



Save Our Seas: NAMEPA's Parent Survival Series - Week 2

Thank you for all the great comments we received from last week's Parent Survival Series! We are so pleased that this initiative has proven to be so valuable!

As more and more communities are going into lockdown, we know finding resources that can support the "new normal" is invaluable. Please see the lesson plan for this week (below) and don't forget the supplemental social media posts on NAMEPA's [Facebook](#) page where we will be targeting a specific activity or area of engagement for you to further explore. Please send us feedback, photos of your activities, and what your student thinks about working to "Save our Seas"!

Stay well—AND sane!

Best always,

Carleen

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Parent Survival Series

Lesson Plan Week 2

Ocean Literacy Principle 2 – *The ocean and life in the ocean shape the features of Earth*

Specific Learning Outcome

Your kids will learn how the ocean floor changes over time with plate tectonics and how the force of waves influence physical structure.

Guiding questions: Ask your kids what they know about...

1. Plate tectonics?
2. Erosion and what about the impact it can have on the shoreline?
3. Wave force?

Day 1: Plate Tectonics

Read with your child:

Sea level changes over time have expanded and contracted continental shelves, created and destroyed inland seas, and shaped the surface of land. Tectonic activity, sea level changes, and force of waves influence the physical structure and landforms of the coast.

Remember from last week - the five ocean basins contain many different geologic features including trenches, abyssal plains, continental shelf and undersea mountains.

Ask your child what they know about:

1) Plate Tectonics:

Plate tectonics is meant to describe the large-scale motion within Earth's lithosphere (the rigid outer layer of the Earth, consisting of the crust and the outermost layer of the mantle). There are seven major plates named after the continent or ocean they underlie.

2) What happens when plates collide?

- a. When plates serving landmasses collide, we see mountain ranges like the Himalaya's. Where these plates meet are called **convergent boundaries** and one plate will move beneath the other in what is called **subduction**
 - o Features include deep trenches, like Mariana's Trench from last week!
 - o As the sinking plate moves deeper into Earth's mantle, new magma rises and erupts from volcanoes creating **island arcs**. The islands of Japan and the Lesser Antilles are examples of this



- b. When plates drift apart, it's called a **divergent boundary**. The Mid-Ocean Ridge from last weeks lesson is an example!
- c. When plates slide past each other, the rocks begin to break causing earthquakes. These are called **fault-lines**. San Andreas Fault in California is a common example.



North American Marine Environment Protection Association

Activity: Create Your Own Ocean Basin

Principle 2: *The ocean and life in the ocean shape the features of Earth*

We are going to create our own ocean basin using the theory of plate tectonics.

You will need a large flat pan or tray, 2 pieces of paper, sand and a marker.

Step 1: Create a Transform Boundary:

1. Lay one piece of paper in your pan.
2. Lay the second piece of paper so that it overlaps the first by roughly 50%
3. Draw arrows on both pieces of paper, so that the arrows are parallel but face in opposite directions
4. Place the sand in the center of the two papers, spread it out so that it covers a square area and is roughly $\frac{1}{2}$ inch thick
5. The set up should resemble the image below
6. Pull the paper in the direction of the arrows, about $\frac{1}{2}$ an inch at a time

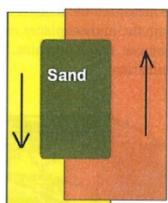


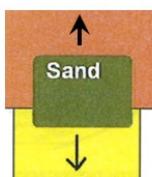
Figure 1: Transform Margin

- 7.
8. Briefly describe how the shape of the sand changed and what landforms (e.g., trenches, mountains) develop



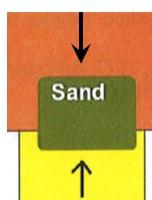
Step 2: Create a Divergent Boundary

1. Clear the sand from your tray
2. Lay one piece of paper in your pan.
3. Lay the second piece of paper so that it overlaps the first by roughly 50%
4. The arrows should be facing away from each other – if they are not, draw new arrows
5. Place the sand in the center of the two papers, spread it out so that it covers a square area and is roughly $\frac{1}{2}$ inch thick
6. The set up should resemble the image below
7. Pull the paper in the direction of the arrows, about $\frac{1}{2}$ an inch at a time
8. Briefly describe how the shape of the sand changed and what landforms (e.g., trenches, mountains) develop



Step 3: Create a Convergent Boundary

1. Clear the sand from your tray
2. Lay one piece of paper in your pan.
3. Lay the second piece of paper so that it overlaps the first by roughly 50%
4. The arrows should be facing towards each other – if they are not, draw new arrows
5. Place the sand in the center of the two papers, spread it out so that it covers a square area and is roughly $\frac{1}{2}$ inch thick
6. The set up should resemble the image below
7. Pull the paper in the direction of the arrows, about $\frac{1}{2}$ an inch at a time
8. Briefly describe how the shape of the sand changed and what landforms (e.g., trenches, mountains) develop





Follow Up Questions:

1. Do you live near a fault line?
2. What types of fault lines do we have in the United States?
3. What type of boundary creates the deepest ocean trenches?

Day 2: Wave Force

Read with your child:

Erosion—the wearing away of rock, soil and other biotic (living) and abiotic (nonliving) earth materials—occurs in coastal areas as wind, waves, and currents in rivers and the ocean move sediments.

Sand consists of tiny bits of animals, plants, rocks and minerals. Most beach sand is eroded from land sources and carried to the coast by rivers, but sand is also eroded from coastal sources by surf. Sand is redistributed by waves and coastal currents seasonally.

Ask your child what they know about

1) Erosion:

Erosion is the wearing away of rock, soil and other biotic (living) and abiotic (nonliving) earth materials

2) Waves:

Waves are commonly caused by wind. Surface waves are created by friction between wind and the surface water

3) How does the beach get its shape?

4) Does the beach change shape?

5) Where do the sand and shells on the beach come from?



Activity: Simulate Wave Action

Principle 2: *The ocean and life in the ocean shape the features of Earth*

You will need a dish that can hold water (lasagna pan), a buoyant object, and either sand or dirt.

First create a “beach” on one side with a gentle slope using sand or dirt. Fill the pan with water till half-way up the beach is covered. Then take a buoyant object (such as a small ball) and use it to create waves. Try different types of wave: gentle daily waves, faster storm surge waves, etc and see how the wave action shapes and/or erodes the shoreline.

If you do not have the supplies to do the activity, you can still talk about wave action, what it does to the beach and how the beach, water and sand, may change after intense storms and/or hurricanes. You can also find photos online of before and after storm pictures and how the shoreline has changed.

Follow up questions:

1. With normal wave action, did you notice a change in the shape of the sand?
2. What about when you created storm surge waves?
3. What can you do to reduce the impact of storms on the beach?