



Making a difference...together

# BEACH SEINE

## Educators Guide

### Program at a Glance

Use a seine net to discover the hidden world of marine life in the underwater “forest” ecosystem. This program fosters curiosity and a sense of wonder about amazing marine life. Your class will observe Regional Parks interpreters collect a sample of rarely seen creatures using a seine net, and then using dip nets and buckets, students will gently gather and transfer animals to buckets for further study. Then like



scientists, we will identify the species using field guides and tally data to share with the Department of Fisheries and Oceans. Through hands on discovery and data collection students will learn about biodiversity and interconnectedness in the marine ecosystem, and understand why it is important to protect.

### In this program, your students will...

- Observe and learn to carefully handle a diversity of marine life
- Explore the intertidal shoreline at Witty’s Lagoon Regional Park
- Identify the unique creatures that inhabit the underwater “forest”
- Understand that the underwater “forest” habitat provides vital food and shelter
- Evaluate the impact of our actions on marine life and the seashore environment

### Curriculum Connections

Our place based school programs directly relate to the K-5 science curricula. Below you will find some big ideas, curricular competencies and content that will be addressed on your program.

#### Big Ideas from BC Curriculum:

- Living things are diverse, can be grouped, and interact in their ecosystems (grade 3)
- All living things respond to their environment (grade 4)

- Multicellular organisms have organ systems that enable them to survive and interact with their environment (grade 5)

### **Curricular Competencies from BC Curriculum:**

- Demonstrate curiosity about the natural world
- Observe objects and events in familiar and unfamiliar contexts
- Identify questions about familiar objects and events that can be investigated scientifically
- Make predication based on prior knowledge
- Safely use appropriate tools to make observations
- Make observations about living and non-living things in the local environment
- Collect simple data
- Use equipment and materials safely, identifying potential risks
- Experience and interpret the local environment
- Sort and classify data and information using drawings or provided tables
- Compare results with predictions, suggesting possible reasons for findings
- Make simple inferences based on their results and prior knowledge
- Identify some simple environmental implications of their and others' actions
- Express and reflect on personal and shared experiences of place

### **Content from BC Curriculum:**

- Biodiversity in the local environment (grade 3)
- The ways organisms in ecosystems sense and respond to their environment (grade 4)
- Biomes are large regions with similar environmental features (grade 4)
- Basic structures and functions of body systems (grade 5)

### **Pre-trip Activities**

- Create a K-W-L chart (what I know, what I want to know, and what I learned) and fill out the first two categories as they relate to maine animals of Witty's Lagoon, and the underwater forest. Have students develop questions they would like to investigate.
- Look at pictures of Vancouver Islands intertidal creatures.
- Make a class mural of a beach showing tidal zones (high tide, low tide, subtidal). Have students draw pictures or write predictions of what they might see in the various zones.
- Have students brainstorm why marine diversity is important to the ocean and us.

## Follow-up Activities

- Revisit the K-W-L chart and fill in the “L” (What I learned). Discuss answers to their investigative questions.
- Make changes on the class beach mural based on their new knowledge
- Draw food chains and webs for the intertidal and subtidal marine community
- Discuss or write about ways that humans have impacted the ocean environment and how we can act to protect it
- Do a project on one of the marine animals seen on their field trip

## Background Information

### Tidal Influences

Over three hundred years ago, Sir Isaac Newton first explained that the tides result from the gravitational attraction of the sun and moon on the oceans of the earth. Because planet Earth is so much closer to the moon than to the sun, our tides are dominated by the gravitational forces of the moon. The moon’s gravity pulls the oceans towards the moon, forming a bulge on either side of the planet (that area of ocean closest to the moon and on the opposite side of the Earth), which shifts in location as the Earth rotates on its axis and as the moon revolves around Earth. The bulge of water is high tide and the adjacent flat areas are low tide. On the West Coast of North America there are typically two high tides and two low tides per day.

### Where Land Meets Sea: The Intertidal Zone

The sea's edge is where two very different environments - land and sea - come together to form a completely unique habitat. The intertidal zone is the area of the marine shoreline that lies between the highest high tide and the lowest low tide, and is typically flooded twice daily. The marine organisms that inhabit this zone have adapted to survive in this often challenging environment. At low tide they must be able to survive prolonged exposure to the air, large fluctuations in temperature and salinity, and extremes in wave action. During low tide, intertidal organisms are vulnerable to predation from land animals, such as raccoons and birds, and by marine predators like sea stars and fish when the tide is in. Starvation is also a risk when the tide is out since most intertidal animals feed only when they are submerged. Also, most intertidal animals need to be underwater to breathe and this can be a limiting factor affecting their distribution on the shore. Within the intertidal zone there are distinct communities of plants and animals, whose distribution upon the shoreline is determined by how much of these stressors

