

Every time a glass or plastic bottle is put in a recycling bin, natural resources are conserved and greenhouse gas emissions are reduced.

Waste, Recycling, and Compost

A waste audit found that only 27 percent of what was put in the trash bin actually belonged in the trash bin. The other 73 percent was either recyclable or compostable.

To reduce the amount of trash, recycling and composting programs are now part of daily life at Camp Emerald Bay.

Recycling. Glass bottles, aluminum cans, and plastic bottles make up 26 percent of the camp's trash. Instead of being thrown out, these items are collected in recycling bins located in every campsite, cabin, and building in camp.

Composting. Through the composting program, the camp also recycles fruits, vegetables, and grains. These items, along with leaves, wood chips, and discarded paper, are sent to compost bins to be processed daily.



During summer camp, nearly 150 gallons of compostable material is processed every day in the camp's garden. With proper aeration (supplied with air), food decomposes within a few days and transforms into a rich soil called humus that retains moisture and nutrients. This soil is added to the native clay soil to grow fruits, vegetables, and native plants in the garden and around camp.

Through the composting program, the food waste generated at Camp Emerald Bay turns into a usable product that enriches the soil and reduces the need for water, fertilizers, and pesticides.

These programs cut the number of times the camp's trash must be hauled across the Gulf of Santa Catalina, reducing pollution and extending municipal landfill life. Another benefit of waste reduction is that animals are less prone to scavenge through the trash to find food. This keeps trash from being scattered and also protects animals from accidental harm.

With initiatives such as these, Camp Emerald Bay sets a pattern for sustainability and strives to protect Catalina Island for future generations.



Sustainable Building Materials

At the heart of sustainable construction are the three R's of green living: reduce, reuse, recycle. Inside and out, energy efficiency is built in to environmentally sound buildings.

When ordering wood for a sustainable home, for example, you would look for wood products certified under the Sustainable Forestry Initiative (SFI) and purchase wood that is generated locally. This reduces shipping costs and saves the energy of shipping wood from a faraway location.



SFI is the largest forest certification program in North America and the largest single forest certification standard in the world. Philmont



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Scout Ranch is certified to the SFI Standard. Scouting magazine is printed on SFI-certified paper and displays the SFI label. *Boys' Life* is printed on paper certified by SFI's global Programme for the Endorsement of Forest Certification (PEFC), and the magazine displays the PEFC label. Merit badge pamphlets also are printed on SFI-certified paper.

Green Building Initiative's GreenGlobes program and the rating tools of the U.S. Green Building Council's LEED (Leadership in Environmental and Energy Design) certified sustainable home program have set high standards of sustainable design and development practices for land developers, architects, engineers, real estate professionals, and others who are interested in sustainable construction. The programs rate building projects based on construction site selection, water and energy efficiency, materials used, and indoor environmental quality.

Tax breaks and incentives are available for green building and vary from state to state and sometimes by city. The Database of State Incentives for Renewables and Efficiency (DSIRE) keeps a database online with up-to-date information by state.



Listed below are some of the materials and techniques that are recognized in sustainable construction:

- Plywood processed without formaldehyde
- Installation of large energy-efficient windows that provide fresh air and natural light
- Installation of energy- and water-efficient appliances
- Installation of low-emitting volatile organics carpeting
- Use of low-volatile-organic compounds (VOC) paint
- Use of reused or recycled construction materials when possible
- Building within walking distance of many basic services

- Selection of a building site that is not on prime farmland, in a floodplain, on threatened animal habitat, or too close to wetlands
- Prevention of pollution on the construction site
- Space provided for recyclable collection and storage
- Establishment of a minimum level of indoor air quality
- Building near alternative transportation

With your parent's permission and counselor's approval, interview a local architect, engineer, contractor, or building materials supplier. Before the interview, prepare a list of questions to ask the construction expert or building supplier. Find out the factors that are considered when using sustainable materials in renovating or building a home. Share what you learn with your counselor.

How Communities Assess Housing Needs

Cities and towns throughout the country conduct "housing needs assessments" to determine the need for affordable housing. With parental permission, go online or visit a public library to look at a current housing needs assessment for your town, city, county, or state.

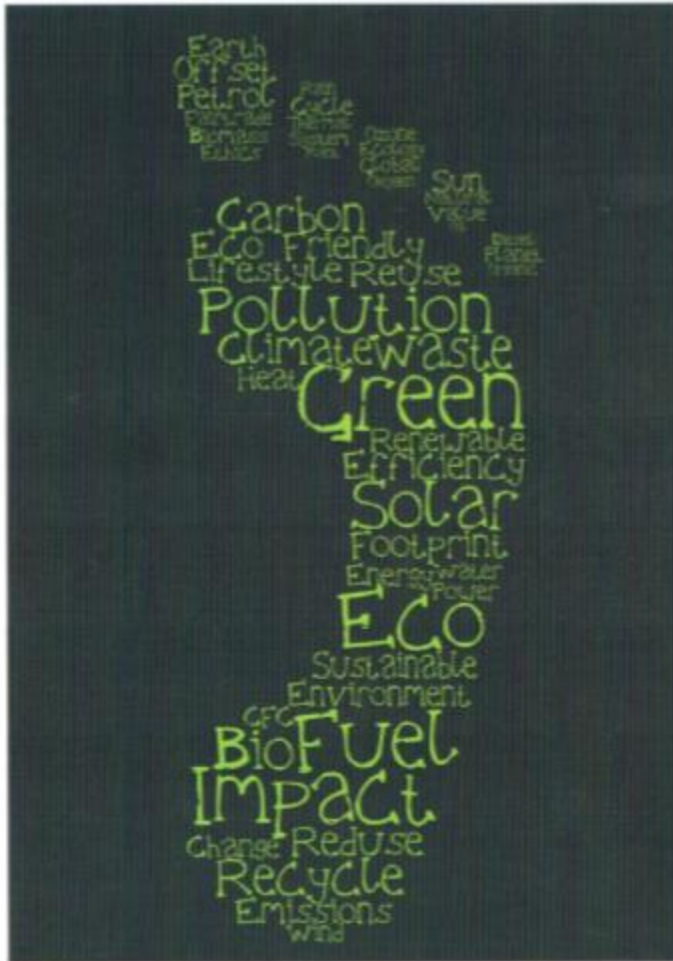
Looking at a housing needs assessment will give you a better understanding of the need for rental housing, affordable homes, senior housing, and special-needs housing in your community. A housing needs assessment also helps to identify issues that may need to be addressed such as urban blight or foreclosure.

In this way, cities determine whether proposed development projects meet the community's needs and should be high priority. A housing needs assessment is a first step in planning how, when, and where to address local housing issues so that priorities can be set, resources identified, and strategies chosen.

City planners and interested groups might ask the following questions:

- Who can afford to live in this community?
- Does our community provide quality housing to a wide range of residents?
- Can our children afford to remain in, or return to, the community as they start their own careers and households?
- Can those people who provide essential services to the community—such as firefighters, law enforcement officers, healthcare workers, and others—afford to live here?
- Do people with special needs have adequate housing options?
- Are there substandard, overcrowded, or other undesirable living conditions that should be addressed?
- Do our elderly residents have adequate housing for remaining in the community as they age?
- Do we provide the type of housing that promotes local job growth?
- Are there significant local housing trends such as an increase in absentee landlords, mortgage foreclosures, increasing housing prices, or decreasing home values?

"Needs" categories you may want to research include affordable rental housing, home ownership, senior housing, and special-needs housing.



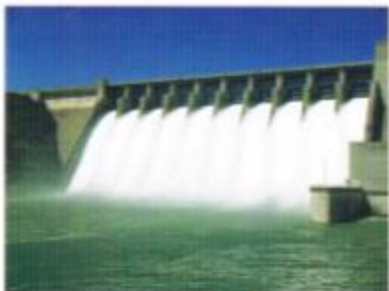
Achieving Sustainable Energy

You are now set to learn about the sustainability of different energy sources and what the term *carbon footprint* means. Here is a list of the terms you will find in this section and a brief definition of each of these forms of energy.

Fossil fuels, such as petroleum, coal, and natural gas, come from the accumulated remains of ancient plants and animals. Burning fossil fuels releases carbon dioxide and other greenhouse gases, which are considered by many to be among the primary causes of global climate change.

Solar energy is the energy received by Earth from the sun in the form of solar radiation, which makes the production of solar electricity possible.





Nuclear power is produced by a fission reaction that splits the uranium nucleus, creating heat. The heat is used to turn water into steam; the steam drives a turbine, spinning a generator to produce electricity. Although nuclear energy is carbon-free, the toxic waste created by used or depleted uranium is difficult to dispose of safely.

