



Save Our Seas: NAMEPA's Parent Survival Series - Week 3

As we enter week 3 (or longer for some) of "social/physical distancing" and closures, it is heartening to see how really creative folks are!!! Not only are people finding new ways of connecting (don't you wish you owned stock in Zoom or Microsoft/Teams?) but also recognizing it is important to stay positive!! Outdoor "tailgate-style" friend gatherings, "foyer cocktails" for those in apartments and condos, and exchange of wonderful videos (just saw a 4 minute segment of dancing sequences from classic movies), and the opportunity to sing along with Disney's villain songs!!!

Physical exercise is a great way to alleviate restlessness AND boredom!!! Don't forget our exhortations to "move a muscle/change a thought". We will also be sending you our next "Change One Habit/Change The World" on Thursday. Why not save the planet while we "shelter in place"? Every effort we make is important, and instilling good environmental habits in young people can never start too early!!

Be well and safe!

Best always,

Carleen

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Parent Survival Series

Lesson Plan Week 3

Ocean Literacy Principle 3 – *The ocean is a major influence on weather and climate*

Specific Learning Outcome

Your kids will understand the role carbon (carbon dioxide) plays in the warming of the oceans and how this is a major influencer on our weather patterns.

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

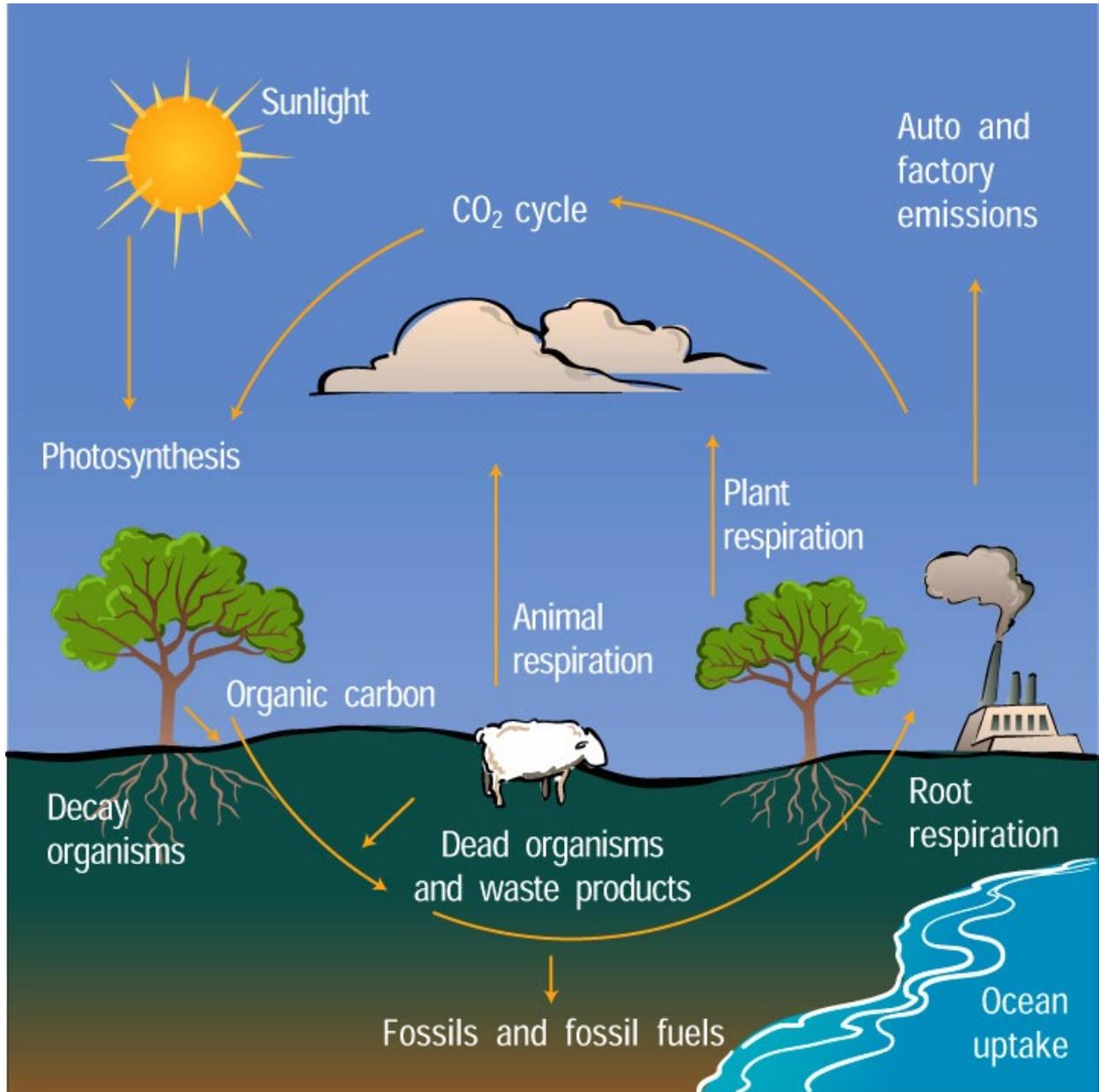
1. Carbon and Carbon Dioxide
2. The weather cycle, where rain comes from and what makes clouds
3. What happens to the carbon dioxide we breathe out?

