Biodiversity in Ecosystems

Ecosystems are dynamic systems, and a static ecosystem would be a dead ecosystem—just as a static cell would be a dead cell. Energy is constantly flowing through an ecosystem and chemical nutrients are continually being recycled. At higher levels of organisation, organisms are dying and being born, populations are fluctuating in their numbers, and climate patterns are varying seasonally and in less predictable ways.

Equilibrium is the steady state of an ecosystem, in which its composition and identity remain generally constant despite fluctuations in physical conditions and the makeup of the biotic community. Ecosystems may be knocked out of equilibrium by *disturbances*, disruptive events that affect their composition.

Some disturbances are a result of natural processes. For example, fire is a disturbance that can be caused by lightning in a prairie or forest ecosystem. Other disturbances are the result of human activities. Examples include acid rainfall, deforestation, algal blooms, and the introduction of invasive species. Different ecosystems may respond differently to the same disturbance; one may recover rapidly, and another may recover more slowly—or not at all.

Ecologists sometimes use two parameters to describe how an ecosystem responds to disturbance. These parameters are *resistance* and *resilience*. The ability of an ecosystem to remain at equilibrium in spite of disturbances is called *resistance*. How readily an ecosystem returns to equilibrium after being disturbed is called *resilience*. Some ecologists consider resistance to be an element of resilience—one that acts on a short timescale.

Many ecologists think that the biodiversity of an ecosystem plays a key role in stability. For example, if there were just one plant species with a particular role in an ecosystem, a disturbance that harms that one species—say, a drought for a drought-sensitive species—might have a severe impact on the ecosystem as a whole. In contrast, if there were several plant species with similar functional roles, there would be a better chance of one of them being drought-tolerant and helping the ecosystem as a whole survive the drought period.

Ecosystem resistance and resilience are important when we consider the effects of disturbances caused by human activity. If a disturbance is severe enough, it may change an ecosystem beyond the point of recovery—push the ecosystem into a zone where it is no longer resilient. A disturbance of this sort could lead to permanent alteration or loss of the ecosystem.

Khan Academy (2019) https://www.khanacademy.org/science/biology/ecology/intro-to-ecosystems/a/what-is-an-ecosystem

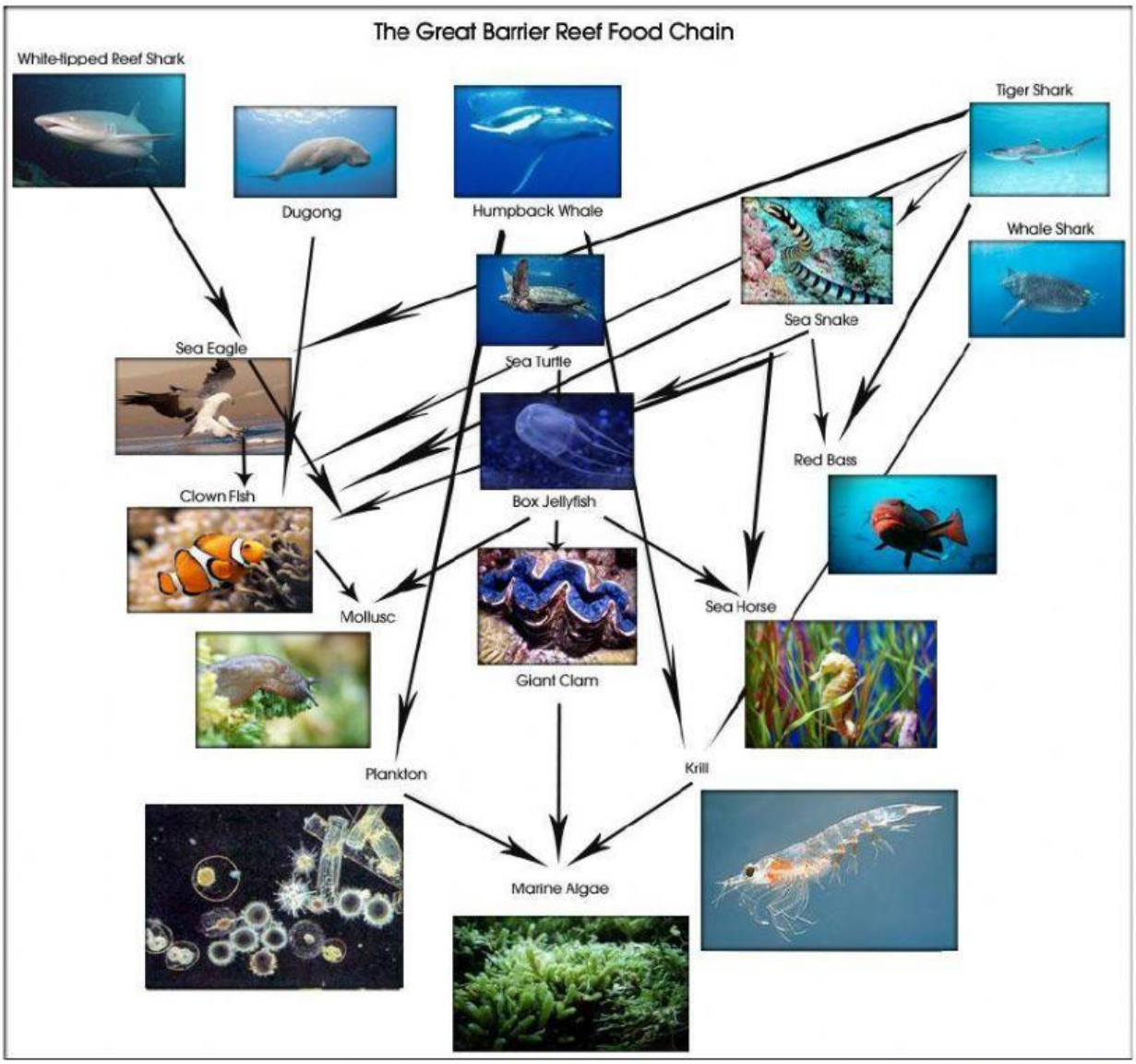
1. What is an ecosystem?

2. What are some features of an ecosystem?

3. What is a disturbance in an ecosystem?

4. How do resistance and resilience contribute to biodiversity in an ecosystem?

LIVEWORKSHEETS



https://greatbarrierreef.com.au/wp-content/uploads/2012/10/Great-Barrier-Reef-Food-Web-Diagram1.jpg

5. Select some examples from the diagram to explain how a food web works.

6. The diagram is a food web of the Great Barrier Reef. What could happen if the diversity in this ecosystem is reduced?

LIVEWORKSHEETS