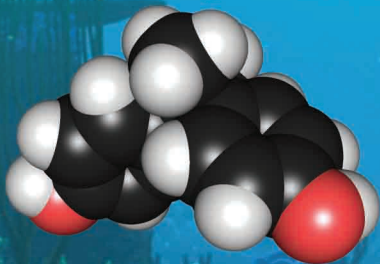


ISSUE NO 2

SCIENCE XPRESS



MOLECULE
OF THE MONTH



**THIS MONTH IN SCIENCE,
NEWS,
FUN & QUIZZES,
KIDS CORNER,
AND
MANY MORE...**



**JACQUES-YVES
COUSTEAU**



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DIVING DEEP; BENEATH THE BLUE WATERS...

Vol. No 1

September 2013

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DEDICATED TO

All Our Esteemed

Readers & Supporters Of

“THE SCIENTIFIC PEOPLE”



From The Chief Editor's Desk...

Greetings to all the esteemed readers of our e-magazine, **TSP SCIENCE XPRESS**. A month has passed, and once again, we are back with another issue, the second issue of the e-magazine. Upon the release of the magazine, all the members of The Scientific People had a dream- scientific empowerment of common man. To some, it might sound absurd, and unreal, and for others it might seem easy and feasible.

We are in the Age of Science, and we are advancing pretty fast towards every goal that we are dreaming of. We have more than hundred thousands of scientists in different countries of the world working for the development of a particular discipline, on a particular topic. With well-set goals and undisturbed attention as well as determination, our scientists perform meticulous studies on a particular subject, and lay out something new for us, almost every day. Ranging from a discovery about the Universe to any agricultural tool, everything is important for us.

However, time is quite precious for us, human beings. The knowledge of the value of time has proved to be a boon, as well as a bane for us, occasionally. There have been examples of us human beings not able to know what is happening around us, and that has created problems for one or multiple person(s). Well, I am sure that a question must be arising in our minds; How are facts related to Science, and why are we focusing on that? Everything in this world is Science, and Science is everything! We human beings emerged into the state we are in because of Science, and we have been able to survive because of the same too. What would have been the fate of mankind as of now if there would have been no wheels, or cell phones, or internet?

To emphasize the importance of Science & Technology in our daily life, we have started the venture of **TSP SCIENCE XPRESS** and will continue spreading knowledge as we have been doing. Knowledge is a birthright of every individual, and we respect the law of nature. Thus, we have been trying our best to make the magazine full of information which can satiate the quest of all our readers, of all age groups. We have also introduced a few new things and changed the layouts of the publication, which might make it more interesting for our esteemed readers. I am hopeful that our esteemed readers will find it worth reading, interesting, and will pass on to others to help everyone in collecting some pebbles of knowledge.

Happy reading and all the best!


(SUJIT KUMAR KAR)



CONTENTS

5 COVER STORY

Diving Deep; Beneath the blue waters...

10 BRISTOL CORNER

Molecule of the Month
Bisphenol A

11 The H₂O QUIZ

12 TSP SCIENTIST BIOGRAPHIES

Jacques-Yves Cousteau

14 PHOTO GALLERY

16 TSP 26 WORDS

18 FEATURED ARTICLE

Devil in the triangle, or
triangle in the devil?

21 THIS MONTH IN SCIENCE

23 IN THE NEWS

24 WORDA SCIDABRA


25 BOTANY QUIZ

27 TSP FACTS OF THE MONTH

29 KIDS CORNER

30 ANSWERS - ISSUE 1

Diving Deep; Beneath the Blue Waters



Of all the planets in the seemingly unending universe, our Earth is the only planet known to be habitable. Our planet is unique, it has several elements and entities to support life, of several forms; that we classify from unicellular to multicellular, terrestrial to aerial and so on. Among the life-supporting entities in our planet, "Biosphere" is the most essential part. Biosphere, as we know, is the proportional horizon of Lithosphere, Hydrosphere and Atmosphere, combined together to support life. Life on our Earth is intelligent, and occurs in various forms, and we will know about aquatic animals and plants in this issue.

