Introducing

The Environmental Warrior Fun Patch Series!

This patch program was made possible through the New Jersey STEM Grant.
Participate while supplies last!

Why It's Here?

• Celebrates the synergy of STEM fields!

• Provides an entryway to learning about relevant environmental issues while taking action!

• Recognizes that all STEM fields can play a role in solving environmental issues.

• Promotes take action engagement and widens our environmental scope through strong and
  relevant partnerships

How it Works...

• Attend a council led or partner collaborative program available through the GSHNJ Event Calendar

• Reach out directly with our participating partners to set up a rocker program for your troop! (page 3)

• Use the self-guided curriculum (pages 5-9)

• Pick up your patch & rockers at a GSHNJ retail shop (Please call ahead to ensure patches are ready for you)

How to wear it?

Sew this patch on your vest or sash so it can grow with you as you bridge!

Look out for events on the GSHNJ Events Calendar or reach out to our partners directly to schedule an Environmental Warrior Program for your troop! Participating partners are ready to make you an environmental warrior!

Participating Partners

1. Choose a participating partner and reach out directly to them.
2. Let them know you are with GSHNJ and which rocker program you are interested in.
3. Be sure to confirm cost before registering. Most programs will charge a fee per Girl Scout.
4. Enjoy your program!
5. The complete Patch Series can be purchased at a GSHNJ retail shop.
   Be sure to call in advance for availability.

Ecosystems Rocker

Raritan Valley Headwaters | Somerset County: https://www.raritanheadwaters.org/scout-programs/

South Mountain Conservancy | Essex County: www.somocon.org

Cora Hartshorn Arboretum | Essex County: https://hartshornarboretum.org/programs/

Essex County Environmental Center | Essex County: https://essexcountyparks.org/facilities/environmental-center

Citizen Science Rocker

GSHNJ Pollination Station | Union County: llaborde@gshnj.org

South Mountain Conservancy | Essex County: www.somocon.org

Cora Hartshorn Arboretum | Essex County: https://hartshornarboretum.org/programs/

Raritan Valley Headwaters | Somerset County: https://www.raritanheadwaters.org/scout-programs/

Essex County Environmental Center | Essex County: https://essexcountyparks.org/facilities/environmental-center

Climate Rocker

Raritan Valley Headwaters | Somerset County: https://www.raritanheadwaters.org/scout-programs/

Microenvironment Rocker

Raritan Valley Headwaters | Somerset County: https://www.raritanheadwaters.org/scout-programs/

Watershed Rocker

AmeriCorps NJ Watershed Ambassadors | Available to all local GSHNJ service units: contact llaborde@gshnj.org
for your local ambassador.

NYNJ Baykeepers | Hudson County: https://www.nynjbaykeeper.org/crew/keion-walker

Raritan Valley Headwaters | Somerset County: https://www.raritanheadwaters.org/scout-programs/

