

Intertidal Habitat



Intertidal Habitats Grades 6/7

Learning Outcomes:

Grade 6 life science: classification of organisms

- classify plants and animals according to their internal and external features
- develop common classification systems for organisms

Grade 6 applications of science:

- organize and interpret information in simple tables and graphs

Grade 7 life science: ecology

- determine the limiting factors for local ecosystems

Ecology Option:

- to assist in meeting Grade 7 ecology learning outcomes, particularly “describe all organisms in terms of their roles as part of interconnected food webs,” consider doing the *Teacher Trails Meadow Bug Hunt* excursion. It’s suggested for grade 4 but easily adaptable to higher grades.

Overview:

This is the only trip to the beach among the BICS Teaching Trails excursions. Students work in small groups throughout. Each group will inventory the kinds of life that live in two different beach habitats from among rocky shore, gravel, sand and mud. Then they will share and synthesize their collected information to determine the limiting factors for the intertidal ecosystem.

Follow Up Activities:

In-class components that students are responsible to complete on their return will keep them accountable and focussed, and aid in assessment and evaluation of the excursion.

Several follow up activities are suggested at the end of the excursion package, including all of the classification activities.

When:

This excursion can take place in fall or spring, as early as mid-April. Warm, sunny conditions tempt sea creatures up to the surface of mud and sand, where their food (diatoms and other microscopic life) is plentiful and where they can be seen. In winter, many organisms are difficult to find.

What is important is to choose the lowest tide available. Use the Point Atkinson (Lighthouse Park) tide figures and don’t forget to correct for daylight savings time if required.

Tide tables are currently available on line at www.islandnet.com/~mjackson/bctides/allbctides, or just do a quick search for the words “tide” and “Atkinson.”

Safety Tips

When students visit the rocky peninsula, they can get out of your sight on slippery rocks at the water’s edge. Send a parent out with them for safety and to persuade them to return at your signal.

Take a first aid kit for scrapes and scratches, and warn students about stepping on slippery wet or plant-covered rocks with sharp barnacles and shells nearby.

The only creatures that could possibly bite or sting are some of the worms. I’ve never had it happen to me or anyone out with me. Worms need to be handled carefully anyway or they break and die. Suggest that students ease their containers or plastic spoons gently under anything they are worried about injuring, especially any worms.



Barnacles can give you a nasty scrape. Move with care on rocky shores.



BICS Teaching Trails

Total Materials List:

You will need:

- whistle
- beach map and focus sheet
- an extra parent or two, preferably with a vehicle that they can bring to the beach parking lot
- *Exploring the Seashore* book
- bucket, in case they catch something big!
- for the classroom activities: beach map overhead, sea creature photo cards, masking tape, classical taxonomy outline

Each group should bring:

- real shovel, labeled with owner's name
- yogurt container
- plastic foam egg carton (not cardboard)
- plastic spoon
- clear plastic cup
- plastic shopping bag to carry these things in
- lined note paper folded up in a pocket with a stubby pencil to record types of creatures found in each habitat. Or go for regular clipboards, paper and pencils, if you think the groups can keep them dry!

What to Wear:

- sun hats
- sunscreen,
- old shoes that they don't mind getting wet and muddy.

It can be surprisingly cool and breezy, so a windbreaker is also a good idea, as is a warm hat if your excursion is early or late in the season.

Activities

Total Time: approx. two hours

1. Introduction

Where: classroom

Why:

Once they are on the beach, it will be hard to get their attention!

Materials: beach habitat map

How:

Describe the excursion to your students. Tell them that they will be looking for **where** organisms live in the **intertidal zone** (the area of beach covered and uncovered by tides—see map on facing page). When they return to the classroom, they will discuss and **classify** the creatures, so they will need to focus on remembering what they find, features and appearance, and where found.

Sketch the beach on a whiteboard or use an overhead projector to show the beach map, and point out where they will be working, what they will be doing at each place, and **orient** them generally to the area and the plan. Run your pointer along the waterline, and let them know that the lower on the beach they work, the more creatures and variety of creatures they will find. For the best stuff, look at the water's edge!

Point out overall boundaries, such as staying on the beach within sight of everyone else. Explain that you will bring a **whistle** to use as a **gathering signal**. The space and wind, not to mention the sense of freedom and excitement of discovery, will make your voice hard for students to hear.

Finally, discuss **sea creature safety** and how to limit your impact. Students will be exploring a sensitive ecosystem that's easy to damage. Use a fun analogy, such as how would they want giant aliens to explore Bowen Island? Would it be OK if they shook all the buildings so the people fell out, left all the houses upside-down and put all the creatures they collected, including humans, into Killarney Lake?