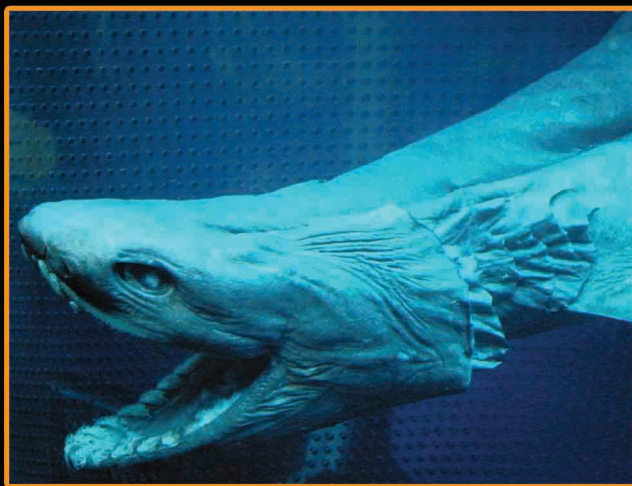
Aquatic organisms, as the term itself says, refers to the plants, animals and any other organisms living in water. In this issue of TSP SCIENCE XPRESS, let's dive down the blue waters in the ocean and seas, and find out the organisms that live beneath the freshwaters and saline waters in different parts of the world.

The term deep sea creatures refers to the organisms that live below the photic zone of the ocean, especially in the abyssal or hadal zones. These organisms have to survive in extreme conditions, such as hundreds of bars of pressure acting on them, lack of Oxygen, very little food, almost no sunlight and extremely low temperatures. Even for feeding, they have to depend on the food floating down from above. The abyssal or hadal zones, their habitats are in extremely deep regions of the ocean, starting from a depth of some thousands of metres below the surface. The water has a temperature of somewhere in between 3-10 degrees Celsius and has quite low levels of Oxygen. The pressure is always somewhere in between 20-1000 bars. And they still survive!

This survival is because of adaptation, the ability to adapt to conditions that are extreme, and not matching to that of one's own surroundings. Let's learn about some of these organisms in details.

Frilled Shark :

Often termed as a "Living fossil", the Frilled Shark is one of the two existing species of Sharks in the family Chlamydoselachidae, and is found in patches in the deep waters of the Atlantic and the Pacific Oceans. Having been caught in depths of almost 1,5000 metres, it is still known to be living in depths of 50-200 metres in some places. It reaches a length of about 2 metres, having an Eel like body, and fins placed far back. It has long and extremely flexible jaws that enable it to swallow the prey whole, and the small needle like teeth make it almost impossible for the prey to escape. Highly specialized to live in the deep sea, it has reduced and poorly calcified skeleton and an enormous liver filled with low density lipids which allow it to maintain its position in the water column without much effort.



Glowing Sucker Octopus :

As the name suggests, it is one of the very small number of octopuses having the ability to emit natural light from their bodies. In other words, it has the ability to exhibit Bioluminescence. These octopuses of the suborder Cirrina are one of the relatively less studied species of Octopuses, that come under the species of *Stauroteuthis syrtensis*. The length of their mantle varies from about 5-10 cm and width is around 4 cm. These eerily beautiful creatures have eight arms that are connected by webbing that the octopuses use to swim. The webbing gives the organism an umbrella like shape. A total of about 60 adhesive suckers are found in each of their arms. These organisms are found in North Atlantic Ocean at extreme depths of 500-4,000 metres. These organisms are known to emit light from about 40 modified suckers known as photopores situated on the underside of each of their arms. It is believed that the light is used by these animals for self-defence. They mainly feed on planktons and crustaceans for their diet.



