



## LESSON 5

### Burnaby Narrows

#### Kindergarten to Grade 3

#### Objectives

- Understand why Burnaby Narrows is so full of marine life.
- Understand why people are asked to float through rather than walk through Burnaby Narrows.
- Explain the advantage of regeneration for ocean creatures.
- Learn ways that bat stars can protect themselves.
- Explain how bat stars can be both grazers and scavengers.

#### Materials

**Station 1:** 74 bat stars cut from coloured paper, 4 m of yarn, masking tape, bat star card (WWF), turban snail shells.

**Station 2:** Sand paper sea stars, crayons, pencil crayons, paper, pictures of different sea stars from the book: *Sea Stars of British Columbia* by Philip Lambert.

**Station 3:** Pictures of sunflower sea stars, six-rayed sea stars, sea stars that have regenerated rays, information about sea stars, close-up pictures of pedicellaria and spines from page 12 of the book: *Sea Stars of British Columbia* by Philip Lambert.

**Station 4:** Gwaii Haanas Board Game, large rubber dice.

**Poster:** *Oceans Day* Poster from 2004 of Burnaby Narrows

**Phone book:** Cover of 2003/2004 Queen Charlotte Islands Phone Book

**Magazine:** Cover of *Western Living Magazine* May 1997

**Book:** Sing Along and Play in the Splash Zone by Linda Arnold, Monterey Bay Aquarium, 2000. (Students may want to sing the “I’m a Seastar Song” as an extension activity)

#### Concepts

- Burnaby Narrows is a protected area within Gwaii Haanas National Park Reserve and Haida Heritage Site.
- Burnaby Narrows is a rich habitat due to its sheltered location with abundant tidal flushing that brings lots of food through.
- Burnaby Narrows is a unique habitat because there are many more bat stars and turban snails than in other areas and the abundant sea life is exposed at low tide and easy to see.
- Bat stars are different from some other sea stars.
- Humans can protect animals in the intertidal zone when studying them.

#### Activities

##### 1. Introduction

Ask students if any of them have seen or been to Burnaby Narrows. Ask them if they have seen the cover of the 2003/04 Haida Gwaii/QCI phone book. Show them the cover with a picture of Burnaby Narrows. You can also show them the *Oceans Day* poster from 2004 or the cover of *Western Living Magazine* from May 1997 for pictures of Burnaby Narrows.

What do they think would make Burnaby Narrows special?

*A: There is more abundant life there than other narrows. Burnaby Narrows is a sheltered, high-current area where lots of plankton and nutrients are brought in with the tides.*

What is a narrows? Do you know of any narrows around Haida Gwaii?

*A: A narrows is a thin passage between two areas of land. Skidegate Narrows, Burnaby Narrows, Louise Narrows.*

Show a visitor map of Haida Gwaii and Gwaii Haanas. Have students locate Burnaby Narrows between South Moresby Island and Burnaby Island. Show them where the other Narrows are located.

## 2. Sea Stars

Find out what students already know about sea stars and snails. What do they need in their habitat?

*A: Most must have a hard surface to attach to and they must have enough food. Snails need seaweed and phytoplankton. Bat stars need both plants and animals to eat. They are both grazers and scavengers. They will even eat other sea stars but don't eat clams. They also need space. How much space do you think a sea star or snail would need?*

What other animals do you notice in the photos of Burnaby Narrows?

*A: Sea urchins, sea anemones, ochre sea stars, clams, sunflower sea star.*

### Activity Stations

Set up the 4 activity stations. Divide the class into 4 groups and rotate through the stations.

Details of each Station are in the accompanying Worksheet for Lessons 5. The answers to the questions are in italics.

## Conclusion

- Review what students learned at the Activity Stations. Discuss the advantages of regeneration.
- Look at the photos of Burnaby Narrows at high tide and at low tide. Look at the charts of transects from the *Burnaby Narrows Ecosystem Study Final Report* so students can see the variety of creatures and the type of substrate.
- Sing the *I'm a Sea Star* Song from Sing Along and Play in the Splash Zone by Linda Arnold, Monterey Bay Aquarium, 2000, page 20.