Which rocker program is right for you? Collect all 5!
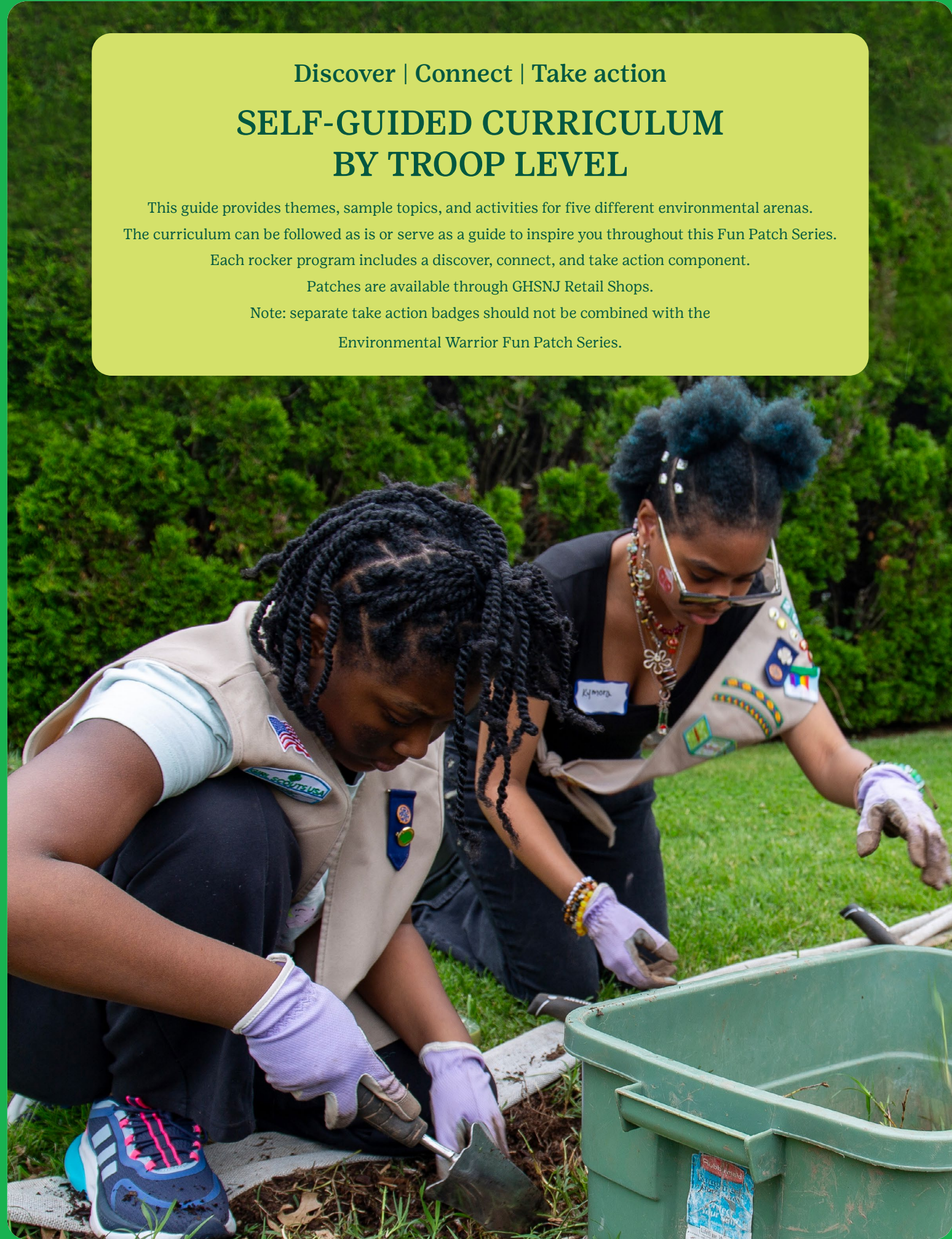
Discover | Connect | Take action

SELF-GUIDED CURRICULUM BY TROOP LEVEL

This guide provides themes, sample topics, and activities for five different environmental arenas.

The curriculum can be followed as is or serve as a guide to inspire you throughout this Fun Patch Series.

Each rocker program includes a discover, connect, and take action component.

Patches are available through GHSNJ Retail Shops.

Note: separate take action badges should not be combined with the

Environmental Warrior Fun Patch Series.

Ecosystems Rocker

Theme: Give back & Inspire
Sample Topics: Interdependence of living things, food web, native vs invasive species, nutrient cycles, photosynthesis, biology of pollinators, predator-prey relationships, stewardship & advocacy

Daisy | Brownie

DISCOVER:
• All living things depend on their environment, which includes both biotic and abiotic relationships, to exist and thrive.
• In an ecosystem, all living organisms interact with each other and their non-living surroundings.
• Disruptions to an ecosystem can upset the interdependence and impact biodiversity.
• More biodiversity is good because it makes an ecosystem more resilient to change.

CONNECT:
Using notecards, create a food chain of living things that exist in the same ecosystem. Talk about predator-prey relationships. Who eats who? With your cards, play a weaving a food web game (look to Helpful Resources for a link). What happens if one living thing is taken away? Be sure try aquatic life as wel!
OR
Learn about how pollinators find their host plants and nectar sources! Do they see or smell or both? What senses do they use?

TAKE ACTION:
Discuss what an ecosystem needs to be healthy. Create a mini ecosystem in a bottle. (It is not recommended to add fish to your ecosystem.)
OR
Build Your Own Bee Hotel and witness the life cycle of a local solitary bee! Be sure that you maintain it year to year to avoid causing disease and pests to spread to the next generation of bees. (see useful resources for guidance)

Junior | Cadette

DISCOVER:
• All living things depend on their environment, which includes both biotic and abiotic relationships, to exist and thrive.
• More biodiversity is good because it makes an ecosystem more resilient to change.
• Disruptions to an ecosystem can upset the interdependence and impact biodiversity.
• What might cause a disruption in an ecosystem?

CONNECT:
Can you think of a disruption to an ecosystem near you?