Ask them about what **rules** they should have for protecting intertidal creatures. (Make sure there is water in all containers before any captured creatures are put into them, and no creature should be kept out of its habitat for more than 20 minutes.



Intertidal Habitat



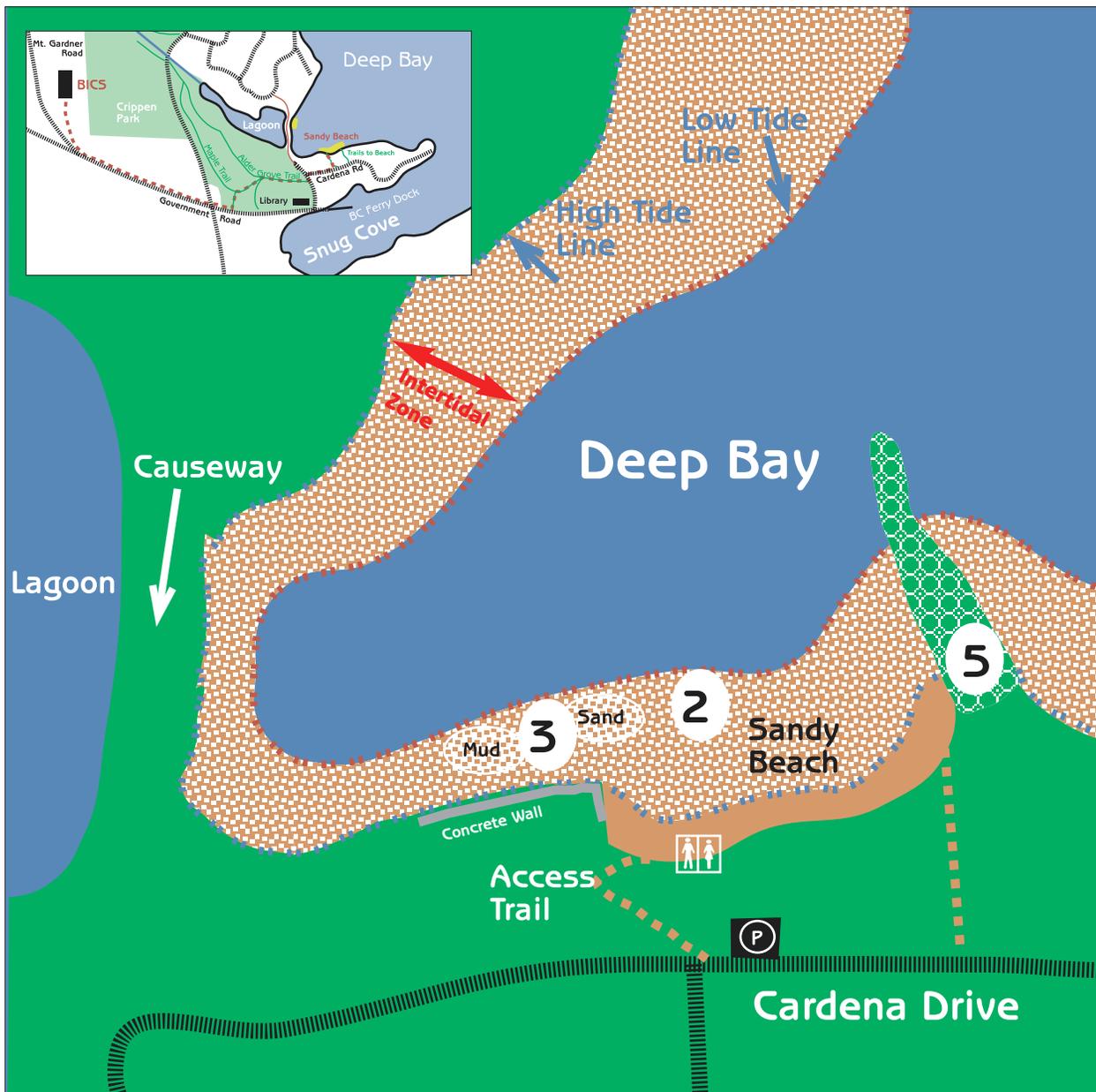
All creatures are to be returned gently to their homes, all holes are to be filled and all rocks turned right way up—to leave the beach as they found it.)

Suggest an **independent activity** for students who can't participate, such as researching local seashore life in the library while the rest of the class is on the excursion.

Assign the rest of the students to **small working groups**, if you haven't already, and assign half the groups to study mud and gravel, while the other half will investigate sand and rocks. They will need a recorder, a reporter, and an investigator or two.