Giant Spider Crab :

Thought to be the largest arthropods on Earth, these crabs of the species *Macrocheira kaempferi* spend their time foraging on the ocean floor at depths of about a thousand feet. Some of them can even measure up to 3.8 metres from claw tip to claw tip. These animals can weigh up to 19 kilograms each. Males have longer claws, whereas females have much shorter ones. It is quite different from the other crabs in many ways. The crabs are orange in colour, with white spots along the legs. They are known to be quite gentle, in spite of their ferocious appearance. These animals are mainly found off the Southern coasts of Honshu, an island of Japan. Adults can be found in depths ranging from 50 metres to 600 metres. They like to inhabit the vents and holes in the deeper parts of oceans. These organisms are omnivores, as they feed on both plants and animals. Sometimes, they are also known to act as scavengers, feeding on dead animals!



Giant Squid :

The elusive and giant organism, Giant Squid, is a mollusk that lives in deep seas and reaches a length of up to 60 feet. It is the largest known invertebrate in the World. The mantle reaches a size of about 2 metres, however it may grow more in case of females, and might be less in case of males. The length of the squid excluding the tentacles reaches almost 5 metres. They are carnivores, and are known to eat anything that they catch. There have been several unofficial reports of giant squids pulling boats, which pictures them as a very powerful predator. They have a mantle, eight arms and two long tentacles, which are the longest known in the cephalopod class. They attain sexual maturity at the age of three years, and females are known to produce a large number of eggs. They catch their prey with the two tentacles and grip their prey with the sucker rings at the ends. They are widespread, and inhabit all the oceans on Earth's surface, at depths of around 300-1,000 metres.



Chimaera :

These strange cartilaginous fishes use their long snout to scan over the sea floor for electrical impulses of their prey. They are commonly known as ghost sharks, ratfish or spookfish. They are the oldest and most enigmatic groups of fishes alive today. Based on their fossils record, they are one of the diverse and abundant group of fishes of a time. Their closest relatives are sharks. Chimaeras live in temperate ocean floors, at depths of around 2,500 metres. However, some of them are found at depths of around 200 feet. These order of fishes are known to have originated about 420 million years ago. There are 39 existing species. Chimaeras are put in the class Chondrichthyes of the phylum Chordata. They have elongated, soft bodies with a bulky head and a single gill opening. Some of the species are known to grow tails. In some of the species, the snout is modified into an elongated sensory organ. They have a skeleton constructed of cartilage. The males have retractable sexual appendages on their forehead and in front of their pelvic fins.



Pelican Eel :

Having enormous mouths, even larger than their bodies, Pelican eels are one of the types of deep-sea fishes that are rarely seen by humans. Their mouths are loosely hinged and can be opened to swallow much larger fishes than themselves. They have a pouch like lower jaw which resembles that of a pelican, hence the name, These animals are the only known members of the genus *Eurypharynx* or the family *Eurypharyngidae*. They belong to the order *Saccopharyngiformes*, which are closely related to eels. Their stomach can stretch and expand to accommodate larger meals, although they are known to eat small crustaceans. They are known to have small teeth, and use a whip like tail for movement. The end of the tail bears a complex organ with numerous tentacles, which glow pink and give occasional red flashes. These animals are known to grow about 1 metre in length, and have been spotted in temperate and tropical areas of all oceans. In North Atlantic, these organisms are known to be living in depths from 500 to 3,000 metres.



The Universe is a battle field, where living beings have to stand as warriors and struggle for existence. Similar is the case of these underwater organisms, which have been able to adapt themselves to these extreme conditions. Hypoxic environment, i.e. the lack of Oxygen, as said, is a major challenge. Even Photosynthesis cannot take place in these regions due to the lack of light, thus some of these organisms have been bestowed with the ability of chemosynthesis. Nature itself acts as a challenge, with effects such as gigantism that engulf some of the creatures in these regions. Enemies are never far away, and they all need to survive – thus is bioluminescence, that acts as a boon for some of these creatures. Every cloud has a silver lining, isn't it?

