sunblock, and chewing gum. Pick up a downed tree branch and ask where it came from (a tree). Eat the fruit, and ask children where it came from (a store? a tree?). Ask children to think of other items that come from trees. Discuss some unusual tree products, using the samples that you have brought.
 - Ask critical questions, including:
 - Have you used anything that comes from trees today?
 - How are tree products alike and how are they different?
 - What do you like most about trees?
 - In addition to giving us wood, paper, food, and other products, trees are invaluable assets to our communities. Take a walk, and look for newly planted trees and shrubs. How are they protected? Find a place without trees, and compare it with a place with many. Which place do you like best? Why?

Interdependent Relationships in Ecosystems

- Plan and conduct an investigation to determine if plants need sunlight and water to grow

Structure and Properties of Matter

- Plan and conduct an investigation to describe and classify different kinds of materials by their observable properties
- Analyze data obtained from testing different materials to determine which materials have the properties that are best suited for an intended purpose
- Make observations to construct an evidence-based account of how an object made of a small set of pieces can be disassembled and made into a new object
- Construct an argument with evidence that some changes cause by heating or cooling can be reversed and some cannot

Recommended Activities (available at the Project Learning Tree Link)

Get in Touch with Trees (2)

The Sounds Around (4)

We all Need Trees (13)

Adopt a Tree (21)

Trees as Habitats (22)

How Plants Grow (41)

Have Seeds, Will Travel (43)

Tree Factory (63)

Looking at Leaves (64)

Bursting Buds (65)

Name that Tree (68)

Signs of Fall (78)

3rd Grade

Physical Sciences

1. Energy and matter have multiple forms and can be changed from one form to another. As a basis for understanding this concept, students know that energy comes from the sun to the Earth in the form of light.
 - a. During the walk, provide an explanation of how trees get their food; utilize the provided QR code that will lead to a kid friendly website that explains photosynthesis in a manner that will allow students to understand the process.
 - b. Allow students to look at the leaves of the given tree while the process is being explained to them so they can better understand that photosynthesis occurs in the leaves of trees.
2. Light has a source and travels in a direction. As a basis for understanding this concept, students know that sunlight can be blocked to create shadows.
 - a. Teachers should gather students around a tree in a position that shows the largest part of the shadow under the tree.
 - b. Ask the students to look at where the sun is, and which way the shadow from the tree goes
 - c. Have students draw a simple picture of the tree, shadow location, and sun location and write one sentence on why they think the shadow is where it is.
 - d. Discuss and explain that the shadow is formed from the trees blocking the sun, and that the shadow is facing the way it does because of where the sun is. Explain that the shadow will change size and direction based on where the sun is in the sky
 - e. ** If there is no shadow due to clouds or weather issues, have the students do the same thing with drawing, and explain why there is no shadow or a very faint shadow depending on conditions.



Life Sciences

1. Adaptation in physical structure or behavior may improve an organism's chance for survival. As a basis for understanding this concept, students know that plants and animals have structures that serve different functions in growth, survival, and reproduction.
 - a. During the tree tour, stop at different trees, and point out/explain the different parts of a tree and their functions: roots, bark, flowers, fruit, etc.
 - b. Depending on the time of year, teachers are encouraged to scan the QR codes attached to the trees in order to be able to point out the parts of the specific tree they are looking at, or show students what the parts would look like in case of off season.
2. Adaptation in physical structure or behavior may improve an organism's chance for survival. As a basis for understanding this concept, students know that when the environment changes, some plants and animals survive and reproduce, and other die or move to new locations.

- a. With the class, sit at a safe distance from 1) a healthy tree and 2) an unhealthy or dying tree. Ask the class to sit in silence and watch the tree and the area around the tree for three minutes. Ask the students to look out for any animals and birds and record their observations. Next, have the students go up to the tree and observe the ground around it and look for any signs of animals, such as holes in the ground, holes on the tree or leaves from bugs, or even bugs themselves.
- b. After observing both trees, have students compare the differences in their observations and explain to the students why the healthy tree and the sick tree have different animal presence/damage.