Ask the recorders to fold a piece of paper in half and to label each part with one of their habitats, ready for **listing and describing**. Let them know that you don't know all the names, but neither did the first scientists studying this still little known ecosystem. They will need to make sketches and create descriptive names, such as the "Orange One-Big-Claw Shrimp" or the "Iridescent Foot Long Worm" for the weird and wonderful creatures they will find, just as the early scientists did. The piece of paper and a short pencil can travel in a pocket.

Next Stop: Sandy Beach



Sandy Beach Activity Map
The Beach Map and Focus Sheet contains a similar map



BICS Teaching Trails

2. Tide Mark

Where:

Lowest point of beach, at the water's edge

Why:

Focuses students on changing tide, makes changes visible

Materials:

- shovels

How:

A brief reference stop. "Is the tide rising or falling?" Students may notice damp sand, logs, or other clues. Ask three groups to heap up shovelfuls of sand: one at the waterline, one three footprints higher up the shore, and the third another three footprints higher. These three piles will act as a reference later to notice whether the tide is rising or falling.

Tide Check:

Is there as much flat sand and mud showing as indicated on the map (see *Beach Map and Focus Sheet*)? If not and the tide is still falling, do the gravel and rock habitat activities first.



Great Blue Herons come here to catch lunch

3. Sand and Mud Habitats

Where:

Lowest point of beach, mud to left in front of concrete wall, sand straight down from path

Why:

Discover, list and describe creatures in these habitats

Materials:

- shovels
- containers

How:

Set your boundaries, such as the logs at high tide line, the concrete wall, that branch in the mud, where Teal is standing and no more than knee deep into the sea. Ask all teams to fill their containers with clear water before you begin. This can be fun, as students get their feet wet for the first time. Then confirm the mud teams, who will dig under the surface of the mud, especially around and under half-buried twigs and branches. The other groups will dig into the sand, or sandiest areas. Remind them all to look for the holes that are tunnel openings, and that if they aren't catching anything, to dig faster and deeper!

Give your students time to catch some good stuff—say 10 min or so—while you mingle and admire. Then gather them with your whistle and ask each sand group to join a mud group to see what they found. One person from each group can report on what the other group found. Make sure there is time for each group to list and describe their own catch on their piece of paper before moving on to the next habitat.

Take the time to carefully release all creatures into their homes and return the beach to flatness (or the gulls will feast in your wake!) Park the shovels if you like. No need to drag them down the beach, as they won't be needed at the next stop. (Check: will students be able to recognize their own shovels?)

Tide Check:

How are those three piles of sand that marked the tide? If they are high and dry, have a few more made lower down. If flooded, make a few more higher up the beach. Mark new piles with sticks. Is the tide falling or rising?

Intertidal Habitat



Look for:

- foot-long iridescent Sand Worms under wood and branches



Sandworm

- smaller worms in the mud
- tunnel piles at the surface
- fat orange-pink Ghost Shrimp



- shellfish—some clams have soft shells (if students break too many, ban the shovels and let them use their hands)



Heart
Cockle



Bent-nosed Clam



Littleneck Clam



Mud Clam



Littleneck Clam showing
its syphon



BICS Teaching Trails

4. Gravel and Rock Habitats

Where:

Turn right and walk along the water's edge, under the CNIB dock, to the firm gravelly surface on the other side and the rocky point extending out.

Why:

Discover, list and describe creatures in these habitats

Materials:

- plastic egg cartons
- plastic spoons for gravel teams
- clear plastic cups for the rock teams

How:

Organize the gravel teams first. Their task is to collect tiny creatures until they have at least a dozen different kinds of creatures, one per egg spot in their carton. The plastic spoon may help to delicately pick up small fragile creatures that fingers could crush. Set boundaries, such as the dock pilings, logs at the high tide line, where Mr. Finlayson is standing and no more than knee deep in the water.

Ask all teams to fill their containers with clear water at this point, and let the gravel teams begin.

Now organize the rock teams before you send them out on the rocky peninsula. To find creatures, students will need to look under rocks at the water's edge. Tell them what to look for, especially the gunnels, which are sometimes found at the tip of the point, out of your sight. Set boundaries carefully—the tip is the limit and one parent will accompany them (to fish out any swimmers and help the groups hear the whistle), for example. Finally, remind them to replace each rock right side up as they go.

Give your students time to catch some good stuff—a bit longer than last time—while you mingle and admire with the gravel teams. (Remember, close to the water's edge is best!)

