

# Exploring Tide Pools

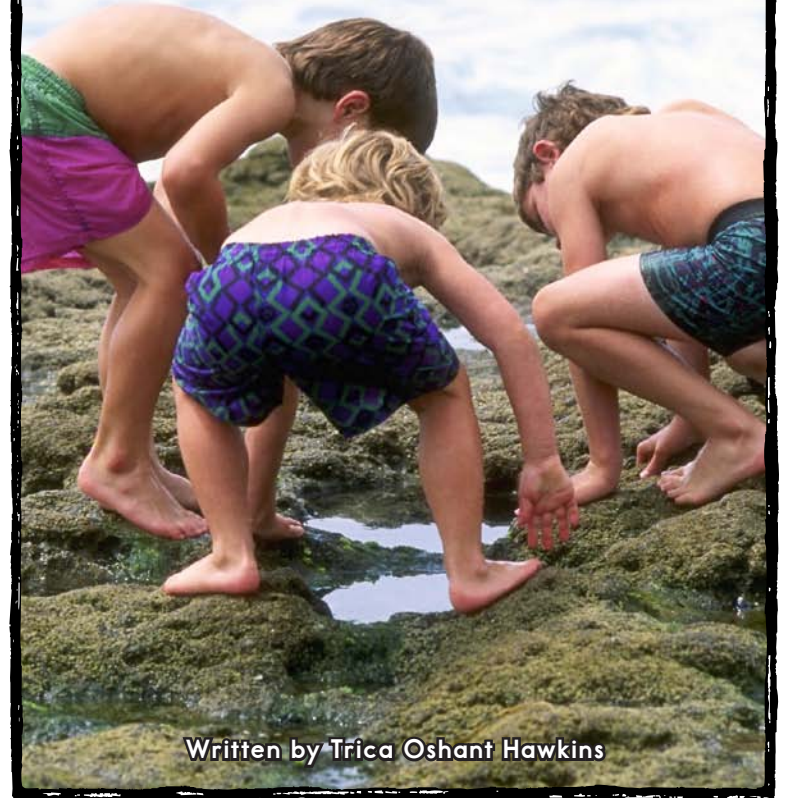
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Written by Trica Oshant Hawkins

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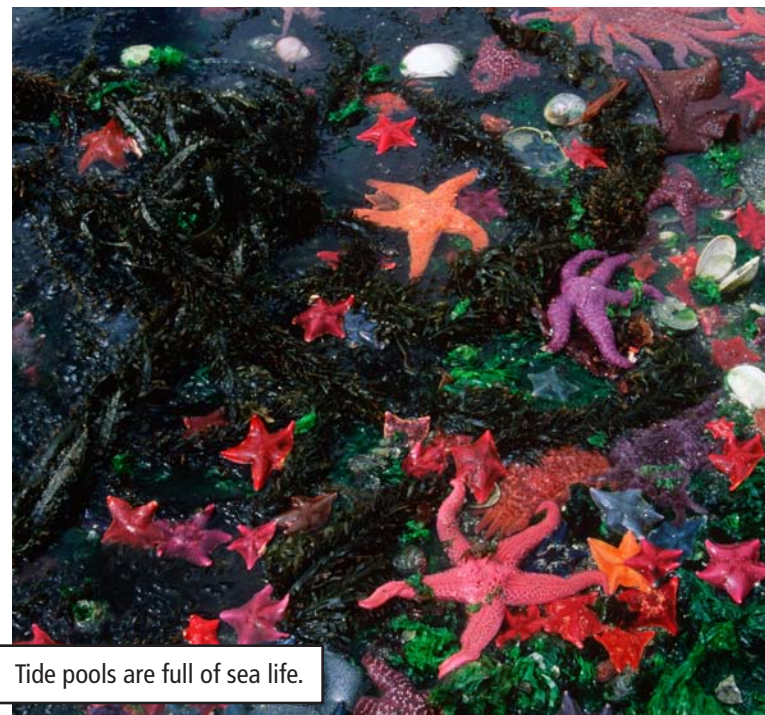
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Tide pools are full of sea life.

