

# Tidepool Hike

**Location:** Dana Point Marine Protected Area

## Overview:

Guests/students will be guided out to Dana Point's Marine Protected Area (MPA) to explore the tidepools and the amazing creatures that live there. Instructors will be responsible for guiding guests, relaying the rules of the MPA, locating tidepool organisms, and educating about said organisms.

## Preparation:

- ❖ Gather tidepool backpack located in Sahm shark side tall cabinet
  - Backpack should contain...
    - First aid kit (check supplies before hike to make sure they are stocked)
    - Water bottle with fresh water for rinsing wounds
    - Tidepool guides
    - Trash bag for collecting trash along the way
- ❖ Check in with front desk on numbers/check-in status.
- ❖ Be at the front desk ready to greet guests no later than 5 minutes prior to hike start time.

## Performance Objectives:

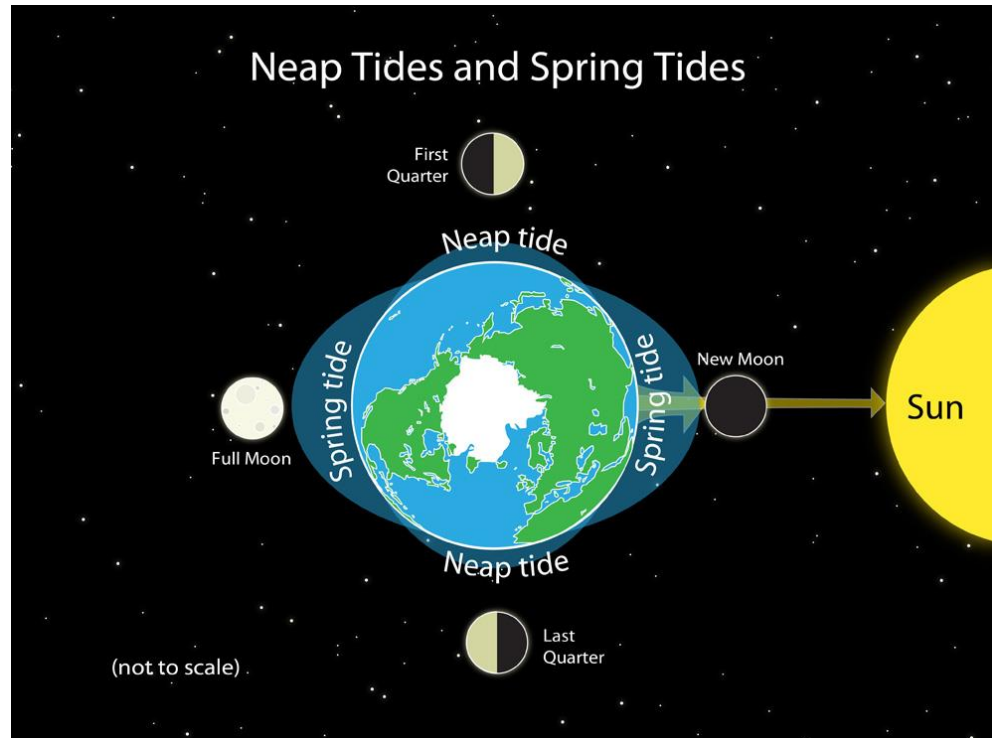
The public/students will be able to...

- ❖ Understand the importance of Marine Protected Areas
- ❖ Learn about the different species that live in rocky intertidal habitats
- ❖ Understand how tides work. Why do we have tidepools? What causes high tide and low tide?
- ❖ Explore the biodiversity of the intertidal zones! What are all the different tidal zones? Why do different species live in different zones?
- ❖ What adaptations do animals have to survive in this habitat?

## Hike Layout:

- ❖ Gather guests/students at the front of the gift shop and give tour intro
  - "Hello, my name is \_\_\_\_\_ and I'll be your guide today on our tidepool hike!"
  - Make sure everyone has everything they need (appropriate footwear, water, etc...)

- “This hike is a 2-hour guided experience through Dana Point’s Marine Protected Area. We will be hiking over rocky terrain so make sure you have appropriate footwear.”
- ❖ Make sure you have everyone and then begin walking to the Native Plant Garden
- ❖ Stop at the top of the stairs ...
  - What are tidepools?
    - Tidepools are the habitat that forms along the rocky intertidal zone along the coastline. When the tide comes in and out small pools of water form that serve as a microenvironment for organisms until the tide comes back in.
    - There are different zones along the tide lines where you can find different animals
    - All the animals we will see today are specially adapted to survive this harsh environment.
      - What makes the rocky intertidal zone a harsh environment?
        - ◆ Fluctuations in temperature, pH, and salinity
        - ◆ High energy wave action
        - ◆ Much more!
  - What is a tide and how does it work?
    - The tide is when the water level increases and decreases throughout the day.
    - This is caused by the gravitational pull by the moon (and the sun)
    - The Moon pulls the water on earth in an oblong blob. When the moon is in line with the sun (when it is a full or new moon) the pull is the greatest so that’s when we see the highest tides of the month. King tides occur when the sun, moon, and earth are all aligned.