Then gather them up with your whistle and wait for the rock teams to make their way back to you. Ask each rock group to join a gravel group to share findings. Again, the reporter from each group can report on what the other group found. Make sure there is time for each group to list and describe their own catch before releasing their creatures into their homes—and ensure that every rock is right side up.

Gravel Teams Look For:



Tiny Sea Stars



Isopod



Hermit Crab



Limpets



Wood with Shipworm holes

A clam that uses its shell to drill homes in wood



Oysters



Signs of Humans

Intertidal Habitat



Rock Teams Look For:



Periwinkles
small, dark snails



Shore Crabs
two types—one
kind has hairy legs

Gunnel

slippery dark
fish which
the
students
will call
“eels”



Mussels



Barnacles



**Seals and
Sea Birds**

5. Ecosystem Limitations

Where:

Walk back under the dock and along to the base of the rock breakwater where the trees meet the sand.

Why:

Determine the limiting factors for intertidal ecosystems

Materials: none

How:

A brief stop to share and synthesize collected information to determine the limiting factors for the intertidal ecosystem.

“Is there intertidal life here? No, that’s right—why not? What’s missing or in limited supply? Water, but what kind of water? Right, Molly. Availability of seawater is a limiting factor right here for this ecosystem.

“What about at the water’s edge? What limits the intertidal ecosystem there? Sure, Ryan—exposure to air. These creatures are adapted to be exposed to air, and to sun and freshwater, actually. There are other creatures better adapted to survive in the marine underwater ecosystem.

“Look around. What about predators? Could those be a limiting factor for this ecosystem? Sure, you could say so, if the predators come from outside this

ecosystem, such as humans harvesting the oysters from the gravel habitat. This limits the ecosystem not in terms of the area it covers, but in terms of its natural variety and abundance. Some predators are part of the ecosystem, of course. Can you see those big bowl-shaped depressions out there in the muddy sand? Some creatures have been digging for sea life underwater.

“What other limiting factors can you think of? (pollution such as septic run-off, trampling by beach visitors, depth that oxygen can reach down below the surface, intensity of UV radiation, abrasion by sand being blown in wind just above surface, etc.)

It helps to be able to look around the ecosystem for clues, but if you can’t get the class’s attention for this kind of discussion on the beach, not to worry. Just save it for the classroom when you have the beach map up on the screen.

Tide Check:

How are those piles of sand that marked the tide doing? Is the tide falling or rising?

Have a nice walk back to school. Activities continue indoors.



BICS Teaching Trails

6. Habitat Communities

Where: Classroom

Why:

Review, organize and interpret habitat information in simple tables and graphs

Materials:

- beach map sketch or overhead
- sea creature photo cards
- masking tape

How:

On returning to the classroom, sketch the beach on a whiteboard or use an overhead projector to show the beach map. Hand out the sea life photo cards, and ask students to come up and stick them on the habitat in which they were found with masking tape. It should become apparent quickly that different organisms tend to live in different areas (habitats) of the shore.

Questions to Discuss:

- Were there any creatures found in only one habitat?
- Which creatures live in more than one habitat?
- Why can they survive in more than one?
- Were there other creatures seen in the air, deeper water or on land that are not pictured on a card? Make up cards and add them to the map.
- Which organisms seemed to be the most abundant in each habitat?
- Make a table of the creatures in each habitat (remember, descriptive made-up names are fine), and graph the number of kinds of creatures in the habitats too.
- Consider handing out or projecting the Pt. Atkinson tide table. When was the low tide during the excursion? Can they predict the next low tide? When will the lowest tide occur next month?



View of Sandy Beach and the Tip of the CNIB Dock

Intertidal Habitat



7. Classification

Where: Classroom

Why:

Classification learning outcomes

Materials:

- beach map sketch or overhead
- Post-It Notes™
- sea creature photo cards
- masking tape
- classical taxonomy classification
(**K**ing **P**hilip **C**ame **O**ver **F**or **G**reat **S**paghetti)

Ask each student to pick a creature card off the map, and then to move about to group his or her creature with a similar creature held by another student. Then ask each pair of students to join another group with similar creatures, and so on until every card and student has joined.

Then ask them to stick their cards up on a board in the pattern representing their grouping (classification) scheme.

Finally, post or project the classical structural categories up beside their own classification scheme, and ask them to match and compare.

Other learning outcome-related activities could include:

- Chart the classification categories of creatures by habitat. Graph these by habitat. What patterns emerge?
- Examine collected water and surface samples with microscopes.
- Relate the movement of the sun, moon and Earth to the tide changes they experienced and the phase of the moon at the time.

That's it for the Grade 6 Teaching Trails activities. Have fun!



Shell Shed by a Growing Crab



BICS Teaching Trails