## What Are Tide Pools?

The tide is the rising and falling of the ocean where it meets the land. The tide rises and falls twice each day. In some areas, little pools of seawater are left behind when the tide goes out. These are tide pools. Most tide pools are found in low areas along rocky shorelines. You might also find small tide pools on sandy beaches. Any place along the shoreline that traps water creates a tide pool.

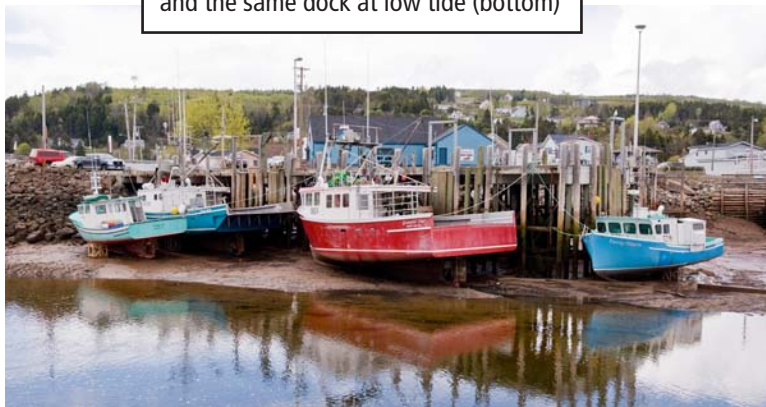


## What Causes Tides?

The tides are caused by the force of **gravity**. The sun and moon have strong gravity that pulls on Earth. This gravity pulls on both land and water. But only the water can move in response to gravity. When the sun and moon pull on Earth, they pull the ocean water into two mounds.



A dock with boats at high tide (top),  
and the same dock at low tide (bottom)

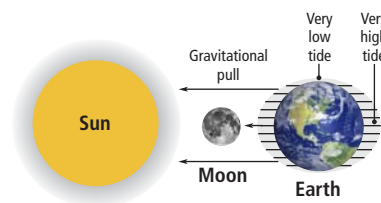


The **rotation**, or spin, of Earth causes the rising and falling of the tides. As land areas move into and out of where the water is in mounds, the tides slowly rise and fall. Since Earth makes one full rotation each day, there are two high tides and two low tides every 24 hours.

The moon also moves around Earth, and this movement affects the tides. Twice each month, the moon and sun line up. They pull on the ocean water together. Their combined gravity causes higher mounds of water, creating the highest and lowest tides of the month. These tides are called **spring tides**. At other times, the sun and moon pull against each other. At these times, the high tides are not as high, and the low tides are not as low. These are called **neap (neep) tides**.