However, these natural paintings on the canvas of nature have not been completely discovered, we human beings have been able to explore a very less percentage of the whole seabed. And this article has presented to you all, a select few of them. Science is advancing, and thus we are; hopefully we will be able to find out more of these beautiful organisms in times to come!



Bristol Corner – Molecule Of The Month

August 2013 - Bisphenol A

Writer : Mie Monti, School of Ramiro do Maeztu, Madrid, Spain

Bisphenol A is a man-made molecule which was first prepared by Alexander Dianin.

It is an important industrial chemical, with the chemical formula $C_{15}H_{14}O_2$, and an IUPAC name of 4, 4'-(propane-2, 2'-diyl)diphenol.

It is synthesized by the condensation of Acetone with two equivalents of Phenol, using a strong acid such as Hydrochloric Acid as catalyst.

This compound is used mainly in plastic industries, since BPA acts as an antioxidant in plasticizers.

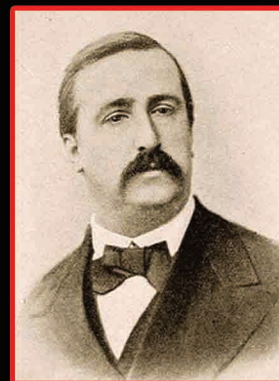
However, it has several ill effects on human health, such as influencing obesity, development of Cancer in body, and reduction of sperm count in men. Because of these ill effects, it has been advised not to be taken by women of reproductive age, and has been banned in some countries of the world.

Read more about Bisphenol A at :

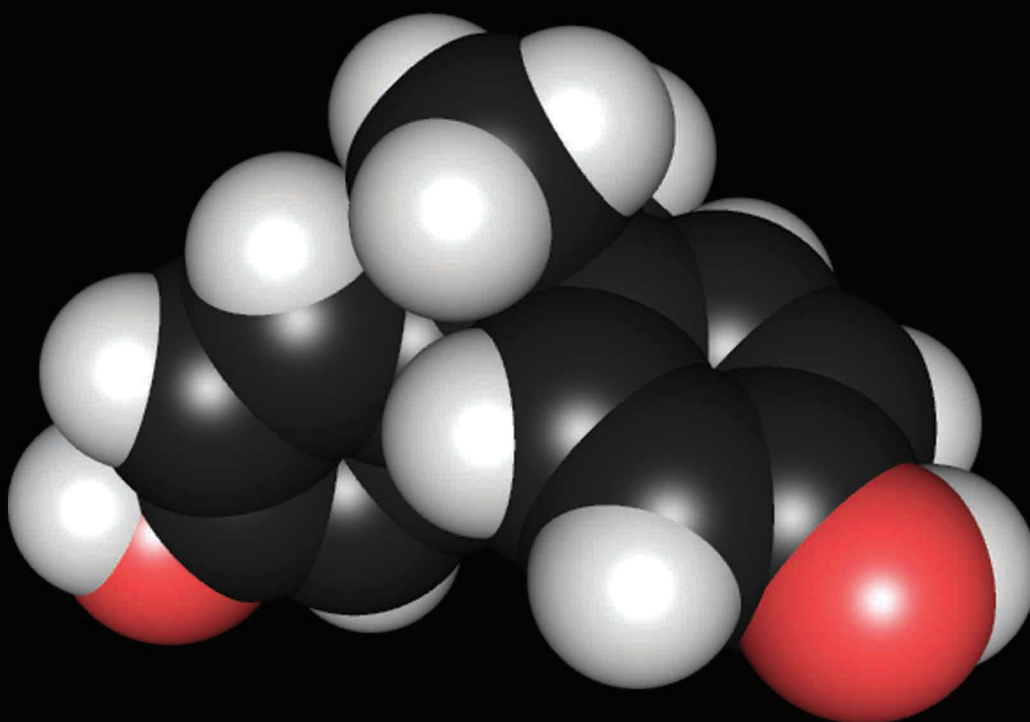
<http://www.chm.bris.ac.uk/motm/bisphenolA/Bisphenol%20A.pdf>

