OUR ATMOSPHERE

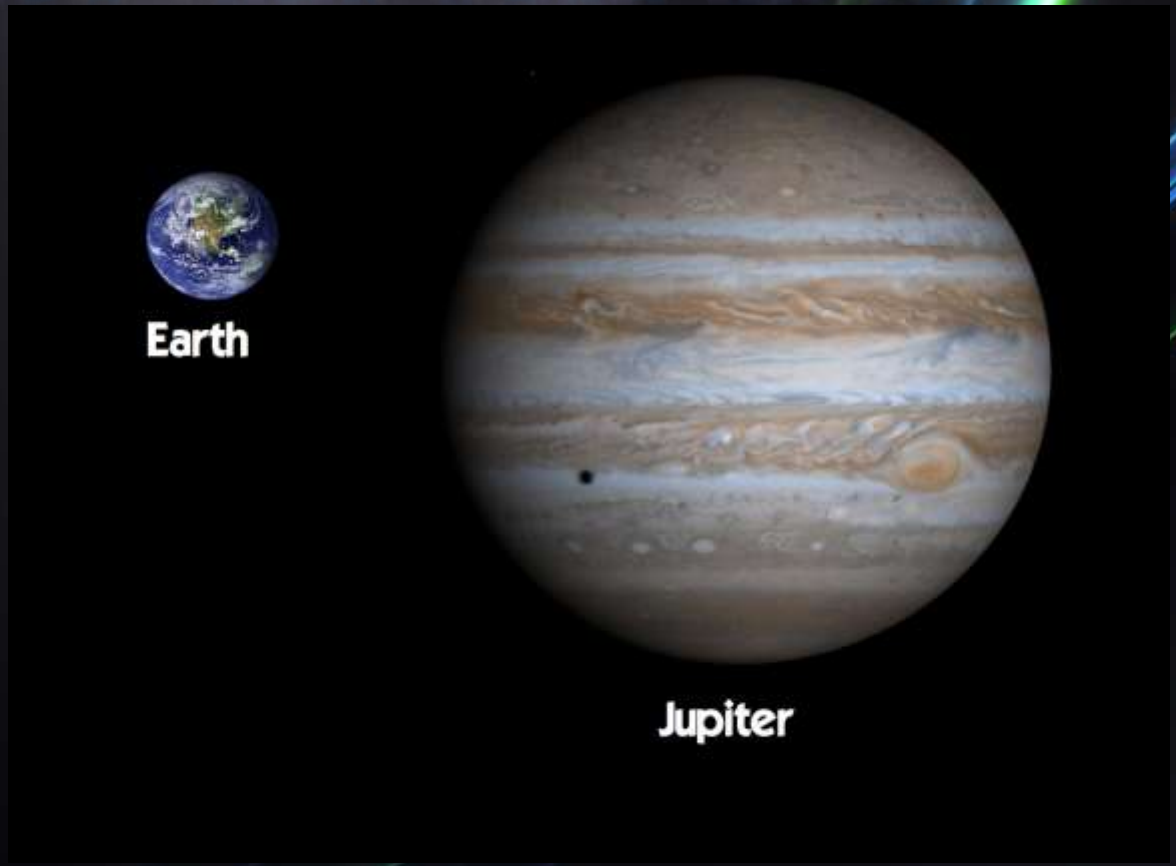
Our atmosphere is held to the earth by…

Gravity.

The moon isn't large enough to have enough gravity to hold an atmosphere.

