3rd -5TH Grade Environmental SPARK Curriculum

Introduction

This SPARK club highlights key pieces in our environment and concludes with combining all learned information into the concept of a habitat. Participants start by exploring nature, learning about the importance of color in our environment, then advance into trees and the importance of vegetation in carbon cycling. Water and soil concepts are introduced to lead into the analysis of biomes and ecosystems. For a final reflection activity, participants are asked to combine their knowledge accumulated through the activities to create an ideal habitat where both humans and wildlife will benefit.

If possible, have an outdoor location in mind to visit and study! Head to a wildlife preserve, national forest, a local forest, or a park. If you can, explore your outdoor location in advance and find the best areas to do each activity. The SPARK can be altered to be completed indoors.
Every activity that requires a lesson plan is **bold and underlined** the lesson plans are included in this packet, in order. Enrichment activities or alterations that can be made are boxed in information. All facilitator information is *italicized and underlined.* The explorer handbook is included at the end of this packet.

1. Explore Nature
   - Welcome and Introductions
   - **Explore Nature**
     - Begin with the open inquiry-based activity "Explore Nature" to allow youth to make observations and develop their own questions. You will need to collect some water samples from various sources, leaves, sticks, rocks, animal indicators, nuts, maybe even small piece of litter, etc. Let the students explore these items and develop a question they have about them. Afterward, you can discuss questions as a group. Have some magnifying glasses, tweezers, or other items available for them to use! Using the life cycle kits, participants will learn by observing differences in the life cycles of various insects. Kits include figurines representing stages of development that participants have to analyze and place in order. The reflection sheet is included in the Explorer's Handbook.
       - *Exploring Nature kit is available to be loaned from the State 4-H Office*
       - *Life cycle models are available to purchase here:* https://store.safariltd.com/collections/safariology-science-toys

     - **Color scavenger hunt**- Have students break into teams, head outside and try to find something that is each color (gray, brown, green, etc.) For harder colors, you can hide a few pieces of "human pollution" – soda can, Easter egg, etc. Talk about what each item is and how they are helpful or harmful to nature. The scavenger hunt colors are located in the explorer handbook. Once the scavenger hunt is completed, introduce the concept of "ecosystem".
       - *Great Ecosystem video is available* here: https://www.generationgenius.com/videolessons/ecosystems-video-for-kids/ you can get a 2-week free trial of all their resources!
       - *PBS: ecosystem Information* http://www.nhptv.org/natureworks/nwepecosystems.htm

If you are completing the SPARK *inside*, consider using the materials from the *Explore Nature* activity.

   - **Coloration Exploration**- What is the importance of color in nature?
     - Read/provide the participants with the information on page 4 about coloration in wildlife. Show the accompanying images (pgs 18-22) for colors that either camouflage themselves to

hide from predators or warn they might be venomous. Complete the frog finding activity if you choose! (pg 6, 9-12).

2. Explore Forestry

Do you know why tree leaves change color? Trees need sunlight to produce a chemical called Chlorophyll! In the fall, shorter, colder days mean less sunlight and less Chlorophyll to produce green leaves. Instead, we get red, yellow, and orange colors!

- ***Tree Talk***- During the scavenger hunt did you find a leaf? What color was it? Trees can be identified from their leaves because leaves can come in all shapes, sizes, and colors Give each student a the *22 Trees handout* and let them choose a leaf from outside

If you are completing the SPARK *inside* you will need to gather leaves prior to the activity. Try and have a selection available.

  i. Once participants have their tree leaf chosen, they can take a crayon and create a leaf rubbing in their explorer manual. Refer to *Tree Leaf Rubbing* handout for instructions.
  ii. You can then have participants label the parts of a leaf and use keys to identify the tree their leaf came from.

- **Rings of a tree**- this activity shows participants how to count and interpret tree ring data. Refer to Rings of a Tree handout for further content information.

Optional: Play the **A Crowded House** game where participants learn about necessary nutrients and competition

- *The importance of trees handout*- describes how trees are useful and what services they provide emphasizing carbon reduction. Have a conversation about what is causing habitat loss and what the impacts may be of decreasing available habitats.
  https://www.nationalgeographic.com/environment/global-warming/deforestation/

- Play **The incredible carbon journey**- This activity covers how human activity has impacted the carbon cycle throughout the Earth.
  - After the game, facilitate a discussion about why we need trees and plants.