Investigation and Experimentation

1. Scientific progress is made by asking meaningful questions and conducting careful investigations. As a basis for understanding this concept and to address the content the other three strands, students should develop their own questions and perform investigations. Students will use numerical data describing and comparing objects, events, and measurements.
 - a. Choose a handful of trees during the walk, and after splitting the students into small groups, ask them to measure the circumference of the tree, measure how long and wide the leaves are, and have each group draw a picture of the leaves of the tree they are studying.
 - b. Have each group write down three observations of their tree.
 - c. When all the groups are finished, compile all of the students' data and have them compare their findings for each tree. Have students look at the differences between each species of tree and allow each group to point out the differences between their tree and the other group's trees.

4th Grade- Grade 4 Lesson Suggestions for tree walk

1. Producers and consumers (herbivores, carnivores, omnivores, and decomposers) are related in food chains and food webs, and may compete with each other for resources in an ecosystem.

Activity 1: Before continuing on the tree walk has the students explain the habitat they live in and what we rely on as human beings to live. Next have them think about the trees on the tree walk and ask them to explain the trees habitat and what animals/ things it relies on to live. This simple lesson will help the students learn that people and trees are connected and connected to many other things in the environment.

2. Producers and consumers (herbivores, carnivores, omnivores, and decomposers) are related in food chains and food webs, and may compete with each other for resources in an ecosystem.

Activity 2: Have students create a food chain at different trees on the tree walk. Ask, how do the trees affect the animals and how the animals affect the trees. This lesson will help show that in areas with fewer trees there will be fewer animals, because trees provide food and shelter to some animals.

3. Differentiate observation from inference (interpretation), and know that scientists' explanations come partly from what they observe and partly from how they interpret their observations.

Activity 3: Have students record observations at each tree, for example the leaf shapes, animals they see, bark texture. Students will then interpret their observations, and brainstorm why the trees are different from each other. Teacher will use select tree to give exact answers showing different adaptations of the trees.

4. Many plants depend on animals for pollination and seed dispersal, while animals depend on plants for food and shelter.

Activity 4: While students walk they will observe and take notes on the type of seed at each tree (if seeds are not present use select tree). Then the students will use worksheet

(https://www.plt.org/stuff/contentmgr/files/1/49ff07fb64d2f5aa468f8fd38c099078/files/seed_dispersal_methods.pdf) and observations of surrounding ecosystem to guess how the seeds are transported. At the end of the class, students will understand how animals and the environment help trees transport their seed.

5. Measure and estimate weight, length, or volume of objects.

Activity 5: Students will estimate the height of the trees on the tree walk using this method.https://www.plt.org/stuff/contentmgr/files/1/22922ca9818cda2a9460f35b62330d8c/files/activity_67_student_pages.pdf) and measure the width with a tape measure. Students will then compare their results with the averages on the select tree website.

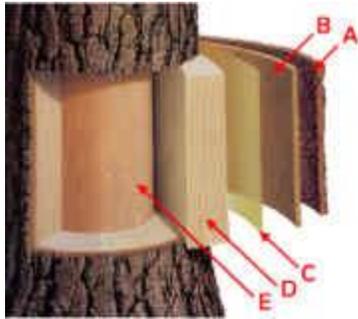
5th Grade

LS1.C: Organization for Matter and Energy Flow in Organisms

Plants acquire their material for growth chiefly from air and water. (5-LS1-

1) Anatomy of a Tree

The Inside Story



- A. The **outer bark** is the tree's protection from the outside world. Continually renewed from within, it helps keep out moisture in the rain, and prevents the tree from losing moisture when the air is dry. It insulates against cold and heat and wards off insect enemies.
- B. The **inner bark**, or "phloem", is pipeline through which food is passed to the rest of the tree. It lives for only a short time, then dies and turns to cork to become part of the protective outer bark.
- C. The **cambium cell layer** is the growing part of the trunk. It annually produces new bark and new wood in response to hormones that pass down through the phloem with food from the leaves. These hormones, called "auxins", stimulate growth in cells. Auxins are produced by leaf buds at the ends of branches as soon as they start growing in spring.
- D. **Sapwood** is the tree's pipeline for water moving up to the leaves. Sapwood is new wood. As newer rings of sapwood are laid down, inner cells lose their vitality and turn to heartwood.
- E. **Heartwood** is the central, supporting pillar of the tree. Although dead, it will not decay or lose strength while the outer layers are intact. A composite of hollow, needlelike cellulose fibers bound together by a chemical glue called lignin, it is in many ways as strong as steel. A piece 12" long and 1" by 2" in cross section set vertically can support a weight of twenty tons!

