BioBlitz Soil Life

Big Question:

What makes soil so important to environmental health?

Set the Stage:

Healthy soil supports all life on earth, but how do we know what makes soil healthy? There are all kinds of soils and each kind has different qualities. Let's do a few experiments to see what kind of soil is in your backyard or park and what it does!

Resources:

Soil Texture:
http://archive.fieldmuseum.org/undergroundadventure/kidzone/pdfs/Texture_by_Feel_Analysis.pdf
Soil Composition: https://www.soils4teachers.org/files/s4t/texture.pdf

Earth and Environmental Sciences Area

Activity:

Procedure:

- Ask students why they think soil is important and what it does for the environment and for them. Fun facts: 1 tablespoon of healthy soil has more organisms than there are people on Earth. There are 138 soil series in NE alone.
- Have students create "mud shakes" to understand soil composition (teachers may want to prepare one the day before to see settled particles). Fill mason jar 1/3-1/2 full of soil, add water to within 1in of top of jar, cap and shake. Soil particles will settle over time, measure to estimate percentages (bottom to top: sand, silt, clay).
- One factor that helps identify soil is its texture. Follow texture by feel activity (Enrichment: use soil from multiple locations in the field to see if they are different and talk about possible reasons why).
- Have students push sharpened pencils into soil in different locations measuring depth (do not use excessive pressure). Take temp with soil thermometers. Consider how habitat is created by these characteristics.
- Create "natural filters" using (in order) rocks, sand, charcoal, grass, leaves, then rocks in a 2-litre bottle with the bottom cut off (put duct tape around sharp edges to prevent cuts) and pour muddy water through the container into the bottom that was cut off to see cleaner water come out.

Reflection

To communicate their observations: "I saw…"
To reflect on diversity of what they found: "I thought…but then…"
To demonstrate science community skills: "I liked…" or "loved…"

Materials:

- Mason jars with lids
- Sharpened pencils
- 2-Litre bottles with bottoms cut off (duct tape around sharp edges to prevent cuts)
- Rocks, sand, grass, and other natural materials from yard
- Optional: Activated Carbon (fish tank carbon works great)
- Paper, Pencil, and clipboard to take notes and draw pictures.
- Recommended: Print resource materials and guides beforehand, create 1 "mud shake" day before to show settled particles.

Standards:

BSB: The Do Place: NGSS - 2-PS1.A.1; K-PS2.A.2; K-PS3.C.1; NS 4D/P1
BSB: The Do Place: NGSS - 2-PS1.A.1; K-PS2.A.2; K-PS3.C.1; NS 4D/P1

BioBlitz Soil Life

1. **Why do you think soil is important?**

2. **What was the result of the soil texture test? Was yours the same as other students'?**

3. **About how much of the soil was sand? Silt? Clay? Draw a picture of your "mud shake" and point out each layer:**

4. **How far down would the pencils go before it was too hard to push in? Do you think the soil there is easy or difficult for plants to grow in?**

5. **What was the soil temperature? Was it a lot different than the air temperature? Why do you think they were different or similar?**