Wind power is the conversion of wind energy into usable forms of energy through windmills for mechanical power, wind pumps for water pumping or drainage, and wind turbines to make electrical power. Wind energy is renewable and clean and produces no greenhouse gas emissions, but some people find wind turbines unsightly or noisy.

Hydropower, or water power, comes from the energy of falling and running water, which may be harnessed for useful purposes such as operating textile mills and other mechanical devices, and generating electricity. Hydropower is a renewable energy source.

Geothermal power comes from the heat of Earth's core. Hot spring water can be brought to Earth's surface and used to heat homes and buildings. Geothermal power generates clean, renewable electricity. Its sources are mainly concentrated in the "Ring of Fire," a volcanic region with large geothermal reservoirs located around the Pacific Ocean. Geothermal power is cost-effective and sustainable, although bringing the heat to Earth's surface does emit small quantities of greenhouse gases.

Bioenergy is generated from biomass: trees, crops, algae, animal dung, or plant material that is left over from agricultural and forestry operations.

Everyone Makes a Carbon Footprint

Your carbon footprint is the total amount of carbon dioxide (CO₂) that you create. The bigger your footprint, the less green your lifestyle is. When you burn fossil fuels like gasoline in your family car or heating oil to warm your house, carbon dioxide is released.

Many websites provide ways to figure out the size of your carbon footprint. Get parental permission before using one of these "carbon calculators," because you will need to answer questions about where you live, the type of home you live in, how much electricity you use, and how often your family uses a car.

Unless your family lives "off the power grid" (that is, you don't rely on a power company for electricity), the electricity used in your home creates the biggest part of your carbon footprint. Although electricity does not make greenhouse gases when you use it in your home, most of the power plants that generate electricity do, by burning fossil fuels.

Using fuels like oil, natural gas, or coal-generated electricity to heat or cool your home add to your carbon footprint. How you adjust the thermostat and what type of fuel you use make a difference in the amount of CO₂ produced.

Cars, buses, trains, and planes that run on fossil fuels also produce CO₂. Household garbage is a culprit, too, if it isn't composted. For every pound of trash you throw in the garbage, one pound of greenhouse gases is created because trash over time produces CO₂ and methane.

How to Shrink Your Carbon Footprint

By using less fuel and less electricity and reducing the amount of trash you create, you can reduce your carbon footprint dramatically. Start by turning off computers, televisions, and lights when you are not using them. Unplug small appliances and phone chargers, etc., when they are not in use. Lower the temperature in your home to 68 degrees or lower in winter, and raise it to 78 degrees or higher when running an air conditioner in summer. Turn off your heat or air conditioner entirely and open screened windows for natural ventilation when the weather is comfortable.



Close window drapes to keep heat out in summer, and open the drapes to let in the warm sun in wintertime.

Here are more tips for reducing your carbon footprint:

Buy local and buy organic. When possible, buy organic or “fair trade.” There’s a better chance the food was grown in an eco-friendly way. Food grown locally doesn’t have to be transported far, which saves fuel, reduces the carbon footprint, and supports the local economy. Eat at restaurants that serve locally produced or seasonal foods.

Keep packaging to a minimum. For example, choose loose vegetables instead of boxed or plastic-wrapped ones. Take reusable cloth tote bags to the grocery store.

Don’t buy bottled water. Bottled water creates a huge carbon footprint. And it is often shipped long distances. Refill a reusable water bottle instead.

Take steps to make your home energy-efficient. The attic should be insulated, windows need to close properly, and heating and air-conditioning systems should be properly maintained. If possible, switch to reusable air filters instead of disposable filters. Switch from incandescent to compact fluorescent or LED light bulbs. These use less electricity and last longer. They are more expensive to purchase but they will pay for themselves over time in reduced energy costs.

Switch to native plants. Wherever you live, there are plants that are native to your region. These will grow better and take less water in most cases than nonnative species and may get shipped shorter distances to reach your local nursery. Green plants are an excellent way to offset carbon. Planting anything helps the environment.

Practice being thrifty. To help you buy only the things you truly need, avoid impulse buying. Every item you purchase has a footprint, so when you curb your urge to spend money on items, you are reducing your individual carbon footprint and our nation’s overall footprint. Some people call this “pre-cycling.” If you don’t buy stuff, no “recycling” is necessary.

Switch your water heater to vacation mode when you go away. In “vacation” or “away” mode, a water heater does not keep a tank full of hot water ready when you don’t need it. Newer tankless models heat water only when it’s needed, making them far more energy efficient than standard water heaters.

Pull the plug. If you don’t use an appliance frequently, unplug it. The same goes for cell phone chargers, laptops, televisions, stereos, toasters, coffee pots, hair dryers, and other electronics. Many devices continue to use energy even when they appear to be turned off. If you use a power strip for a group of electronic devices, you can flip one switch and disconnect them from the power all at once.

Keep your car as long as it runs well. Rising gas prices do not mean you should rush to buy a hybrid or an electric vehicle. If your older car still runs well, keep it, and keep it well tuned-up. Even hybrids create a huge footprint when they are built, so consider driving a well-maintained older car for a while longer. Use more eco-friendly forms of transport—buses, light rail, bicycle—and walk or carpool whenever possible.

Choose fresh over frozen. Frozen dinners are energy-intensive to produce. It takes energy to freeze foods, ship them cold, display them frozen in the grocery store, and keep them frozen in the home freezer. Try to eat fresh food when you can and ditch frozen foods that must be zapped in the microwave.

Use cold water to wash clothes. It takes lots of energy to heat water. Multiply that energy by the number of washer loads your family does weekly, and it adds up to a big footprint. Try washing mixed loads and dark clothes in cold water. Most detergents are designed to have the same cleaning power in cold water as in warm water.

Combine errands to save trips in the car. Driving to the same part of town on different days to run multiple errands uses more gas than if you had planned and done everything in the same area all at once. Reduce your need to travel back and forth on short trips by planning your errand trips in advance.

Remember the Three R’s: Reduce, Reuse, Recycle! Buy less, reuse and fix things when you can instead of buying new, and recycle as much as you can at home and at school. **Upcycle, too: Repurpose things into useful and fun new items.**

Think about how you and your family can reduce your carbon footprint. Discuss with your counselor what you’ve learned about how each energy source affects the environment, what the term “carbon footprint” means, and what your family can do to reduce your impact on Earth.

Reduce your food waste by shopping and cooking wisely, and you’ll also reduce the size of your carbon footprint.



Lowering Household Utility Bills

In addition to the other tips provided in this pamphlet, consider these ideas for lowering your family's utility bills.

- Seal cracks around doors and windows to cut energy costs by an estimated 15 to 30 percent. Caulk and weather-stripping are inexpensive to buy.
- Properly insulate attic spaces. In cold climates, install storm windows.
- Use heat-generating appliances like the oven, clothes dryer, and dishwasher at night when it is cooler outside. Running these appliances during the heat of the day in summer forces the air conditioner to work harder to keep a home comfortable.
- Use a slow cooker to cook some meals each week. Slow cookers use less energy than cooking in pans on the stovetop, and they do not heat up a house the way cooktops and ovens do.
- If you have ceiling fans in your rooms, turn them on. Fans make a room feel more comfortable, and using them could save hundreds of dollars a year.
- Air-dry laundry instead of using a dryer. If you live in a city or you can't hang clothes outside on a clothesline because of allergens in the air, try hanging them on hangers and letting them drip-dry in your laundry room or inside your home.



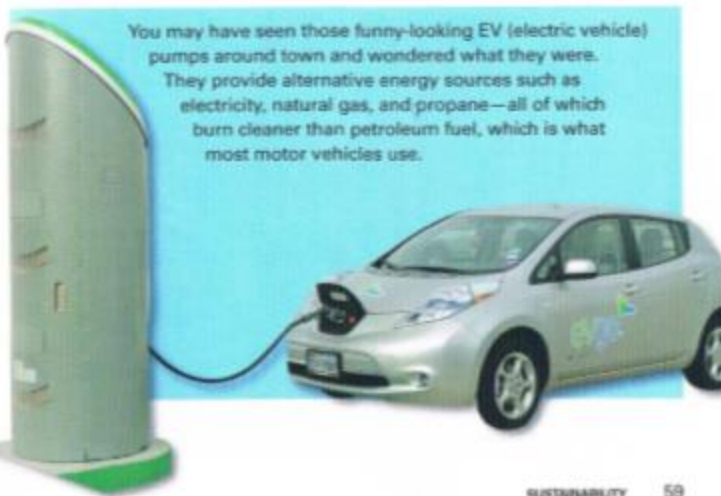
- When you leave a room, turn out the lights. That single act can save hundreds of dollars per year.
- Use a programmable thermostat. If you don't have one, make it a habit to set the thermostat higher in summer or lower in winter when no one will be home.
- Replace air filters or clean a reusable filter once a month. Dirty air filters cause air-conditioning or heating systems to run longer and harder as airflow gets restricted.

