MARINE INVERTEBRATES LESSON PLAN

Overview	This lesson will provide students with an introduction to the taxonomic classification of marine invertebrates. Students will engage in a shoreline walk activity to observe marine invertebrates such as sea urchins and brittle stars.
Objective	Students will be able to identify common marine invertebrates found in the U.S. Virgin Islands.
NGSS Standards	LS4.D: Biodiversity and Humans - There are many different kinds of living things in any area, and they exist in different places on land and in water.
Ocean Literacy Standards	5. The ocean supports a great diversity of life and ecosystems.

Background – What are invertebrates?

Invertebrates are animals that lack a vertebra also known as a backbone. They also account for most of the macroscopic life found in our oceans. These invertebrates exhibit a variety of different body plans; some allowing them to thrive in habitats where other animals could not. There are 6 major phyla that most marine invertebrates can be grouped into.

1. Arthropoda   (Greek) Arthron = Joint / Pous = foot

Animals in the phyla Arthropoda have these defining features:
- Possess an exoskeleton
- Have jointed appendages

Examples of Arthropods include crabs, lobsters, shrimp, and barnacles.

2. Annelida   (Latin) Annelus = Little ring

Annelids are segmented worms which can be found on land and underwater. Most marine worms are classified as polychaetes (having many hairs per segment). Examples of annelids include fireworms, christmas tree worms, and featherduster worms.

3. Cnidaria   (Greek) Cnidos = Stinging nettle

Animals in the phyla Cnidaria are primarily found in both freshwater and marine environments. Cnidarians typically possess cnidocytes, which are specialized stinging cells used to capture prey. Examples of cnidarians include jellyfish, corals, anemones, and hydroids.

4. Echinodermata Greek - Ekhinos = Hedgehog / Derma = skin
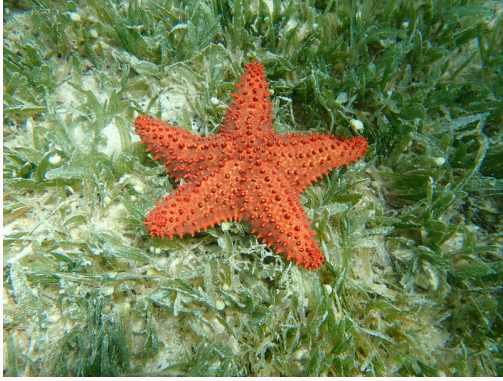
Echinoderms are animals that posses body symmetry (usually 5-point / like a star) and may also have spiky or bumpy skin. Most are also able to regenerate lost appendages or organs. Examples of echinoderms include sea stars, brittle stars, sea urchins, sand dollars, and sea cucumbers.

5. Mollusca Latin - Mollis = Soft

Molluscs can be found on land, freshwater, and marine environments. Defining features of molluscs include a mantle which resembles a cape, a radula used for feeding, and the presence of a nervous system. Examples of moluscs include snails, octopus, clams, squid, and chiton.

6. Porifera Latin - Porifera = Pore bearer

Sponges belong to the phyla Porifera; they are multicellular and contain numerous pores which allows water to flow through them, thus aiding in filter feeding.

Overview of the Shoreline Walk

Equipment

During the shoreline walk, the following equipment will be used/needed:
- Viewfinder buckets
- Gloves
- Laminated animal identification cards
- Notebook and pencil
- Drinking water

Attire

Students should have the following:
- Clothing they don't mind getting wet (No long pants)
- Water shoes
- Hat

Safety

The following precautions will be taken during the shoreline walk to ensure safety of all participants:
- **Safety briefing administered prior to the start of activity.**
- **Gloves will be worn when overturning rocks to avoid being injured by fire worms.**
- **Water shoes are worn by all participants to avoid injury.**

Explore

Examples of students using the Viewfinder buckets are provided below.

Overview

For the Shoreline Walk Activity, students will:
- Be organize into small groups and provided their equipment.
- Receive the safety briefing.
- Use the Viewfinder buckets to observe marine invertebrates in their natural habitat.
- Document what they find and categorize based on phyla.

Duration

Approximately 1 - hour

Critical Thinking

While on the shoreline walk, use these prompts to encourage further discussion:
- What are the defining features of (insert invertebrate phyla here)?
- Which marine invertebrate did you observe most frequently?
- What are potential impacts to this ecosystem and the animals it supports?

EVALUATION:

Evaluation Rubric:

Can identify at least 1 representative animal from each of the 6 marine invertebrate phyla.   1   2   3

Can identify defining features for each of the marine invertebrate phyla.   1   2   3

Needs work   **Great**   **Excellent**

1 ————————— 2 ————————— 3