girl scouts of central texas

Patch Program

Sustainability

In this patch, you will explore the connections between humans and their natural environment and recognize how our everyday actions affect the world around us.

Special thanks: LBJ Wildflower Garden & National Fund for the United States Botanic Garden

Grade level requirements:

- **Daisies (grades K-1).** Pick one track (water, plants and soil, energy, or habitat) and choose at least one Discover, Connect, and Take Action activity in that track to explore.
- **Brownies (grades 2-3).** Pick one track (water, plants and soil, energy, or habitat) and choose at least one Discover, Connect, and Take Action activity in that track to explore.
- **Juniors (grades 4-5).** Pick one track (water, plants and soil, energy, or habitat) and choose at least one Discover, Connect, and Take Action activity in that track to explore.
- **Cadettes (grades 6-8).** Pick two tracks (water, plants and soil, energy, or habitat) and choose at least one Discover, Connect, and Take Action activity in each track to explore.
- **Seniors (grades 9-10).** Pick two tracks (water, plants and soil, energy, or habitat) and choose at least one Discover, Connect, and Take Action activity in each track to explore.
- **Ambassadors (grades 11-12).** Pick two tracks (water, plants and soil, energy, or habitat) and choose at least one Discover, Connect, and Take Action activity in each track to explore.

Discover

Explore the world around you and how you can make simple changes in your day to be more sustainable.

The Environmental Protection Agency defines "sustainability" as being based on the simple principle that "everything that we need for our survival and well-being depends, either directly or indirectly, on our natural environment. To pursue sustainability is to create and maintain the conditions under which humans and nature can exist in productive harmony to support present and future generations."

We can practice sustainability by protecting, conserving, and learning about our natural resources. Keep reading to learn about water, plants and soil, energy, and habitat.

- **Water:** Water falls from the sky as rain, sleet, and snow. But, then where does it go? Pervious surfaces allow water to pass through. Soil would be an example of a pervious surface. Impervious surfaces do not allow water to pass through them. An example of an impervious surface would be concrete. In the next water section, you'll explore pervious and impervious surfaces.

  When rain, sleet, or snow accumulates it may form a river, stream, or lake. Here are some definitions of different bodies of water. In the next water section, you may choose to explore a map of Texas and identify some of these water features on a map.
  (Source: https://water.usgs.gov/edu/dictionary.html)

  - River - a natural stream of water of considerable volume.
  - Stream - a general term for a body of flowing water. The term is generally applied to the water flowing in a natural channel (versus a canal)
  - Tributary – a stream or other body of water, surface or underground, which contributes its water, even though intermittently and in small quantities, to another and larger stream or body of water.
  - Aquifer - a water bearing stratum (layer) of permeable rock, sand, or gravel.

    - Ground water - the supply of fresh water found beneath the Earth's surface (usually in aquifers) which is often used for supplying wells and springs.
    - Lake - an inland body of water, usually fresh water, formed by glaciers, river drainage etc., larger than a pool or pond. Bodies of water filling depressions in the earth's surface.
    - Reservoir - a pond, lake, tank, or basin (natural or human made) where water is collected and used for storage
    - Ocean - the great bodies of salt water which cover more than two-thirds of the earth's surface.

- **Plants and soil:** You probably take dirt for granted. Have you ever stopped to think what dirt is made of? Soil is made up of living and non-living things. Soil is a mixture of minerals from rocks, organisms in the soil, and organic matter. Soil provides nutrients for plants, filters water, and helps decompose things.

  One way that we can help put nutrients back into the soil is by composting. Composting speeds up the natural decomposition process of our green waste. As the green waste decomposes, nutrients are released back into the soil so that plants can use them to grow. Why might it be important to have healthy soil?

- **Energy:** What are things in your daily life that use energy? If you thought of home appliances, phones, cars, or lights, you are correct! We use energy to power many of the things we do every day. Where does that energy come from? Most of our electricity is made in power stations. A power station has large machines called turbines. Coal is burned to heat up the turbines to make them spin. As they spin, they turn magnets within coils (generators) which causes charged particles to move down the electric wire—electricity! Burning coal is one of our main sources of creating electricity. However, coal must be mined, and it creates some pollution when it's used to make electricity. Coal is a non-renewable energy source. Non-renewable energy is energy that comes from sources (like coal, natural gas, and oil) that cannot be replaced once they have been all used up.

  Renewable energy is a term that we use to talk about sources of electricity that won't ever run out. Can you think of some sources of renewable energy? Energy from the sun (solar), the wind, the movement of water, and geothermal heat are all examples of renewable energy.

- **Habitat:** A habitat is the natural home for an animal, plant, or other organism. A habitat provides food, water, shelter, and space that the living thing needs to survive. Animals do best in their own habitat where they have the food, shelter, and protection that is best suited for them. For instance, a desert tortoise would not prefer a tropical rainforest for a habitat. Not every living thing thrives in the same kind of habitat.

  What kind of habitat do you need to do your best? Where do you get your food, water, and shelter?

Connect

Now it is time to take some of your new knowledge into the real world. Every person on our planet interacts with water, plants and soils, energy, and habitat. These are some of the building blocks of our world. Have fun exploring!