After you have made and carried out a family plan to reduce one or more of your household's utility bills, share with your counselor how your plan affected your family's usage.

Lowering Transportation Bills

To evaluate your family's fuel and transportation expenses, look at your family's transportation-related bills (gasoline, diesel, parking, public transportation, etc.). As a family, consider how you can help reduce these costs.

You may have seen those funny-looking EV (electric vehicle) pumps around town and wondered what they were. They provide alternative energy sources such as electricity, natural gas, and propane—all of which burn cleaner than petroleum fuel, which is what most motor vehicles use.



Here are some ways you can save on fuel and transportation costs.

- Use the right grade of gasoline. Most cars run fine on regular. Look at the vehicle owner's manual to find out what's right for your family's car. Regular-grade gas is usually significantly less expensive than premium grade.
- Make sure the fuel cap is on tight. Loose gas caps can reduce fuel efficiency and allow gasoline to vaporize into the air.
- Carpool, use public transit, or bike and walk when you safely can.
- Encourage family members to not drive aggressively and to drive at the speed limit. Vehicles lose economy at speeds above 55 mph.
- If it's cool outside, use the flow-through ventilation system in your car instead of rolling down windows or running the air conditioner. Air conditioning increases fuel use.
- On a trip, carry suitcases, tents, coolers, and camping gear inside the vehicle, not on a roof rack. Loaded roof racks increase wind resistance and fuel use. Also eliminate unnecessary weight from your car.
- Idling for a long time in a drive-through lane wastes gas. Instead, park and walk inside.

After you have followed your family plan to reduce fuel and transportation costs, discuss with your counselor how your plan affected your family's transportation habits.



What About All This Other Stuff?

We live in a consumer culture that bombards us daily with advertisements and enticements to buy the latest whatever-it-is, from cell phones and tablet computers to games, movies, and shoes. Many of us buy more "stuff" than we need.

One part of living greener is learning to tell the difference between essential needs and desirable wants. Eliminating unnecessary "stuff" from your life is easier when you consider every new purchase in terms of momentary "want" versus true "need."

If too much "stuff" is cluttering your home, plan a family project to identify the possessions your family no longer needs. Individually, go through closets and drawers. Together, sift through the garage, basement, attic, or other common areas.

The key to paring down clothes is to look at each piece of clothing and ask yourself how long ago you last wore the item. Does it still fit? Is it comfortable? Are you ever likely to put it on again? Does it have sentimental value? Your answers will help you decide what to keep and what to put on the discard pile.

Make your life less complicated and cluttered by recycling or repurposing those things that are simply gathering dust. While you are at it, you might want to reorganize your closets and drawers so you know where everything is. Thinking thriftily and treading more lightly are important as you start to lead a more sustainable lifestyle.

Box up or bag your reusable items. Your donations will be welcome at Goodwill® stores, The Salvation Army, women's shelters, and various local nonprofit organizations. If you have items you want to sell, consider having a garage or yard sale. Recycle, repurpose, or donate items that don't sell.

As a Scout, you should make conscious choices about the stuff that you own, have to store, take care of, and use.





Earth's Life-Support Systems

One way to picture how planetary systems support life on Earth and interact with one another is to think of an intensive-care unit in a hospital, where many life-support systems are in place to help critically ill people survive and get better. Earth also has life-support systems. In a sense, our planet could be considered one big intensive-care unit, supporting all forms of life.

The *Encyclopedia of Life Support Systems* offers this definition:

"A life support system ... furthers the life of the biosphere in a sustainable fashion. The fundamental attribute of life support systems is that together they provide all of the sustainable needs required for continuance of life. These needs go far beyond biological requirements. Thus life support systems encompass natural environmental systems as well as ... social systems required to foster societal harmony, safety, nutrition, medical care, economic standards, and the development of new technology.

The one common thread in all of these systems is that they operate in partnership with the conservation of global natural resources."

By viewing the world in this way, people can begin to develop a new appreciation of how we can work together to sustain life on Earth. As we gain a deeper understanding of nature and society, that knowledge can be used to create a better quality of life and a healthy, sustainable environment for those of us who live here now and for all those who come after us.

This is a crucial challenge of our time. Many of our technologies and social institutions will need to be redesigned to lessen the environmental impact on our natural resources.

To make this happen requires a positive attitude toward sustainable development. Instead of consuming more of Earth's limited resources, people will need to learn how to consume far less.

Scouts are well prepared to lead this effort. Scouts are used to leaving no trace behind when camping in the backcountry. And community service is second nature for Scouts who see areas of need and pitch in to create a better quality of life for all.

Consider promoting sustainability and ecologically sound practices for your larger community—Earth itself—as the biggest Scouting project that you and 1.4 million like-minded Scouts can undertake in your lifetime.

A Tipping Point

The makeup of our atmosphere, marine ecosystems, coastal zones, freshwater systems, forests, land and soil, and biological diversity are all coming under increasing pressure as the global population grows and the global economy expands.

Since 1930 the world's population has tripled to more than 7 billion people. The global economy has increased more than 15-fold since 1950. All of this human activity has had far-reaching impacts on the planet and how it functions. Many scientists believe we may be reaching critical "threshold points" where the effects on land, oceans, air, and fresh water may be irreversible.

Carbon dioxide levels in the atmosphere are increasing at a rate 10 times faster than any natural increase since the last Ice Age. As more and more rainforests are cleared for housing, farming, and fuel, the environment has less ability to absorb greenhouse gases. More cars on the roads mean more pollution in the air and in the world's oceans and fresh water.



If public transportation is available in your area, consider yourself lucky and take advantage of it. Riding on a subway, train, or bus will give you some down time for listening to music or reading.



Earth's life-support systems interact in complex ways. For example, coral reefs in the world's oceans have been degraded by fishing and tourism, and by chemical and agricultural pollution. Now the reefs are also under threat from the changing chemistry of seawater, which is one result of the dramatic increase in atmospheric carbon dioxide.

Increasingly warm and dry conditions are contributing to soil erosion, dwindling wildlife diversity, diminishing freshwater supplies, and large intense wildfires worldwide.

Some scientists call this period of time the Anthropocene Era, where human beings are the dominating environmental force. Deforestation, biodiversity loss, freshwater depletion, and climate change are issues that call for major lifestyle changes and action on a large scale.

The need is great for cooperation among businesses, cities, states, regions, and countries because these life-support systems sustain all forms of life on the planet.

The melting of the Greenland ice sheet could lead to a rise in sea levels of from 6 to 20 feet. Imagine how that could change Earth's shorelines and disrupt societies around the world.

Use of Raw Materials

The energy and resources required to make one new aluminum soda can could be used to make 20 cans from recycled aluminum.

Source: Can Manufacturers Institute

The extraction of raw materials from Earth has social and economic effects, both positive and negative. Extracting raw materials can create jobs and economic growth, but extraction activities also have the potential to affect people's health and disrupt or displace communities. Taking raw materials from Earth may cause environmental damage, such as water scarcity, air and water pollution, and problems of waste disposal.

Increasingly, ethics play a huge part in sustainable extraction of raw materials. Sustainable development of natural materials means preserving the environment, which can involve, for example, harvesting at the appropriate times, replanting for the future, and restoring the land to health. More companies are embracing forest certification standards like the Sustainable Forestry Initiative to ensure forest sustainability. Others are adopting fair-trade policies that try to pay fair wages and improve the quality of life for those who cultivate and harvest the products we need.

For example, a company in Australia uses sandalwood oil in its fragrance products. Company leaders knew that deforestation (destruction of forests) was threatening the sandalwood supply from India, so they partnered with a producer of Australian sandalwood oil to "ethically source" that raw material. The partnership creates a sustainable supply of oil from sandalwood that is harvested by indigenous (native) communities in western Australia.

The company also works with local communities and a local partner in Madagascar, which is the source for 80 percent of the world's vanilla. To ensure a sustainable, fair-trade supply of vanilla from the island, they have adopted environmentally sound harvest and production methods.

The company works to educate the local people in how sustainable agricultural methods can enhance their quality of life and help protect their future.



Vanilla bean pods

These are just a few of the ways that businesses are turning toward sustainable methods to reduce their environmental impact on the planet while at the same time earning profits. Now you can meet with your counselor and talk about how the harvesting and production of raw materials, along with how they are distributed, consumed, and disposed of or recycled, is part of current and future thinking and planning for sustainability.

