



# MOUNTAINS





# MOUNTAINS



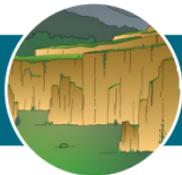
You see dust buried beneath  
rocky soil on the mountain.

**DRAW AGAIN**

to look for more nutrients

**OR**

**MOVE TO**  
the Loess Plateau



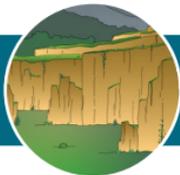
You see dust buried beneath  
rocky soil on the mountain.

**DRAW AGAIN**

to look for more nutrients

**OR**

**MOVE TO**  
the Loess Plateau



Eroding rocks create dust that is rich in iron. Living things need iron to grow and survive.

Fe

MARK ONE IRON SQUARE ON  
YOUR TRACKING SHEET

DRAW AGAIN

Eroding rocks create dust that is rich in iron. Living things need iron to grow and survive.

Fe

MARK ONE IRON SQUARE ON  
YOUR TRACKING SHEET

DRAW AGAIN

Eroding rocks create dust that is rich in iron. Living things need iron to grow and survive.

Fe

MARK ONE IRON SQUARE ON  
YOUR TRACKING SHEET

DRAW AGAIN

You see dust buried beneath  
rocky soil on the mountain.

**DRAW AGAIN**

to look for more nutrients

**OR**

**MOVE TO**  
the Atmosphere



You see dust buried beneath  
rocky soil on the mountain.

**DRAW AGAIN**  
to look for more nutrients

**OR**

**MOVE TO**  
the Atmosphere





You see dust that has piled up over many years, forming a **Loess Plateau**.

**MOVE TO**  
the Loess Plateau





You see dust that has piled up over many years, forming a **Loess Plateau**.

**MOVE TO**  
the Loess Plateau

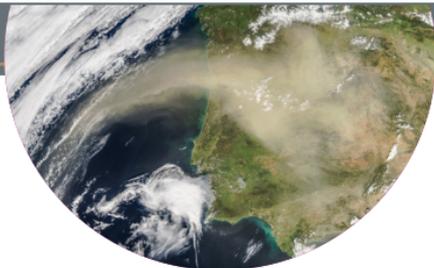




You see dust that has piled up over many years, forming a **Loess Plateau**.

**MOVE TO**  
the Loess Plateau

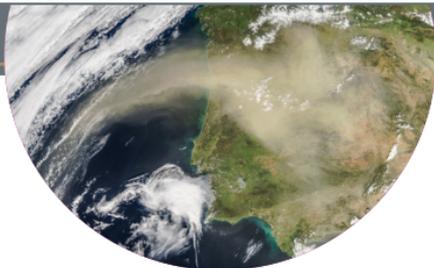




You see dust being carried  
high into the **atmosphere** by  
winds.

**MOVE TO**  
the Atmosphere





You see dust being carried high into the **atmosphere** by winds.

**MOVE TO**  
the Atmosphere



You see rain wash dust down  
from the mountains into **lakes**  
and **rivers**.

**MOVE TO**  
the Lakes & Rivers



You see rain wash dust down  
from the mountains into **lakes**  
and **rivers**.

**MOVE TO**  
the Lakes & Rivers





# LOESS PLATEAU





# LOESS PLATEAU



Loess deposits are made of dust from the mountains. Dust contains lots of iron.

Fe

MARK ONE IRON SQUARE ON  
YOUR TRACKING SHEET

DRAW AGAIN

Loess deposits are made of dust from the mountains. Dust contains lots of iron.

Fe

MARK ONE IRON SQUARE ON  
YOUR TRACKING SHEET

DRAW AGAIN



You see plants growing on the loess plateau. Roots stop the dust from blowing away.

**DRAW AGAIN**  
to look for more nutrients

**OR**

**MOVE TO**  
the Lakes & Rivers





You see plants growing on the loess plateau. Roots stop the dust from blowing away.

**DRAW AGAIN**  
to look for more nutrients

**OR**

**MOVE TO**  
the Lakes & Rivers





You see dust buried in the loess plateau. It is buried deeper and deeper over many years.

**DRAW AGAIN**

to look for more nutrients

**OR**

**GO BACK TO**  
the Mountains





You see dust buried in the loess plateau. It is buried deeper and deeper over many years.

**DRAW AGAIN**

to look for more nutrients

**OR**

**GO BACK TO**  
the Mountains





You see people carving  
into loess deposits to build  
their homes.

**DRAW AGAIN**  
to look for more nutrients

**OR**

**MOVE TO**  
the Atmosphere





You see people carving  
into loess deposits to build  
their homes.

**DRAW AGAIN**  
to look for more nutrients

**OR**

**MOVE TO**  
the Atmosphere



You see dust swept away  
by the rain that falls on the  
loess plateau. The dust flows  
into a river.

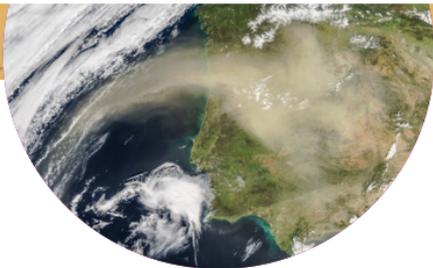
MOVE TO  
the Lakes & Rivers



You see dust swept away  
by the rain that falls on the  
loess plateau. The dust flows  
into a river.