3. Explore Soils and Water

- **Human Intervention in the Water Cycle-** This activity engages youth by having them participate as "raindrops" in the water cycle, passing through a watershed and moving from one learning station to another; "raindrops" learn they can be used for human or natural purposes.

- **There's No New Water**-This activity represents how much water is available on earth and how much is readily accessible for human consumption.

- **Earth's Filter** – Build water filtering system that models earth filtering groundwater.
  - Use the Soil Health guide to talk about soil layering and how soils form. Have students label the soil horizons in their explorer's handbook.
  - *Educational video you can show* https://www.youtube.com/watch?v=bgqea0E2eAY
  - Helpful website: https://www.soils4kids.org/about
  - Helpful website: https://www.soils4teachers.org/soil-horizons

- can print out the chart to show participants

- Have students build and eat **Dirt Pudding Cups!**
  i. *Soil Horizons (soil profiles)* https://www.asec.purdue.edu/soilhealth/soil-basics.html

If you are completing the SPARK close to campus I *highly* suggest borrowing the Enviroscape board! It is a hands-on way to analyze water runoff and pollution by determining sources. It's interactive and the kids love it!

4. Biome Exploration- *Refer to the vocabulary section below for reference*

- In this section, participants will learn how climate can impact their habitat. Begin by asking what is climate and how they think climate can impact living conditions for organisms. What is the difference between the climate in the desert and tropical rainforest? See
- Describe the concept of habitat. What an animal needs to survive and what resources they depend on.
- Use the following resources to teach participants about biomes. You can have each student go to the provided links below and research each biome (if you have enough computer access) or can create "biome stations" they can visit to learn about each biome by printing off the resource pages.

- Becoming a Bio-geographer- in this activity, students pick a biome and using the information from their research, make a diorama.
  Resources:
  https://earthobservatory.nasa.gov/experiments/biome
  http://kids.nceas.ucsb.edu/biomes/index.html
  Optional Video: (35 minutes)
  https://www.natureworkseverywhere.org/resources/wild-biomes-from-americas-rainforest-to-desert/

- **Biodiversity Basics**- How are organisms dependent on each other?
  i. Follow the guide to explain food webs, interdependence and ecosystem collapse.

- What happens when a part of an ecosystem collapses? From our food web game earlier, can we guess what may happen if a part of an ecosystem disappears? A great way to demonstrate habitat loss and human impact is the play the **Habitat Collapse Game**. In this game, participants will learn how deforestation/human development is decreasing available habitat and how it stresses wildlife populations.
  - Use cones/chairs or some type of item to create a square. Break the students into two groups and have them start at opposite ends of the square. One side represents shelter and one represents food and water. Participants have to move from one side of the square to the other in order to get food/water/ or shelter. They cannot touch another person or they are out! Keep decreasing the size of the square until only a few individuals left. This is a great game to talk about how decreasing habitat space for wildlife strains the population. For added difficulty have the students find their mate by working in pairs and linking arms (do not let them turn sideways to let others pass)!

5. Explore Conservation- summary/closure activity

- Creature Connections: Have students work in groups of 2-4 to creatively think about conservation- how humans and animals can coexist. Have participants design something that is useful to humans, but provides a suitable habitat that includes: water, food, and shelter for animals. Participants should use knowledge gained from content presented in this SPARK club to design their "habitat" (they should think about soil, water, biodiversity, habitat, animal needs).
    - Example Environments: parks, flooded agricultural land, abandoned buildings or fields.
    - Example Scenario: have students design a park where animals and humans can coexist where there is value for both parties involved.