City governments, too, are looking for ways to help their cities become more sustainable. For example, Austin, Texas, is working to significantly reduce greenhouse gas emissions. The city bans plastic bags; uses wind power and other clean, renewable energy sources such as hydropower, biomass, and solar power for some of its electricity; and is switching high-wattage electric lights in parking garages and streetlights to low-watt LED lamps. Soon, all restaurants in Austin will be required to recycle food waste by composting.





A Roundup of Sustainability Issues

You don't have to look far to see the blight that plastic waste makes in our environment. Drive down any road in America and you'll likely see plastic bags stuck in trees and plastered against fence lines, and plastic bottles, wrappers, and containers tossed in ditches or accumulating in piles along the banks of creeks, rivers, lakes, and marshes.

Plastic Waste and the Trash Vortex

Plastic bags are also among the top two items of trash found in our oceans, where they choke, strangle, and starve wildlife. The National Oceanic and Atmospheric Administration noted that plastic bags can also cover living corals in coral reefs, which can lead to the death of the reef.

Many large coastal cities use barges to transport their garbage offshore and dump it into the ocean. This has caused an island of plastic to form off California's west coast that is twice the size of Texas and made up of 7 billion pounds of plastic garbage. It is known as a trash vortex because the prevailing ocean currents keep it swirling around slowly in a circle. The dead zone is choked with dead fish, marine mammals, and birds that have gotten snagged in the mess.

Zooplankton are small floating animals that drift with the currents. Along with phytoplankton (tiny plants), zooplankton make up the food supply upon which almost all oceanic organisms depend to survive. Plastic pieces now outweigh surface zooplankton in the central North Pacific Ocean by a factor of 6 to 1, according to researchers.

Plastic pieces poison the ocean environment. They attract and hold deadly elements like PCBs, a pollutant used in coolants, transformers, capacitors, and electric motors; and DDT, a chemical

Reports of microscopic bits of plastic washing ashore to become part of a beach are starting to spring up where stunningly beautiful and abundant natural environments once stood.

compound widely used as an agricultural pesticide that Rachel Carson wrote about in 1962 in the famous book *Silent Spring*. Carson's book documented the ways pesticides harm the environment and wildlife, particularly birds. Although both DDT and PCBs were eventually banned, these toxic, cancer-causing chemicals do not break down in the environment.

When plastic enters water sources, it stays there. According to the Research Triangle Institute, "every little piece of plastic manufactured in the past 50 years that made it into the ocean is still out there somewhere." The plastics you use today will still be polluting our environment when your grandchildren are born.

Keep these things in mind every time you use a plastic bag, drink from a polystyrene cup, or buy anything wrapped or contained in plastic. Instead, substitute reusable shopping bags, bottles, and containers, and do your part by spreading the word to end wasteful consumption of plastics.

The Number System for Plastic Recyclables

A coding system exists for identifying the type of plastic used in products and packing materials. This recycling codes system consists of a number within the universal recycling symbol, which is a triangle formed by three arrows.

Each code provides useful information about the recyclability of an item and its possible effects on human health. Here are the seven types of plastics represented by the recycling codes system:



PETE

1. Polyethylene terephthalate (PETE) is a clear, hard plastic used in disposable food and drink containers. PETE is easy to recycle into furniture, carpet, polar fleece, and some types of containers. No known health risks are associated with this type of plastic. PETE is accepted at recycling programs in most U.S. cities.



HDPE

2. High-density polyethylene (HDPE) is a hard plastic but it is not transparent like PETE. HDPE is found in household cleaner bottles, shampoo bottles, and yogurt containers. Easy to recycle, it is accepted widely by recycling programs. It can be recycled into pens, recycling bins, laundry detergent bottles, drainage pipes, and fencing. No known health risks are associated with HDPE.

3. Polyvinyl chloride (PVC) is less stiff than HDPE but has many of the same uses. It is the main plastic in bottles for detergent, shampoo, and cooking oil. It is more difficult to recycle than the first two plastics and is not commonly collected in municipal recycling programs. PVC is known to contain phthalates, a suspected carcinogen, or cancer-causing agent.



V



LDPE

4. Low-density polyethylene (LDPE) is a soft, flexible plastic found in plastic bags including bread bags, frozen-food bags, and plastic shopping bags. Although LDPE can be recycled, it is often not included in city recycling programs but can be recycled in collection bins set up at many retail stores. There are no known health concerns related to LDPE.



PP

5. Polypropylene (PP) is a plastic commonly found in bottle caps, some yogurt containers, medicine bottles, and straws. Number 5 plastics are not accepted by all recycling programs. If PP plastics are recycled, they are used in items such as brooms, rucks, battery casings, and battery cables. No health concerns have been linked to PP.



PS

6. Polystyrene (PS), also known as Styrofoam[®], is found in disposable coffee cups and takeout food containers. PS is not accepted by many recycling programs. If recycled, it can be used in insulation. PS contains styrene, a suspected carcinogen.



OTHER

7. Number 7 includes miscellaneous plastics but is most often polycarbonate (PC). PC is used in water-cooler bottles, most other large plastic containers, and, until recently, in baby bottles. Number 7 plastics are not commonly accepted by recycling programs. PC contains bisphenol-A (BPA), which is a known hormone disruptor. The use of BPA has been banned from some items.

Check with your city or county to see which numbered items are accepted for curbside recycling.

Some recycling centers won't accept electronic waste but a growing number of businesses now offer e-waste recycling.



Electronic Waste (E-Waste)

Try counting the electronic gadgets your family has. Are you surprised by the number in your home?

When the newest gadget comes along and replaces the outdated computer, television, stereo, CD player, cell phone, or any number of other electronic devices, the old one often gets tossed in the trash. Americans now own an average of 24 electronic gadgets per household. It's a terrible idea to just throw them away.

All electronic scrap may contain contaminants such as lead, cadmium, and beryllium. These heavy metals can leak into our environment in landfills and spew into the atmosphere as ashes from incinerators. It has become increasingly important to manage e-waste more carefully and effectively.

A company headquartered in New Jersey has created national recycling systems for previously nonrecyclable or hard-to-recycle waste, including electronic waste. With more than 20 million people collecting waste in over 20 countries, the program has diverted billions of units of waste and used them to create more than 1,500 different products that are sold in well-known retail stores. In the process, the company has donated more than \$20 million to schools and nonprofit organizations that serve as "brigades" to collect waste.

Many Cub Scout packs and Boy Scout troops across the country have signed up to contribute to this program, collecting electronic waste from their communities and other "stuff" that is not commonly recycled, such as used juice boxes and pouches, candy wrappers, and office products.

In exchange for acting as a collection station and shipping the waste to the company, the Scouts earn points for their troop for the waste they collect. Points earned can be redeemed for charitable gifts, or for a payment of a penny a point to nonprofit organizations or schools.

New Life for Old Cell Phones

The metals from cell phones—gold, silver, platinum, palladium, copper, tin, and zinc—are recovered in the recycling process, then used in such different industries as jewelry, plating, electronics, automotive, and art.

The plastics recovered from cell phones are recycled into components for new electronic devices and other plastic products such as garden furniture, license plate frames, nonfood containers, and replacement auto parts.

When the rechargeable battery can no longer be reused, it can be recycled into other rechargeable battery products.



Consumer electronics now make up 1 to 2 percent of all solid waste. A great deal of energy and diverse, often scarce resources go into manufacturing electronics. Instead of giving these devices the heave-ho when they have served their purpose, recycle electronic products even if you must go to some trouble to do so.

In 2009, 438 million new consumer electronics were sold, 5 million tons of electronics were gathering dust in storage, 2.37 million tons were ready for recycling, and yet only 25 percent of these tons were collected for recycling. Source: U.S. Environmental Protection Agency

Many councils collect old cell phones for recycling. Check with your local council to see if it participates.

For more composting tips, see the Gardening merit badge pamphlet.



Food Waste

What are the benefits of turning food waste into compost? To start with, it's a source of free fertilizer for your plants, it's good for the environment, and it's easy to make. Compost adds nutrient-rich humus to the soil, which fuels plant growth and restores depleted soils. It also introduces beneficial organisms into the soil that are a natural way to ward off plant diseases and aerate the soil. And compost offers a natural alternative to chemical fertilizers.

How to Compost

If you live in an apartment and have only houseplants, you might choose a kitchen-counter compost bin. If you live in the country and have a garden, lawn, shrubs, and trees, you can start a large compost pile that will enrich the soil on your family's land.

