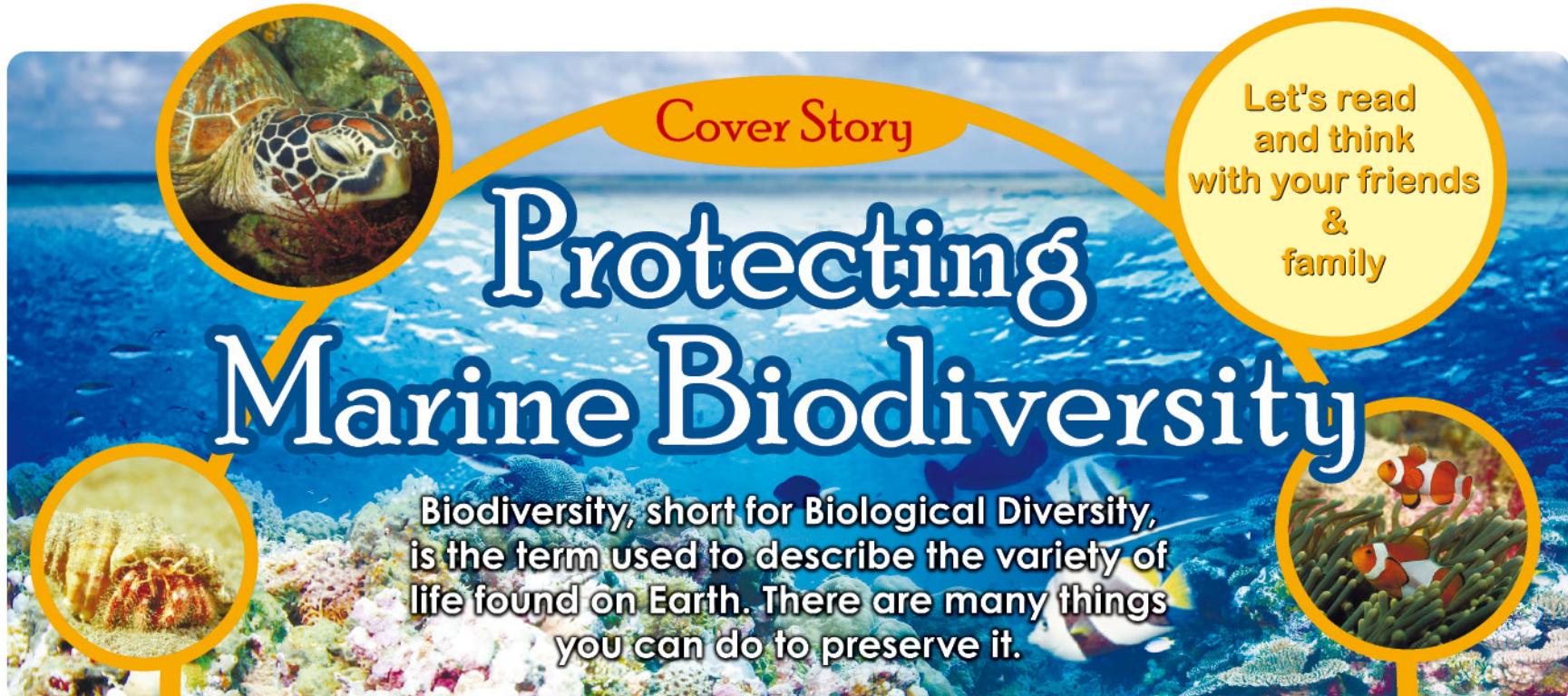


Learning sciences

Earth Kids Times

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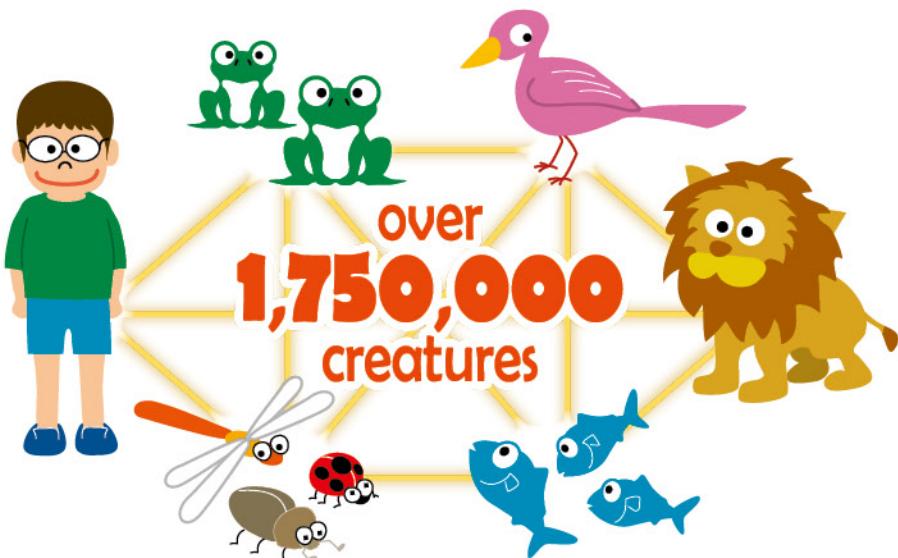
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What is Biodiversity?