MOVE TO  
the Lakes & Rivers

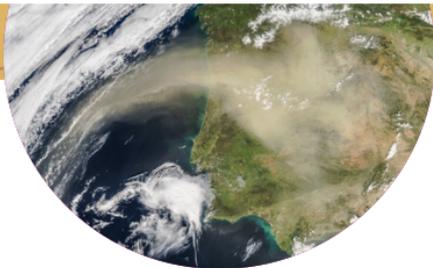




You see dust carried into the  
**atmosphere** by the wind.

**MOVE TO**  
the Atmosphere





You see dust carried into the  
**atmosphere by the wind.**

**MOVE TO**  
the Atmosphere





You see dust caught up in a  
strong storm that carries it  
back to the mountains.

GO BACK TO  
the Mountains

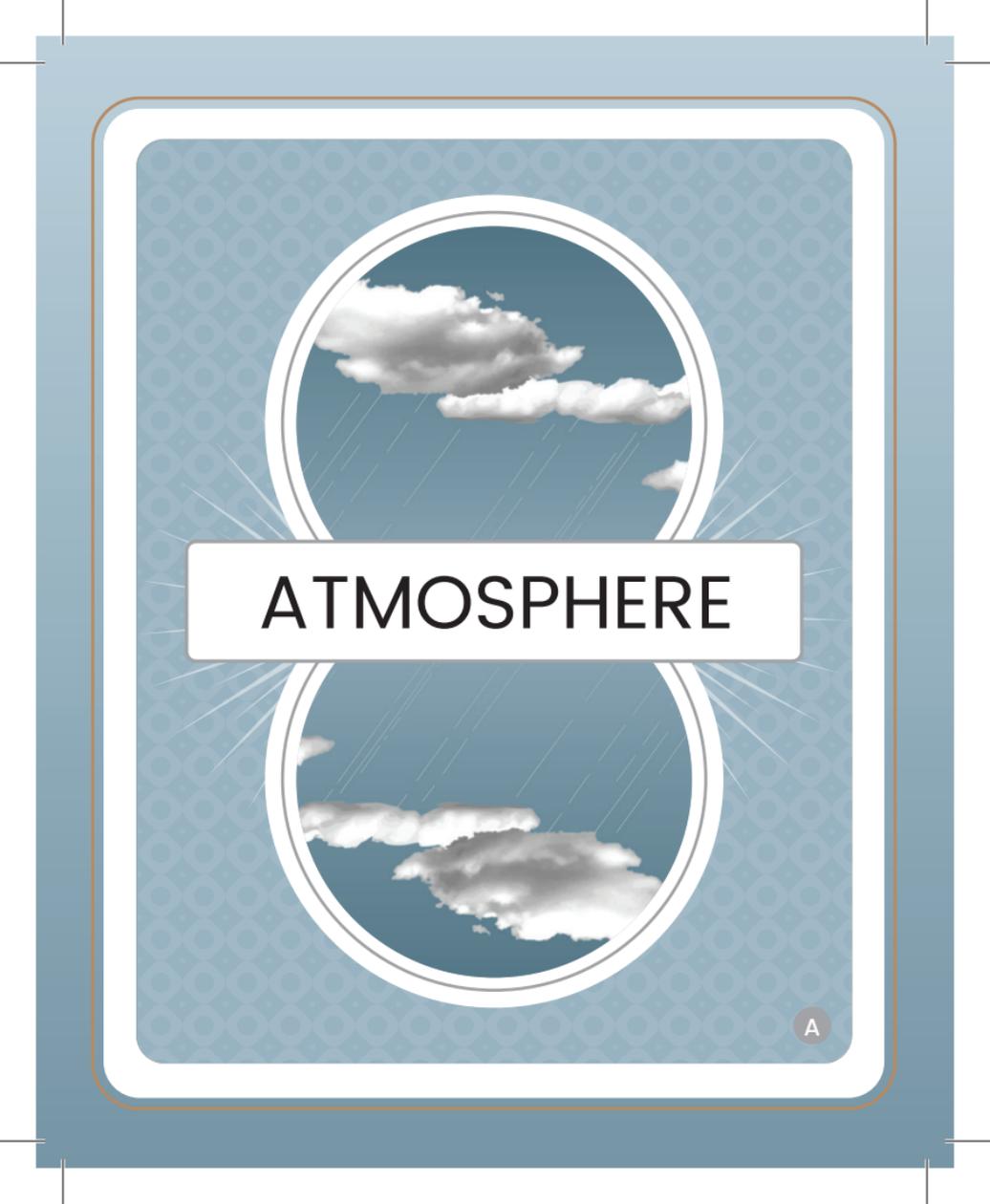




You see dust caught up in a  
strong storm that carries it  
back to the mountains.