Bristol University - Molecule of The Month page :

<http://www.chm.bris.ac.uk/motm/motm.htm>



Alexander Dianin



THE H₂O QUIZ

1. What is the molecular weight of Water?

- (a) 18
- (b) 16
- (c) 20
- (d) 24

2. What is the vertical salinity gradient of water known as?

- (a) Thermocline
- (b) Halocline
- (c) Ecocline
- (d) Chemocline

3. Which life supporting entity deals with water on the surface of the Earth?

- (a) Lithosphere
- (b) Atmosphere
- (c) Magnetosphere
- (d) Hydrosphere

4. Which of the following is a source of freshwater?

- (a) Sea
- (b) Estuary
- (c) Ocean
- (d) Pond

5. What percentage of the Earth's supply is freshwater?

- (a) About 3%
- (b) About 15%
- (c) About 30%
- (d) About 90%

6. How many average glasses of water should a person drink everyday?

- (a) 2 glasses
- (b) 4 glasses
- (c) 8 glasses
- (d) 20 glasses

7. Which is the largest ocean in the world?

- (a) Arctic Ocean
- (b) Pacific Ocean
- (c) Atlantic Ocean
- (d) Indian Ocean

8. What are the organisms living in water known as?

- (a) Terrestrial Organisms
- (b) Extraterrestrial Organisms
- (c) Aerial Organisms
- (d) Aquatic Organisms

9. What are the huge chunks of ice that give rise to rivers known as?

- (a) Ice cap
- (b) Ice bed
- (c) Glacier
- (d) Avalanche

10. The process of water changing from liquid to gaseous state upon the action of heat is known as :

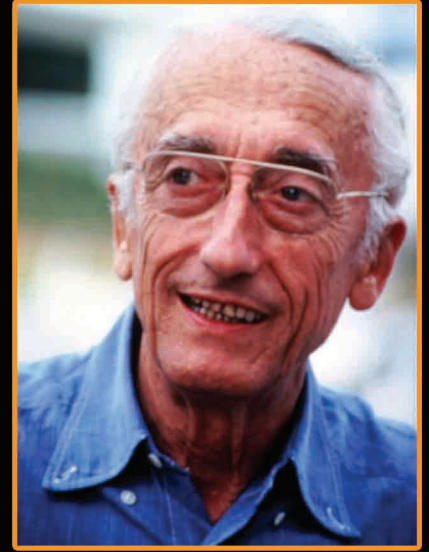
- (a) Evaporation
- (b) Condensation
- (c) Sublimation
- (d) Coagulation

TSP Scientist Biographies

Jacques-Yves Cousteau

(11 June 1910- 25 June 1997)

Jacques-Yves Cousteau, or Jacques Cousteau, as we know him, is a common name in the field of Oceanography. He was a well known explorer, conservationist, film maker, innovator, scientist, photographer, author and researcher who is known for his studies of the sea and marine life forms. He is known for all these achievements in several fields, along with his innovation of modern underwater diving. His pioneering role in the field of development in Oceanography, and his role in the development of Aqua-lung has given birth to today's open-circuit scuba technology.