ESS2.A: Earth Materials and Systems

- Earth's major systems are the geosphere (solid and molten rock, soil, and sediments), the hydrosphere (water and ice), the atmosphere (air), and the biosphere (living things, including humans). These systems interact in multiple ways to affect Earth's surface materials and processes. The ocean supports a variety of ecosystems and organisms, shapes landforms, and influences climate. Winds and clouds in the atmosphere interact with the landforms to determine patterns of weather. (5-ESS2-1)

What role does vegetation play in erosion?

- Plants provide a protective cover on the landscape and slow soil erosion:
- -- plants get in the way and slow down water as it drains off the land
- -- plants literally soak up water (further slowing runoff)
- -- plant roots hold the soil in place, keeping it from being washed away
- -- plants weaken the impact of a raindrops hitting the ground, slowing the ability of the rain to induce erosion

Biological Weathering

Biological weathering is, of course, weathering done by living things. I suppose it could really be called a special case of either physical or chemical weathering, but it is kind of neat that life on the planet can weather rocks. Some examples:

- **Tree roots**
Tree roots grow into cracks and widen them, which helps physical weathering.
- **Bacteria**
Some bacteria and other organisms secrete acidic solutions, which helps chemical weathering.

LS2.A: Interdependent Relationships in Ecosystems

The food of almost any kind of animal can be traced back to plants. Organisms are related in food webs in which some animals eat plants for food and other animals eat the animals that eat plants. Some organisms, such as fungi and bacteria, break down dead organisms (both plants or plants parts and animals) and therefore operate as "decomposers." Decomposition eventually restores (recycles) some materials back to the soil. Organisms can survive only in environments in which their particular needs are met. A healthy ecosystem is one in which multiple species of different types are each able to meet their

needs in a relatively stable web of life. Newly introduced species can damage the balance of an ecosystem. (5-LS2-1)

Wildlife populations depend on their environment or habitat to receive the basic needs for survival. An ecosystem or habitat provides populations of wildlife with food, water, shelter and space. If all four of these basic needs are not available in a suitable arrangement, populations of wildlife can not exist.

All populations of living things are interrelated. When one population of animals, plants, or insects increase or decrease, other populations of living things are also affected. For example, when treed areas are removed from an ecosystem, the bird/squirrel populations will likely go down. The reduced bird/squirrel population will lower predator populations that use them as a food source

The amount of suitable habitat for a species of wildlife will determine the number of animals that can survive in the area. Human activity has the greatest impact on the amount and quality of wildlife habitat in Illinois. Wildlife habitat can be destroyed or its quality diminished as a result of urban sprawl, agricultural practices, pollution, sedimentation, or habitat fragmentation.

People can also have a positive impact on wildlife populations through improvement and protection of habitat or ecosystems. The planting of trees and shrubs, as well as wildlife food plots, in the appropriate locations is one way landowners can improve wildlife habitat. People can protect ponds, streams, rivers and wetlands from sedimentation by reducing soil erosion on lands surrounding these aquatic ecosystems. Nesting boxes placed in ecosystems that lack dead, hollow trees will enhance the habitat for cavity nesting animals. There are many things people can do to improve habitat for wildlife.

PS3.D: Energy in Chemical Processes and Everyday Life

The energy released [from] food was once energy from the sun that was captured by plants in the chemical process that forms plant matter (from air and water). (5-PS3-1)

- **Definition:** Photosynthesis is an important process permitting plants, and most particularly trees, to trap the sun's energy in the form of sugar using the leaf. Leaves then store the resulting sugar in cells in the form of glucose for immediate and potential [tree growth](#). Photosynthesis represents a beautifully wonderful chemical process that takes six molecules of water from roots and six molecules of carbon dioxide from the air and creates one molecule of sugar. There would be no life on earth as we know it without the photosynthetic process.
- Photosynthesis means "putting together with light". It is a manufacturing process that happens within cells of plants and within tiny bodies called chloroplasts. These [plastids](#) are located in the cytoplasm of leaves and contains the green coloring matter called chlorophyll.
- When photosynthesis takes place, water that has been absorbed by the tree's roots is carried to leaves where it comes in contact with the layers of chlorophyll.
- At the same time, air, which contains carbon dioxide is taken into leaves via leaf pores and exposed to sun light and a very import chemical reaction occurs. Water is

broken down into its oxygen and nitrogen elements, combines with carbon dioxide in the chlorophyll to form sugar.