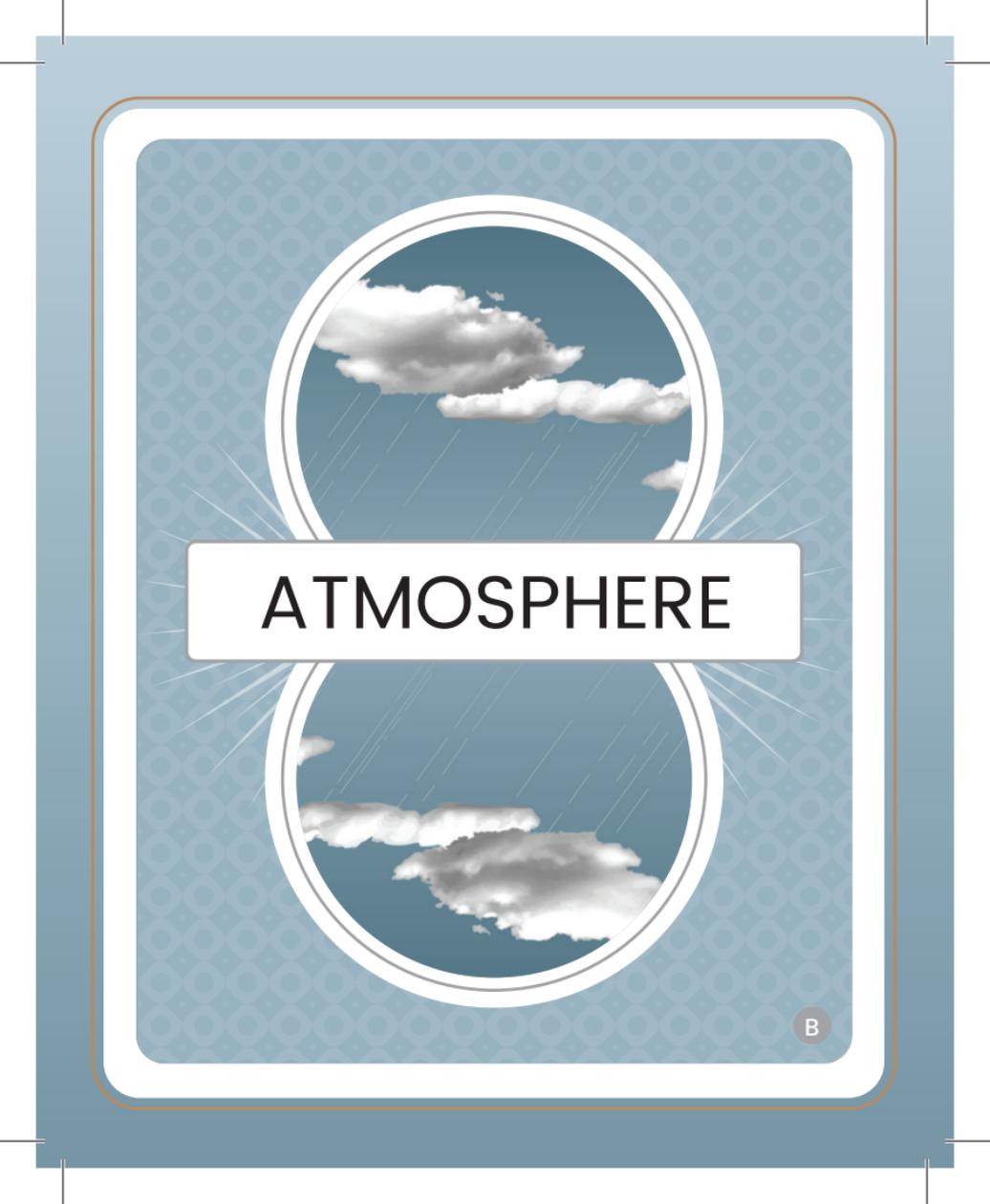
GO BACK TO  
the Mountains





# ATMOSPHERE

A



# ATMOSPHERE

B



You see dust in a cloud.  
Tiny particles of dust help  
clouds form.

**DRAW AGAIN**

to look for more nutrients

**OR**

**MOVE TO**  
the Loess Plateau





You see dust in a cloud.  
Tiny particles of dust help  
clouds form.

**DRAW AGAIN**

to look for more nutrients

**OR**

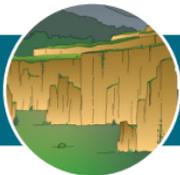
**MOVE TO**  
the Loess Plateau





You see dust within  
raindrops falling onto the  
**Loess Plateau.**

**MOVE TO**  
the Loess Plateau



You see dust carried by  
strong winds settle onto  
**lakes and rivers.**

MOVE TO  
the Lakes & Rivers



You see dust carried by  
strong winds settle onto  
**lakes and rivers.**

**MOVE TO**  
the Lakes & Rivers





You see a cloud of dust  
settle into the ocean.

**MOVE TO**  
the Upper Ocean Layer





You see dust in raindrops  
falling into the ocean.

**MOVE TO**  
the Upper Ocean Layer





You see dust in raindrops  
falling into the ocean.

**MOVE TO**  
the Upper Ocean Layer





You see dust carried by  
strong winds settle back onto  
the mountains.