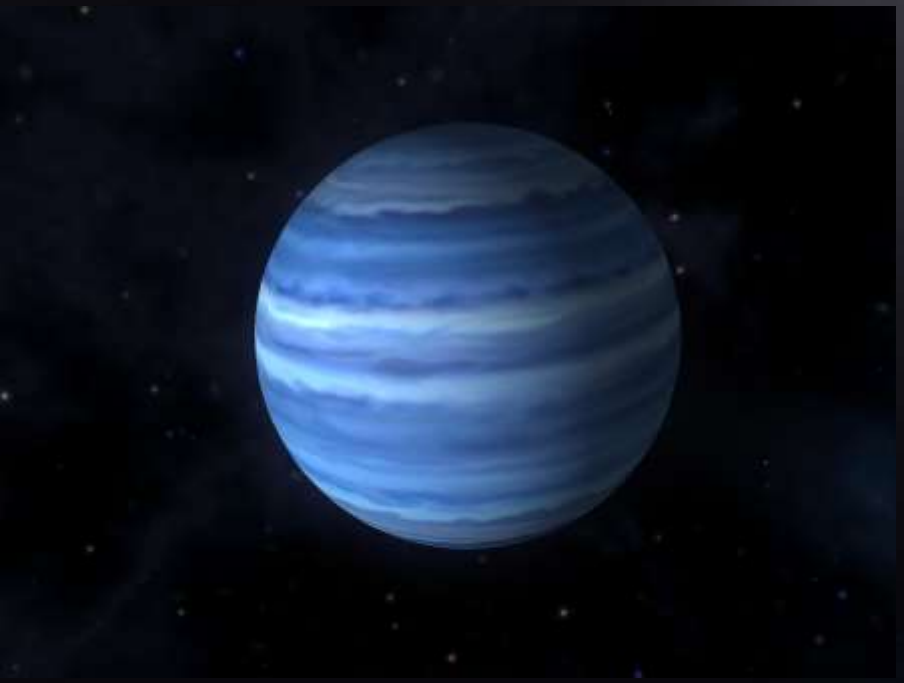
The planets all have atmospheres. Which sized planets tend to have more atmosphere?

Large, because they have more gravity.



Which temperature of planet tends to have the thickest atmosphere?

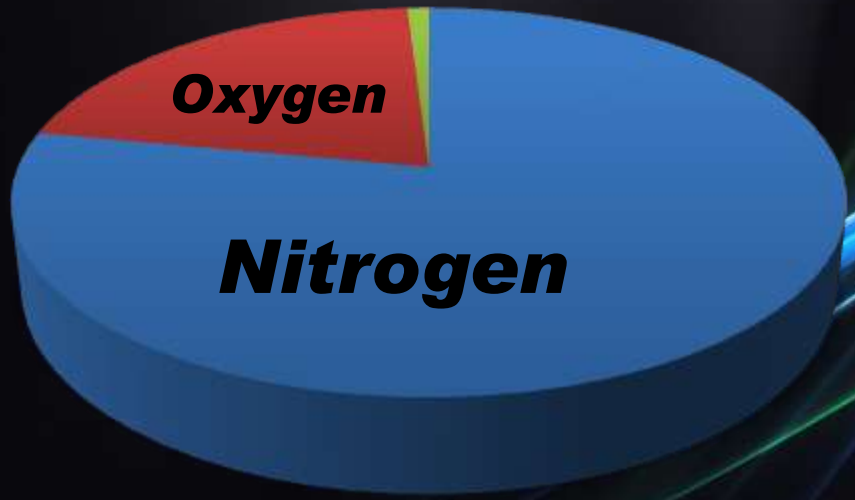
Cold, because the gas shrinks and is more dense.