In NJ we have a high deer population. Why is that? What are some of the effects of a high deer population on the ecosystem and on people?

We also have high people populations. What effects does our own population have on other living organisms?
Talk to an expert in your area about these issues. Get inspiration from them about

what you can do to make a positive impact in your own ecosystem.

TAKE ACTION:
Take action by making a positive impact on your own ecosystem. Reach out to local projects and volunteer!

Contact your local green team, environmental centers or organizations, or our GSHNJ council. Hint: They don't have to be a participating partner to volunteer with them.

Senior | Ambassador

DISCOVER:
• All living things depend on their environment, which includes both biotic and abiotic relationships, to exist and thrive.
• More biodiversity is good because it makes an ecosystem more resilient to change. Disruptions to an ecosystem can upset the interdependence and impact biodiversity.
• How might invasive species affect the interdependence of living things in an ecosystem?
• Do you think it is worth it to manage invasive species?
• Why or why not?
• Investigate this and have an informal debate with your family or your troop.

• Set guidelines to ensure a healthy and respectful debate.

CONNECT:
Research what environmental policies, regulations, and/or laws your township committee has enacted.
How does this compare at the state and federal level?
Do you feel that your opinions are represented in these policies?

TAKE ACTION:
Take action by contacting your local green team, environmental centers or

organizations and volunteering with them for a day!

Are their efforts supported by the laws and regulations you researched? Is there something you would like to advocate for?

Go further by writing to your local government or NJ's Governor!

Let your opinions and experience be heard! If you get a letter in return, let us know so we can inspire others to make their voices heard!

Citizen Science Rocker

Theme: Data Collection and Data Analysis
Sample Topics: Using observations, data, and analysis to drive change, connecting with the natural world through citizen science participation, stewardship & advocacy, career exploration
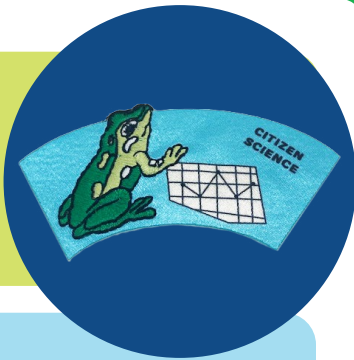
Daisy | Brownie

DISCOVER:
- What are observations?
- We can collect data through observation
- We can make a chart to collect data.
- We can share our data with others to tell a story.
- How can citizen science help nature?

CONNECT:
Choose 3 things to count outside in a favorite place or park. (Example. Insects, amount of litter on different streets, take a survey of tree types in your neighborhood, or anything that the groups decides on!) Grownups may need to make a simple chart in advance for Girl Scouts to fill in. You can use pictures or words based on age level. If possible have them write a title on your chart about what you will be counting.
What did you learn from your data? Are you happy with your results? Does your data inspire you to change anything?

TAKE ACTION:
Take action by telling 3 people about your project or use your data to inspire you to complete an activity that makes a positive change.

Junior | Cadette

DISCOVER:
- What does it mean to be a citizen scientist?
- What is the scientific method and why is it important when sharing our data with others?

CONNECT:
Choose an environmental topic that you are interested in to study (as an individual or a troop). This can be something related to the weather, plants, animals, water, litter, renewable or non-renewable energy, etc.

Are there any problems or questions you would like to explore? How might the data you collect convince you or others to make a positive change?

Interview an expert that relates to your topic to learn more and discover why they love the work they do!

TAKE ACTION:
Take action by contributing to a national or local citizen science project that relates to your topic. (see Helpful Resources for citizen science projects).
Did you like the experience of collecting data outdoors? Which part did you like the best?

Which careers are related to the work that you contributed to? Would this be a good fit for you? Why or why not?

Senior | Ambassador

DISCOVER:
- How does citizen science help the environment?
- Why does it take years and lots of data to begin to understand trends or patterns?
- Why do you think people contribute to citizen science projects?
- Can you think of examples where data analysis led to positive changes?

CONNECT:
Talk to a researcher that is doing environmental studies. Learn about why they do the work they do, what inspired them, and what they hope to achieve with their research.

TAKE ACTION:
Take action by contributing to a national or local citizen science project that you are passionate about. (see Helpful Resources for citizen science projects).

Did you like the experience of collecting data outdoors? Which part did you like the best?

Which careers are related to the work that you contributed to? Would this be a good fit for you? Why or why not?