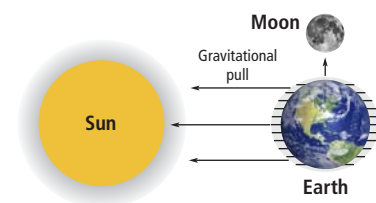
### Spring Tides

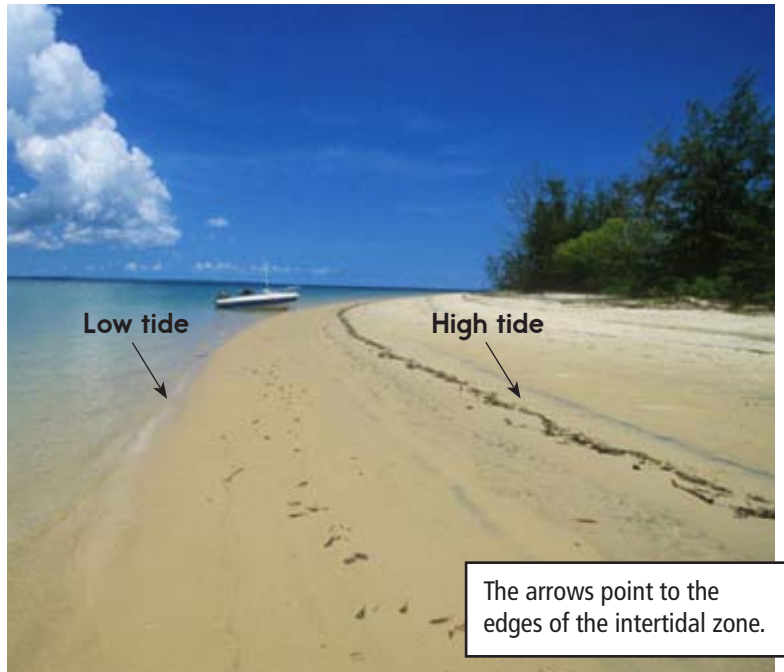
Sun and moon pull together and cause very high and low tides.



### Neap Tides

Sun and moon pull against each other and make smaller tides.





## The Intertidal Zone

The area along the shore between high tide and low tide is the **intertidal zone**. This area is covered by seawater during high tide and exposed to air during low tide. The area closest to the sea is only exposed to the air during the very lowest tides. The area farthest from the sea is only covered by water during the highest tides. Different creatures live in different parts of the intertidal zone, depending on whether they need air or water.



## What Is Life Like in a Tide Pool?

Tide pools are full of sea life. You can see these creatures when the tide goes out. Usually, the more places there are for animals to hide or attach themselves, the more animals you will find in a tide pool. The tide pools with the most animals usually occur in rocky areas. The material the animals live in or attach themselves to is called the **substrate**. In tide pools, the substrate is usually rocks or sand.



Surviving in the intertidal zone is difficult for the animals there. Imagine living where seawater washes in and out of your home every day! The animals in tide pools have to be able to deal with waves crashing over them. If they don't hang on tight or get out of the way, they could be tossed around, battered against rocks, or even swept away.



But it isn't just seawater that threatens the animals of the intertidal zone. Exposure to the air and sun is also dangerous. For an animal that needs to be covered by water, exposure to air causes two major problems. The first problem is drying out. The second problem is that these animals are suddenly exposed to **predators** looking for an easy meal. So how do intertidal-zone animals survive?



Intertidal animals have **adapted** to life in the tide pools. These animals are used to the tide coming and going from their homes every day. They have ways of clinging to rocks and finding protection from crashing waves. They have ways of preventing their bodies from drying out in the air. They also have ways of avoiding the beaks and jaws of predators.

How a tide pool animal survives depends on whether it is stuck in one place or can move around. Many animals are attached to the substrate, and they do not move around. This prevents them from being washed away.

Some animals, such as mussels, have very strong hair-like fibers that attach to the substrate. Other animals, such as barnacles (BAR-nick-els), create cementlike “glue” that they use to attach themselves to rocks. Because they cannot move around, these animals cannot escape from the sun, air, or predators.



Barnacles

Tide pool animals that are **mobile**, or can move around, are able to run, swim, and crawl. Some of these creatures are sea creatures that become trapped in tide pools during low tide. They cannot return to the sea until the high tide returns. But because they are mobile, they can seek shelter from the air, sun, and predators.



A crab on the move



Anemones need moisture to survive.

## Drying Out

Most stationary tide pool creatures have developed ways to protect their bodies from drying out. Some animals, such as barnacles and oysters, have hard shells that they can close or crawl into during low tide. Once in their shells, they have enough moisture to keep from drying out until high tide returns. The stationary animals most in danger of drying out are the soft-bodied creatures such as sea anemones (ah-NEM-oh-nees). These animals are usually found close to the ocean, where the low tide does not uncover them for very long. When the tide is out, they close up their bodies as much as possible to keep moisture from escaping.



