

MACROINVERTEBRATE ECOSYSTEM WEB ACTIVITY

Prep time: 10 minutes (printing materials, cutting out cards)

Activity duration: 20 minutes

Target grade level: 1- 8. Maybe Kindergarten but may need to shorten the narration or have somebody help facilitate.

MATERIALS

- Ecosystem cards (print single sided)
- Ball of yarn
- Scissors

OBJECTIVE

Students will learn about how important macroinvertebrates are to an ecosystem by building a food web. They will also learn what human/environmental factors can make this food web collapse. The teacher will act as a narrator to help build the story. At the end, there can be a class discussion/brainstorm about how humans can help streams and marshes.

HOW TO PLAY/NARRATION

1. Print out the ecosystem cards and cut them out. If you have a larger class, print the pages twice or three times.
2. Have your class get in a circle and each choose one of the cards. The cards should be shuffled and face-down so the students don't know what they are choosing.
3. Have the students read their card and place the card by their feet to remind them which critter they are.
4. Have all the "bugs" (labeled with #1 on their card) raise their hands. Choose one bug to start with the ball of yarn. Have them hold the end of the yarn and optionally read aloud the name of their critter (at the bottom of the card).

5. Instruct the remaining bugs to raise their hands again. Have the student with the ball of yarn hold onto the end and roll/toss the ball to another bug. This will create a line between the bugs, therefore building the web.
6. Repeat step 5 until all the bugs are holding part of the web. As this happens, narrate ***“All the macroinvertebrates, or bugs, in streams and marshes are connected. They need a few things to survive: good habitat (like sticks, boulders, and leaves in the water), clean water, cool water, and oxygen in the water.”*** By now, about half of the students should be holding a part of the web. Once all the bugs are connected, narrate ***“Now that all the macroinvertebrates are connected in an ecosystem, what do you think might come next in the food web?”*** (amphibians, fish)
7. Next, have all the #2 cards (fish and amphibians) raise their hands. Have the student who is holding the ball of yarn roll/toss the yarn to a student who is raising their hand.
8. Have “fish/amphibian” (labeled #2 on their card) keep their hands up. Have the student with the ball of yarn hold onto the end and roll/toss the ball to another fish/amphibian. This will create a line between the fish/amphibians, therefore building the web.
9. Repeat step 8 until all the fish/amphibians are holding a part of the web. As this is happening, narrate ***“Since the macroinvertebrates have a healthy ecosystem, there are a lot of them living in the stream or marsh. This means that fish and amphibians, like frogs and salamanders, will want to live there because they have food (the macroinvertebrates) to eat.”*** Once all the fish/amphibians are connected, narrate ***“Now that we have fish and macroinvertebrates in our ecosystem, what do you think comes next in the food web?”*** (birds)
10. Next, have all the #3 cards (birds) raise their hands. Have the student who is holding the ball of yarn roll/toss the yarn to a student who is raising their hand.
11. Have “birds” (labeled #3 on their card) keep their hands up. Have the student with the ball of yarn hold onto the end and roll/toss the ball to another bird. This will create a line between the birds, therefore building the web.
12. Repeat step 11 until all the birds are holding a part of the web. As this is happening, narrate ***“Since the macroinvertebrates are in a healthy ecosystem, the fish and amphibians want to live there. Since the fish and amphibians live there, the birds want to live there because they have food to eat.”***

13. By this point, the whole ecosystem is connected in a web! Narrate ***"We made an ecosystem web! This all started because macroinvertebrates had a good place to live. They have good habitat (like sticks, boulders, and leaves in the water), clean water, cool water, and oxygen in the water. But recently, some humans who do not care about the habitat moved into the area."***
14. Have all the bugs (card #1 raise their hands again). Narrate ***"Some of these humans decided to cut down a lot of trees right by the stream. What do you think this will do?"*** (make the stream warmer, increase erosion/pollution entering the stream).
15. Cut a couple of the strings that are held by the students raising their hand. Once their string is cut, have them sit on the floor. All other students who didn't have their string cut should stay standing.
16. Have the remaining bugs raise their hand. Narrate ***"Some other humans decided to build a factory with a pipe that empties waste right into a marsh! What do you think this will do?"*** (pollute the stream, making it hard for macroinvertebrates to live)
17. Repeat step 15
18. Have the remaining bugs raise their hand. Narrate ***"Someone used too much road salt this year to melt the ice on the roads. This salt dissolved and entered the stream. What do you think this will do?"*** (pollute the stream, making it hard for macroinvertebrates to live)
19. Repeat step 15
20. Have any remaining bugs raise their hand. Narrate ***"Some humans decided to build their houses on top of a marsh. What do you think this will do?"*** (destroy habitat).
21. Cut the remaining strings of the bugs that are raising their hands and have them sit down.
22. Have the fish/amphibians (#2) raise their hands. Ask your class ***"Now that all the macroinvertebrates are gone, what do you think is going to happen to the fish/amphibians?"*** (move to a new habitat, die with no food if they can't move, etc.)
23. Cut all the fish/amphibian strings and have them sit down.
24. Have the birds (#3) raise their hands. Ask your class ***"Now that all the macroinvertebrates are gone, all the fish/amphibians are gone too! What do you think will happen with the birds?"*** (they will fly away and find a new habitat)
25. Cut all the bird strings and have them sit down. Narrate ***"Now the whole ecosystem collapsed."***
26. Have a discussion/brainstorm with your class about what happened and what humans can do to keep this from happening. Some questions you could ask to facilitate this are:

- a. Did we have a healthy ecosystem before the humans who did not care about the streams and marshes came?
- b. What made this ecosystem a healthy ecosystem?
- c. What are some things that humans did that made the macroinvertebrates disappear?
- d. Once the macroinvertebrates were gone, what happened to the fish/amphibians? What about the birds?
- e. What did the ecosystem look like after humans did all those things to hurt the stream and marsh?
- f. What could humans do instead to help restore the ecosystem so the macroinvertebrates, fish/amphibians, and birds eventually return?

1

BUG (MACROINVERTEBRATE)



Caddisfly

1

BUG (MACROINVERTEBRATE)



Stonefly

1

BUG (MACROINVERTEBRATE)



Mayfly

1

BUG (MACROINVERTEBRATE)



Dragonfly

1

BUG (MACROINVERTEBRATE)



Damselfly

1

BUG (MACROINVERTEBRATE)



Crane fly

2

FISH



Brook trout

2

FISH



Rainbow trout

2

AMPHIBIAN



Northern leopard frog

3

BIRD



Bald eagle

2

AMPHIBIAN



Spotted salamander

3

BIRD



Great blue heron

1

BUG (MACROINVERTEBRATE)



Watersnipe fly

1

BUG (MACROINVERTEBRATE)



Water boatman beetle

1

BUG (MACROINVERTEBRATE)



Water penny

1

BUG (MACROINVERTEBRATE)



Scud

1

BUG (MACROINVERTEBRATE)



Aquatic worm

1

BUG (MACROINVERTEBRATE)



Leech

2

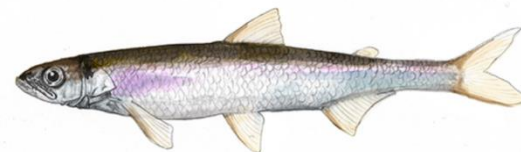
FISH



Splake

2

FISH



Rainbow smelt

2

AMPHIBIAN



Blue spotted salamander

2

FISH



Landlocked salmon

2

AMPHIBIAN



Spring peeper

3

BIRD



Black tern