Bozeman Science: **Ecosystems** Guided Viewing

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1: What is ***primary productivity***? What do we measure it in? **(units)**

* “How much a livable mass is being laid down by the producers in the area”, “measure of how much life can be created in an area”
* Measured in gC/m2/yr (grams of carbon per meters squared, per year)

2: What are **producers**? Who are the *main producers* in the ocean? *How is this measured in an aquatic environment?*

* Producers are organisms that produce their own food.
* Phytoplankton are the ocean’s producers.
* Measured by gases being produced such as oxygen

3: What is a ***trophic level***? List and define the trophic levels. **(Give examples)**

***In which direction does the arrow go in a food web? Explain.***

* A trophic level is an eating level, such as a level of producers that make their own food.
* Producers, consumers, second level consumers, third level consumers
* The arrow goes from what’s eaten to what eats that, to what eats that, etc.
* The food chain is linear and goes up. Each organism above eats the one below.

4: What is a **food web**? *How is it different than food chains?*

* A compilation of the food chains in the ecosystem, shows all interactions
* Food webs are more complex than food chains, and are not linear. They show all interactions and connection of species.

5: Explain the *limiting factors* for growth in ecosystems. Explain ***logistic growth.***

* Limiting factors include lack of resources, not enough space, competition, and geological changes such as droughts.
* Growth and overpopulation lead to lack of resources, lack of space, and increased competition.
* Logistic growth is growth that eventually reaches a limit, or the carrying capacity.
* Logistic growth leads to decline.

6: What is the **carrying capacity (K)** of an ecosystem?

The maximum population level that an ecosystem can support.

7: **What factors** affect the carrying capacity of a population? *Explain how wolves and elk populations are linked and how they will reach* ***equilibrium.***

* Factors that affect carrying capacity include amount of resources, competing animals, and space.
* Wolves and elk reach equilibrium when populations fall and rise, for example, when wolf populations lower and elk increase because less wolves demand less food (elks). This rise in elk population will also increase wolf population, which will lower elk population, and so on.

8: Summarize the story of the **Whitebark Pine** and how humans can impact an entire ecosystem by choices we make (directly or indirectly).

* In Whitebark Pine, pine nuts found in the winter from trees are gathered by squirrels and buried in middens, but squirrels forget where they are, or bears raid these middens for food to aid hibernation. However, global climate change from human industry and emissions prevent these nuts from growing in the winter, so scientists believe that population will diminish due to lack of resources. Our choices affect the ecosystem around us in the form of industrialization and gas emissions, and these unnecessary gases can cause this change to happen. Although this isn’t intended, these accumulated gases affect more than just Whitebark Pine.