GO BACK TO  
the Mountains





You see dust carried by  
strong winds settle back onto  
the mountains.

GO BACK TO  
the Mountains





78% of the atmosphere is nitrogen. Special bacteria that live in the soil and water use nitrogen from the air to grow.

N

MARK ONE NITROGEN SQUARE  
ON YOUR TRACKING SHEET

DRAW AGAIN



78% of the atmosphere is nitrogen. Special bacteria that live in the soil and water use nitrogen from the air to grow.

N

MARK ONE NITROGEN SQUARE  
ON YOUR TRACKING SHEET

DRAW AGAIN



78% of the atmosphere is nitrogen. Special bacteria that live in the soil and water use nitrogen from the air to grow.

N

MARK ONE NITROGEN SQUARE  
ON YOUR TRACKING SHEET

DRAW AGAIN



# LAKES & RIVERS



A



# LAKES & RIVERS



B

You see dust floating  
in the river.

**DRAW AGAIN**

to look for more nutrients

**OR**

**MOVE TO**  
the Upper Ocean Layer



You see dust floating  
in the river.

**DRAW AGAIN**

to look for more nutrients

**OR**

**MOVE TO**  
the Upper Ocean Layer



You see dust that settled at  
the bottom of a lake.

**DRAW AGAIN**  
to look for more nutrients

**OR**

**MOVE TO**  
the Loess Plateau



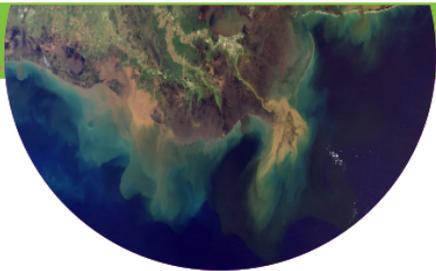
You see dust that settled at  
the bottom of a lake.

**DRAW AGAIN**  
to look for more nutrients

**OR**

**MOVE TO**  
the Loess Plateau

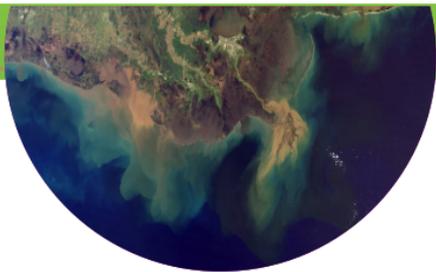




You see dust carried by a river wash into the ocean.

**MOVE TO**  
the Upper Ocean Layer

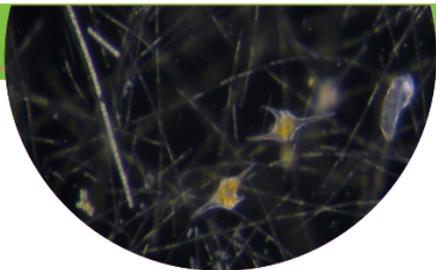




You see dust carried by a river wash into the **ocean**.

**MOVE TO**  
the Upper Ocean Layer





You see phytoplankton in lakes and rivers using the iron-rich dust to live and grow.

**DRAW AGAIN**

to look for more nutrients

**OR**

**MOVE TO**  
the Atmosphere



You see water vapor and  
nitrogen gas moving from  
lakes and rivers into the  
**atmosphere.**

MOVE TO  
the Atmosphere



You see water vapor and  
nitrogen gas moving from  
lakes and rivers into the  
**atmosphere.**

MOVE TO  
the Atmosphere



Plants and animals living in the rivers release **nitrogen** into the water after they die.

N

MARK ONE NITROGEN SQUARE  
ON YOUR TRACKING SHEET

DRAW AGAIN

Plants and animals living in the rivers release **nitrogen** into the water after they die.