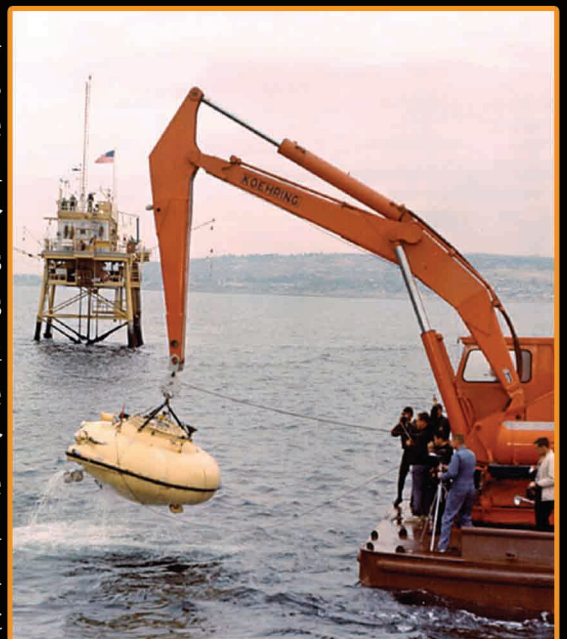


Early Life

Jacques-Yves Cousteau was born on 11th of June, 1910, in Saint-André-de-Cubzac, Gironde in France; to Daniel and Élisabeth Cousteau. Having completed his preparatory studies in Collège Stanislas of Paris, he entered the École Navale in 1930, and graduated as a gunnery officer. However, an unfortunate event of an automobile accident cut short his career in naval aviation. Later on, he indulged in his interest in the sea. He carried out his first underwater experiments in 1936, when he was in Toulon.

At a Later Stage...

On 12th of July, 1937, Cousteau married Simone Melchoir, and had two sons, Jean-Michel and Philippe. However, his wife breathed her last in 1990, after which Cousteau married Francine Triplet, and had a daughter Diane Cousteau and a son Pierre-Yves Cousteau. Later on, in the early 1940's, his efforts led to the innovation of modern underwater diving. Even he was given the charge to form the French Underwater Exploration Group. Later on, he founded the French Oceanographic Campaigns (FOC), and accomplished a lot, until the event of his sad demise on 25th of June, 1997, due to heart attack.

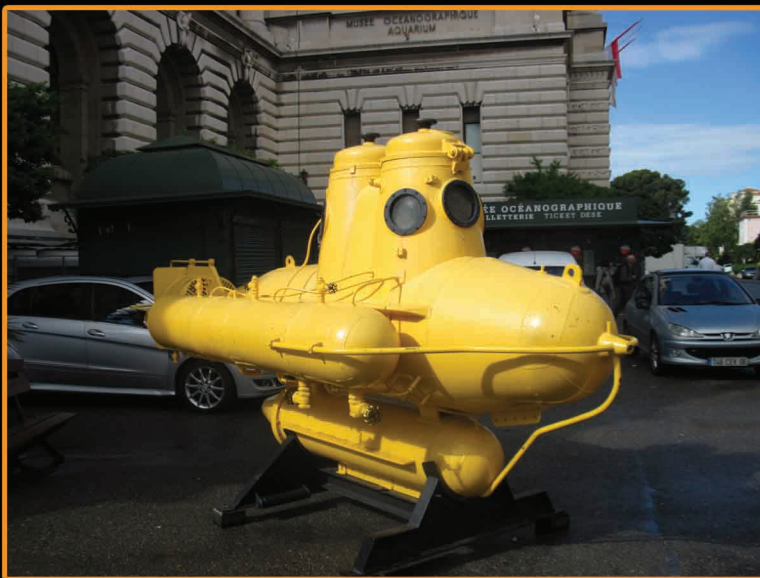


Contributions :

- Co-development of Aqua-lung, which gave birth to open-circuit scuba diving.
- Innovation of modern underwater diving.
- Set up the Underwater Research Group of France, Groupement de Recherches Sous-marines (GRS)
- Took part in a rescue mission and rescued Professor Jacques Piccard's bathyscape.
- Founded French Oceanographic Campaigns (FOC)
- Created Confédération Mondiale des Activités Subaquatiques.
- Filmed the aquatic worlds, and authored more than 45 books.