## Extension

Make a bird's eye view mural of sea stars of all colours, types and sizes, snails, crabs and any other animals found at Burnaby Narrows.



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**Activity Stations**

**Station 1. Bat Stars**

Set up a 1 m squared area with the 4m long piece of yarn.  
Place the 74 bat star cut outs in the 1 m squared area.

See how that looks – it is the density of bat stars that can be seen in Burnaby Narrows. In other parts of the coast like Bamfield on the west coast of Vancouver Island, they found 3 bat stars per square metre area.

Why are there so many bat stars in Burnaby Narrows?

*A: There is an abundance of food. With the sheltered location and strong current, a lot of food comes through. Though bat stars are normally grazers, they will eat other animals.*

**Station 2. Sea Star Art**

Sea stars belong to a group of animals called echinoderms. Echinoderm means spiny skin. Sea stars have spines and pinchers (pedicellaria) to protect them. Look at the different types of sea stars. Sea stars are not eaten by many other animals, but sea otters, gulls and other sea stars will eat them.

Do a rubbing of one of the sandpaper sea stars.

Why do you think sandpaper was chosen?

*A: Because it has a similar texture to sea stars.*



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**Activity Stations**

**Station 3. Regeneration**

Sea stars can grow new arms (rays). As long as there is a part of the central disk attached to a ray, a sea star can regenerate the other rays. When they look like the sea star in the picture, they are called sea comets. Notice the close up of sea star spines and pinchers (pedicellaria).

What other animals can regenerate limbs or tails?

*A: Crabs can regenerate limbs, sea stars can regenerate rays and lizards can regenerate their tails.*

The six-rayed sea star grows up to 5 cm. How big can a sunflower sea star get? Compare the size of the 2 sea stars.

*A: The sunflower sea star can grow up to 80 cm. It grows much much larger than the six-rayed star.*

How many arms does a six-rayed sea star have? How many arms (rays) can a sunflower sea star have?

*A: The six-rayed star has 6 arms. The sunflower sea star can have up to 24 arms.*



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**Activity Stations**

**Station 4. Conservation**

In Burnaby Narrows, visitors are asked to float through rather than walk through the area. Why? They also ask people not to collect things and to put animals back in their original habitat. Why?

*A: Many people stomping and walking across the narrows means animals are crushed underfoot. If they float by, then animals are not damaged. Putting animals back in their original habitat means they can avoid predation by birds etc. People are asked not to collect shells because taking empty shells may deprive some invertebrate like a hermit crab of shelter. A park is a place where things are protected and nothing should be removed. The expression “take nothing but pictures and leave nothing but footprints” (except in Burnaby Narrows!) is a good guide.*

Can you think of any other ideas for careful low tide exploration?

*A: If you lift a rock up, carefully put it back so the creatures underneath are protected, not crushed and don't dry out.*

Play the Gwaii Haanas Board Game. This is a large board game borrowed from Gwaii Haanas Parks Canada that allows students to become more familiar with the Park Reserve. Students move to different squares after rolling a large dice to discover Gwaii Haanas.



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**Activity Stations**

**Station 5. Other Inhabitants**

Many red turban snails are also found in Burnaby Narrows. They are grazers. Up to 50 have been found in 1 square metre. Why do you think there are so many?

*A: There is lots of seaweed for turban snails to eat and lots of rocky substrate for them to attach to.*

There are many other animals found in Burnaby Narrows including purple shore crabs, hermit crabs, isopods, coon-striped shrimp, spiny pink sea stars, many different clams, kelp greenlings (a fish), and juvenile (young) copper rockfish.

Look at the books and cards and sketch some of them.

Burnaby Narrows may act as a nursery for some invertebrates (animals with no backbone) and vertebrates (animals with backbones).

Why do you think Burnaby Narrows is a good nursery? What do baby animals need?

*A. There is lots of shelter and an abundance of food for baby animals.*