**N**

MARK ONE NITROGEN SQUARE  
ON YOUR TRACKING SHEET

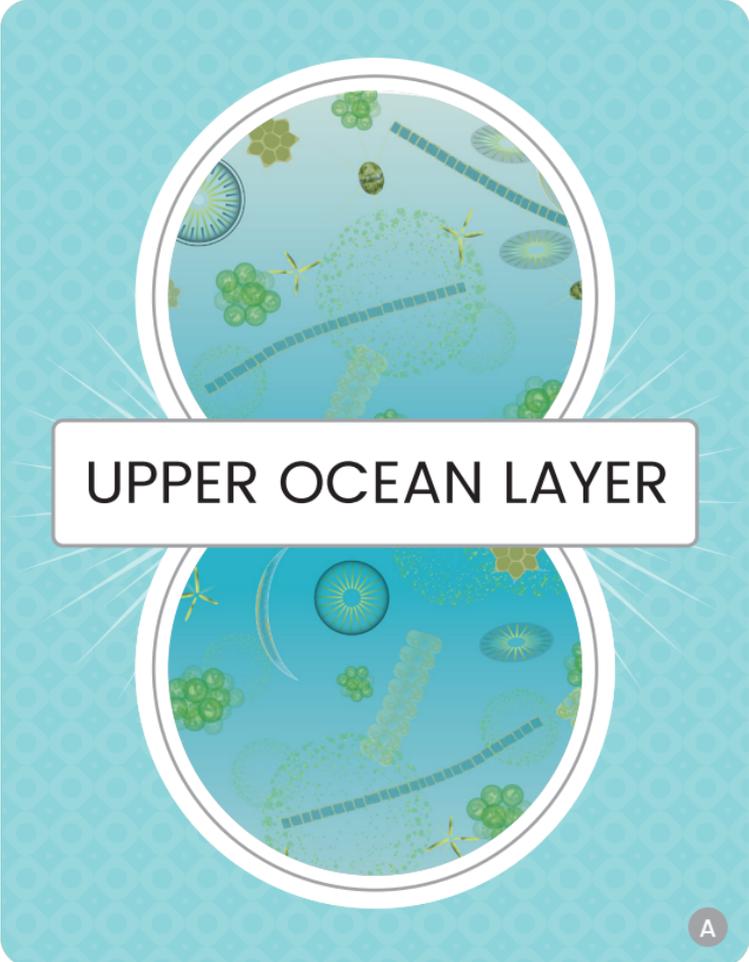
**DRAW AGAIN**

Plants and animals living in the rivers release **nitrogen** into the water after they die.

N

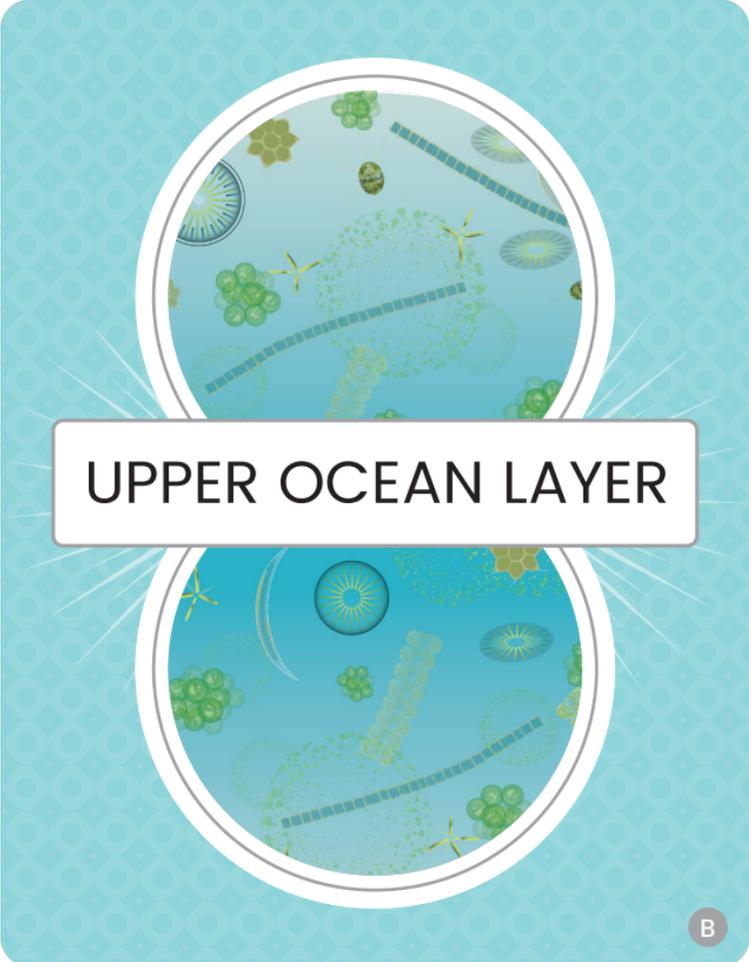
MARK ONE NITROGEN SQUARE  
ON YOUR TRACKING SHEET

DRAW AGAIN



UPPER OCEAN LAYER

The illustration depicts a cross-section of the upper ocean layer, characterized by a light blue background with a repeating pattern of small, light-colored circles. Two large, white circular frames are positioned vertically, each containing a detailed view of the water column. Within these frames, various marine organisms are shown, including green, spherical clusters of cells, elongated, segmented structures, and circular organisms with radial patterns. The overall scene is framed by a dark blue border with a thin white inner line.



UPPER OCEAN LAYER

B



You see dead plants and animals sinking down deeper in the ocean. Iron and other nutrients within them are carried to the middle ocean layer.

**MOVE TO**  
the Middle Ocean Layer





You see dead plants and animals sinking down deeper in the ocean. Iron and other nutrients within them are carried to the deep ocean layer.

**MOVE TO**  
the Deep Ocean Layer





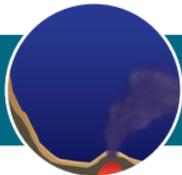
You see krill eating phytoplankton. The iron that was in the phytoplankton is now a part of the krill.

**DRAW AGAIN**

to look for more nutrients

**OR**

**MOVE TO**  
the Deep Ocean Layer





You see krill eating phytoplankton. The iron that was in the phytoplankton is now a part of the krill.