Climate Rocker

Theme: Explore Renewable Energies & Innovation
Sample Topics: Engineering and design, greenhouse gases, carbon footprint, biodiversity, life cycle of plastic, electricity, energy storage, negative & positive human impact, environmental justice

Daisy | Brownie

DISCOVER:
- What is the greenhouse effect?
- How do greenhouse gases make the climate warmer?
- Renewable Energies like solar, wind, and hydro do not emit greenhouse gases into the air.

CONNECT:
With your family or troop, research ways that YOU can reduce your carbon impact on the environment. Draw pictures to go with your list and hang it in a place where you can see it every day.
Complete one of the following activities: Build a solar powered car.
Make S'mores in a solar oven (see Helpful Resources)
Conduct a greenhouse effect experiment
Invent a new machine that helps you with a task. Choose renewable energy to power your invention. Share with your friends and family what it looks like, what it does, and how it gets its power from either the sun, wind, or water!

TAKE ACTION:
Plan a picnic with your troop, family, or friends that reduces your carbon footprint.
Walk or ride bikes to get there.
Plan a meal that does not include meat. Be sure to use reusable containers for your food and water.
Save any leftover food scraps and compost them if you are able.

Junior | Cadette

DISCOVER:
- What are some of the ways that people contribute to the greenhouse effect?
- Human activities have caused temperatures on our planet to increase at a faster rate. Luckily, we can change our harmful practices through innovation and renewable energies!

CONNECT:
Investigate the life cycle of plastic. Plastic and other synthetic materials are made from non-renewable resources. When they are made and burned, they release carbon into the air. Then take a survey of the different plastic materials in your home. Be sure to include clothing made from Polyester, Nylon, Acrylic, Polypropylene, Spandex, and Fleece. Which do you have the most of? Can you put your results in a bar graph? How can you reduce the amount of plastic in your home?

Create & Share: Create a model showing how the greenhouse effect works and share it with someone at least 2 years younger than you. Was it easy for you to communicate these ideas? Did the person or younger troop understand the relationship between human impact, greenhouse gases, and a warmer planet?

TAKE ACTION:
Using Scratch, code a video game about the effects of human activities on the climate. Create bonus points when your character reduces carbon impacts on the environment. Have your friends play it. Ask them for feedback! Share with Council to have our Girl Scout community play your game!
OR
Take part in a large-scale tree planting event. (see Helpful Resources, Volunteering in NJ) (This tree planting event should not be combined with any other Girl Scout Badge or Patch programs).

Senior | Ambassador

DISCOVER:
- How has the earth's climate changed throughout history? (see Helpful Resources documentary series)
- How has the changing climate affected biodiversity throughout earth's history?
- Human activities affect the rate of climate change and disproportionately impact marginalized communities. Why is there a need for equitable energy innovations now?

CONNECT:
According to a "Newark Community Impacts" report by MJB& A (see Helpful Resources) Environmental Justice (EJ) Communities experience higher levels of air pollutants known to impact human health. Transportation is also the largest contributor to NJ's greenhouse gas emissions.

Research one of the following topics: Which organs in the body are affected by air pollutants and some of the diseases it can cause? As climate change increases, who is the most at risk? How can you use this knowledge to keep loved ones safe? What can you do to lower your own Carbon Footprint? What can you advocate for to make the world a better place? **OR**
Research the relationship between transportation, air pollutants, trees, human organs, and renewable energies, and plastic. How do they affect one another? Within this system, how can we reduce negative impacts, to make the world a safer and more equitable place?

TAKE ACTION:
Research your city or town's public transportation system. Design an improved public transportation system for your city or town that would meet the economic and social demands of your community. Show your model to your mayor and/or share with Council to help raise awareness for how improved public transportation can reduce carbon emissions.
Does it run on renewable energy? If so which ones?
Take part in a large-scale tree planting event. (see Helpful Resources, Volunteering in NJ) (This tree planting event should not be combined with any other Girl Scout Badge or Patch programs).

Micro-environment Rocker

Theme: Discover the Hidden World of Microbes
Sample Topics: What's in the water, how germs move through the environment, environmental indicators, shape & function (lock & key), cell receptors, water filters, microplastics as transporters, microbes and human health, climate change and microbes

Daisy | Brownie

DISCOVER:
- Microbes can be both beneficial and harmful in our bodies and environment.
- Microbes are tiny and cannot be seen without special tools, i.e. the microscope. They are found in soil, water, plants, animals and on and in the human body.
- Many types of microbes: bacteria, viruses, fungi, protozoa, algae, archaea.
- They come in different shapes and sizes. Some can infect humans and make us unhealthy while others do not.