Here are suggestions for how to build a compost pile outdoors:

1. Build the pile on bare earth so that worms and other beneficial organisms can get into the compost to aerate it.
2. Spread twigs or loose straw on the ground a few inches deep to aid drainage and let air into the pile.
3. Add compostable materials in layers, alternating moist ingredients (food scraps, tea bags, etc.) with dry materials (leaves, sawdust, wood ashes). Sprinkle wood ashes thinly to keep them from clumping together.
4. Add manure, clover, buckwheat, wheatgrass, or any nitrogen source to help speed the composting process.
5. Keep the compost moist, not saturated. When rainfall is scarce, water the pile but do not soak it.

What You Can Compost

Compostable materials include table scraps, fruit and vegetable scraps, eggshells, leaves, grass clippings, garden plants, flowers, lawn and garden weeds, shrub prunings, straw, hay, pine needles, seaweed, wood ash, chicken manure, coffee grounds and filters, tea leaves, newspaper, shredded paper, shredded cardboard, corn cobs, dryer lint, sawdust pellets, and wood chips.

6. Cover the pile with plastic sheeting, wood, carpet scraps, or anything that will serve to hold in moisture and heat, two things that are essential for composting.
7. Every few weeks, remove the cover and turn the pile with a pitchfork or shovel to introduce more oxygen, which is needed for the composting process to work.

With your parent's permission, go online to find out more about composting, or get tips from local nurseries. Many cities and county extension services also offer free classes in composting.

Species Decline

The world's biodiversity (number of different species of plants and animals) is declining at a record rate, according to the International Union for Conservation of Nature (IUCN), an organization that produces an annual "red list" of the most vulnerable wildlife. Current extinction rates are at least 100 to 1,000 times higher than natural rates found in the fossil records, the group reported. Humans are the main reason for the decline of many of these species.

"Habitat destruction and degradation are the leading threats, but other significant pressures include over-exploitation (for food, pets, and medicine), introduced species, pollution, and disease," the IUCN has reported.

In 2012, the Red List of Threatened Species noted that of 63,857 species assessed, 19,817 are threatened with extinction, including 41 percent of amphibians, 33 percent of reef-building corals, 25 percent of mammals, and 13 percent of birds.

One strategy for preventing species decline is to protect and preserve wildlife habitats. Governments and private organizations purchase land to protect wildlife and provide nature preserves, state parks, national parks and reserves, and designated wilderness areas. Another strategy is to manage our natural resources to provide critical wildlife habitats, such as active forest management that takes into account the value of wildlife habitat and conservation as well as timber values.

Laws and regulations fostering biological diversity exist at state, national, and international levels. The U.S. Endangered Species Act of 1973 was enacted to protect plant and animal species.

"A sustainable future cannot be achieved without conserving biological diversity—animal and plant species, their habitats and their genes—not only for nature itself, but also for all 7 billion people who depend on it. The latest IUCN Red List is a clarion [loud, clear] call to world leaders ... to secure the web of life on this planet."

—Julia Marton-Lefèvre, director general of the IUCN

Well-managed protected areas can benefit many species. Yet only about 3.2 percent of Earth's land surface is currently protected, which is not enough to preserve the world's biological diversity. Captive breeding—programs in which endangered species are bred in captivity to increase their numbers—has had some success in reintroducing species to wilderness areas. Ultimately however, if suitable habitat is not available and few released animals survive, those reintroductions may end in failure.

Many organizations work to increase suitable wildlife habitat and have been successful in helping species recover from extirpation (the disappearance of species in certain areas) and near extinction. Scientific research and public education play big parts in helping people understand the needs of certain species to help them recover. Many species have been reestablished and their populations stabilized in areas where they once thrived, including the American bison, eastern wild turkey, American bald eagle, whitetail deer, wolves, and grizzly bears.

Animals, fish, and birds cross national borders, and marine mammals traverse vast oceans, so there is a great need for international agreements to protect biodiversity. Cooperation among nations is crucial to protect wildlife, marine life, amphibians, birds, and pollinators such as bees and bats.

Two important international agreements to protect threatened or endangered mammals were crafted by the International Whaling Commission, which regulates commercial hunting of whales; and the Convention on the International Trade in Endangered Species of Wild Fauna and Flora, which regulates the buying and selling of endangered species and their parts, such as rhino horns, skins, and ivory.



Much more must be done to slow the destruction of wildlife habitats and protect our environment and ecosystems, which is one more reason why leading a sustainable lifestyle is how every Scout can take a big step for humankind.

If you have a yard, one way you can help wildlife is to turn your lawn into a suitable habitat for birds, butterflies, and bees. By providing food in the form of plants that attract and sustain birds, butterflies, and bees, and by providing water, cover, and places for wildlife to raise their young, your garden can qualify as a Certified Wildlife Habitat by the National Wildlife Federation. You can also work with your Scout troop and local schools to transform school property into an educational wildlife garden.

Discuss with your counselor how human activities can endanger animals and plants and contribute to species extinction. What do you think can be done to stop the decline in wildlife and its impact on a sustainable environment?

As Earth's climate warms, sea levels rise and snow and ice melt sooner in the spring, causing animals, and ecosystems to come under greater environmental stress.

World Population

The diverse life on Earth is interconnected in a "web of life." Maintaining biodiversity is crucial to the welfare and future of human life. Biodiversity also contributes mightily to the quality of life on Earth, providing climate regulation, fiber, food, clean water, and clean air.

Many of our medicines come from plants. We rely on wild populations of fish, shellfish, trees, and many other species for food, rubber, wood, and other products. When a species becomes extinct, it diminishes our lives and those of future generations.

Consider how the world's growing population can reduce biodiversity. You may want to do research on your own before you speak with your counselor about how the needs of the world's people affect the sustainability of life on Earth.



Climate Change

On any given day, you might see the weather change from sunny and warm to cold with thunderstorms. As you go through each year, you see the seasons change from spring to summer to fall to winter.

Earth's climate may be changing, too, but in ways that are more significant and far-reaching than daily or seasonal shifts in the weather. While Earth's climate has gone through many periods of change in its long history, the actions of people may now be adding significantly to the changes.



When people around the world started burning large quantities of coal, oil, and natural gas to power their homes, vehicles, factories, and businesses more than 100 years ago, the burning of these fossil fuels began releasing large amounts of carbon dioxide. Most scientists agree that fossil fuels are a significant factor in our changing climate.

Greenhouse gases exist naturally in the atmosphere. As the world's population has grown, however, the added gases from human activities seem to be causing Earth to grow warmer at a faster rate, and have set off many other changes on land, in the atmosphere, and in the oceans. These changes affect animals, plants, and people in many ways.

Scientists predict that higher temperatures can lead to more droughts, wilder and more extreme weather due to changing rain and snow patterns, less snowpack, and rapidly melting glaciers, shrinking sea ice, and thawing permafrost.

Less rain can mean water sources dry up in some locations, while too much rain can cause devastation from terrible flooding in other places. More hot days can make crop harvests smaller and sicken animals and people.

Oceans play an important role in keeping Earth's carbon cycle in balance. Warmer water and increased ocean acidity from absorbing excess carbon dioxide can make it hard for corals to build skeletons, and for shellfish to build the shells needed for protection. As the acidity in the ocean rises, more and more marine species may be unable to reproduce and may die out.

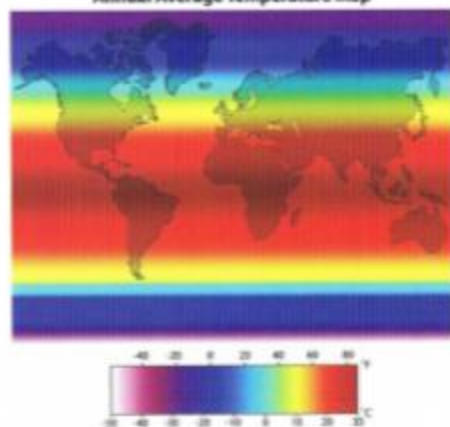
Conserving water
now is our best
way to be
"Be Prepared"
for the future.

According to the U.S. Environmental Protection Agency, more deaths are caused by heat waves each year than by hurricanes, tornadoes, floods, and earthquakes combined.

Severe heat waves and stronger hurricanes are other possible effects from climate change. These changes may make it too hot to grow certain crops, and could reduce the amount of water available for irrigation.

Rising temperatures and an increase in the intensity and number of droughts worldwide will likely cause freshwater supplies to diminish. People will have to make lifestyle changes, using less water in their homes and businesses.

Annual Average Temperature Map



Heat waves, severe storms, air pollution, and diseases linked to climate may leave many people at risk for illness, especially infants, the elderly and disabled, and those who live in big cities and along coastlines. Heat waves can be lethal for people who are already ill.

Ozone found high in the atmosphere is called "good ozone" because it protects life from the sun's harmful ultraviolet rays. But ozone close to Earth's surface is considered "bad ozone" because it is a main ingredient of smog. The pollutants in smog make it hard for people to breathe. As the temperature rises, more ozone is created.