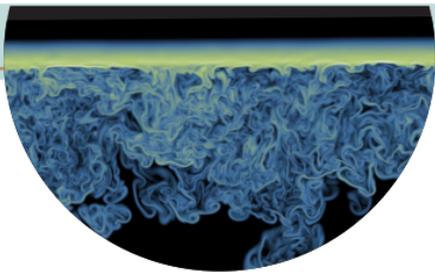
**DRAW AGAIN**

to look for more nutrients

**OR**

**MOVE TO**  
the Deep Ocean Layer





**You see ocean currents  
mixing the waters, sending  
surface water down to the  
middle ocean layer.**

**MOVE TO**  
the Middle Ocean Layer



You see water vapor and nitrogen gas moving from the ocean's surface into the atmosphere.

MOVE TO  
the Atmosphere



You see water vapor and nitrogen gas moving from the ocean's surface into the atmosphere.

MOVE TO  
the Atmosphere



In the surface waters, there is lots of light. Phytoplankton use **sunlight** to make energy in a process called photosynthesis.



MARK ONE SUNSHINE SQUARE  
ON YOUR TRACKING SHEET

**DRAW AGAIN**

In the surface waters, there is lots of light. Phytoplankton use **sunlight** to make energy in a process called photosynthesis.



MARK ONE SUNSHINE SQUARE  
ON YOUR TRACKING SHEET

**DRAW AGAIN**

In the surface waters, there is lots of light. Phytoplankton use **sunlight** to make energy in a process called photosynthesis.



MARK ONE SUNSHINE SQUARE  
ON YOUR TRACKING SHEET

**DRAW AGAIN**

In the surface waters, there is lots of light. Phytoplankton use **sunlight** to make energy in a process called photosynthesis.



MARK ONE SUNSHINE SQUARE  
ON YOUR TRACKING SHEET

**DRAW AGAIN**

In the surface waters, there is lots of light. Phytoplankton use **sunlight** to make energy in a process called photosynthesis.



MARK ONE SUNSHINE SQUARE  
ON YOUR TRACKING SHEET

**DRAW AGAIN**



A cloud of iron-rich dust settles in the ocean from the atmosphere.

Fe

MARK ONE IRON SQUARE ON  
YOUR TRACKING SHEET

DRAW AGAIN

Ocean life releases **nitrogen**  
into the water after it dies.

**N**

MARK ONE NITROGEN SQUARE  
ON YOUR TRACKING SHEET

**DRAW AGAIN**



MIDDLE OCEAN LAYER





MIDDLE OCEAN LAYER





You see bacteria breaking down dead plants and animals. This releases iron and other nutrients back into the ocean.

**DRAW AGAIN**

to look for more nutrients

**OR**

**MOVE TO**  
the Upper Ocean Layer





You see bacteria breaking down dead plants and animals. This releases iron and other nutrients back into the ocean.

**DRAW AGAIN**

to look for more nutrients

**OR**

**MOVE TO**  
the Upper Ocean Layer

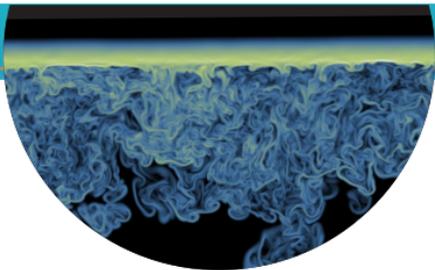




You see dead plants and animals sinking all the way down to the ocean floor. Iron and other nutrients within them are carried into the **deep ocean.**

**MOVE TO**  
the Deep Ocean Layer





You see ocean currents  
mixing the waters, sending  
nutrients back to the **upper**  
**ocean layer.**

**MOVE TO**  
the Upper Ocean Layer



You see nutrients carried  
back up to the surface by  
ocean currents and then  
moving into the **atmosphere**  
as gas molecules.

MOVE TO  
the Atmosphere





You see a whale eating phytoplankton. The phytoplankton contain iron, and that iron is released back into the ocean in whale poop.

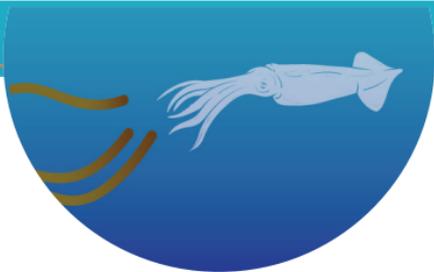
**DRAW AGAIN**

to look for more nutrients

**OR**

**MOVE TO**  
the Deep Ocean Layer





You see a squid eating phytoplankton. Phytoplankton contain iron, and that iron is released back into the ocean in squid poop.

**DRAW AGAIN**

to look for more nutrients

**OR**

**MOVE TO**  
the Deep Ocean Layer



You see pieces of rock break off from the edges of the underwater continent. This rock is rich in iron.

Fe

MARK ONE IRON SQUARE ON  
YOUR TRACKING SHEET

DRAW AGAIN

You see pieces of rock break off from the edges of the underwater continent. This rock is rich in iron.

Fe

MARK ONE IRON SQUARE ON  
YOUR TRACKING SHEET

DRAW AGAIN

You see pieces of rock break off from the edges of the underwater continent. This rock is rich in iron.

Fe

MARK ONE IRON SQUARE ON  
YOUR TRACKING SHEET

DRAW AGAIN

Sometimes, a small amount of **sunlight** can reach down more than 200 meters to the middle layer of the ocean.