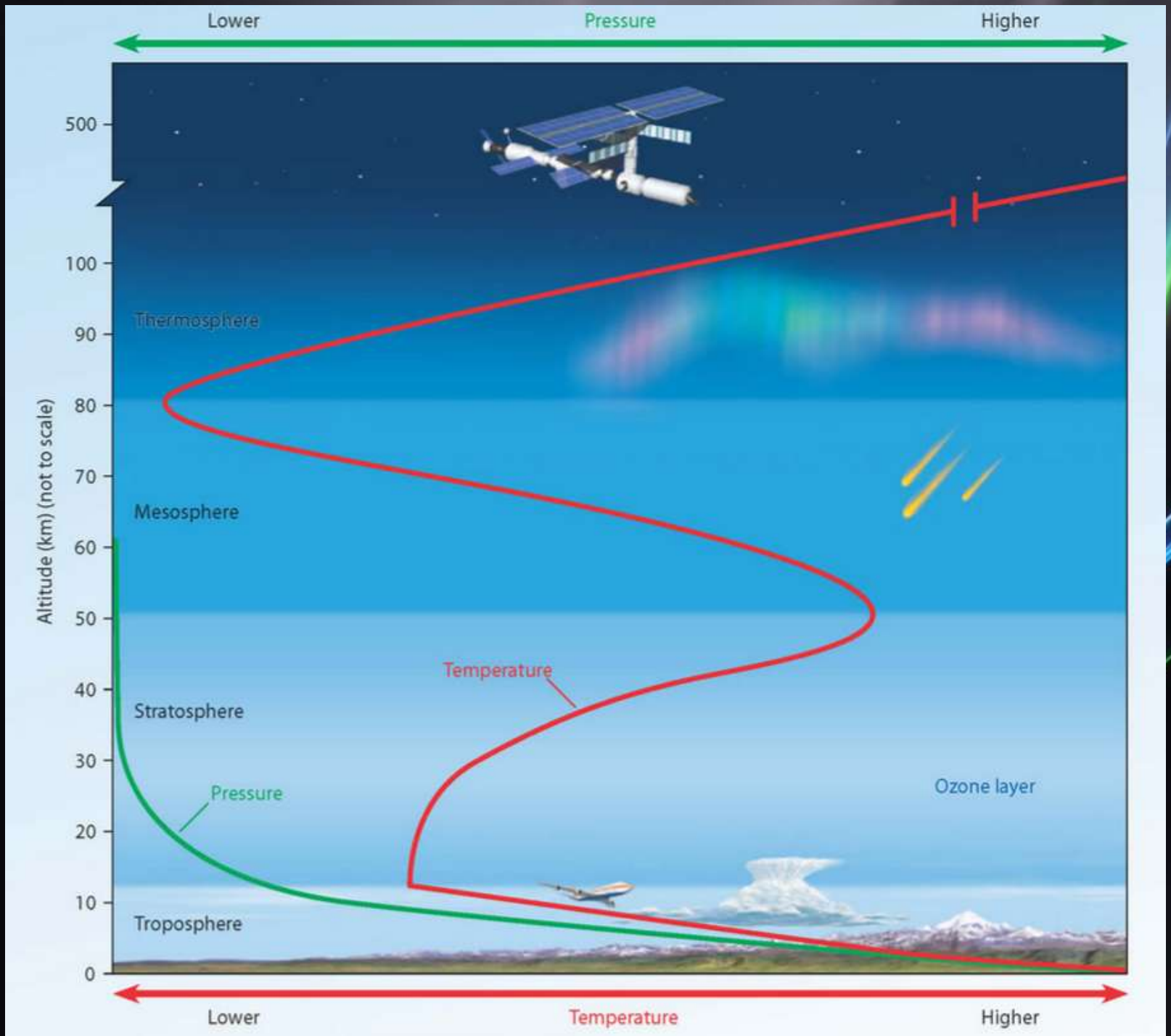
Neptune

Composition of our atmosphere:

Nitrogen (78%) and Oxygen (21%). All other gases (1%)



There are 5 main layers of our atmosphere.


Lower
Pressure
Higher
500
100
90
80
70
60
50
40
30
20
10
0
Altitude (km) (not to scale)
Thermosphere
Mesosphere
Stratosphere
Troposphere
Temperature
Pressure
Ozone layer
Lower
Temperature
Higher

1. Troposphere -

The first layer. All of the weather takes place here.

20 km = 12.4 miles

2. Stratosphere -

The second layer. This is where the ozone layer is found.

50 km = 31 miles

Ozone layer -

A layer of ozone (O_3) that absorbs harmful ultraviolet light from the sun.

There is a hole in the ozone layer. What caused it?

A chemical in refrigeration called CFC. (Chloroflurocarbon)

3. Mesosphere -

The third layer. This layer protects our earth by burning up most meteors that come towards us.

85 km = 52.8 miles


Leonid Meteor Shower
November 17, 2009

Really large meteors can still get through however.