Mobile tide pool animals have a better chance of survival, since they can move to prevent drying out in the sun and air. Many can dig into the sand, while others seek shelter under rocks or seaweed. A group of very thin crabs called slider crabs can slide their flat bodies into cracks between rocks. Slow-moving animals such as marine snails can hide inside their shells. They can actually close a little “trap door” to seal themselves inside. But usually there is enough water in a tide pool for mobile animals to swim or crawl about.



Crabs can hide in burrows in wet sand.



Crabs feasting on tiny sea creatures.

## Eating and Being Eaten

Eating and being eaten are facts of life everywhere, even in tide pools. Tide pool animals have unique and interesting ways of finding and eating food. Oysters and clams use hair-like parts to trap tiny animals floating in the water. Anemones and jellyfish sting tiny animals with their tentacles. An octopus uses its strong arms and suction cups to catch other animals. Crabs and lobsters use their claws to pick up food.



Tide pool animals also have amazing ways to avoid being eaten. Often, the way animals avoid drying out also helps them avoid being eaten. They simply slide under rocks or slip into their shells. Other tide pool animals run, scuttle, swim, or even jump to escape hungry predators. Some tide pool animals blend in with their surroundings. This helps them hide from predators.

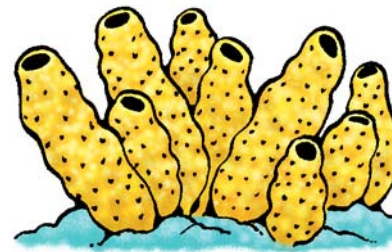


Seagulls will eat almost any small sea creatures they can find.

## What Lives in Tide Pools?

### *Invertebrates*

The most common kinds of animals in tide pools are called ***invertebrates***. These animals have soft bodies and no backbones. They range from creatures such as sponges and corals to creatures such as octopuses and sea stars. Invertebrates also include animals such as anemones, jellyfish, worms, crabs, shrimp, snails, and urchins. Invertebrates can be stationary or mobile. These drawings show invertebrates commonly found in tide pools.

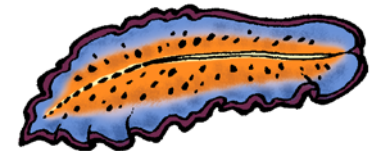


### ◀ **Sponges**

Lumpy, irregular bodies  
Small holes all over bodies  
Stationary; stuck to the substrate

### **Flat worms** ▶

Flat, worm-like bodies  
Mobile



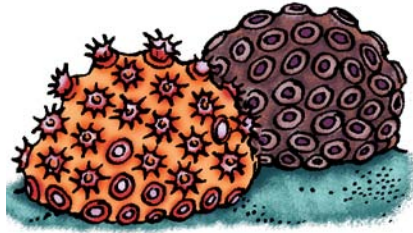
### **Segmented worms** ▶

Flat or round segments or sections  
Mobile



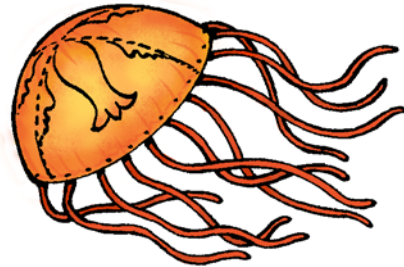
## Corals ▶

Hard skeletons or shells  
Soft bodies with tentacles  
Stationary



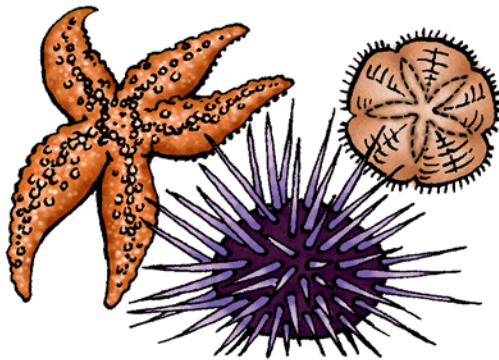
## ◀ Anemones

Flower-shaped bodies  
Tentacles with stinging cells  
Usually, but not always,  
stationary