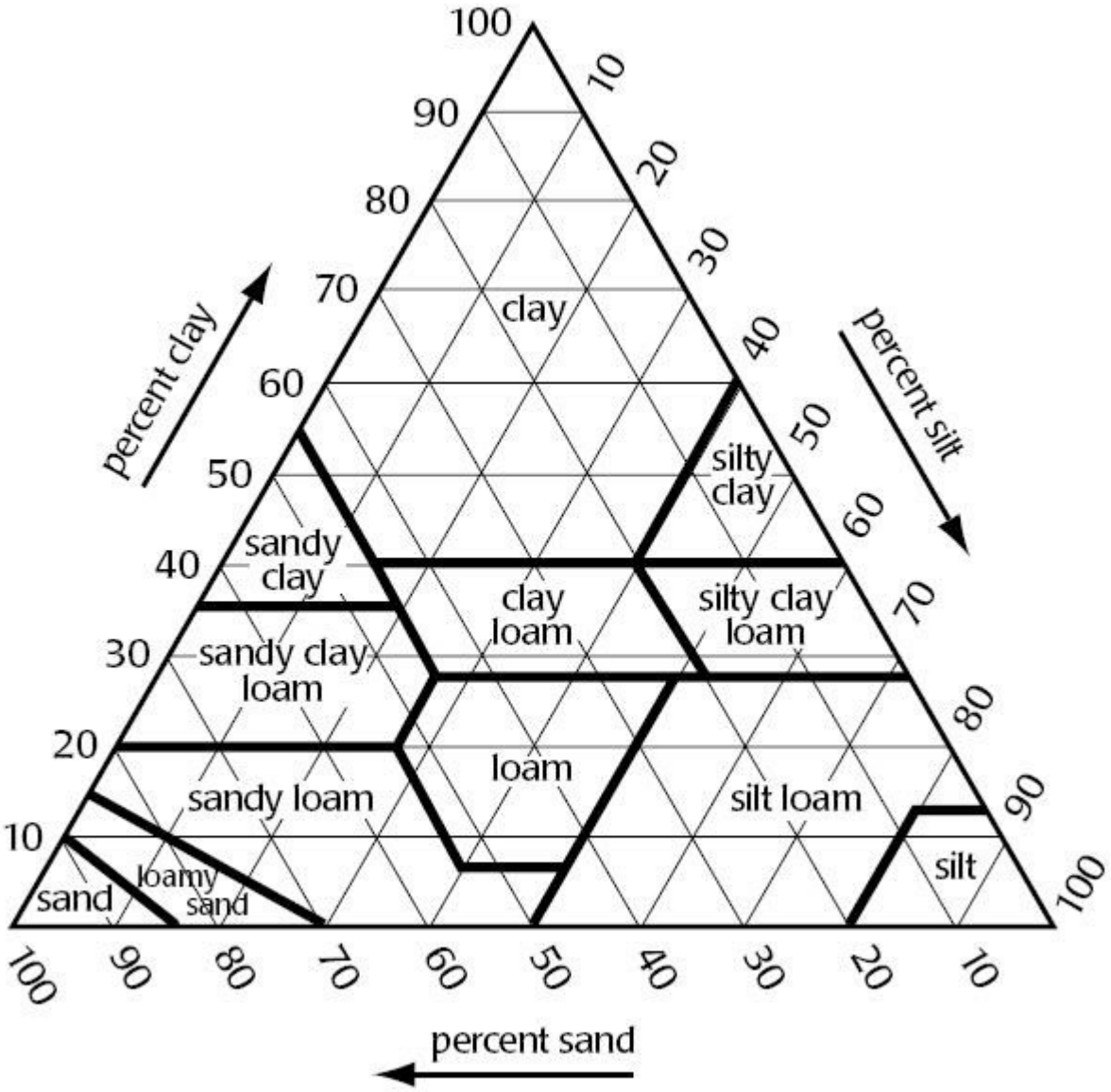
6. **What new things did you learn about soil and why it is important?**

Standards:

BSB: The Do Place: NGSS - 2-PS1.A.1; K-PS2.A.2; K-PS3.C.1; NS 4D/P1

BSB: The Do Place: NGSS - 2-PS1.A.1; K-PS2.A.2; K-PS3.C.1; NS 4D/P1

BioBlitz Soil Life



(Use percentages from mud shake to estimate soil type)