- Introduce Marine Protected Area rules/guidelines
  - No taking anything from the MPA! Taking rocks and shells from our MPA takes precious calcium carbonate from the environment...
    - **OVERVIEW:** Ocean acidification is making it harder for shellfish and crustaceans to grow and maintain their shells. Shells are made from calcium carbonate! If we remove shells from the environment the calcium carbonate is leaving the system so there is less available for things to form new shells! (When we leave shells on the beach they eventually break down and dissolve so those molecules can be reused by new creatures!)
    - IN DETAIL:** Ocean acidification is an issue that our oceans are currently facing where the oceans are getting more acidic. There is naturally CO<sub>2</sub> found in our oceans, but the ocean absorbs 30% of CO<sub>2</sub> emissions from human activity. When it absorbs this excess CO<sub>2</sub> from the atmosphere it binds with H<sub>2</sub>O molecules and creates carbonic acid (H<sub>2</sub>CO<sub>3</sub>). This compound is weak and breaks down into a Hydrogen ion (H<sup>+</sup>) and bicarbonate (HCO<sub>3</sub><sup>-</sup>). This means that bicarbonate is being formed instead of carbonate, which is needed by shellfish/crustaceans to form and maintain their calcium carbonate shells (CaCO<sub>3</sub>).

- Watch where you step! There are many animals in the tidepools that might not necessarily look like animal. For example, when sea anemones are above the water they tend to cover themselves with sand and shell fragments to prevent themselves from drying out. This makes them look like sand!
  - Leave no trace/better than you found it!
    - Make sure to pick up after yourself and if you find trash pick it up! If you find trash with organisms however (Like algae, sponges, kelp, etc...) , leave it there since it is now a habitat! For example, a large lobster trap with kelp growing on it would have to stay! Everything else can be disposed of in the trash bag in the tidepool backpack.
  - Keep your hands to yourself! Please do not touch or pick up any live animals. You can pick up shells and rocks to get a closer look but be sure to put them back where you found them.
  - Never turn your back to the waves. Although the tide might be low the waves could still come up behind you and get you wet! The surge can get high, so even during low tide big waves can make it dangerous, so always watch the water!
  - Never run/jump from rock to rock! Many of the rocks are covered in rock weed or other algae that is extremely slippery! Running and jumping increases your likelihood of falling and getting injured.
    - Avoid any wet rocks or algae covered rocks to begin with for the same reason :)
  - On our hike out to the tidepools we are going to walk in a single file line behind the guide. The trail is along the cliff and it is a narrow path, so we have to make sure there is room for people to pass as well. Prevent from touching the cliff to keep rocks from falling.
- “Let me know if you have any questions and let's get started!” Start walking with the group.
  - Hike out to the point where the cliff starts to cut into the trail, the trail will disappear slightly before then.
  - Begin looking for animals!
    - Make sure to point out any animals you find. Show them hermit crabs, anemones, and more! Encourage them to look for things too. Look under rocks, but never move rocks to ensure you are not crushing animals by accident!

- Continue down the MPA. Depending of the time of the low tide you can either search on the way out and hike back, hike out to the end and search on your way back, or do a little of both. This is based on your preference as well. Just be sure to time everything accordingly and pay attention to the time while you're out there.
- For public tidepool hikes the guests can leave at any point or stay as long as they like. They are not bound to the tour group.
- School groups and summer camp groups must stay with the group for the entirety of the hike. Be sure to have chaperones or other instructors at the end and middle of the school group/camp while one guide leads the front.
- At the end of the hike throw out any trash and thank everyone for joining you on the tidepool hike. Make closing remarks:
  - “Thank you so much for joining me today on our Tidepool hike! Since the Ocean Institute is a non-profit all your ticket purchases, gift shop purchases, and donations go directly back to us, helping us continue to educate about the amazing animals we saw today, and supporting our mission to inspire people to learn by using the ocean as our classroom! We have many other offerings throughout the year if you would like to stay involved, just go to our website for more info or follow our socials to stay caught up with us!”

## **Additional Resources:**

- ❖ How do tides work?
  - <https://oceanservice.noaa.gov/facts/tidefrequency.html#:~:text=They%20are%20caused%20by%20the,coast%20experiences%20a%20low%20tide.>
- ❖ Marine Protected Areas
  - <https://wildlife.ca.gov/Conservation/Marine/MPAs>
  - <https://oceanexplorer.noaa.gov/facts/mpas.html>
- ❖ Ocean Acidification
  - [https://oceanservice.noaa.gov/facts/acidification.html#:~:text=Ocean%20acidification%20refers%20to%20a,CO2\)%20from%20the%20atmosphere.](https://oceanservice.noaa.gov/facts/acidification.html#:~:text=Ocean%20acidification%20refers%20to%20a,CO2)%20from%20the%20atmosphere.)
- ❖ Intertidal Species
  - <https://www.nps.gov/cabr/learn/intertidal-field-guide.htm>
- ❖ Adaptations to the intertidal zone
  - <https://www.nps.gov/articles/000/on-the-edge-the-curious-lives-of-intertidal-organisms-and-how-we-monitor-them.htm>