There are currently 1.75 million different species on Earth. If we include other species which remain undiscovered or named by scientists, there would be more than 30 million species in the world!

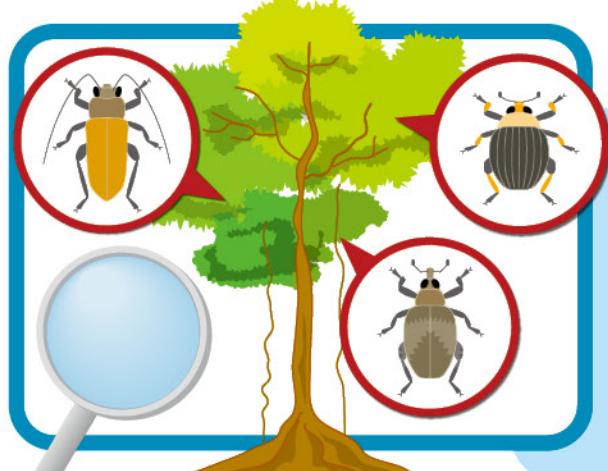
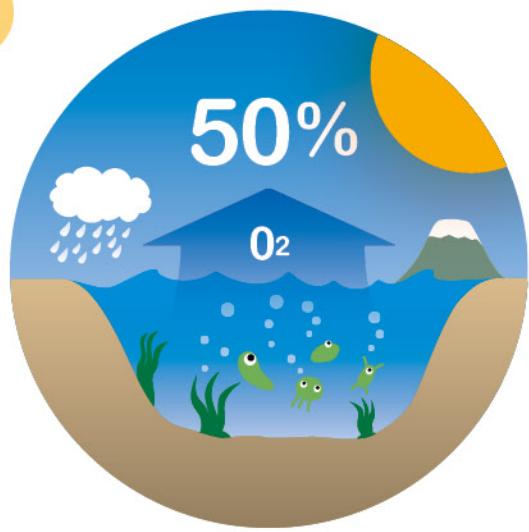
However, none of them can live on their own. The huge variety of species, including human beings, live together and are dependent on each other -- what we call Biodiversity.



Marine Biodiversity

Oceans cover 70% of the Earth's surface, which is why the Earth looks blue from the space, and is often called "the Planet of Water". There are over 1 million known species of plants and sea life on Earth, and scientists say there may be 9 million unknown species underneath the deep seas!

Marine Biodiversity is very important for all life on Earth because it is related to the Earth's overall environment. It is the tiny plankton floating in the oceans that produce more than 50% of oxygen on Earth, and it is the coastal systems such as mangroves, salt marshes and sea grass meadows that absorb carbon dioxide (CO₂) - 50 times more than that of the same area of tropical forest.



[page 2] ... Threats to Marine Biodiversity >>>

Column | 30 million species!? How did they get that number?

A scientist examined some trees in a rainforest, and counted the number of the beetles he found. He presumed that there lived about 160 kinds of beetles in a single tree. Using the hypotheses on the number of trees in the world's rainforests (50,000), the proportion of the beetles out of arthropods (40%) and so on, he finally estimated there would be 30 million species on earth. However, this number was based only on his hypotheses. There must be many species still to be discovered, and YOU can be the one to find one of these!



Threats to Marine Biodiversity

Unfortunately, Marine Biodiversity has been in rapid decline in recent years. Some of the main reasons are; overfishing, water pollution, habitat destruction, the introduction of invasive alien species, and global climate change. If there are no significant changes, more than half of the marine species on Earth may disappear by the year 2100. This loss would spread to the habitats of the oceans, making them unable to perform their required ecosystem functions, or causing them to lose their ability to fight back to their original state. Once lost, those conditions are hard to regain. Therefore, it is important to protect Marine Biodiversity, and use it in a sustainable way.



What We Can Do



There are many simple things you can do to protect the oceans. When you eat seafood, think about how it lives in the oceans. Being aware of marine life is a very good start. When you visit the beach, you could clean up before you leave. That is also an easy way to start. Furthermore, making sure that harmful chemicals will not go down your household drains, is a very effective way to protect the oceans. You might also want to participate in activities that promote the preservation of marine life.