- Another valuable byproduct of this chemical reaction is leftover oxygen the leaf releases back into the atmosphere. That oxygen becomes a part of the air we breath while the glucose is carried to the other parts of the tree as nourishment. Also from this reaction comes 95% of of what becomes the existing tree. Incredibly, out of thin air and water comes the vegetative biological organism called a tree.
- Photosynthesis - the English translated chemical equation for this process is:
- 6 molecules of carbon dioxide + 6 molecules of water + light → glucose + oxygen
- [Many processes occur in a leaf](#), but none more important than photosynthesis and the resulting food it manufactures. So, through the works of green plants, the radiant energy of the sun is captured in leaf structure and made available to living things. Except for a few kinds of bacteria, photosynthesis is the only process by which organic compounds are constructed from inorganic substances, with a resultant storage of energy.
- Unfortunately, some 80 percent of the earth's total photosynthesis is produced in the ocean and largely unavailable to creatures living on the land. So pressure is constantly on terrestrial plants to keep up the pace. Good news is, the total production of sugar by land plants is estimated to be 40 billion tons a year and much more than enough to support every living terrestrial organism at present.

ESS3.C: Human Impacts on Earth Systems

Human activities in agriculture, industry, and everyday life have had major effects on the land, vegetation, streams, ocean, air, and even outer space. But individuals and communities are doing things to help protect Earth's resources and environments. (5-ESS3-1)

Trees are also very important for us as a renewable resource. [Trees are a natural resource that can be renewed - by the planting of trees](#) - replacing the trees that are harvested for use by people. We depend on forest products for things like the wood we burn for heat and the wood we use to make houses and furniture. We use trees for the paper to make books and letters we write. Actually, there are more than 5,000 things made from trees. Trees give us baseball bats, shoe polish, and even tooth paste that comes from tree extracts.

Today, the people and companies that manage our nation's forests recognize that trees are a valuable resource and that it is in the best interest of each of us to conserve them. The idea of sustainable forestry means trying to keep things in balance - when trees are cut down to make paper and other products, new trees are planted or regrow naturally. Forests help wildlife by providing them food and a home. Trees and forests help us by cleaning our air, soil, and water - and provide a place for you to camp and hike! So you can help the world by planting a tree.

LS1.C: Organization for Matter and Energy Flow in Organisms

Plants acquire their material for growth chiefly from air and water. (5-LS1-1)

LS2.A: Interdependent Relationships in Ecosystems

The food of almost any kind of animal can be traced back to plants. Organisms are related in food webs in which some animals eat plants for food and other animals eat the animals that eat plants. Some organisms, such as fungi and bacteria, break down dead organisms (both plants or plants parts and animals) and therefore operate as “decomposers.” Decomposition eventually restores (recycles) some materials back to the soil. Organisms can survive only in environments in which their particular needs are met. A healthy ecosystem is one in which multiple species of different types are each able to meet their needs in a relatively stable web of life. Newly introduced species can damage the balance of an ecosystem. (5-LS2-1)

LS2.B: Cycles of Matter and Energy Transfer in Ecosystems

Matter cycles between the air and soil and among plants, animals, and microbes as these organisms live and die. Organisms obtain gases, and water, from the environment, and release waste matter (gas, liquid, or solid) back into the environment. (5-LS2-1)