- **Water:**
  - Make a rain map: Go outside. Pretend that it is raining. Where are some of the places that rain goes when it falls? Create a map that shows where water flows when it rains. Share your map with someone. Which places on your map have pervious surfaces? Which places on your map have impervious surfaces?
  - Rain in your area: Look at pictures and/or talk about the differences between urban, suburban, and rural areas. Does the area where you live seem to you to be urban? suburban? or rural? Which of these three types of areas has the most pervious surfaces? What do you think would happen if it rained a little, some, or a lot in each of these three areas?
  - Water in your state: Look at a map of Texas. Where are the different places that you see water on the map? Think about some sources of pollution. If you have a printed map, put a few stickers down on different areas around Texas. Imagine that each sticker is a source of pollution. Trace all the ways pollution might travel in our underground and above-ground water to our oceans.
- **Plants and soil:**
  - The dirt on dirt: Dig up a sample of dirt and put it in a shallow container. Make observations about your soil. Is it wet or dry? Is it light or dark? Is it sandy or like clay? Are there any critters in your soil? Did you find any plant material in your sample? Categorize your

findings in three categories: minerals from rocks, organic matter, and organisms
    - Keeping soil healthy: Look or imagine you're looking in your trash or recycle bin. What things inside could be composted? What can't be composted? Why might it be important to make sure that we compost and return nutrients to the soil? What is the benefit in doing that?
    - Decomposition proposition: Bury a peeled apple and an unpeeled apple. Dig it up every now and then and look at it and then re-bury it. How does it change? How long does it take for it to disappear? Draw or take pictures of your decomposing apples. Does one decompose faster than the other?
- **Energy:**
    - Plug it in: Look at a map of the United States. Think about its geography. Where would be a good place for us to build wind turbines? Solar farms? Dams to capture hydroelectric power? Machines to capture tidal energy. Draw your own picture of the United States and label where you would build each of these renewable energy stations.
    - It's so hot you could fry an egg!: Have you heard people say "it's so hot you could fry an egg" before? Do you think it could ever be that hot? Pick some outdoor and indoor places where you can take some temperature readings. Think about picking a shady place, a sunny place, a high place, a low place. Use a thermometer to measure the temperatures of these places.

      If you have an infrared thermometer available, explore the surface temperatures of objects (asphalt, leaves, cars, etc.) If you don't have an infrared thermometer, use your sense of touch to compare temperatures.

      Which areas were cooler? Which were warmer? Why? Are YOU going to find out if it's hot enough to fry an egg?
- **Habitat:**
    - Habitat make-believe: Create and draw a pretend animal. What would their pretend habitat be like? When you're drawing your pretend habitat, think about how the habitat will provide your animal with food, shelter, and protection.
    - Think like a scientist: Monarch butterflies migrate 3000 miles south to Mexico during the colder months of the year. However, the number of butterflies migrating each year has declined over the past decades. Part of a butterfly's habitat is its food source. Butterflies will

only lay their eggs on milkweed because when the eggs hatch into caterpillars, the caterpillars love to eat milkweed. Scientists think that our use of pesticides has reduced the amount of naturally occurring milkweed plants. This has decreased the numbers of monarch butterflies.

What would you do to solve this problem? Learn about how citizen scientists track the monarch migration each year. Check out a resource online that shows where monarchs are migrating.

Take Action

You can make a difference for our planet. Here are some ideas to get you started in thinking about how you might be able to take action to help protect our world.

- **Water:**
  - Implement water conservation measures in your home.
    - Take shorter showers.
    - Don't keep the tap running while you are brushing your teeth.
    - Replace taps and shower heads with low-flow models.
    - Fix a leaky faucet.
    - Water your yards early in the morning instead of midday.
    - Only run full loads of laundry.
    - Use mulch in your flower beds to reduce how often you need to water.
  - Build a rainwater harvesting system for outdoor water use. Or collect used dishwater in the home for outdoor use.
  - Share conservation tips with friends and neighbors.
  - Collect trash to protect our waterways.
  - Volunteer with your local water provider to mark storm drains.
- **Plants and soil:**
  - Take the Girl Scout Tree Promise. Plant a tree and make sure to log it as part of the **Girl Scouts Tree Promise**.
  - Build a compost pile & learn about the advantages of composting.
- **Energy:**
  - Implement energy conservation measures in your home.
    - Shut off lights and other electronics when not in use.
    - Adjust your thermostat.
    - Replace light bulbs with compact fluorescent bulbs.

        - Use cold water in the washing machine.
        - Use curtains or blinds to block the sun.
        - Plant a tree to shade your home on hot days.
        - Turn off the thermostat and open your windows on moderate days.
    - Advocate for dark skies by encouraging others to reduce outdoor light use at night (earn the Dark Skies patch, too!).
    - Check with your city about what can go in the recycle bin and educate others about what can and can't be recycled.
    - Start a recycling program.
    - Commit to saving energy by riding a bike, walking, or carpooling to school.
    - Research your local energy company. What percentage of their energy comes from renewable versus non-renewable sources?
- **Habitat:**
    - Support monarch migration by planting native milkweed (tropical milkweed is not suggested) at your home, scout house, or school.
    - Volunteer with a local conservation effort to remove non-native plant species.
    - Write a letter to your U.S. Senators and Representative about how you feel about endangered species and why you think it is important to protect them.
    - Find out what people in your community are doing to help endangered species and join their efforts.
    - Do a beach or community clean-up.

We would love to see photos of you earning your patch. If you would like to share them with us, please email us at communications@gsctx.org.