MARINE DEBRIS

We many be tiny, but we are powerful

Learn about microplastics and how they affect the ocean and marine life.

WHAT ARE MICROPLASTICS?

Microplastics are tiny, sometimes microscopic, pieces of plastic that find their way into our oceans and environment. The major sources of microplastics to our oceans are:

- Fragments of larger pieces of plastic pollution
- Foam pieces that break off larger foam material
- Microfibers from clothing and textiles
- Microbeads from toothpastes and cosmetics
- Tire particles left on the road after driving
- Nurdles (plastic pellets used to make plastic products)

HOW CAN SOMETHING SO SMALL MAKE SUCH A BIG IMPACT?

Microplastics DO NOT **biodegrade**, or break-down, in the environment. Larger pieces can break into smaller pieces, but will remain in the ocean for hundreds or thousands of years. Each year, millions of microplastics enter the ocean, adding to those that are already there. Microplastics continue to collect over time and wreak havoc on ocean life.

What does it mean to biodegrade? Let's say you finished eating an apple and put the core into your garden. If you checked on that apple every day, it would get smaller and smaller until it is completely absorbed, or has biodegraded, back into the environment. For an apple core, it takes about 1 month to biodegrade.

MICROPLASTIC SIZE

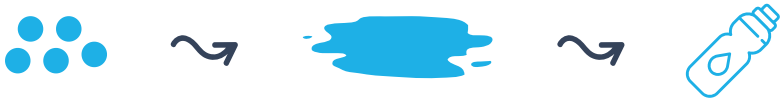
Microplastics are plastic pieces under 5 mm long. Just how big are they?

Ants are usually 2-3 mm long.

A grain of rice is about 2 mm long.

Dust is smaller than 1 mm.

Nurdles are created in factories to make plastics we use in our everyday lives (water bottles, to-go containers, plastic wrappers, etc). Each year, billions of pounds of nurdles are produced, melted, and shaped into everyday plastics.



For more information: "The nurdles' quest for ocean domination", TedEd, Kim Preshoff.

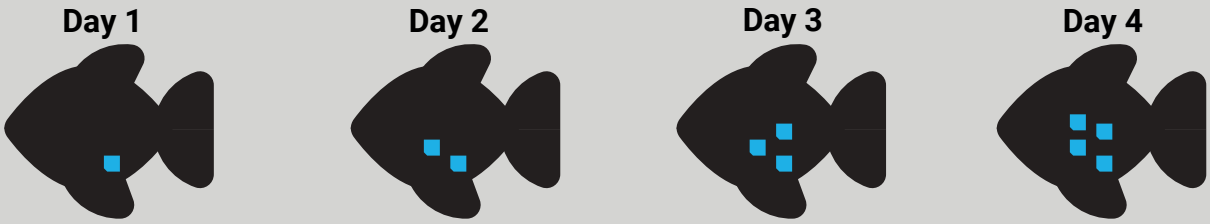
WHAT'S THE BIG PROBLEM ABOUT MICROPLASTICS?

Microplastics absorb toxic chemicals that are in the ocean, which make them quite harmful if they are ingested. Unfortunately, microplastics are becoming part of the food chain.

Marine animals eat based on size, so if something is smaller than them, it looks like dinner. Unfortunately, since microplastics are so small, they are confused for plankton and are eaten by fish and filter feeders instead of other small prey.

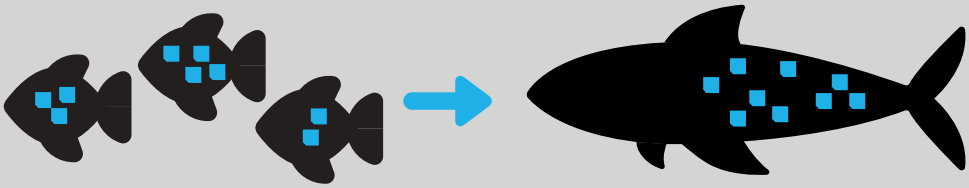
Microplastics do not easily digest, so they can stay in the guts of fish for their life. This is called **bioaccumulation**, when something is concentrated in a living thing. The toxic chemicals that were absorbed by the plastic will also bioaccumulate in the fish.

See how microplastics bioaccumulate if this fish eats a piece each day instead of plankton.

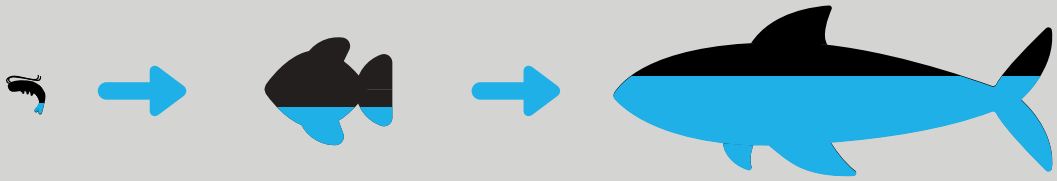


Microplastics and toxic chemicals bioaccumulate in animals and these will be transferred to any animal that eats them. Predators that eat a lot of fish can accumulate many microplastics and chemicals from their prey. The transfer of pollutants up the food chain, giving top predators the highest concentrations, is called **biomagnification**.

If this shark eats three fish each day, their pollutants will be transfer to the shark.