6th Grade

Invasive Species

1. Invasive Species: Anything that is not native; One that reproduces itself in such a manner that it will eventually take over a native plant.
 - 90-95% of the plants are non-native.
 - On your campus, there are a diverse amount of trees. Do you think there are any invasive or non-native trees on your campus? Are invasive species a problem? What do you notice about these invasive trees?
 - <http://www.cal-ipc.org/paf/> list of invasive species in California
 - Ex. Brazilian pepper is one, for example.
2. Invasive Species adapt and develop specific characteristics to prevent native species from growing in the same area (evolution/competition). How do you think non-native species appeared in the US? Or at school?
 - a. Birds and animals: many seeds are distributed from fruits that birds and animals consume. The seeds have adapted to stay intact to easily pass through the animal. Birds and animals can travel far distances before they release their waste that hosts all the seeds anywhere on the ground. The seeds will then be able to germinate and grow in the place they were left in. Seeds in the form of “stickers” or “spurs”, have the characteristic of latching on to fur and can be transported that way on the backs of many animals.
 - b. People: People help with the transportation of seeds both intentionally and unintentionally. Seeds can hitchhike on the bottom of shoes, latching onto clothes and fabrics, or even be intentionally planted.
 - c. Wind: Many seeds are very light in weight and small and can easily be blown far distances from the wind.
 - d. Soil distribution: Sometimes, non-native seeds can be introduced into a new area by being mixed within compost, mulch, or soil that have been packaged for planting.

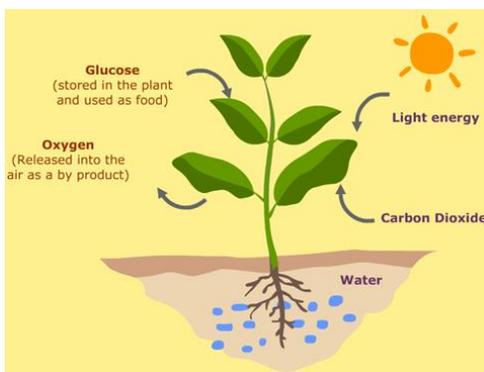
Tree Walk: Look at the trees on your campus. Do you see any trees that may produce or hold any fruit or seeds? You can check on the ground under the tree for any fallen seeds.

Ex. Pine cones (closed pine cones haven't released their seeds yet. Opened pine cones have released their seeds), Acorns, Pods, Fruit. Open up the pods or fruit to find the seeds. Why do you think there are so many seeds in one fruit, pod, or pinecone?

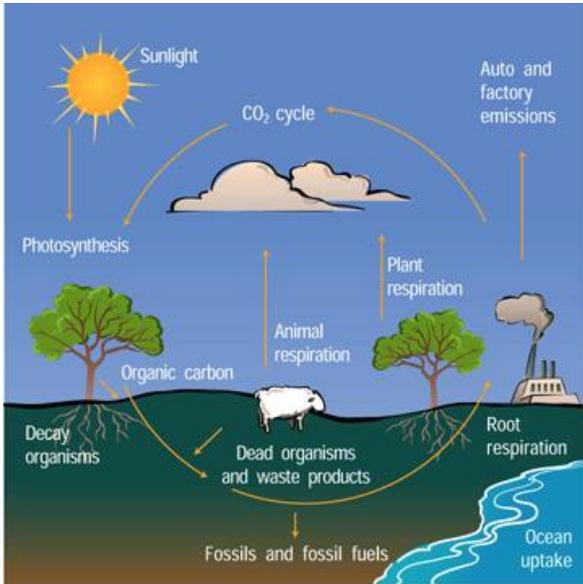
Food Web/ Ecology -cycles

Life cycles are what make the world go round.

1. Photosynthesis- the complex process by which carbon dioxide, water, and certain inorganic salts are converted into carbohydrates by green plants, algae, and certain bacteria, using energy from the sun and chlorophyll.
 - Photosynthesis is a natural process creating oxygen for humans.



- Lots of trees= more oxygen and water on Earth's surface
- Why is photosynthesis important?
 - The process creates oxygen, which all life (animals, plants, and humans) depend on.
 - Ask students to explain the process of photosynthesis
- For lesson plan on Photosynthesis you can refer to <http://kids.mongabay.com/school-lessons/lesson-2-photosynthesis>



2. Carbon Dioxide

Can you name this cycle?

- On your tree walk, notice where the trees are on your campus and how they are doing. Do you see any differences between a number of trees? If so, why do you think some of the trees may be doing better or worse than others?
- Count the number of trees on campus and look at all the different species. They are all good for the environment since they help create oxygen. Now can you find multiple trees of the same species?