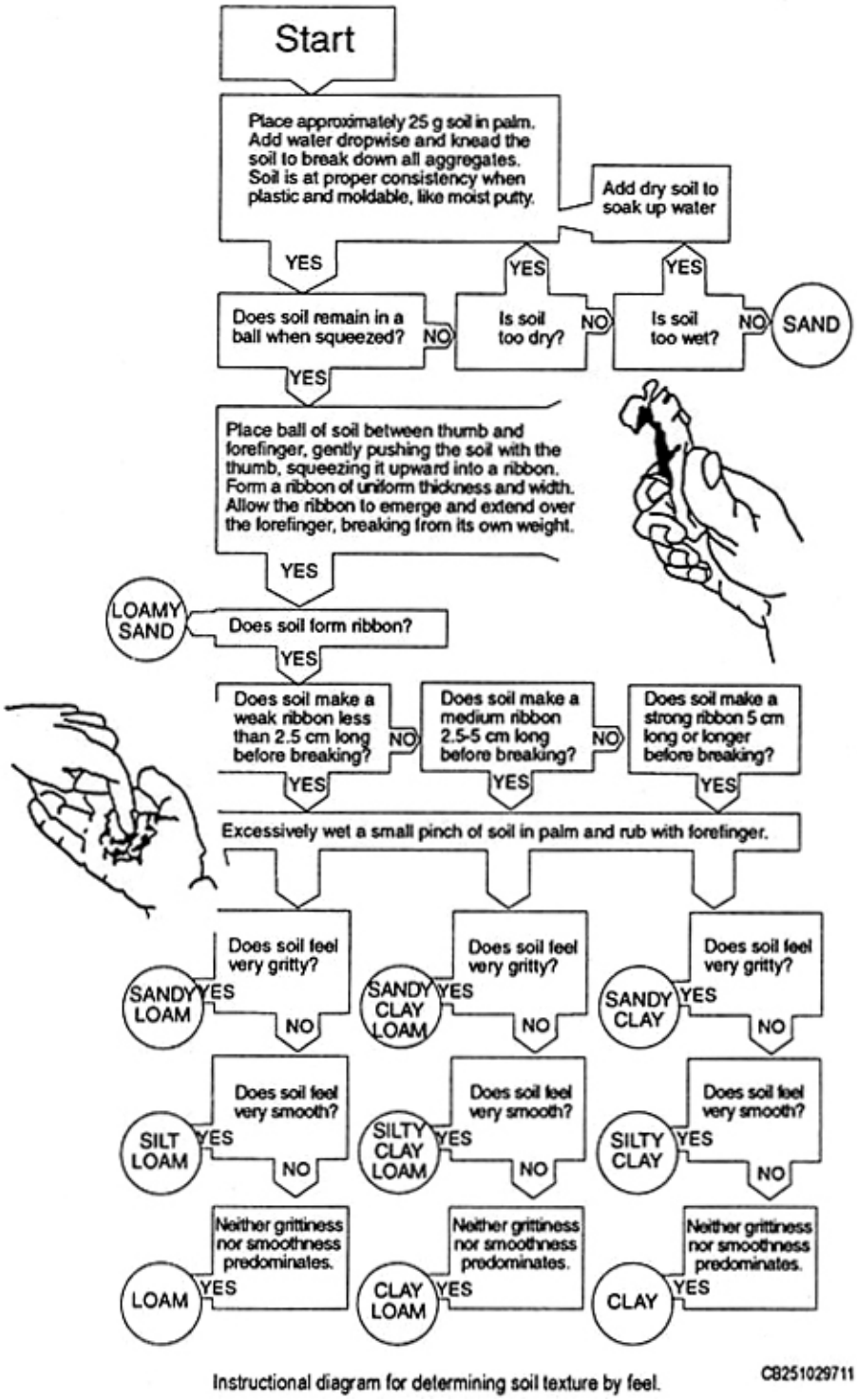
Standards:

BSB: The Do Place: NGSS - 2-PS1.A.1; K-PS2.A.2; K-PS3.C.1; NS 4D/P1

BSB: The Do Place: NGSS - 2-PS1.A.1; K-PS2.A.2; K-PS3.C.1; NS 4D/P1

WORKSHEET

Texture-by-Feel Analysis of Soil



Instructional diagram for determining soil texture by feel. C8251029711

This worksheet supports the **Texture Test** activity on
The Field Museum's *Underground Adventure* Web site: www.fieldmuseum.org/undergroundadventure.

BioBlitz Habitat and Plant Life

Big Question:

Plants are all around us, but what kind of habitat do they provide for the environment?

Set the Stage:

Plants are everywhere, but they are different based on factors like climate, water, sun, and other factors. They help create habitat for all kinds of other organisms, so it is important to understand them. Let's see what plants and habitat are near you!

Resources:

This activity has students look for all kinds of plants in their backyard, park, or natural areas near them. Try to identify what you find with a local field guide or the iNaturalist app. Consider the importance of plant diversity to provide habitat and food for all kinds of bugs, birds, and other animals in the environment.

