Be AIS AWARE: Food Web Challenge







© 2019 AIS Unit created by the Flathead Lake Biological Station and the Flathead Lakers. Funded by the Montana Department of Natural Resources and Conservation, FLBS and Flathead Lakers.



Look at all of the plants below... WHAT DO ALL PLANTS NEED TO SURVIVE?





Look at all of the animals below... WHAT DO ALL ANIMALS NEED TO SURVIVE?











N.W. Montana Forest Ecosystem

Individually record ONE observation you have about this ecosystem

N.W. Montana Forest Ecosystem

What is the most abundant type of organism you see?

Global Partitioning of Biomass



Which group of organisms has the MOST biomass worldwide?

Global Partitioning of Biomass



1 Gt = 1,000,000,000,000,000 grams or 10¹⁵g

82% = PLANTS 17% = bacteria/fungi/protists/archaea 0.3 % = ANIMALS (mostly microscopic)

Global Partitioning of Biomass



Why do you think plants are the most abundant? BE SPECIFIC.

Producers

Organisms that use light or chemical energy to produce their own food from inorganic (nonliving) substances

Examples:

- Plants
- Algae
- Cyanobacteria



Organisms that EAT or CONSUME OTHER ORGANISMS to survive!

• What do **HERBIVORES** eat?



- What do **HERBIVORES** eat?
- What do **CARNIVORES** eat?



- What do **HERBIVORES** eat?
- What do **CARNIVORES** eat?
- What do **OMINIVORES** eat?



- What do **HERBIVORES** eat?
- What do CARNIVORES eat?
- What do **OMINIVORES** eat?
- What do **DETRITIVORES** eat?



- What do **HERBIVORES** eat?
- What do **CARNIVORES** eat?
- What do **OMINIVORES** eat?
- What do **DETRITIVORES** eat?
- What do **DECOMPOSERS** eat?



Food Chains of Life

- A series of organisms linked together by the TRANSFER OF FOOD ENERGY from one population of organisms to another population of organisms.
 - Start with a **PRODUCER**
 - Contain 3 or more organisms



Flathead Lake Food Chain

 A series of organisms linked together by the TRANSFER OF FOOD ENERGY from one population of organisms to another population of organisms.

- Start with a **PRODUCER**
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Think of ONE more food chain.

Flathead Lake Food Chain

 A series of organisms linked together by the TRANSFER OF FOOD ENERGY from one population of organisms to another population of organisms.

- Start with a **PRODUCER**
- Contain 3 or more organisms



What could negatively impact this food chain?

Tundra Food Web

 A series of interlocking and independent food chains found in an ecosystem.



Ecological Disturbance

 An event that disrupts ecosystem, community, or population structure and changes resources, substrate availability, and/or the physical environment.





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CHALLENGE: BUILD YOUR OWN FOOD WEB!

- 1. WRITE "Flathead Lake Food Web" across the top of the poster and **SORT** the organisms into producers and consumers. **PLACE** the producers along the bottom.
- 2. ARRANGE the individual food chains on your poster and then **BUILD** your food web.
- 3. **STOP** *w* and have your teacher **CHECK YOUR WEB!**
- 4. GLUE or TAPE the paper cards onto the poster OR TRACE the laminated cards.
- 5. DRAW ARROWS that MOVE UP through the web.
- 6. **IDENTIFY** the zebra mussel and **LABEL** it as an aquatic invasive species in the web.
- 7. EXPLAIN on an index card (or paper) how the invasive mussels could impact the lake food web and possibly cause a ecological disturbance. IDENTIFY the organisms that would be directly impacted by predation or a loss of food. ATTACH card to poster.

References

Slide #1: Photograph of Lake McDonald in Glacier National Park by Holly Church at FLBS

Slide #2: Photo of aspen trees by Edward Marcinek Photo of Ponderosa pine Photo of snow berries Photo of carrots Photo of pansy flowers Photo of Indian paintbrush flower

Slide #3: Hummingbird photo by Terry Sohl <u>Photo of black bear cub</u> <u>Photo of red fox</u> <u>Photo of frog</u> <u>Photo of lobster</u> <u>Photo of jellyfish</u> <u>Photo of bee on flower</u> <u>Photo of reptile</u>

Slide #4: Photograph of a mountain side in Glacier National Park by Smack (Creative Commons (public domain))

Slide #5: Photograph of a mountain side in Glacier National Park by Smack (Creative Commons (public domain))

References

Slides #6-8: Biomass diagram retrieved from Bar-On et al. (2018), PNAS

Slide #9: Photosynthesis diagram Photo of purple saxifrage by Alastair Rae (CC BY-SA 2.0) Photo of arctic willow by Qaqqaqtunaaq (CC BY 2.0) Photo of bearberry by Jesse Taylor (CC BY-SA 3.0)

Slides #10-14: Photo of snowshoe hare by Denali National Park and Preserve (Wikimedia Commons (public domain)) Photo of Canadian lynx by Keith WIlliams (Creative Commons CC BY 2.0) Photo of Grizzy bear by Jean-Pierre Lavoie (Creative Commons CC BY 2.5) Photo of Tundra mushroom by Howcheng (Creative Commons CC BY 2.0) Photo of bacteria by Fae (Creative Commons CC BY 4.0)

Slide #15: Diagram of a food chain by Mariana Ruiz Villarreal (LadyofHats) (CC BY-NC 3.0)

Slides #16-17: Diagrams of Flathead Lake Food Chain by Holly Church at FLBS

Slide #18: Diagrams of Tundra Food Web

Slides #19-20: Diagrams of Food Web Disturbance by Holly Church & data and graph provided by Tom Bansak at FLBS <u>Photograph of Mysis relicta by Harald Olsen/NTNU (CC BY 2.0)</u>