3. Now that you know how interconnected the living systems are to one another, what do you think will happen if one aspect is changed? For example, right now we are facing a drought. What happens in a drought? How do you think this will affect the life cycles we have discussed? And in turn, affect the trees on your campus?

- a. Drought: period of below-average precipitation in a given region, resulting in prolonged shortages in its water supply.
 - i. Without water, the roots of the trees won't be able to receive all the nutrients it needs to grow. Some trees may die as a result making there be one less tree that can contribute to the carbon dioxide cycle/life cycle.

Renewable/non-renewable Resources

1. What are renewable and nonrenewable resources?
 - Renewable: a resource which is replaced naturally and can be used again. For example, water, oxygen, solar energy, etc.

- Non-renewable: a resource of economic value that cannot be readily replaced by natural means and that is not sustainable. For example, natural oil or coal because they have been in formation for millions of years.

Is a tree a renewable or nonrenewable resource?

2. What makes a certain type of tree over another tree, more preferred as a renewable resource? For example, to build a house or to build a boat?
 - The durability, strength, and the availability of the wood.
 - The physical structure and makeup of the wood varies from tree to tree. There are two classification of wood: hardwood and softwood.

Hardwood	Softwood
Examples of hardwood trees include alder, balsa, beech, hickory, mahogany, maple, oak, teak, and walnut.	Examples of softwood trees are cedar, Douglas fir, juniper, pine, redwood, spruce, and yew.
Most hardwoods have a higher density	Most softwoods have a lower density
Hardwood has a slower growth rate.	Softwood has a faster rate of growth.
More fire resistant	Less fire resistant
Used in construction that needs to last a long time.	About 80% of all timber comes from softwood but can be used in construction to make paper, windows, doors, etc.

2. Trees as a natural resource, provide us with more than commercial goods.

- Bear fruit and food for us, we can climb certain ones, they provide us with shade, and provide many habitats for animals, birds, and insects.
- Trees take in carbon dioxide and produce oxygen.
- Trees stabilize the soil which prevents erosion and conserves water.

3. However, trees are a limited resource.

- We need to be wary and be careful about what we are using and how much we are using.
 - Today deforestation is taking place at fast levels.
 - Deforestation is the process of clearing Earth's forest on a massive scale, often resulting in damage to the quality of the soil.
 - There are many forms of deforestation:
 1. Fires

2. Clear-cutting for agriculture
3. Ranching and development
4. Unsustainable logging for timber
5. Degradation due to climate change

- Every year 46-58 thousand square miles of forest are lost.

Carbon Footprints

1. Did you know planting a tree reduces your carbon footprint?
 - a. A carbon footprint is the amount of carbon dioxide or other carbon compounds emitted into the atmosphere by the activities of an individual, company, country, etc
 - b. The earth is made up of four elements: carbon, hydrogen, nitrogen, and, oxygen
 - i. A tree will help stabilize the elements, as a tree matures it consumes 48 pounds of carbon dioxide per year.
 - ii. Too much carbon dioxide is bad for the earth, it causes the earth to heat up. We need oxygen, which comes through trees.
 - c. Gardening is a great way to reduce your carbon footprint. If your school has a garden, go and see what plants you have. Are they all fruit plants? What other benefits does planting a fruit plant bring?
 - i. Fruit trees not only provide oxygen but also the fruit which is a sustainable way to live if you are planting and eating your own fruit.
 - ii. If you plant trees, for example during California's Arbor Week, you are reducing your carbon footprint since you are planting something that will lower the amount of carbon dioxide in the air on our earth.

How do you think you can save trees?

1. Use paper wisely.
 - a. You can recycle paper, or even purchase recycled paper.
 - b. Use both sides of the paper (as scratch paper or for homework).
 - c. Use cloth napkins, cloth towels, or plastic/ceramic plates instead of paper napkins, towels, or plates.
 - d. Choose a reusable lunchbox instead of paper lunch bags.
2. Borrow, share and donate books.
3. Plant a tree. 4. Visit the forest. 5. Stay on the trails. This will minimize your impact on wilderness areas. 6. Be careful with fire.