The most important action of all is to educate yourself about Marine Biodiversity. The more you learn about the problems the oceans are facing, the more you will want to help preserve them— then why don't you share your knowledge and inspire others!



Column | The Sun and the Ocean

The Sun's rays of light give the Earth various benefits, however, these rays contain ultraviolet rays (UV rays) which harm all the plants and animals on Earth. So, why can we live safely and unharmed?

It is because we are protected by the Ozone Layer, which absorbs most of the UV rays from the Sun. Ozone is made from oxygen, and most oxygen is produced by plankton living in the oceans. The Sun and the Oceans are connected in this way, which is one of the important reasons we need to protect marine life.

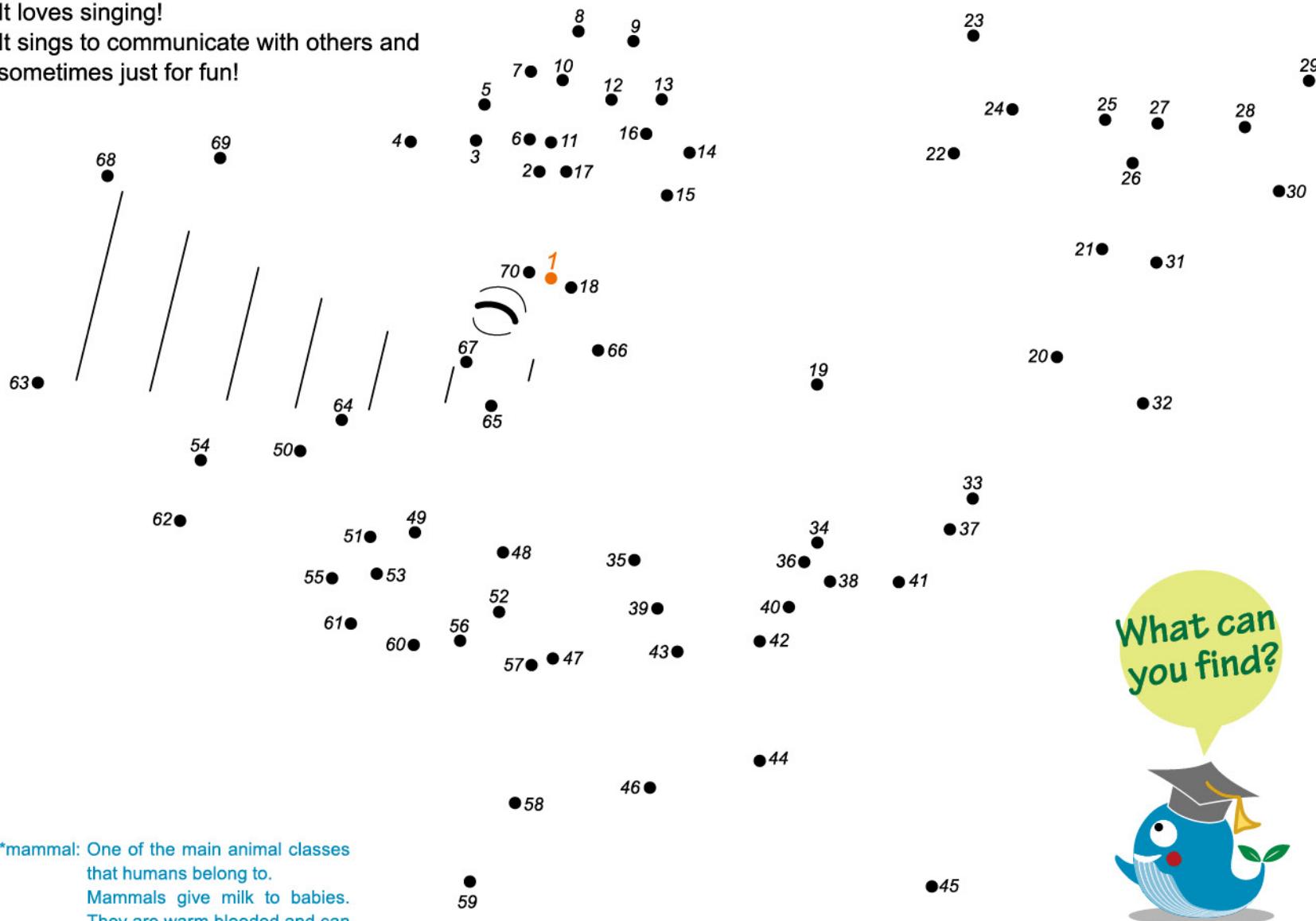


- What produces more than the half of the Earth's oxygen?**
- What are the threats to Marine Biodiversity?**
- What do you think you can do to protect the oceans?**

The Dot Quiz

Connect the dots from 1 to 70.