MARK ONE SUNSHINE SQUARE  
ON YOUR TRACKING SHEET

**DRAW AGAIN**

Ocean plants and animals  
release **nitrogen** into the  
water after they die.

N

MARK ONE NITROGEN SQUARE  
ON YOUR TRACKING SHEET

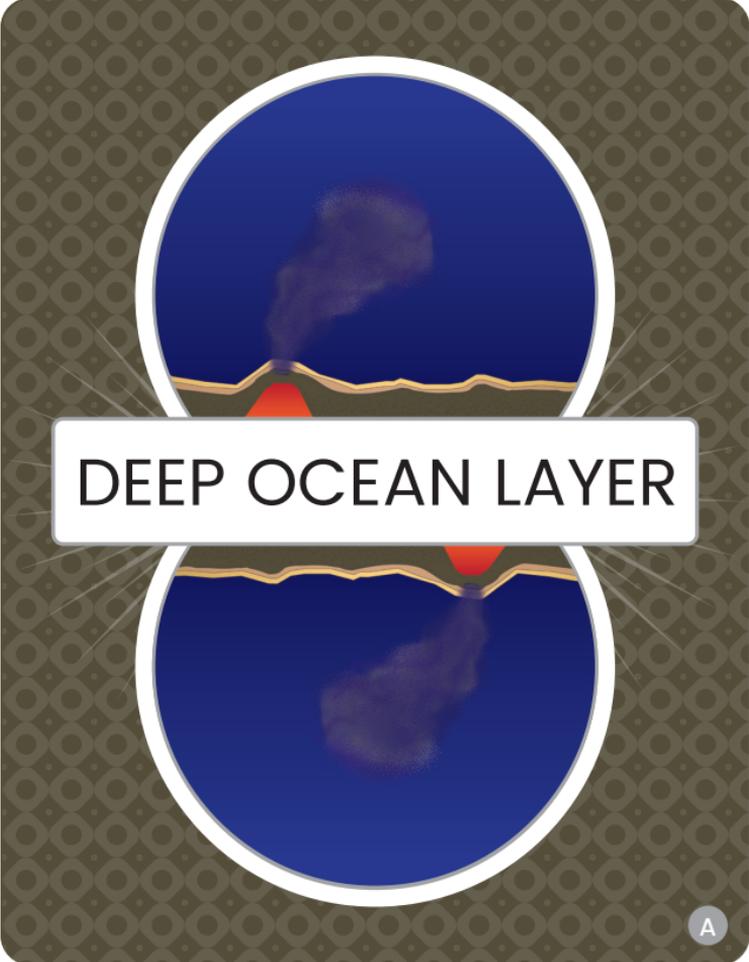
DRAW AGAIN

Ocean plants and animals  
release **nitrogen** into the  
water after they die.

N

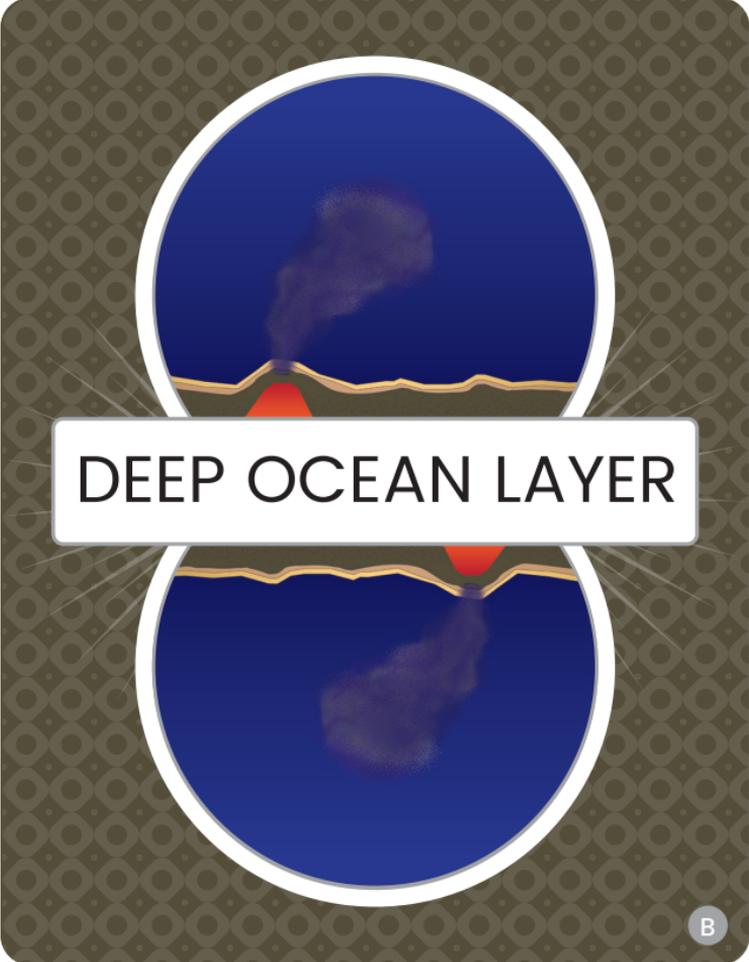
MARK ONE NITROGEN SQUARE  
ON YOUR TRACKING SHEET

DRAW AGAIN

The diagram shows a cross-section of the deep ocean floor. A central hydrothermal vent, or "black smoker," is depicted with a red, conical chimney structure. From the top of this chimney, a dark, mineral-rich superheated fluid is being emitted, forming a plume that rises into the dark blue water above. The surrounding seafloor is shown with a brownish, rocky texture. The entire scene is framed by a white circular border, which is itself set within a larger dark blue square frame with rounded corners. A white rectangular box with the text "DEEP OCEAN LAYER" is superimposed over the center of the diagram.