A meteor hit Russia in meteor crash in February of 2013. 500 people were injured and the explosion was 25 times more powerful than the atomic bombs we dropped in WWII.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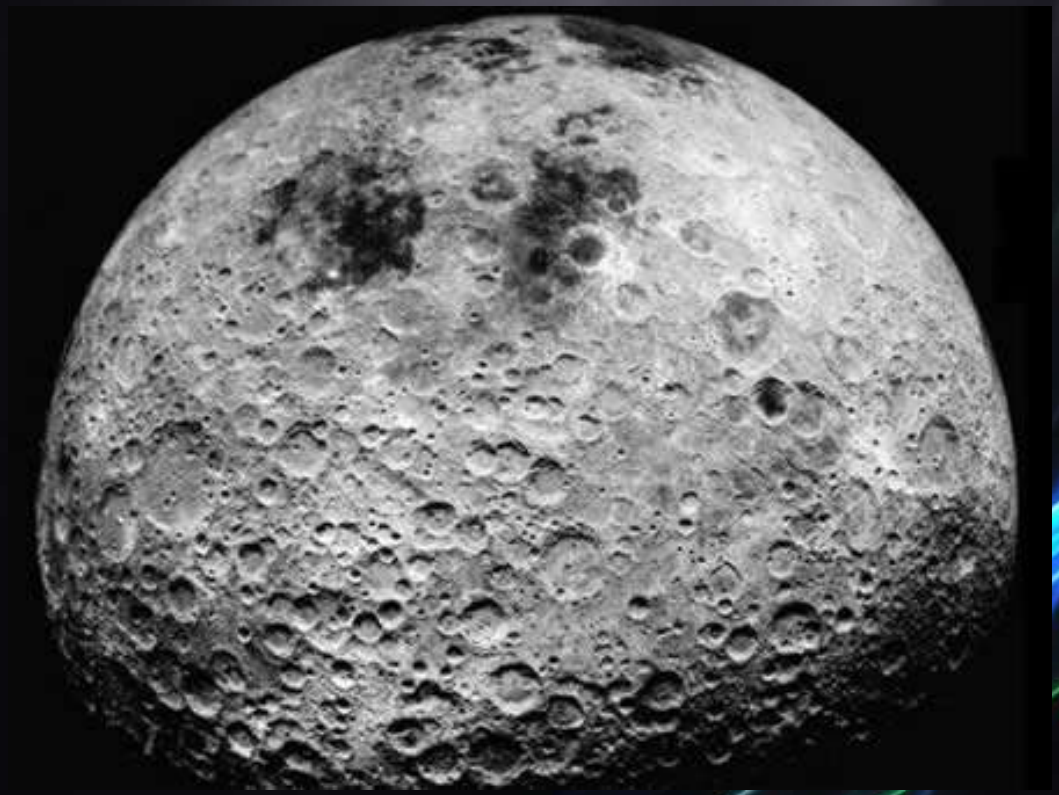
The moon doesn't have an atmosphere, so every meteor that comes towards it, hits it.



4. Thermosphere -

The fourth layer. The International Space Station orbits here. Also auroras can be found in this layer.

690 km = 428.7 miles

Auroras are glowing bands of light caused by charged particles. They are most often seen near the north and south poles.

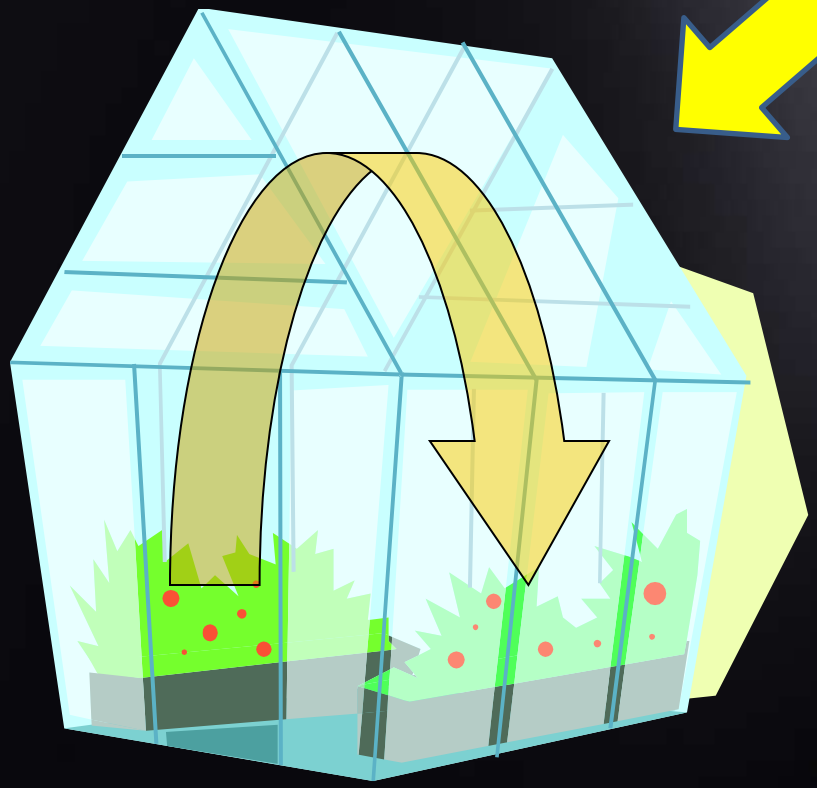
Auroras from the International Space Station.