Most plants and animals live in areas with specific climate conditions that allow them to thrive. Any change in the climate of an area can affect the plants and animals living there, and the entire ecosystem they depend on to survive.

Some species are already moving to cooler locations. On a warming Earth, plants and animals that live in cold places, such as the Arctic, may not have suitable places to live any longer. Some scientists predict that up to one-fourth of all plants and animals on Earth could become extinct within the next 100 years.

In every ecosystem, all plants and animals play roles in the web of life. For example, some plants and animals are sources of food; others are predators, pollinators, or sources of shelter. Losing one element of an ecosystem can harm many others.

Reducing the use of fossil fuels and reducing garbage waste gives the coral reefs a better chance of surviving the effects of climate change.

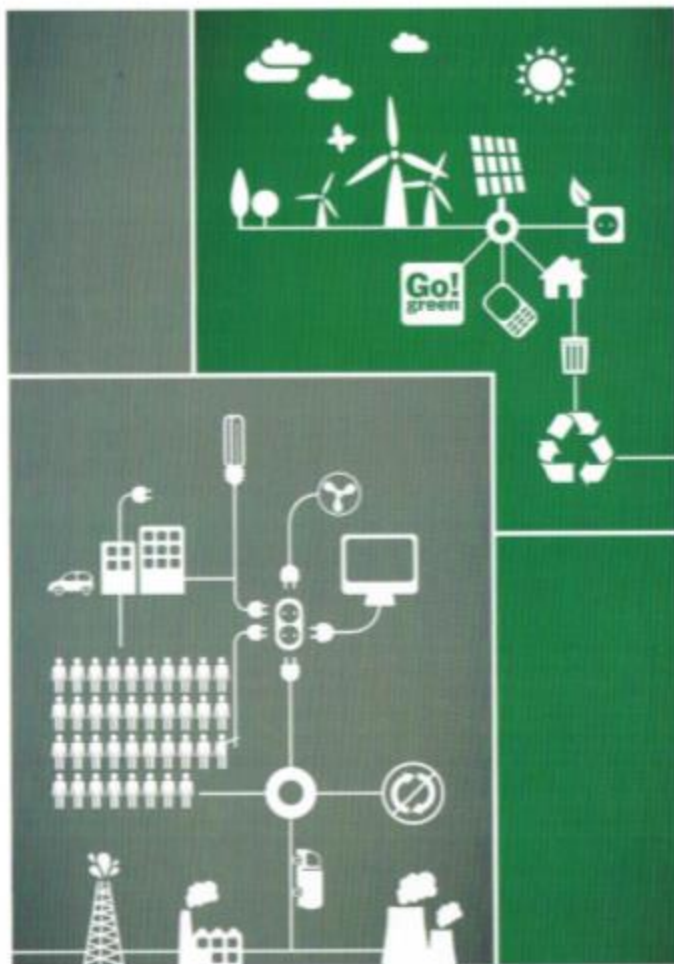
Forests are particularly sensitive to climate change, because they can't get up and move when it gets too warm. Forests provide homes, shelter, and food for many kinds of plants and animals. Trees protect water quality in rivers, lakes, and streams. They also filter many pollutants out of the air we breathe. They can lower heating and cooling costs when near homes.

Severe droughts and the extreme fire conditions that result when long-term drought conditions take hold are expected to occur more often. On a warming Earth, wildfires may occur more often, spread faster, and burn more forestland than they do now.

To do some climate-change research of your own, find a map that shows the pattern of global temperature change for a period of at least 100 years. Discuss with your counselor the major factors that scientists believe affect the world's climate and temperature. You might also share your ideas about the seriousness of climate change and how to find solutions for the problems it is predicted to create.

Proper forest management based on scientific principles can help forests be healthier and resist their vulnerability to drought, disease, and insect attack, while providing renewable wood for products we all need.





How People Can Support Sustainability

Throughout this pamphlet are tips for sustainable living. Here are more actions you can take.

Choose green power. Talk with your family about switching to renewable energy. Explore your options at Green Power Network's website: http://apps3.eere.energy.gov/greenpower/buying/buying_power.shtml.

Generate your own power. Can your home generate its own renewable energy? Talk with your family about the possibility of installing solar panels, a solar water heater, or a wind turbine.

Use less energy. Power down appliances and electronic devices when not in use.

Get an energy audit. An audit can help your family figure out how much energy your home uses and identify ways to reduce your energy use.

Look for the label. Energy-efficient appliances and electronics typically use about 10 to 50 percent less energy than regular models. Look for products that display the Energy Star label. Also look for products that display the Sustainable Forestry Initiative label. Wood and paper products from certified forests ensure forest sustainability.

Be energy wise at school. Schools can partner with the EPA's Energy Star program to reduce their energy use.

Travel greenly. Walk, bike, and hike when you can be safe doing so.

Watch your water use. Don't squander this precious resource.

Reduce waste. Reduce, reuse, recycle. Make compost. Upcycle useless items into things of value.

Plant a tree. Trees absorb carbon dioxide and provide shade.

Buy locally grown food. The farther your food travels, the more greenhouse gases are produced in getting it from the farm to your plate.

Spread the word. Teach others what you have learned.

Join with others. Find environmental or other public-interest groups that focus on sustainability issues in your community or region, and lend your time and support to their efforts.

Lead a Family Meeting About Sustainability

After completing requirements 1 through 4, have a family meeting to talk about what you and your family have learned about becoming sustainable citizens. Discuss the behavioral changes and life choices that your family can make to live more sustainably.

Scouting has taught you values that you use in your everyday life. How can living by the Scout Oath and Scout Law in your daily life help promote sustainability and good stewardship? Talk to your counselor about what you have learned.

Doing Your Part: Minimizing Your Global Footprint

You might ask yourself what role you play in sustainability, what you can do to help sustain Earth. Earning the Sustainability merit badge is the first big step in educating yourself and increasing your awareness about the topic. Continue the trend by making your family, friends, and classmates more aware.

There are lots of steps you can take toward net zero waste, from how you wash dishes or brush your teeth, to how you can be a smart shopper. Turn that water off. Buy only what you need or will consume. Help reduce what goes in our landfills and make purchases based on minimal packaging. Practice the three R's of green living—recycle, reuse, reduce.

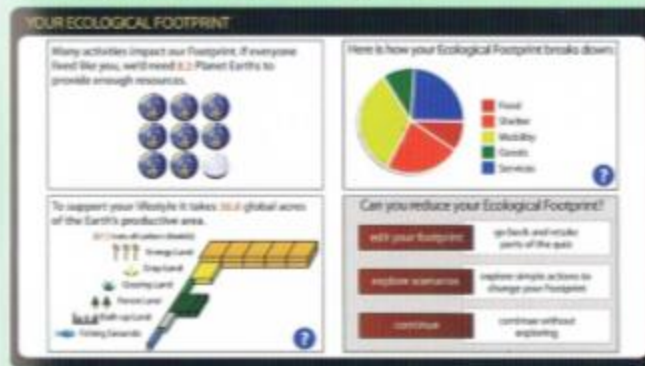
Take a genuine interest in practicing what you have learned and changing your lifestyle and habits at home, school, work, your place of worship, and in your community. You—and your family—can make a pledge to be sustainability citizens. Who knows, you might take it a step further and pursue a career in the growing field of sustainability.

Take the Footprint Calculator Challenge

To find out your ecological footprint, take the "Footprint Calculator" quiz found at the Global Footprint Network website <http://www.footprint-network.org/en/index.php/GFN/page/calculators>. You will learn how much land it takes to support your lifestyle, how much carbon dioxide you generate, and how many planet Earths it would take if everyone lived just like you.

The calculation is based on a number of factors, such as the foods you consume, where you live, the goods and services you depend upon, and how you get around. Once you have your ecological footprint, start thinking about the ways you can change your lifestyle and adopt new habits. Walk, bike, or take the bus, for example. Then go back and retake the quiz to see how those changes can help you reduce your ecological footprint. The results might surprise you.

The global footprint shown here is typical of a U.S. businessperson. The calculation shows how it takes 8.3 Earths and 36.8 global acres of Earth's productive area to maintain this individual's lifestyle, which generates 475 tons of carbon dioxide each year.



Source: Global Footprint Network

The Scout Law and Sustainability

A Scout is:

Trustworthy. Sustainability starts with you, and helps you to stand out as a young leader. You can help by recycling, and advocating green solutions to everyday issues.

Loyal. Demonstrate sustainability by being the voice of reason and reminding others we all share limited resources.

Helpful. You can make a difference in your family and in your community—and help our world—by using only what you need. Take time to share with others what you are doing.