## Jellyfish ▶

Bell or dome-shaped bodies  
Long tentacles with  
stinging cells  
Mobile



## ◀ Sea stars, sea urchins, and sand dollars

Spiny skin  
Bodies with sections  
arranged in a circle  
Can move slowly

## Snails and slugs ▶

Soft bodies  
Crawl on single "foot"



## ◀ Clams and oysters

Soft bodies  
Hard, two-sided shells  
Usually stationary,  
but can move  
in an emergency

## Octopi ▶

Soft bodies  
Hard beaks  
Eight arms  
Swim very fast





## **Barnacles** ►

Stationary;  
hard shells  
stuck to rock  
Segmented legs



## ◄ **Shrimp, crabs, and lobsters**

Segmented legs and  
bodies  
Hard outer shells  
Mobile

A kelpfish in a tide pool



## *Fish*

Another group of animals commonly found in tide pools is fish, which do have backbones. There are many types of fish that are adapted to life in the tide pools. Since tide pools are small compared to the ocean, fish that live in them are usually small. Other fish accidentally get trapped in tide pools when the tide goes out. These fish are not used to living in such a small space. They wait until the tide returns to swim off in the open sea.

## Land Animals

Many land animals also visit tide pools. The shallow water in tide pools makes it easy for these animals to find and eat sea creatures.

Many birds, including seagulls and ravens, eat oysters, mussels, and fish. Mammals such as raccoons and monkeys can scoop up animals and eat them.



A shorebird eating a shellfish

## Plantlike Organisms

There are also many plantlike organisms in tide pools. Most of these belong to a group called marine **algae**. They are also known as seaweed. There are many different types of seaweed, but only some of them are found in tide pools. Seaweed provides good hiding places for animals. It also provides a substrate to which some animals attach themselves or their eggs.



Marine algae, or seaweed



Tide pools are full of fascinating creatures.

## Exploring Tide Pools

Tide pools are fun to explore. They are like an aquarium full of sea creatures. If you ever go to the ocean, find a place where there are tide pools. The best places to find tide pools are rocky shores. Pay attention to the rising and falling of the tides. Usually newspapers near the oceans publish the times and heights of the tides. Remember, the lower the tide, the more you are likely to see.

When you find a tide pool to explore, there are some things you can do to help you see more creatures. It is best to move slowly and gently to avoid stepping on or crushing animals.



Sometimes it is a good idea to just stop and closely observe one small area that you find interesting. The longer you look, the more likely you are to see things.

Remember that the tide pool is home to many creatures. If you lift up a rock to look for creatures, do so gently. Always put rocks back where you found them. Check with an adult if you want to pick up a tide pool animal—some of them can sting! Put some water in your hand first to keep the animal moist. And always put sea creatures back where you found them. Animals need to stay in their tide pool homes. They don't make good pets and are likely to die if they are removed from the tide pool.

Be careful handling tide pool animals.



## Glossary

<b>adapted</b>	changed or shaped to work in a certain situation (p. 10)
<b>algae</b>	plant-like organisms, including seaweed (p. 21)
<b>gravity</b>	the force that pulls things toward very large objects (p. 5)
<b>intertidal zone</b>	the zone between the highest tide level and the lowest tide level (p. 7)
<b>invertebrates</b>	animals without backbones (p. 16)
<b>mobile</b>	can move around (p. 11)
<b>neap tides</b>	the smallest tides of the month that happen when the sun and moon pull against each other (p. 6)
<b>predators</b>	animals that hunt and eat other animals (p. 9)
<b>rotation</b>	spinning (p. 6)
<b>spring tides</b>	the greatest tides of the month that happen when the sun and moon line up (p. 6)
<b>substrate</b>	the material that tide pools animals attach themselves to or live in, usually rocks or sand (p. 8)