Vocabulary

- **Conservation-** Management of habitats to protect its biodiversity
- **Ecological Restoration-** Assisting in the recovery of an ecosystem
- **Mutualism-** Different organisms can co-exist and both benefit
- **Climate-** The average patterns of precipitation and temperatures in a given area over time
- **Biomes-** Regions with similar climates and dominant vegetation
    - **Desert-** Lowest levels of perceptions
    - **Forest**: Highest levels of precipitation
        - **Temperate-** Various seasonal temperatures
        - **Rainforest-** Continuous warm temperature
    - **Grasslands-** Moderate levels of precipitation (dry and wet seasons)
    - **Tundra-** Low levels of perception, extreme cold temperature
- **Adaptations-** Characteristics all living things have that help them survive in their environments
- **Habitat-** natural environment (or home) for an organism that provides efficient food, water, shelter, and space for that organism to survive.

Extra Time or Enrichment Ideas

- Talk to your local wildlife center, Department of natural resources, or soil and water conservation district. Some of these entities already have educational programs they use with youth and would be willing to come talk about them!
- Play biome animal charades- research the names of some animals commonly found in each biome, print (or write) them out on strips of paper and divide them into their "biomes". Each participant has to choose a biome and an animal, then act or draw out clues to get the rest of the group to guess their animal. No talking!
- The environmental and habitat wellness ideas pair well with the film, the Lorax!
- Talk about bugs! Their habits, life cycles, etc. you can even talk to you entomology superintendent and see if you can get some bugs brought in!

- Talk about soil properties and do the **Soil Filtration Experiment**

Items Needed for all lessons:

1. *If completing indoors,* nuts, bark, branches, some water samples, leaves, grass, etc. some outside items that participants can explore and ask questions about.
    a. Clear plastic or glass jars for water samples
2. *If completing indoors,* a variety of leaves, at least one leaf per participant to complete a leaf rubbing.
3. Any items that may be needed for the color scavenger hunt. Make sure you have something of every color.
4. Explorer's Handbook printed for each participant
5. Printed copies of the lesson materials
6. Pencils/writing utensils for participants

Tree Leaf Rubbing

1. Crayons
2. Leaves from outside or gathered beforehand

Carbon Cycle Game:

1. Pipe Cleaners (2 per participant)
2. Printed copy of the Carbon Cycle Game- assemble pieces beforehand- printed copies of the station signs
3. Beads- green, blue, black, and clear
    a. Beads need to be big enough to fit on the pipe cleaners, at least six in each color per participant.
4. Four plastic bowls
5. Clear Tape
6. Scissors

Human Intervention in the Water Cycle

1. ½ gallon of water for every 10 youth
2. 2 clear gallon buckets/containers
3. For each group: 3-5, 12oz. plastic or paper cups
4. 7 six sided dice
5. 4 oz of dishwashing detergent
6. 1.75 oz. container of chocolate sprinkles
7. ¼ cup of salt
8. 1 roll of toilet paper
9. Small bottle of maple syrup
10. 3-4 cups cereal
11. 4 Tablespoons
12. 1 teaspoon
13. 2 white coffee filters
14. 2 funnels
15. ½ cup vegetable oil
16. Cup of grass or other plant matter
17. ½ cup soy sauce
18. Package of food dye (red, yellow, green)
19. 2 bottles of blue food dye
20. 2 cups of soil
21. 1 calculator

There's No New Water

1. 5- gallon bucket
2. Large jar labeled "freshwater"
3. Cup labeled "groundwater"
4. Small jar labeled "rivers and lakes"
5. Tablespoon
6. Eyedropper
7. Water

Earth's Filter

1. Cotton Balls
2. Plastic Spoons
3. Sand
4. gravel
5. Crushed charcoal
6. Rubber Bands
7. Coffee filters
8. Pitcher
9. "Dirty" Water
10. Clear plastic cups
11. Graduated cyclers

Dirt Pudding

1. Oreos

2. Chocolate Pudding
3. Gummy Worms
4. Whipped Cream
5. Coconut (dyed green)
6. Plastic Cups
7. Spoons

Becoming a Biogeographer

1. Shoeboxes or other similar items for diorama
2. Sand & rocks
3. Various plastic animals
4. Paint
5. Paintbrushes
6. Cups
7. Paper Towel
8. Glue
9. Scissors
10. Tape

Biodiversity Basics

1. Index Cards
2. Tape
3. Yarn
4. Diagram of a food web (included in activity)

Habitat Collapse Game

1. Cones/Chairs