Awards and Honours :

Cousteau was conferred on the Grand Cross of the National Order of Merit, Commander of the Legion of Honour, Cross of War, Officer of the Order of Maritime Merit, Command of the Order of Arts and Letters, Honorary Companion of the Order of Australia, National Geographic Society's Special Gold Medal and many more awards and honours. He was also a regular consultant for the UN and the World Bank. Several authors have written books about him in his honor, and certain chronographs by the International Watch Company have been named after him.



Cousteau's submarine near Oceanographic Museum in Monaco



Classic twin-hose Cousteau-type aqualung

"The sea, the great unifier, is man's only hope. Now, as never before, the old phrase has a literal meaning: We are all in the same boat."

- Jacques-Yves Cousteau

PHOTO

GALLERY



Rattail fish
(*Macrouridae* sp.)



Atlantic wolffish
(*Anarhichas lupus*)



Giant Isopod
(*Bathynomus giganteus*)



Sea Anemone
(*Actiniaria*)



Vampire Squid
(*Vampyroteuthis infernalis*)

PHOTO

GALLERY



Pacific Viperfish
(*Chauliodus macouni*)



Ocean Sunfish
(*Mola mola*)



Ling
(*Molva molva*)



Hagfish
(*Myxiniidae*)



Fangtooth Fish
(*Anoplogaster*)

TSP 26 WORDS

A	Abyssal Plain	The flattened floor of the deep ocean offshore from the continental margin.
B	Bamboo Shark	A shark of the genus <i>Chiloscyllium</i> , which live in shallow waters around coral reefs and have bamboo like markings when young.
C	Carrageenan	An edible substance extracted from red algae, used as a thickener in foods, cosmetics and other products.
D	Doliolid	A deep-sea, pelagic tunicate.
E	Ebb	To flow away. At low tide, water ebbs back into the ocean.
F	Fluke	The flat tail flipper of a whale or other marine mammal.
G	Garibaldi	A bright orange fish that lives in warm waters, including the kelp forests off southern California.
H	Hadal	The deep sea region with trenches, below 20,000 feet (6,100 meters).
I	Ichthyology	The scientific study of fishes.
J	Jelly	Also called jellyfish, a drifting sea animal with a soft central disk and long tentacles.
K	Krill	Shrimp-like crustaceans that grow to two inches long. Large populations of krill provide the main food for baleen whales and some kinds of fishes.
L	Lingcod	A long-bodied fish that lives in cold Pacific waters.
M	Mesotech Sonar	A device on a remotely operated vehicle that's similar to an echo-sounder and shows the bathymetry (hills and valleys) of the seafloor.

TSP 26 WORDS

N	Net Pen	A system in which fishes are enclosed in a net or cage, with a facility of Water and waste to pass freely into the surrounding environment.
O	Ochre star	An extremely air tolerant sea star that lives in the intertidal zone. They are found in a variety of shades from purple to orange and brown depending on its location and the water temperature.
P	Pelagic	Refers to fishes and animals that live in the open sea, away from the coast or seafloor.
Q	Quintessential**	Ultimate; the finest example of something.
R	Radula	A rough tongue or band of horny teeth used by snails and other molluscs to scrape algae or bore into shells.
S	Sanddab	A type of small flatfish, caught for food along the California coast.
T	Tide Pool	A pool of water left along the shore as the tide level falls.
U	Upwelling	The movement of cold, nutrient-rich water from the ocean depths up toward the ocean surface.
V	Vertical Migration	An aquatic animal's daily or seasonal movement up toward the water's surface and back down to deeper water.
W	Wolf-Eel	A long, eel-shaped fish with large teeth, most common in northern Pacific waters.
X	Xerothermic Period**	A postglacial interval of a warmer, drier climate. Also known as xerothermal period.
Y	Yellowfin Tuna	One of the larger species of tuna, which has yellow markings on its fins and tail.
Z	Zooxanthella	Tiny, colorful algae that live in the tissues of corals.

** - Not directly related to theme

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