Unit 4
Marine Animal Phylums

Concept 1
Invertebrates

Lesson Essential Questions

1. What are poriferans?
2. What are cnidarians and ctenophores?
3. What is the role of marine worms?
4. What are molluscans and echinoderms?

What is one example of each of these organisms?

Porifera = pores

Cnidaria = stinging cells

Ctenophore = comb

Mollusca = soft

Echinoderm = spiny skin

LEQ 1: What are Poriferans?

- Phylum Porifera is made up of sponges.
  - Sponges are one of the most simple animals:
    - No eyes
    - No visible movement
    - No true tissues
    - No organs

LEQ 1: What are Poriferans?

- Sponges have 2 main cell types:
  - Collar cells have flagella that are used to push water through the pores in the epithelium, or outside of the sponge.
    - Collar cells absorb and digest the food.

LEQ 1: What are Poriferans?

- Amoebocytes pick up the nutrients and carry them throughout the sponge.
  - Amoebocytes also act as the immune system for the sponge.

LEQ 1: What are Poriferans?

- Sponges are considered filter feeders because they pull water in and filter the food out of the water.
  - Some sponges can filter up to 20 times their own volume of water per minute.

LEQ 1: What are Poriferans?

- Special properties of sponges:
  - Sponges have a defense system made of hard needle-like spicules.
    - Can be made of a glass-like calcium material or an elastic like protein fiber.
    - Can release toxins.
  - Sponges can reassemble themselves after being torn apart.

LEQ 2: What are cnidarians and ctenophores?

- Cnidarians are marine animals that have stinging cells.
- These include soft and hard coral, sea anemones, sea fans, and jellyfish.

LEQ 2: What are cnidarians and ctenophores?

- All cnidarians have common characteristics:
  - Live in a marine environment.
  - Have radial symmetry, or symmetry around a point.
  - Have a cup or umbrella shaped body made of 2 tissue layers separated by a layer of jelly with tentacles around the rim, surrounding a mouth-like opening.
  - Stinging cells called nematocysts.

LEQ 2: What are cnidarians and ctenophores?

- Cnidarians have 2 body forms:
  - Polyps: Corals and Anemones
    - Attached to something
    - Soft body often surrounded by a protective calcium cup.

LEQ 2: What are cnidarians and ctenophores?

- Medusa: Jelly fish
  - Free floating
  - Similar to polys, but upside down with tentacles and mouth on the bottom pointing down.

LEQ 2: What are cnidarians and ctenophores?

- Special features of corals and anemones:
  - Corals are nocturnal feeders of plankton and eat only at night.
  - Hard coral builds a calcium skeleton.
  - Soft coral builds a protein skeleton.
  - Anemones have a symbiotic relationship with many fish species called anemonefish.
    - The fish swims back and forth in between the tentacles to coat its skin with anemone cells so the anemone recognizes its own fish and does not sting it.

LEQ 2: What are cnidarians and ctenophores?

- Special features of jellyfish:
  - Can be as small as a coin and over 3 feet across with tentacles longer than 9 feet.
  - They eat plankton.
  - They are weak swimmers and generally drift on the current.
  - Box jellyfish are the most dangerous to humans causing paralysis and death within minutes of the sting.

LEQ 2: What are cnidarians and ctenophores?

- Ctenophores are marine animals that have 8 comb rows on their bodies made of cilia.
- The appear very similar to jellyfish, however they do not have the typical bag-like body shape or stinging cells.

LEQ 2: What are cnidarians and ctenophores?

- Characteristics of ctenophores:
  - Generally very small, up to a few centimeters long.
  - Nearly colorless bodies.
  - Produce rainbow colored lights by beating their cilia and diffracting light.
  - Organized tissues but no true organs.
  - Eat plankton.

LEQ 3: What is the role of marine worms?

- There are three main types of marine worms:
  - Flatworms, roundworms, and segmented worms.
  - Their names describe the shape of the worms body.

LEQ 3: What is the role of marine worms?