# DEEP OCEAN LAYER

A

The diagram shows a cross-section of the deep ocean floor. A central hydrothermal vent, or "black smoker," is depicted with a red, conical structure at its base. From the top of this structure, a dark, mineral-rich superheated fluid is being emitted into the surrounding dark blue water. The seafloor is shown as a brownish, rocky surface with some smaller vents. The entire scene is viewed through a circular white frame. The background of the frame has a repeating pattern of small, light-colored circles. The entire illustration is set within a dark blue border.

# DEEP OCEAN LAYER

B



Hydrothermal vents on the ocean floor release hot gases, iron, and other minerals into the deep ocean.

Fe

MARK ONE IRON SQUARE ON  
YOUR TRACKING SHEET

DRAW AGAIN

Ocean plants and animals  
release **nitrogen** into the  
water after they die.

N

MARK ONE NITROGEN SQUARE  
ON YOUR TRACKING SHEET

DRAW AGAIN

Ocean plants and animals  
release **nitrogen** into the  
water after they die.

N

MARK ONE NITROGEN SQUARE  
ON YOUR TRACKING SHEET

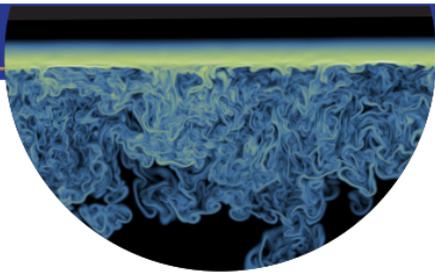
DRAW AGAIN

Ocean plants and animals  
release **nitrogen** into the  
water after they die.

N

MARK ONE NITROGEN SQUARE  
ON YOUR TRACKING SHEET

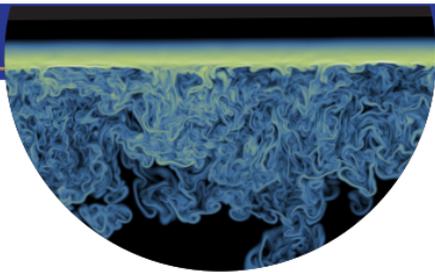
DRAW AGAIN



You see deep ocean currents carrying nutrients from the ocean floor up to the middle ocean layer.

**MOVE TO**  
the Middle Ocean Layer

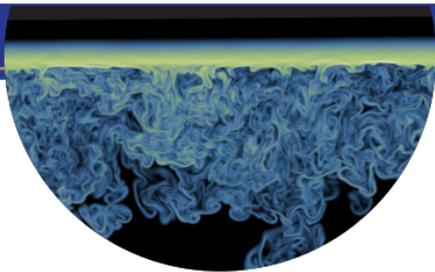




You see deep ocean currents carrying nutrients from the ocean floor up to the middle ocean layer.

**MOVE TO**  
the Middle Ocean Layer

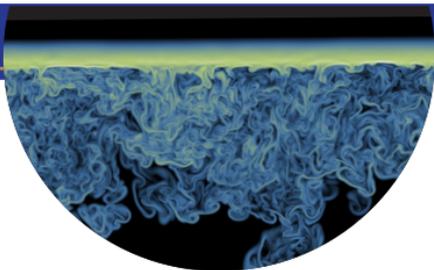




You see deep ocean currents carrying nutrients from the ocean floor to the **upper ocean layer.**

**MOVE TO**  
the Upper Ocean Layer





You see deep ocean currents carrying nutrients from the ocean floor to the **upper ocean layer.**

**MOVE TO**  
the Upper Ocean Layer



You see nutrients buried in  
sediments on the ocean floor  
for a very, very long time.

**DRAW AGAIN**

nutrients are trapped in the deep ocean!

You see nutrients buried in  
sediments on the ocean floor  
for a very, very long time.

**DRAW AGAIN**

nutrients are trapped in the deep ocean!



You see so many particles floating down from the ocean above that it looks like it is snowing in the lower ocean! The nutrients settle on the ocean floor.

**DRAW AGAIN**

to look for more nutrients

**OR**

**MOVE TO**  
the Middle Ocean Layer



You see nutrients on the  
ocean floor dissolving into  
the water.

**DRAW AGAIN**  
to look for more nutrients

**OR**

**MOVE TO**  
the Upper Ocean Layer



You see nutrients buried in  
sediments on the ocean floor  
for a very, very long time.

**DRAW AGAIN**

to look for more nutrients

**OR**

**MOVE TO**  
the Mountains