CONNECT:
Make a Winogradsky Column (see link in Helpful Resources) and practice thinking like a scientist with observation, questions, experimentation, research, and discussing the data. **OR**
Practice ways to keep you safe from harmful microbes with a Glo Germ handwashing activity.

TAKE ACTION:
Take action by creating artwork that represents a microbe of your choice. You can use pipe cleaners, paper mâché, or even recyclables! Share your art with others as you teach them what you've discovered about Microbes.
OR
Take Action by protecting the ones you love with knowledge!
Learn about 3 ways you can protect yourself from harmful microbes.
Draw someone you love a picture that shows them how to keep their bodies safe from harmful microbes.

Junior | Cadette

DISCOVER:
- Microbes can be both beneficial and harmful in our bodies and environment.
- Microbes are tiny and cannot be seen without special tools, i.e. the microscope. They are found in soil, water, plants, animals and on and in the human body.
- Many types of microbes: bacteria, viruses, fungi, protozoa, algae, archaea.
- They come in different shapes and sizes.
- Some can infect humans and make us unhealthy while others do not.
- They play essential roles in maintaining biodiversity in the environment.

CONNECT:
Many different types of professions study microbes. Do you know a nurse, doctor, dentist, ecologist, or a farmer? If so, write down three questions you would like to ask them about microbes. Be sure to ask them what happens when microbe communities become unbalanced?
Be an Artist: Create 3D models of viruses, bacteria, or fungi papier mâché, paint, pipe cleaners or recyclables. Which microbe did you choose to create and why? **OR**
Be a scientist: Collect water from outside. It can be anywhere that is safe to collect from. Be sure to ask an adult before collecting water. Create a water filter to see if you can get clear water. Be sure to follow these steps: Observe. Ask questions. Imagine & create a solution. Experiment with your solution. Analyze your data. Revise your solution and retest. Did you succeed? Knowing what you know about Microbes, would you drink it? Why or why not? What illnesses or symptoms might a person have if they drink or bathe in water with harmful microbes?

TAKE ACTION:
Take Action by being a champion for healthy ecosystems and living things. Now that you know that microbes are found everywhere and that they can be both harmful and beneficial, choose a campaign from the list to share with our council.
Create a poster, story, graphic novel, video, or video game to spread the word about microbes. Choose from the following topics:
Dog Safety in & Around Natural Water Bodies
Safe Drinking Water for All! Common Waterborne Illnesses in the U.S., Causes, & Ways to Keep Drinking Water Safe Soil Microbes & Stewardship: The Importance of Leave No Trace Fire Building While Camping.

Senior | Ambassador

DISCOVER:
- Microbes can be both beneficial and harmful in our bodies and environment. Microbes are tiny and cannot be seen without special tools, i.e. the microscope. They are found in soil, water, plants, animals and on and in the human body.
- Many types of microbes: bacteria, viruses, fungi, protozoa, algae, archaea. They come in different shapes and sizes. Some can infect humans and make us unhealthy while others do not.

CONNECT:
Interview a scientist or professor who researches Indicator Species.
What is the species? How does this species fit into their ecosystem? What may happen to the biodiversity of the ecosystem if this species' populations decline?
What harmful microbes if any may affect this indicator species. What work can people do to help conserve this species?

TAKE ACTION:
Share what you learned by presenting this information to a class, at a GSHNJ event, or create a 3-minute video presentation and share it with Council to share within our Girl Scout Community! **OR**
Educate others by creating a presentation or 3-minute video that shows the relationship between human activities, runoff, and algal blooms. Then show either of the following:
How poisonous blooms can affect their ecosystems, and what actions we can take to reduce our negative impact
How human organs are affected by poisonous algal blooms and what we can do to protect ourselves and the ones we love.

Send it to Council and we'll share it throughout our Girl Scout Community!

Watershed Rocker

Theme: Explore Human Impact
Sample Topics: Pollution, Microplastics, Recycling, Sea level rise, Infrastructure & Storm Damage, Environmental Justice

Daisy | Brownie

DISCOVER:
- What is a watershed?
- Using a model, make a watershed out of clay, paint, finger paint, etc.
- Human behavior can affect water quality.
- What are some things we use that could end up in the oceans?
- Do these items hurt or help living things living in the water? How do you know?

CONNECT:
Complete a survey of plastic items that are in your house.

Could you reduce them by using the 4 r's? (See Helpful Resources.)

