Plankton
COVID VERSION

Plankton Terminology

- Plankton are free-floating organisms that they have such weak swimming ability that they are at the mercy of the prevailing water movement.
- Phytoplankton are capable of photosynthesis while zooplankton are animals.
- Holoplankton spend their entire lives as plankton while meroplankton spend only part of their lives as plankton.

Primary Production

- Primary production is the formation of organic compounds from inorganic materials. This is accomplished through photosynthesis or chemosynthesis. The standing crop is the total amount of the organism's biomass present in a given volume of water at a given time.
- The most important physical and chemical factors affecting primary production are light, nutrient supply (specifically nitrogen phosphate and silicate), and hydrography

Energy Flow in Ecosystems

- The transfer of energy from a producer through a given series of consumers is called a food chain.
- The organisms in most ecosystems form a complex network of interconnected food chains called a food web.
    - Each organism is assigned a trophic level (producers in the 1st, primary consumers in the 2nd, etc.)
- Energy stored in biomass is transferred from one trophic level to another, with some usable energy degraded or lost to the environment as low-quality heat in each transfer (ecological efficiency).

Major Plankton Groups

- Major Phytoplankton groups include Diatoms, Dinoflagellates and Prochlorophytes
- Major Zooplankton groups include Copepods, Hydrozoa and Scyphozoa

Jellyfish & Comb Jellies

- Jellyfish (Cnidaria) and Comb Jellies (Ctenophora) are gelatinous animals that drift through the ocean, although some can actively swim in slower currents. They both have very simple anatomy; Jellyfish with a pulsating bell and flowing tentacles, Comb Jellies with groups of cilia they use to paddle through the water.

Krill

- Krill (order Euphausiacea) are possibly the most important species in the sea. Feeding on phytoplankton themselves, these small crustaceans are the main food source for many marine mammals, birds, fish and squid. The entire Antarctic ecosystem would collapse without krill.

Plankton Distribution

- Plankton tend to be distributed in patches. Patches may be caused by physical factors such as advection (movement of water masses in which plankton is embedded) or gyres and eddies (circular motions of water). The patches may also be caused by biological factors such as grazing, vertical migration or marine snow (amorphous particulate material derived from living organisms that become floating microcosms).

Major Plankton Phyla

- Monera (kingdom) – bacteria & cyanobacteria
- Protista (kingdom) – algae & protozoa
- Cnidaria – jellyfish
- Ctenophora – comb jellies
- Arthropoda – copepods, krill
- Meroplankton Phyla
    - Annelida – segmented worms
    - Mollusca – shellfish & snails
    - Echinodermata – starfish & sea urchins
    - Chordata - fish

Marine Organisms of the Day

1. *Pfiesteria picicida*: Pfiesteria is a toxic dinoflagellate discovered by Dr. JoAnne Burkholder at NC State. It was referred to as "the cell from hell" in media reports due to its ability to cause huge fish kills and neurological problems in humans.
https://www.youtube.com/watch?v=IAFVC1T0KpU (4:57)

2. Sea Wasp (*Chironex fleckeri*): The Sea Wasp, a type of Box Jellyfish, are some of the most dangerous and most advanced jellies in the world. Their venom has toxins that attack the skin cells, nervous system, and the heart, and are powerful enough to kill a human through heart failure or shock (which causes the victim to drown).
https://www.youtube.com/watch?v=WrMRwddl7iQ (2:09)

3. Comb Jellies (Phylum Ctenophora): These jellies are oval shaped, and as they swim, their comb rows refract light to produce a shimmering, rainbow effect. Comb jellies can eat other comb jellies that are bigger than themselves by biting off chunks with special cilia structures in their mouths.
https://www.youtube.com/watch?v=G7WT81ukHZE (1:01)

4. Nomura's Jelly (*Nemopilema nomurai*): The largest cnidarian in the world. It grows up to 2 meters in diameter and weighs up to 440 pounds. The population has been increasing in past years, which could be caused by climate change, overfishing, and coastal modification. The Japanese company Tango Jersey Dairy makes a vanilla and jellyfish ice cream from Nomura's jellyfish.
https://www.youtube.com/watch?v=u0I-3wkH37w (2:38)

5. Krill (Order Euphausiacea): Krill are possibly the most important species in the sea. Feeding on phytoplankton themselves, these small crustaceans are the main food source for many marine mammals, birds, fish and squid. The entire Antarctic ecosystem would collapse without krill.
http://video.nationalgeographic.com/video/krill (1:52)

Finding Nemo Clips for This Exam

1 – New Parents 14 – Jellyfish 20 - Algae