



# **PACIFIC MARINE MAMMAL CENTER CURRICULUM**

## **Why the Ocean Is Important - Presentation Content**

### **WHY IS THE OCEAN IMPORTANT TO US?**

No matter how far from the shore you live, the oceans affect your life and the lives of your families, friends, classmates and colleagues. The air you breathe, the water you drink, the food you eat, the products that keep you warm, safe, informed and entertained – all can come from or are transported by the ocean.

### **TAKE A DEEP BREATH - DO YOU LIKE BREATHING FRESH AIR?**

70% of our oxygen that we breathe comes from the ocean! – Phytoplankton are microscopic organic compound organisms that live in the top sunlit layer of the ocean's surface. These life sustaining tiny ocean plants produce oxygen through photosynthesis – using energy from the sun - a process that absorbs and converts carbon dioxide into oxygen and into the air we breathe. One of the most abundant and prolific phytoplankton, Prochlorococcus, is so small that millions can fit into a drop of water! Through photosynthesis these tiny organisms provide oxygen for one in every five breaths we take.

### **THE OCEAN DELIVERS BOUNTIFUL FOOD WORLDWIDE**

The ocean provides trillions of dollars in food yearly. Millions of people rely on the food, vegetation/kelp, and even the table salt that comes from the sea. It is estimated that the ocean provides more than 25% of the protein consumed worldwide. Some families go to the market and pick up their fish dinner while for some families, catching their dinner daily directly from the ocean is a way of life.

### **THE OCEAN PROVIDES MEDICINE FOR THE HEALTH OF OUR FUTURE**

The ocean's medicine chest provides us with sponges, shells of crabs, pearls, cuttlefish bones, sea cucumbers and many other marine animals for medicinal remedies. To name a few, lobsters and crabs showing us how our kidneys work, squids helping us understand how our nerves conduct electricity and horseshoe crabs teaching us about human vision! Other marine life, plants, fungi, bacteria also contribute to help cure human diseases such as cancer, leukemia, heart disease, topical wounds and infections. There are 18,000 health products derived from 4,800 marine species! Marine based drugs are vital because many infectious organisms have developed strains resistant to soil and plant based drugs. There are many possible medical cures from the ocean yet to be discovered.

### **THE OCEAN IS VITAL TO OUR ECONOMY BY CREATING JOBS**

Fishing is an ancient practice that dates back, at least, to the Upper Paleolithic period about 40,000 years ago. Today fishing employs over 500 million people worldwide. One of every six jobs in the U.S. is marine related, which generates 54 billion dollar a year. Seaside real estate – everyone wants to live by the ocean - more than 66% of the population lives approximately 60 miles of the coastline. Tourism



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provides revenue and livelihoods for small and large coastal towns with recreational activities like surfing, snorkeling, and whale watching. Who doesn't love to take a quiet walk on the beach? The ocean is an inspiration to many artists through the ages. And a Beach Clean-Up is a great way to enjoy the ocean and to do something good. The oceans are traveled yearly by thousands of Cruise, Passenger and Cargo ships transporting people and goods internationally.

### **THE OCEAN IS RESPONSIBLE FOR DRIVING OUR WEATHER PATTERNS**

The interaction between terrestrial surface winds and ocean currents create our climate patterns. They are often predictable; the heat carried westward by Pacific warm ocean currents causes powerful thunderstorms in Australia. In contrast the cold ocean surface on the east side of the Pacific creates high pressure areas and drought for the west coast of South America. The ocean moderates our planet's temperatures, the movement of air, high to low pressure, and warmer to cooler ocean currents, is responsible for most winds that blow across the Earth's surface. The Ocean absorbs 80% of the heat caused by global warming. What's the difference between climate change and weather? Weather can change from minute-to-minute, hour-to-hour, day-to-day and season-to-season. Climate change is the long term average of weather over time and space.

### **INTERDEPENDENCY - THE OCEAN, ITS' INHABITANTS AND US**

Sea Otters are a keystone species in our off shore environments. They eat urchins and other invertebrates that eat the giant kelp. Without sea otters, urchins prevent kelp forests from growing. Kelp forests are vital habitats for many marine animals. The sea otter also consumes crab that consume snail that live in estuaries (the nurseries of the oceans), and those very snails eat the algae that choke and kill the eel grasses, allowing for a growing, safe, flourishing habitat. Years ago sea otters were hunted almost to extinction for their fur coats. As a result life in Monterey Bay basically disappeared. With man's help sea otters have returned to the bay. Now the kelp is growing and the bay is healthy and striving again. Changes for one animal or a condition in an ecosystem often affects the entire ecosystem. The balance of nature in the oceans is just as important as it is on land. Every year, at Pacific Marine Mammal Center where we Rescue, Rehabilitate and Release seals and sea lions, we are alerted to new harmful conditions in our coastal waters through observations of the patients we treat. The health of all marine life and any changes in their wellbeing warns us of changes in the ocean environment.

### **MARINE RESEARCH & UNDERSTANDING**

It's an exciting time for young Ocean Stewards and marine career opportunities. Marine Conservation – the protection and preservation of marine life and ecosystems, focusing on the impact and limiting human-caused damage, restoring the ecosystems and the preservation of vulnerable marine species and marine ecosystems. Other career opportunities, to name a few - \*Marine Mammal Biologist Aquaculture



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Veterinarian \*Ecologist \*Oceanographer \*Microbiologist \*Marine Educator \*Aquatic Chemist  
\*Aquarium Curator \*Ocean Engineer

### **THE OCEAN -- IT'S WHAT WE DON'T KNOW!**

70% of planet earth is covered in water and 97% of that water is ocean and only 5% of all that has been explored! The oceans cover more than 70% of our planet's surface, hundreds of thousands and probably millions of species live in the ocean. Yet 95% of our oceans remain unexplored! We have yet to unlock the secrets of the ocean, from mapping and recording the geological floors and caves, discovering new biological life and chemical dynamics. There are organizations leading innovative research expeditions to investigate unexplored areas of our oceans. Healthy oceans are essential to our planet being healthy.



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