5. Exosphere -

The fifth layer. This is the very top layer and it meets with outer space.

What is more dense, the thermosphere or mesosphere?

How a greenhouse works:



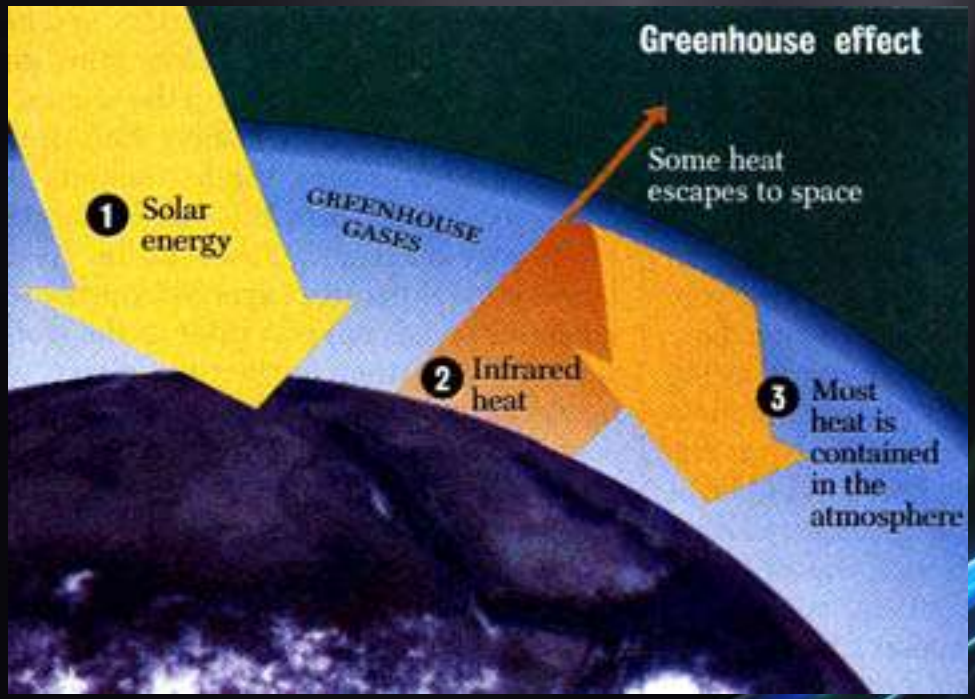
The sun heats up the greenhouse.

Most of the heat gets trapped inside by the glass, making it much warmer.

Where have you seen this Greenhouse Effect before?

In a car

It also happens in our atmosphere.



The Greenhouse Effect -

When gasses in our atmosphere trap the heat to keep us warmer.

The Greenhouse Effect allows life on earth to survive!

Average moon temperature is 4°F.

Average earth temperature is 59°F.

Common greenhouse gasses -

Carbon dioxide, methane and water vapor.

The earth's climate has been changing for billions of years. Some of the climate change is natural, and some of it is man-made.

Natural causes of greenhouse gasses and climate change -

Evaporation, volcanoes and livestock farts.