Twenty20

Activity:

Procedure:

- Have students search the field for unique plants and take pictures or draw what they find noting some of the things that they like, and think are interesting. Use the iNaturalist app to identify plants.
- Use the pencils and string to create a transect square (push pencils into dirt in a 1.5x1.5 ft square with string connecting them to create a square).
- Pick one kind of plant and count how many are in the transect – use this number to estimate how many of this plant are in the field (multiply by a guess of the field area).
- Count the number of different plants in the transect to understand plant diversity. Do you think this is a good representation of the whole field or just the nearby area? Why or why not?
- Look for different species of trees in the field and use the iNaturalist app. How many are there? Talk about why more tree species is good for the environment.
- Talk about different habitats that students saw through each activity and in different areas of the field and why diversity is important.

Reflection

To communicate their observations: "I saw…"
To reflect on diversity of what they found: "I thought…but then…"
To demonstrate science community skills: "I liked…" or "loved…"

Enrichment – Keep track of species found and repeat the BioBlitz Aquatic Life activity every 3-4 weeks to see how the environment changes with the seasons and weather!

Materials:

- BioBlitz Kit
- 4 pencils
- 6.5 feet of string
- Magnifying Glasses
- Mini Microscopes
- Paper, pencil, and clipboard to write on
- Local Plant Guide
- Smartphone with iNaturalist app

Standards:

BSB: The Do Place: NGSS - 2-PS1.A.1; K-PS2.A.2; K-PS3.C.1; NS 4D/P1
BSB: The Do Place: NGSS - 2-PS1.A.1; K-PS2.A.2; K-PS3.C.1; NS 4D/P1

BioBlitz Habitat and Plant Life

1. **Describe the unique plant you found in the field. Draw the plant and show where you found it in the field.**

2. **What plant did you choose to count in your transect tool? Describe it and why you chose it:**

3. **How many different species of plants (flowers, grasses, bushes, weeds) did your group find?**

4. **What makes them different from each other?**

5. **How many trees are in the area?**

6. **Are they different species or the same? Is this a good or bad thing?**

7. **Do you think the environment in the field is healthy or not? Why? How can you improve it?**

Standards:

BSB: The Do Place: NGSS - 2-PS1.A.1; K-PS2.A.2; K-PS3.C.1; NS 4D/P1

BSB: The Do Place: NGSS - 2-PS1.A.1; K-PS2.A.2; K-PS3.C.1; NS 4D/P1

BioBlitz Animal Life

Big Question:

What animals live in your backyard? How many are there

Set the Stage:

There are all kinds of animals in your backyard that you may or may not know of, but their presence creates a healthy habitat! It is important to know how many insects, birds, and mammals are near you to keep the environment healthy, so lets find out!

Resources:

This activity has students look for bugs, birds, and any other animals they can find. Try to identify them with a field guide (http://archive.fieldmuseum.org/undergroundadventure/kidzone/pdfs/Soil_Critter_Field_Guide.pdf) or the iNaturalist app.

Activity:

Procedure:

- Use the pencils and string to create a transect square (push pencils into dirt in a 1.5x1.5 ft square with string connecting them to create a square)
- Use available tools to uncover, dig, and search for insects and decomposers. Use Microscopes and magnifying glasses to identify what you find and record the name, number, and where you found them on a worksheet.
- Spread out and Search for different species of insects throughout the field. Collect species and try to identify them with the field guide or iNaturalist app. Take notes and draw pictures on your worksheets.
- Take pictures to document what you find.
- Search for birds and mammals in the field and trees. Count the different species you see and take notes. Use a bird guide or iNaturalist to try to identify species.

Note to Facilitators: Have a washing station prepared as students may get dirty!

Reflection

To communicate their observations: "I saw…"
To reflect on diversity of what they found: "I thought…but then…"
To demonstrate science community skills: "I liked…" or "loved…"

Enrichment – Keep track of species found and identified and repeat the BioBlitz Animal Life activity every 3-4 weeks to see how the environment changes with the seasons. And weather.