Contact your local watershed ambassador to learn about your local watershed and how people affect water quality. (request the enviroscape!)

TAKE ACTION:
Discover ways people can leave a positive impact! Volunteer at a beach or watershed cleanup.
Make art with recyclable plastics.
Share your art or watershed diagram with your class at school!
Lend your art to your local library to display for others to see.

Junior | Cadette

DISCOVER:
- What is the name of your local watershed?
- Where does your watershed begin and end?
- What are some ways that people impact water quality in a watershed?
- Can you tell if water is safe to drink by looking at it? Why or why not? Share a story with your troop or family about an experience that relates to water quality.
- Does everyone have the same access to high quality drinking water along a watershed?
- Why or why not?

CONNECT:
Take a walk: where are places in your neighborhood where trash and/or other pollution enter the watershed? How does a heavy storm impact these entry points?

Create an invention that will reduce negative human impact in a watershed. What does it look like and how does it work?

Submit a picture or video about your work to our council so we can inspire other Girl Scouts!

TAKE ACTION:
Volunteer at a beach or watershed cleanup. OR
Adopt a drain (citizen science project, see Helpful Resources)

What type of trash was the most common? Can you create a graph to help tell this story? Will your invention prevent this type of trash from ending up in the watershed?

Senior | Ambassador

DISCOVER:
- What is the name of your local watershed?
- Where does your watershed begin and end?
- Discover watersheds of the past and present by exploring at least 3 of the 6 following watersheds.
- What do they have in common?
- How are they different?
- Venice's Watershed and Infrastructure
- The Indus Valley Civilization Watershed
- The Nile Basin
- The Colorado River
- Upper Lempa Watershed
- Mississippi River Watershed and Infrastructure

CONNECT:
Waste management, recycling, textiles, ocean temperatures, agriculture and nutrients, pollution, disease, storms, infrastructure and people are all interrelated.

What relationships are most interesting to you and why?

Work in a team to discuss these connections. In your opinion what must we address to create a more sustainable and equitable future for all people. If you know someone who works in one of these fields, talk to them about these relationships and share points from your discussion.

TAKE ACTION:
What is your favorite aquatic animal? Take action for your animal by volunteering at a beach or watershed cleanup
OR
Adopt-a-drain (see the citizen science Helpful Resources)

Ecosystems Rocker
Weaving a Food Web Game
Build your own bee hotel
D.E.P. Rules & Regulations

Citizen Science Rocker:
Girl Scouts SciStarter Projects
Tracking Migrations & Seasons Projects
Adopt a Drain Project
Plants, Animals, & Climate Projects
NestWatch Project
National Geographic Projects

Climate Rocker:
Make S'Mores With a Solar Oven
Understanding Carbon
What is the Greenhouse Effect? **(Video)**
Nasa's Climate Kids
Nasa's Climate vs Weather **(Video)**
Netflix: 8 part series, Life on our Planet
Science Sparks: Climate Change Resources for Kids
Learn about Scratch for Coding
Environmental Justice, Shalanda Baker **(Article)**
NJ Environmental Justice Alliance
A Tree Can Be an Equalizer (Environmental Justice) **(Article)**
Toilet Paper Report Card
Newark Community Impacts of Mobile Source Emissions (NJEJA) **(Research)**
NJ Energy Profile & Impact of Individual Plants and Refineries (Princeton Student Climate Initiative)
D.E.P. Bureau of Climate Change, Clean Energy & Sustainability: Maps & Tools
Causes of Climate Change (Environmental Protection Agency)

Microenvironment Rocker:
Lock & Key Game Options: Use various padlocks and mixed up keys. Girl Scouts make the connection that in order for the key to get into the lock, it has to have the right shape.
Microbe Game
Research: National Library of Medicine: Microbes and Climate Change – Science, People & Impacts
Soil Microbes Lab
Make a Winogradsky Column

Watershed Rocker:
What is a Watershed?
Reduce Plastic with the 4r's
NOAA's Marine Debris Program: Resources for Kids & Families
Watershed Locator
Saving Salmon-from One Generation of Fisherwomen to the Next (Natural Resources Defense Council) **(Article)**

Other:
American Museum of Natural History is an excellent resource for all rocker programs.
Volunteer in NJ
Technology, Rainwater, and Survival of the Maya

We would love to hear from you!

Create an impact by sharing your work with our Girl Scout network!

Do you have questions about this guide?

Do you know of a great organization that we can add to our list of partners?

Would you like to share your feedback?

Email Lori LaBorde, Girl Experience Manager STEM