Day 1: Carbon Dioxide

Read with your child:

Humans breathe in Oxygen (really a mixture of gases but they may not know that), our body uses it to fuel our brain and muscles. When we breathe out, we expel carbon dioxide (CO₂). **Carbon dioxide** is an unusable byproduct of animal respiration BUT is usable to plants! Just as we breathe "oxygen", plants breathe "carbon dioxide" using it for many functions and then expelling it as oxygen! We are perfect partners!! We need the oxygen they make, and they need the carbon dioxide that we make!

What you may not know is that the ocean contains far more plants than we see on land, therefore is responsible for absorbing a lot of the carbon dioxide in our atmosphere. When the ocean absorbs CO₂, the CO₂ reacts with the sea water and is transformed into an acid...resulting in the ocean becoming more acidic and making it more difficult for animals with shells, like oysters and clams, to form those shells.



Activity: Carbon Dioxide and the Ocean

Principle 2: *The ocean is a major influence on weather and climate*

Let's do a simple experiment so we can see the effect your CO₂ could have on the oceans and imagine that times the number of people and animals on earth!

Materials:

You'll need:

- Red cabbage
- Two cups
- Straw



Option 1: Roughly chop the red cabbage and boil in water, about 15 mins. The water should turn purple. Pour a small amount of purple water (cooled) in each of the two cups, a few teaspoons. Place the straw in one cup and blow, creating bubble. Careful, not too hard as you don't want the purple juice to come out of the cup

What is happening:

The CO₂ from your breath is reacting with the water and creating an acid, changing the color from purple to pink. In the other cup, you can observe the color and then add a small amount of baking soda if you'd like to see what basic water would look like. The plants (algae) in the ocean do a good job of using up the CO₂ but sometime can't keep up, causing a rise in the pH. Because our oceans cover roughly 70% of earth, they dominate the Earth's carbon cycle. Half the primary productivity on Earth takes place in the sunlit layers of the ocean and the ocean absorbs roughly half of all carbon dioxide added to the atmosphere.



Activity: Carbon Dioxide and the Ocean

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Option 2: Visit www.NAMEPA.net/education to create your own ocean acidification experiment! In our *Educator's Guide to the Marine Environment* Lesson 4: Shells in Acid

Follow Up Questions for Each Option:

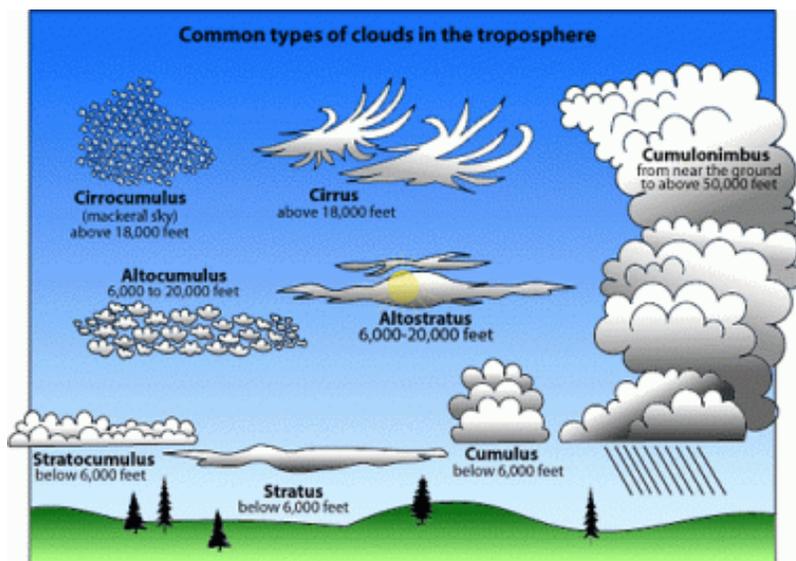
1. What are other sources of CO₂ in our atmosphere?
Fossil Fuel, Burning Forests
2. The Ocean absorbs a large amount of the CO₂ we produce, what land base places also contribute to removing it from the atmosphere?
Rain forest and mangrove forests

Day 2: Let's talk about the Water Cycle!

Read with your child:

Do you know where our rain comes from? What are clouds? Why do clouds look different? Do all clouds make rain? All these questions can be answered by understanding the weather/water cycles.

The Ocean is greatly influenced by our atmosphere, think about it, the atmosphere and ocean are always touching! It is this interaction (the touching of the atmosphere with the oceanic waters) that controls the weather and climate we experience each day because the energy is continually being transformed back and forth, from the ocean to the atmosphere and vice versa. The temperature of the water verses the temperature of the atmosphere will cause evaporation, causing clouds and possibly storms.





Activity: Carbon Dioxide and the Ocean

Principle 2: *The ocean is a major influence on weather and climate*

For a fun activity to get outside and identify clouds in your area, visit <http://www.NAMEPA.net/education> to learn all about clouds! In our *Educator's Guide to the Marine Environment* Lesson 10: Read the Skies, Clouds and Weather at Sea.

Follow Up Questions:

1. What types of clouds could you see at your house?
2. Do they produce rain?
3. What type of cloud/conditions produce hurricanes or tornadoes?