It's the largest animal that lives in the ocean.
It's a *mammal and breathes air as we do.
It loves singing!
It sings to communicate with others and sometimes just for fun!



*mammal: One of the main animal classes that humans belong to.
Mammals give milk to babies.
They are warm blooded and can maintain their body temperature.

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Let's start a Science!

A fun experiment known as the *Cartesian Diver*, where you can make the diver move up and down at your own will!
It's the same mechanism fish use to make themselves float and sink.



Things You Will Need

- ① An empty soda / soft drink bottle and cap *any size (from about 500ml to 2 liters)
- ② A plastic drinking straw *transparent ones are better for observation
- ③ Plastic covered paper clips ④ A tall glass or container to test the diver ⑤ Scissors



What you do!

1

Cut the straw about 10cm long.

2

Bend the straw in half. If your straw is the bending kind, use that part to make a U-shape.

3

Put the paper clips on both ends as weights.

* about 5 - 6 clips depending on the size of bottle you use.

4

Place the diver in a glass or container of water to check if it floats near the waters' surface.

* If it sinks, adjust the number of the clips. If it still sinks, try again with a new straw, as there may be an invisible crack or hole.

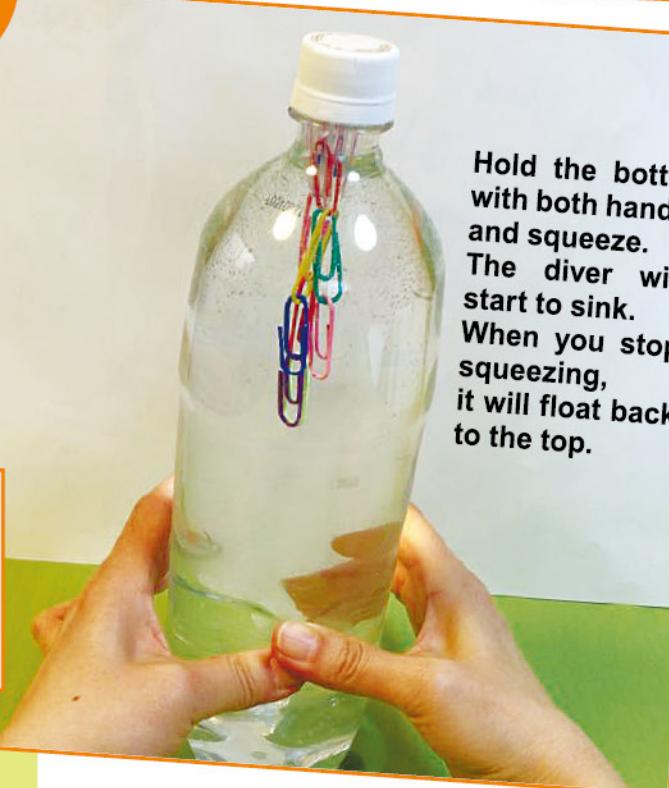


5

Fill the bottle to the top with water. Place the diver carefully into the bottle and screw on the lid.

6

Hold the bottle with both hands and squeeze. The diver will start to sink. When you stop squeezing, it will float back to the top.



What's happening in the bottle?

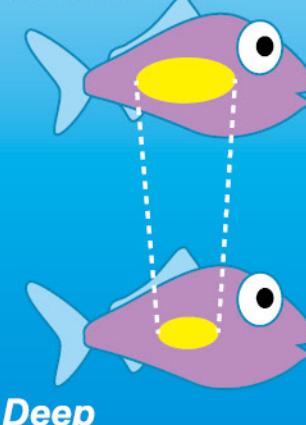
First, let's think about what makes things sink or float.

When you put something into water, the object is pushed upward with the force equal to the weight of water it displaced. That's what is called 'buoyant force'. As air is compressive while water isn't, the volume of the air inside the straw is decreased when you squeeze the bottle, giving it pressure. More water enters into the straw (if you look carefully at the straw as you squeeze, you'll notice the water level changing), which means the amount of displaced water decreases, and so does the buoyant force. The straw, therefore, starts to sink (meaning it becomes negatively buoyant).

When you stop squeezing, the air inside the straw expands again and moves the water out of the straw. This means the amount of displaced water increases, and so does the buoyant force and the straw floating back to the top (meaning it becomes positively buoyant).

How does this apply to fish?

Shallow



Deep

Most species of fish have a gas filled sac in its body (a swim bladder, or gas/air bladder). They can rise and sink in water by changing the volume of the gas, by just squeezing and releasing their muscles around the swim bladder. How amazing!