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Educational Materials

Title

Food Web Lesson Plan/Parasites

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Food Web Lesson Plan With Parasites

NGSS Standard(s) Addressed:

- 5-PS3-1. Use models to describe that energy in animals' food (used for body repair, growth, and motion and to maintain body warmth) was once energy from the sun. [Clarification Statement: Examples of models could include diagrams, and flow charts.]
- 5-LS2-1. Develop a model to describe the movement of matter among plants, animals, decomposers, and the environment. [Clarification Statement: Emphasis is on the idea that matter that is not food (air, water, decomposed materials in soil) is changed by plants into matter that is food. Examples of systems could include organisms, ecosystems, and the Earth.] [Assessment Boundary: Assessment does not include molecular explanations.]

Amount of Time for the Lesson: 20-30 minutes

Science Content Information:

- Producer: An organism on the food chain that can produce its own energy, also called an autotroph
- Consumer: organism that is unable to make their own energy, instead relying on the consumption and digestion of producers or other consumers, or both, to survive
- Decomposer: an organism, often bacterium, fungus, or invertebrate, that feeds on and breaks down dead plant or animal matter, making organic nutrients available to the ecosystem
- Parasite: an organism that lives in or on an organism of another species and benefits by deriving nutrients at the other's expense
- Herbivore: animals which eat only plants
- Omnivores: animals which eat both plants and animals
- Carnivore: animals that only eat meat
- Food chain: The sequence of transfer of matter and energy in the form of food from organism to organism
- Food web: a system of interlocking and interdependent food chains

Management Considerations:

This lesson is designed for small groups (3-8 students) outdoors.

Materials:

Organism cards, stakes, and balls of colored ribbon

Cognitive Behavioral Learning Objectives: Students will be able to....

1. Define the 5 trophic levels and list an example of an organism belonging to each level.
2. Construct their own food chain and demonstrate their understanding of the transfer of energy within the chain.
3. Define what a parasite is and give at least one example of one from the food web.

Affective Learning Objectives: Students will feel....

1. Better equipped to understand the interconnectedness of nature and ecosystems.
2. More comfortable classifying organisms and understanding their relations.

Step-By-Step Procedures:

Preparation:

Stakes with organism cards are placed in a large circle (30') with the sun card on a stake at the center of the circle. Several balls of ribbon of various colors are tied to the stake with the sun.

Engage:

- Students are asked to start running around the circle to get warmed up.
- "What did you all need to run like that?" Ask how humans get their energy- looking for the answer: through food.
- Introduce that the subject of the lesson will be food chains and food webs.

Explore:

- Have the students observe the organism cards near them for a minute. Where do plants get their food/energy? Through photosynthesis/ultimately from the sun
- Ask the students why it is important that animals receive energy through food (either plants or other animals)- used for body repair, growth, and motion and to maintain body warmth
- Ask students if there may be organisms that feed off of other organism's energy while they're alive? Parasites are introduced.
- Ask the students if they know about food chains/webs and if they do, ask them what the difference between the two are- then define once they answer.
- Ask students to volunteer to act as various characters as they read the fun facts on the organism cards, starting with the sun in the middle. The sun will toss the ball of ribbon to a producer, the producer will wrap the ribbon around their stake, read the fun facts, and toss the ball of ribbon to a primary consumer. The primary consumer will wrap the ribbon around their stake, read the fun facts, and toss the ball of ribbon to a secondary consumer, etc. and on to parasites and decomposers.
- Some will encounter parasites in the form of ticks before they eventually go on to be decomposed and return their energy and nutrients back to the soil for the plants.
- Where do parasites fit into these food webs? What other parasitic organisms can we think of? Which ones can affect humans?

Explain:

- Explain how there are different levels in a food chain and how each animal/plant falls into a category.
- Go over the 5 trophic levels (producer, primary consumer, secondary consumer, tertiary consumer, and decomposer) and place the chaparral organisms in the level they fall under. After classifying the chaparral organisms, ask the students if they can think of another animal/plant that falls into the level that they have just gone over. Any animal/plant from any ecosystem.
- Explain how energy is transferred from each level, highlighting that each preceding level is necessary for the next level to receive their energy. i.e. tertiary consumers would not be able to survive without the consumers who would not be able to survive without the producers. Ultimately meaning that tertiary consumers cannot survive without the producers even though they do not directly eat the producers as their energy source. Tie back in that the producer's energy stems from the sun.
- Explain how plants derive their energy from the sun along with two other keys components (air and water) (before explanation, ask if students can think of the other two components).
- In this model, ticks have been introduced as parasites that feed off of other organisms by sucking their blood.
- Explain the role of decomposers and how they utilize the energy from other organisms – note `how consumers may not get eaten but their energy goes back to soil after death(examples including earthworms and mushrooms).
- Parasites are introduced in this lesson as well. Some organisms take nutrients/energy from others.

Evaluate:

- Verbal assessment can be used throughout to gauge student's understanding of the concepts.
- After several rounds of food chains being created, a more connected food web of tangled ribbons will be noticeable, demonstrating the interconnectedness of organisms.

Extend:

- What would happen if one of these links in the food web went extinct? To demonstrate this, a stake can be removed to dismantle the ribbon food web.
- What can we do to make sure these organisms don't go extinct? Students can discuss strategies such as conservation and habitat restoration, etc.
- What can students do to avoid ticks? Know what to look for and wear long pants. Check periodically when you're hiking.
- What other parasites should we be cautious of?