Materials:

- BioBlitz Kit
- 4 pencils
- 6.5 feet of string
- Magnifying Glasses
- Mini Microscopes
- Butterfly Nets
- Hand-shovels
- Paper, pencil, and clipboard to write on
- Soil Critter Field Guide
- Local Bird and Wildlife Guide
- Smartphone with iNaturalist app

Standards:

BSB: The Do Place: NGSS - 2-PS1.A.1; K-PS2.A.2; K-PS3.C.1; NS 4D/P1
BSB: The Do Place: NGSS - 2-PS1.A.1; K-PS2.A.2; K-PS3.C.1; NS 4D/P1

BioBlitz Animal Life

1. **Draw a picture of your transect tool and some of the insects you found in it:**

2. **Were you able to see anything with the microscope or magnifying glass that you couldn't see otherwise? Draw what you saw:**

3. **How many different species of insects did you find?**

4. **What about the weather conditions could make today different than another collection day?**

5. **How many species of birds can you find? Are they similar or different in size, color, beak shape, behavior, or anything else you notice?**

6. **How many other animals can you find?**

7. **Did you find anything surprising today? What was it and why did it surprise you?**

Standards:

BSB: The Do Place: NGSS - 2-PS1.A.1; K-PS2.A.2; K-PS3.C.1; NS 4D/P1

BSB: The Do Place: NGSS - 2-PS1.A.1; K-PS2.A.2; K-PS3.C.1; NS 4D/P1

BioBlitz Aquatic Life

Big Question:

How do rivers and streams form and what lives in and near them?

Set the Stage:

Water is the key to all plant, animal, and human life! What parts of the water cycle can you see in your backyard or local park? Understanding the plants and animals in and near the water is key to understanding the environment so let's see what we can find!

Resources:

This activity has students look for bugs, animals and plants around water. Try to identify what you find with a field guide (https://aquaplant.tamu.edu/plant-identification/, https://3jgs2o4a02n22u73bi2gnd3l-wpengine.netdna-ssl.com/wp-content/uploads/StroudWebsiteMacroKeyFNL.pdf) or the iNaturalist app.

Activity:

Procedure:

- Ask students if they know about the water cycle and discuss how water moves through systems and into their lives.
- Create a "watershed" with students in a paint tray or Tupperware bin with dirt, sand, gravel, and other natural materials in the area. Show how rivers and streams are formed and talk about different habitats they create.
- Allow students to change the "watershed" and create new rivers and valleys. (Enrichment: introduce "pollutants" that can float downstream or change the color of the water to show impact of pollution and runoff)
- Have students observe plants around a body of water in their yard or nearby park. Consider diversity of plants, looking at where they grow and how plants in the water are different than plants on the shore and plants further up the bank on land. Take notes, draw pictures, and try to identify with iNaturalist.
- Using nets, buckets, and other tools observe and safely collect insects in ice-cube trays to study and identify with iNaturalist or field guides.

Note to Facilitators: Have a washing station prepared as students may get dirty!

Reflection

To communicate their observations: "I saw…"
To reflect on diversity of what they found: "I thought…but then…"
To demonstrate science community skills: "I liked…" or "loved…"

Enrichment – Keep track of species found and repeat the BioBlitz Aquatic Life activity every 3-4 weeks to see how the environment changes with the seasons and weather!

Materials:

- Paint tray or Tupperware bin
- Loose dirt, gravel, and sand
- Water buckets
- BioBlitz Kit
- Magnifying Glasses
- Mini Microscopes
- Butterfly Nets
- Ice-cube trays
- Paper, pencil, and clipboard to write on
- Aquatic Life Field Guide
- Local Wildlife Guide
- Smartphone with iNaturalist app

Standards:

BSB: The Do Place: NGSS - 2-PS1.A.1; K-PS2.A.2; K-PS3.C.1; NS 4D/P1
BSB: The Do Place: NGSS - 2-PS1.A.1; K-PS2.A.2; K-PS3.C.1; NS 4D/P1

BioBlitz Aquatic Life

1. **Draw a river or stream in a watershed (be creative!):**

2. **Describe and draw some plants you found growing in the water or on the shore:**

3. **Describe and draw an insect or animal you found in or near the water. Where do you think it came from and where do you think it is going? What kind of animal or insect do you think it is?**

4. **How do you think the watershed, plants, animals, and insects contribute to the environment? Do you think it is healthy? Why or Why not? How can we improve it?**

Standards:

BSB: The Do Place: NGSS - 2-PS1.A.1; K-PS2.A.2; K-PS3.C.1; NS 4D/P1

BSB: The Do Place: NGSS - 2-PS1.A.1; K-PS2.A.2; K-PS3.C.1; NS 4D/P1