Overtime, the shark will have much greater concentrations of pollutants than other animals in the food chain because they are eating fish that have bioaccumulated toxins and plastics.

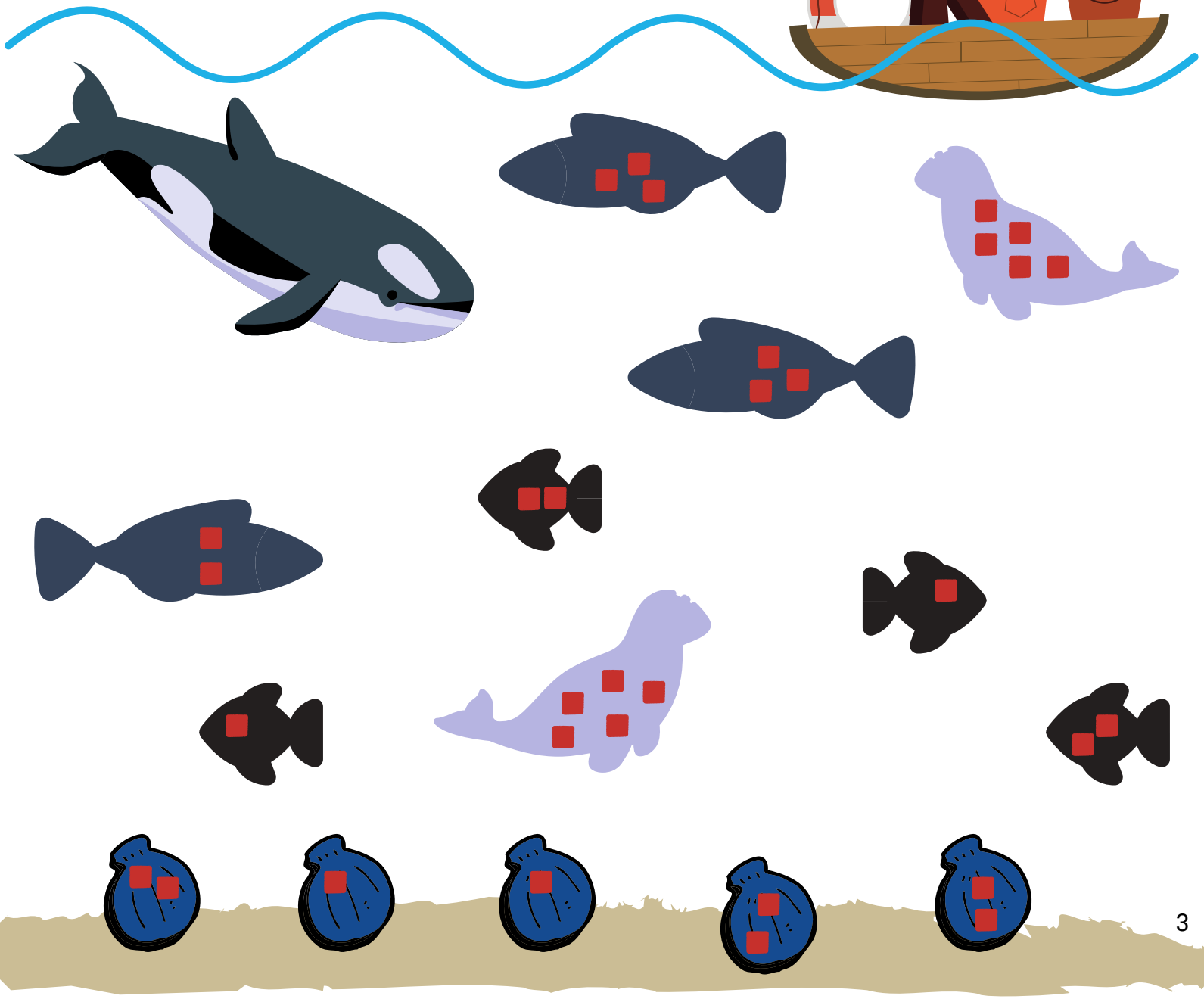


MICROPLASTIC FOOD WEB

*Microplastics affect all top predators, including humans. Help this fisherman and this orca catch their dinner. Draw a **square** around the orca's prey and a **circle** around the fisherman's food. Then, calculate the amount of total microplastics they eat on the next page.*

This fisherman wants: 1 small fish, 2 large fish, 4 clams

The orca wants: 2 small fish, 1 large fish, 1 sea lion



MICROPLASTIC FOOD WEB

Add up the amount of microplastics both predators get from their prey. Then answer the questions about microplastics in the oceans.

Total microplastics eaten by the fisherman:

_____ (small fish #1) + _____ (large fish #1) + _____ (large fish #2) + _____ (clam #1) + _____ (clam #2) + _____ (clam #3) + _____ (clam #4) = _____ (total)

Total microplastics eaten by the orca:

_____ (small fish #1) + _____ (small fish #2) + _____ (large fish #1) + _____ (sea lion #1) = _____ (total)

Question 1.

Who has the most microplastics inside of them? _____

Question 2.

Is it good to eat microplastics? Do we want to have more or less microplastics in our food?

_____

_____

_____

Question 3.

How can we stop microplastics from getting into the ocean and eaten by marine life?

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