Friendly. Volunteer in your community at a community garden, recycling center, or other sustainable activity and encourage others to do the same. This can be a fun and exciting way to see firsthand how, when we all are working together, we can make a difference in this world.

Courteous. Always thank people for their help and understanding, because we all benefit from sustainability and thinking about how our actions, no matter how small, affect others.

Kind. Treat this world with respect, save valuable resources and set an example for others to follow. Take time to smile; it does make a difference.

Obedient. To protect the world's resources you need to be true to yourself and believe in sustainability.

Cheerful. Tell your stories of sustainability activities and projects with a smile, knowing you are making a difference, and others just might take action based on how you tell your story.

Thrifty. Track your savings at home or in your troop on solid sustainability actions.

Brave. You can be a leader at home or in your community when taking the appropriate actions. Stand up for what is right; start with your actions so you and your family can lead others to engage in sustainable living.

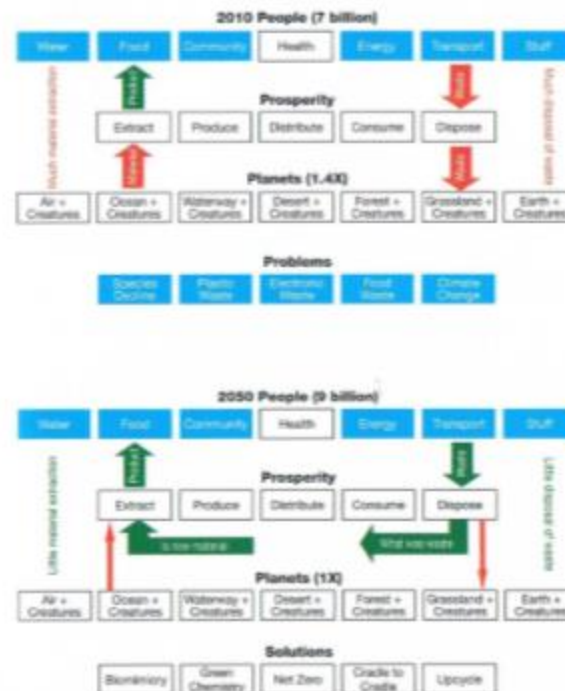
Clean. Respect our world and the valuable resources we are consuming every day. You can always help by understanding what is really needed and talking with others to protect the air we breathe, and the water we drink.

Reverent. Always consider other points of view and be true to Earth, as we all live here together.

Remember that sustainability starts with you.

Camp Emerald Bay

These charts*, which show the relationship between people, prosperity, and the planet, are examples of additional materials and resources available for those who want to learn more about sustainability than can be presented in a merit badge pamphlet. The blue boxes represent topics covered in detail in this pamphlet; the white boxes represent deeper topics that are addressed online at the BSA Sustainability website, www.scouting.org/sustainability.





Careers in Sustainability

Scouts can use their science skills in many ways to help create a sustainable future, from developing sources of renewable energy to securing habitats for endangered wildlife or creating nonpolluting plastics.

Scientists in all fields working together and with the community will be needed to help solve the increasingly complex problems our world is facing. Here are some career paths in sustainability that may be of interest to you.

Environmental consultants study the ecological impacts of conservation, development, and industry projects and recommend solutions to environmental problems. Natural resource managers care for ecological resources for private and public organizations. Park naturalists provide education programs to people of all ages.

Restoration ecologists carry out programs to reestablish natural ecosystems. In the field of geography, geographic information system specialists evaluate alternative locations for landfills, roads, and other facilities using computer-based map information.

Area specialists study specific countries or regions of the world and provide information to help government officials set policy or address important issues. Coastal zone managers oversee ecologically sensitive areas, such as river mouths, bays, and marshes, so the areas can better survive the growth of cities, ports, industries, and roads as well as an increase in tourism.

In public health careers, statisticians help interpret data. Mathematicians analyze the data to develop models, for example, to predict epidemics and to compare various strategies to combat epidemics. Mathematicians and statisticians also create models that can help find oil reserves, understand complex biosystems, forecast weather, and predict storm surges.

Many large companies employ sustainability officers to ensure their business is functioning with sustainability in mind.

Sociologists can use their understanding of human interaction to help create sustainable pathways for the future. Careers for sociologists include environmental policy, environmental outreach, environmental law, urban planning, communications, environmental affairs, resource management, conflict mediation, government or university sustainability coordination, sustainable development, and human dimensions science.

Chemists and chemical engineers design products and processes that can eliminate or reduce hazardous substances. Careers in green chemistry and engineering can lead to new household products, green building materials, and energy-efficient devices.

The complex issues surrounding global climate change will provide jobs for chemists and engineers in the government and private sectors as challenges to sustainability arise and solutions must be developed.

Park rangers protect state and national parks and educate the public in preservation of natural resources.

Biologists also work to solve environmental problems and preserve natural habitats. Zoo biologists undertake endangered species recovery programs. Wildlife biologists manage, protect, rehabilitate, and enhance wildlife habitat.

Management and conservation biologists work with community members and special-interest groups to develop and implement land-management programs. Science advisors work with organizations to study and address the economic impacts of biological issues.

Psychologists, who are trained to study human behavior, may research such topics as understanding environmental beliefs, attitudes, and values and determining the emotional benefits humans receive from green, open spaces. Psychologists may also study the local ecological concepts of a native society.

Foresters manage forest resources to sustainably provide products that people need as well as habitats for wildlife, watersheds for clean water, recreational opportunities, and jobs that support communities.

Landscape architects plan and design outdoor spaces for homeowners, businesses, and others. They understand how to make the best use of large land areas, protect or restore natural resources, and also help preserve historic areas. Landscape architects are leaders in the area of sustainable, "green" designs.

Geologists, geophysicists, hydrologists, oceanographers, marine scientists, meteorologists, environmental scientists, and soil scientists gather and interpret data about Earth and other planets, using their knowledge to increase our understanding of natural processes. Atmospheric scientists study weather, solar radiation, climate and its effects, ozone depletion, climate change, and pollution.

Economic geologists study metallic and nonmetallic resources and mineral deposits, and find safe ways to dispose of waste materials from mining. Environmental geologists study the ways in which land, water, air, and humans interact. They also work to find solutions to pollution, waste management, flooding, and erosion.

Civil engineers help to meet human needs for industrial products, natural resources, food, transportation, shelter, waste management, and energy while protecting environmental quality and the natural resources essential for future development.

Mechanical engineers design and manufacture more efficient vehicles and power systems that use renewable energy sources, along with many other products needed for creating a sustainable world.

Electrical and computer engineers design information systems to connect people working on projects in remote areas, create networks that allow communities to quickly report data such as disease outbreaks or receive warning of natural disasters, and give people in developing countries access to the Internet. They also design computer chips and circuit boards to be more environmentally friendly.

Congratulations! In fulfilling the requirements for the Sustainability merit badge, you have become a better citizen of planet Earth. As you go forward in your life and in Scouting, remember all the things you have learned about living a sustainable lifestyle.

Go forth and be green!

See the resources section to find more about sustainability and careers in the field.

Glossary

biological diversity. The full range of variety and variability within and among living organisms and the ecological complexity in which they occur, encompassing ecosystem, species, and genetic diversity.

biomass. The total mass of living matter within a given unit of environmental area. Also refer to all plant material, vegetation, or agricultural waste used as a fuel or energy source.

biosphere. The entire Earth including the atmosphere and all the living organisms that inhabit it.

carbon footprint. The sum of all emissions of CO₂ (carbon dioxide) that are induced by your activities in a given time frame. Usually a carbon footprint is calculated on a yearly basis.

climate change. A change of climate that is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural climate variability observed over comparable time periods.

consumption. The use of a resource.

eco-city. A human settlement that uses the least possible resources, keeps waste and pollution to a minimum, and builds dwellings to make good use of sun, wind, and rain. Food and goods

are sourced locally. Transportation is limited to walking and cycling, with public transport for longer journeys.

eco-village. A small-scale intentional community with the goal of being more socially, economically, and ecologically sustainable while having less of an ecological impact.

extinction. When all members of a species cease to exist.

global economy. The world's nations, their respective economies, and the institutions that unite them in a global marketplace. Developments since World War II and especially since the early 1990s have enabled rapid movement of goods and services around the world, causing greater interdependence in trade and creating a system where the economic status of one nation affects many.

graywater. The relatively clean wastewater from bath tubs, sinks, washing machines, and dishwashers.

green chemistry. A philosophy of chemical research and engineering that encourages the design of products and processes that minimize the use and generation of hazardous substances; also called sustainable chemistry.

habitat destruction. The process through which a natural habitat is rendered unable to support the species present.