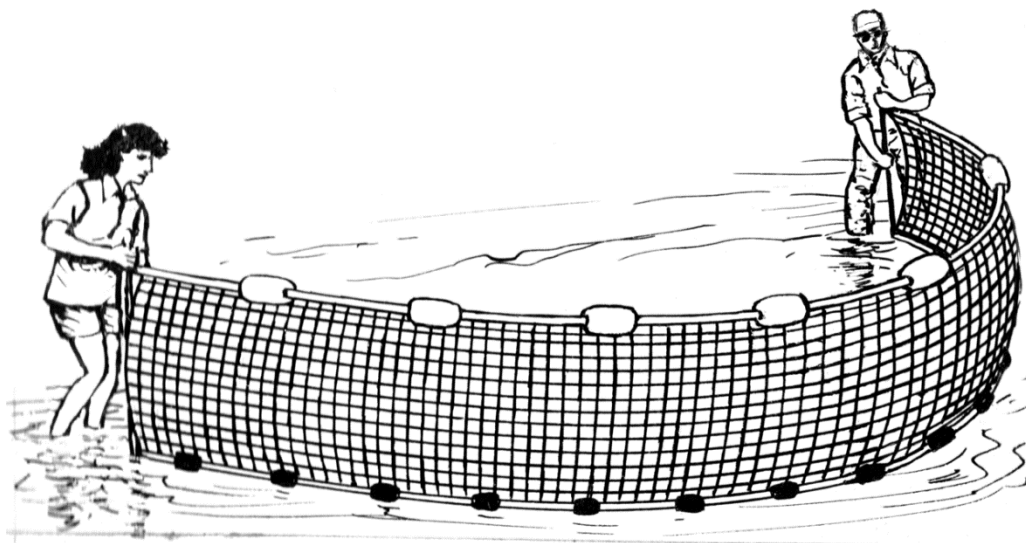
they are able to withstand.

Animals found in the sandy intertidal zone at Witty's beach include sandworms, lug worms, ghost shrimp, mud shrimp, horse clams, cockles, bent-nose clams, butter clams, and littleneck clams. In isolated tidepools one may find flat fish, sculpins, and bubble snails and their ribbons of yellow-orange eggs. Witty's beach also has rocks and cobbles which provide a different habitat. On and under the rocks, one may find many algae and animals including rockweed, sea lettuce, barnacles, limpets, periwinkle snails, hermit crabs, and shore crabs.

### **The Subtidal Zone and the "Underwater Forest"**

Just below the low tide area on a beach is the subtidal fringe, which is exposed only by the lowest of low tides. It borders the subtidal zone, which is always submerged. The subtidal fringe has the richest diversity of species of all the intertidal zones, and includes those that can tolerate only a short exposure to air. Some of the many types of species in this zone include kelp, eelgrass, red algae, nudibranchs (sea slugs), sponges, bryozoans, whelks, limpets, chitons, red rock and dungeness crabs, shrimp, sea anemones, sea stars, as well as fish such as sculpins, clingfish and gunnels. The many marine algae and plants in the subtidal zone form an "underwater forest" that provides food and shelter for a diverse community of marine animals. All marine animals depend on algae at different stages of their lifecycles to eat, hide from predators, lay eggs in, or seek refuge from the sun and tossing waves. Eelgrass habitats are of particular interest due to their ecologically significant role as a habitat for a great diversity of marine animals and as a protective nursery that shelters juvenile species, especially fish.

### **Seine Net**



## General Information about Fish

Fish have been on the planet since they evolved over 500 million years ago, during the Cambrian Period. They are the first vertebrates to appear on earth; the most primitive fish (now extinct) were covered with armour and had no jaws. Today there are estimated to be over 30,000 species of fish in the world, many of them still undescribed. All fish are vertebrates with an internal skeleton. They are a large and diverse group of animals so there are exceptions to each point in the following list, but the majority of fish are/have the following:

- Are ectothermic ("cold blooded")
- Have a streamlined (tapered, fusiform shaped) body for rapid swimming
- Have gills to extract oxygen from the water
- Have skin that is covered with protective scales
- Have fins for rapid and maneuverable swimming
- Have jaws
- Lay eggs
- Have a simple circulatory system
- Have glands in the skin that secrete mucous, prevent infection, and reduce drag
- Have an operculum, which is a hard, bony flap that covers and protects the gills
- Have a swim bladder, which is an internal air sac that helps control buoyancy

## Online Resources

### Vancouver Aquarium

Marine Biodiversity Project: <https://www.vanaqua.org/marine-biodiversity/>

Aqua Facts: <http://www.vanaqua.org/learn/aquafacts>

### Ocean Networks Canada

Numerous educational resources including videos and ocean webcams

<http://www.oceannetworks.ca>

### Seattle Aquarium

Live streaming webcams, videos, animal fact sheets and field guides

<http://www.seattleaquarium.org/teacher-resources>

### NatureWatch

NatureWatch is a community that engages all Canadians in collecting scientific information on nature to understand our changing environment. Find out how you can be a citizen scientist in your local area.

<https://www.naturewatch.ca/>

### Capital Regional District

Information about the features, amenities and directions to Capital Regional District Parks

<https://www.crd.bc.ca/parks-recreation-culture/parks-trails/find-park-trail>

### Kingfisher Press

Based out of Sooke, BC it produces marine education resources

<http://www.kingfisherpress.ca/index.html>

## Additional Resources

### Teacher References

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