- Flatworms
  - Considered a simple worms
  - Their body is a flattened tube of muscles with a simple digestive system (single opening).
  - They have no distinct body segments but they do have a definite head region and tail region.
  - All are parasites accept for Turbellaria which is a brightly colored tropical reef worm.

LEQ 3: What is the role of marine worms?

- Roundworms
  - Have a simple body structure with a round tube like body and a complete tube digestive system (two openings).
  - They have no body segments, so they are also simple worms.
  - They are also parasites that live in both sea animals and humans.

LEQ 3: What is the role of marine worms?

- Segmented worms
  - Considered complex worms.
  - They have segmented bodies, complete digestive systems and even circulatory and nervous systems.
  - Most marine segmented worms are in Class Polychaeta and they help keep the ocean clean by filtering the water and scavenging through the sand.

LEQ 4: What are molluscans and echinoderms?

- Animals in the phylum mollusca (mollusks) are a very diverse group of organisms.
- Mollusks include:
  - Squids
  - Octopuses
  - Snails
  - Sea Slugs
  - Oysters
  - Clams
  - Conchs

LEQ 4: What are molluscans and echinoderms?

- All mollusks share three main characteristics:
  - A muscular bag that surrounds the gills and organs and is used to help circulate water throughout the organism.
  - A muscular foot that is used to crawl in some organisms and has evolved into tentacles in others.
  - A radula which is a tongue covered in rough scraping teeth that is used for feeding. The radula is either used as a scraper or a spear.

LEQ 4: What are molluscans and echinoderms?

- Mollusks include the class Gastropoda:
  - Snails, Slugs, and most single shelled mollusks.

LEQ 4: What are molluscans and echinoderms?

- Mollusks also include class Bivalvia:
  - Muscles, clams, oysters, and scallops.

LEQ 4: What are molluscans and echinoderms?

- Mollusks also include Class Cephalopoda:
  - Nautilus, Cuttlefish, Squid, and Octopus.

LEQ 4: What are molluscans and echinoderms?

- Animals in the phylum Echindermata (echinoderms) do not look like animals, however they move, attack prey, and defend themselves very slowly.
- Echinoderms include:
  - Feather stars
  - Sea Lilies
  - Sea Stars
  - Brittle Stars
  - Sand Dollars
  - Sea Urchins
  - Sea Cucumbers

LEQ 4: What are molluscans and echinoderms?

- All echinoderms share three characteristics:
  - Radial symmetry
  - Tube feet
  - Body in five parts
- Most echinoderms also have a water vascular system that uses water pressure to control body movements.

LEQ 4: What are molluscans and echinoderms?

- Feather Stars and Sea Lilies:
  - Have long feather-like arms and short hook-like legs.
  - Their mouths face upward and they are nocturnal feeders.

LEQ 4: What are molluscans and echinoderms?

- Sea stars
  - Usually have five arms and organs in each one.
  - Have downward facing mouths.
  - Some have toxic spines for protection.
  - Able to regenerate lost limbs.
  - They are predators, eating other invertebrates.
  - Can attack prey with their stomachs.

LEQ 4: What are molluscans and echinoderms?

- Brittle stars
  - Shaped like sea stars, five legs.
  - Have slender legs.
  - Have a single set of organs in the central disk.
  - Move faster than sea stars.
  - Skin is like jointed armor.
  - Feed on detritus and small animals.

LEQ 4: What are molluscans and echinoderms?

- Sand Dollars and Sea Urchins
  - Five section body.
  - No arms.
  - Sea urchins eat algae.
  - Some sea urchin spines can inject venom.
  - Downward facing mouths.

LEQ 4: What are molluscans and echinoderms?

- Sea Cucumbers
  - Have an elongated five segment body.
  - Tentacles around their mouths.
  - Most feed by moving with their mouths open and allowing sand to go through them taking in the organic nutrients, some are filter feeders.
  - Have tough skin.
  - When attacked they will puke out their intestines for the predator to eat, flee, and regrow their intestines
  - Can also expel toxins.