industrial pollution. Pollution resulting from an industrial plant releasing harmful emissions into the environment.

natural resources. Materials or substances such as minerals, forests, water, and fertile land that occur in nature and can be used for economic gain.

oil reserves. An estimate of the amount of crude oil located in a particular economic region. Oil reserves must have the potential of being extracted under current technological constraints. For example, if oil pools are located at unattainable depths, they would not be considered part of a nation's reserves.

organic farming. A form of agriculture that relies on techniques such as crop rotation, green manure, compost, and biological pest control. Organic farming uses fertilizers and pesticides but excludes or strictly limits the use of manufactured (synthetic) fertilizers, pesticides (which include herbicides, insecticides, and fungicides), plant growth regulators such as hormones, livestock antibiotics, food additives, and genetically modified organisms.

pollution. The presence in or introduction into the environment of a contaminating substance that has harmful or poisonous effects, thereby causing imbalance.

renewable energy. Energy that comes from resources that are continually replenished such as sunlight, wind, rain, tides, waves, and geothermal heat.

resource depletion. The use of resources, especially a natural resource, faster than it is replenished.

runoff. The draining away of water (or substances carried in it) from the surface of an area of land or a structure.

species decline. Reduction in the actual numbers of a species. Usually this decline is a result of a reduction in the area occupied by the species.

sustainable agriculture. A form of agriculture that uses nonrenewable agricultural resources and on-farm resources in the most efficient manner to sustain the economic viability of farm operations.

trash vortex. The Pacific trash vortex is composed of high concentrations of plastics, chemical sludge, and other debris trapped by the currents of the North Pacific Gyre. It is located in North Pacific Ocean roughly between 135°W to 155°W and 35°N and 42°N.

urban planning. The branch of architecture dealing with the design and organization of urban space and activities.

xeriscape. A style of landscape design requiring little or no irrigation or other maintenance that is used in arid regions.

wastewater. Water mixed with waste matter.

wildlife habitat. An ecological or environmental area that is inhabited by one or more species of wildlife.

Sustainability Resources

Scouting Literature

Boy Scout Handbook, Fieldbook, Energy, Environmental Science, Fish and Wildlife Management, Forestry, Nature, Oceanography, Plant Science, Public Health, Soil and Water Conservation, and Weather merit badge pamphlets

Visit the Boy Scouts of America's official retail website (with your parent's permission) at <http://www.scoutstuff.org> for a complete listing of all merit badge pamphlets and other helpful Scouting materials and supplies.

Books

- Kaye, Kathryn Berger, and Philippe Cousteau. *Going Blue: A Teen Guide to Saving Our Oceans, Lakes, Rivers, & Wetlands*. Free Spirit Publishing, 2010.
- Petronis, Lesi. *47 Things You Can Do for the Environment*. Zest Books, 2012.
- Roa, Michael L. *Environmental Science Activities Kit: Ready-to-Use Lessons, Labs, and Worksheets for Grades 7-12*, 2nd ed. Jossey-Bass, 2008.
- Savelge, Jenn. *The Green Team: The Eco-Friendly Teen's Guide to Saving the Planet*. New Society Publishers, 2009.
- Sivertsen, Linda, and Josh Sivertsen. *Generation Green: The Ultimate Teen Guide to Living an Eco-Friendly Life*. Simon Pulse, 2008.

Organizations and Websites

AAS Center for Science, Technology and Sustainability

Website: www.aas.org

American Chemical Society Green Chemistry Institute

Website: www.chemistry.org/greenchemistryinstitute

American Forest and Paper Association

Website: <http://www.afandpa.org>

American Institute of Biological Sciences

Website: <http://www.aibs.org>

Association of Fish and Wildlife Agencies

Telephone: 202-624-7890
Website: <http://www.fishwildlife.org>

Center for Biological Diversity

Website: <http://www.biologicaldiversity.org/news/center/articles/2010/new-scientist-02-24-2010.html>

Eartheasy

Website: http://eartheasy.com/grow_com-post.html

Ecological Society of America

Website: www.esa.org

EnviroLink Network

Website: <http://www.envirolink.org>

For more information about sustainability, go to www.scouting.org/sustainability.

Environmental Protection Agency

Telephone: 202-272-0167
Website: <http://www.epa.gov> and <http://water.epa.gov>

Global Footprint Network

Website: <http://www.footprintnetwork.org>

Leave No Trace Center for Outdoor Ethics

Toll-free telephone: 800-332-4800
Website: <http://www.lnt.org>

NASA Climate Kids

Website: <http://climatekids.nasa.gov>

The Nature Conservancy

Website: <http://www.nature.org>

Natural Resources Conservation Service

Telephone: 202-720-3210
Website: <http://www.nrcs.usda.gov>

Rouseff

Website: <http://www.rouseff.com/learn-more/top-facts/impact-on-oceans>

Society of American Foresters

Website: <http://www.sforester.org>

Sustainable Forestry Initiative

Website: <http://www.sfi.org>

U.S. Environmental Protection Agency

Websites: <http://www.epa.gov/climateaction>
<http://www.epa.gov/f3>

U.S. Fish and Wildlife Service

Toll-free telephone: 800-344-9453
Website: <http://www.fws.gov>

USDA Forest Service

Website: <http://www.fs.fed.us>

Acknowledgments

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more sustainable way of life, but it was his inspiration that brought this merit badge to life.

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If a Scout has already started working on a merit badge when a new edition for that pamphlet is introduced, he may continue to use the same merit badge pamphlet to earn the badge and fulfill the requirements therein. In other words, the Scout need not start over again with the new pamphlet and possibly revised requirements.

Merit Badge Pamphlet	Year	Merit Badge Pamphlet	Year	Merit Badge Pamphlet	Year
American Business	2002	Environmental Science	2006	Plant Science	2005
American Culture	2005	Family Life	2005	Plumbing	2004
American Heritage	2005	Farm Mechanics	2008	Pottery	2008
American Labor	2006	Fingerprinting	2003	Public Health	2005
Animal Science	2008	Fire Safety	2004	Public Speaking	2013
Archaeology	2008	First Aid	2007	Pulp and Paper	2006
Archery	2004	Fish and Wildlife		Rocks	2008
Architecture and Landscape Architecture	2010	Management	2004	Railroading	2003
Art	2008	Fishing	2009	Reading	2003
Astronomy	2013	Fly-Fishing	2009	Reptile and Amphibian Study	2005
Athletics	2006	Forestry	2005	Rifle Shooting	2001
Automotive Maintenance	2012	Gardening	2005	Robotics	2011
Aviation	2006	Genealogy	2010	Rowing	2006
Backpacking	2007	Geocaching	2005	Safety	2005
Beauty	2003	Geology	2005	Salesmanship	2003
Bird Study	2005	Golf	2002	Scholarship	2004
Bugling (see Music)		Graphic Arts	2006	Scouting Heritage	2010
Camping	2005	Hiking	2007	Scout Diving	2008
Canoing	2004	Home Repairs	2009	Scoutcraft	2007
Chemistry	2004	Horsemanship	2010	Search and Rescue	2012
Chess	2011	Indian Lore	2008	Shotgun Shooting	2005
Cinematography	2008	Insect Study	2008	Snelling	2005
Citizenship in the Community	2005	Inventing	2012	Small Boat Sailing	2004
Citizenship in the Nation	2005	Journalism	2006	Snow Sports	2007
Citizenship in the World	2005	Kayaking	2012	Soil and Water Conservation	2004
Climbing	2011	Landscape Architecture (see Architecture)		Space Exploration	2004
Code Collecting	2008	Law	2003	Sports	2006
Collections	2006	Leatherwork	2002	Stamp Collecting	2007
Communication	2006	Literature	2006	Surveying	2004
Composite Materials	2006	Mammal Study	2003	Swimming	2006
Computers	2009	Medicine	2008	Textile	2003
Cooking	2007	Motorboating	2007	Theater	2005
Crime Prevention	2005	Model Design and Building	2010	Traffic Safety	2006
Cycling	2003	Music and Bugling	2003	Truck Transportation	2005
Dentistry	2006	Nature	2003	Veterinary Medicine	2005
Disabilities Awareness	2005	Nuclear Science	2010	Water Sports	2007
Dog Care	2012	Oceanography	2008	Weather	2006
Drafting	2006	Owlery	2003	Wildlife	2012
Electricity	2004	Oversewing	2008	Whitewater	2005
Electronics	2004	Painting	2008	Wilderness Survival	2007
Emergency Preparedness	2012	Personal Fitness	2006	Wood Carving	2006
Energy	2005	Personal Management	2003	Woodwork	2011
Engineering	2008	Pets	2003		
Entrepreneurship	2006	Photography	2013		
		Flowering	2006		

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