Human causes of greenhouse gasses and climate change -

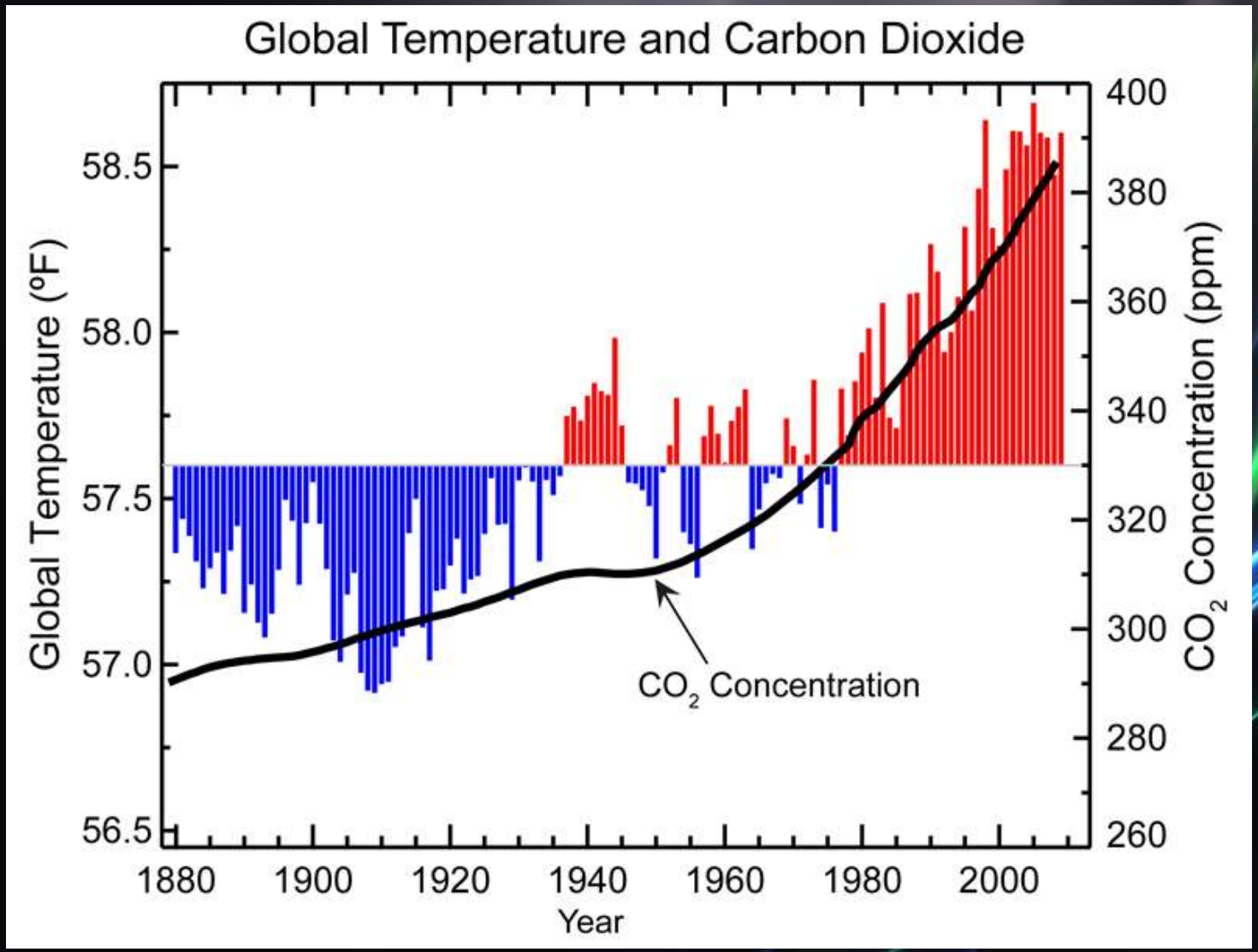
Burning fossil fuels and deforestation.

What is one of the main challenges to reducing greenhouse gas emissions?

It's expensive.

If we don't do something about climate change, what are some predictable effects?

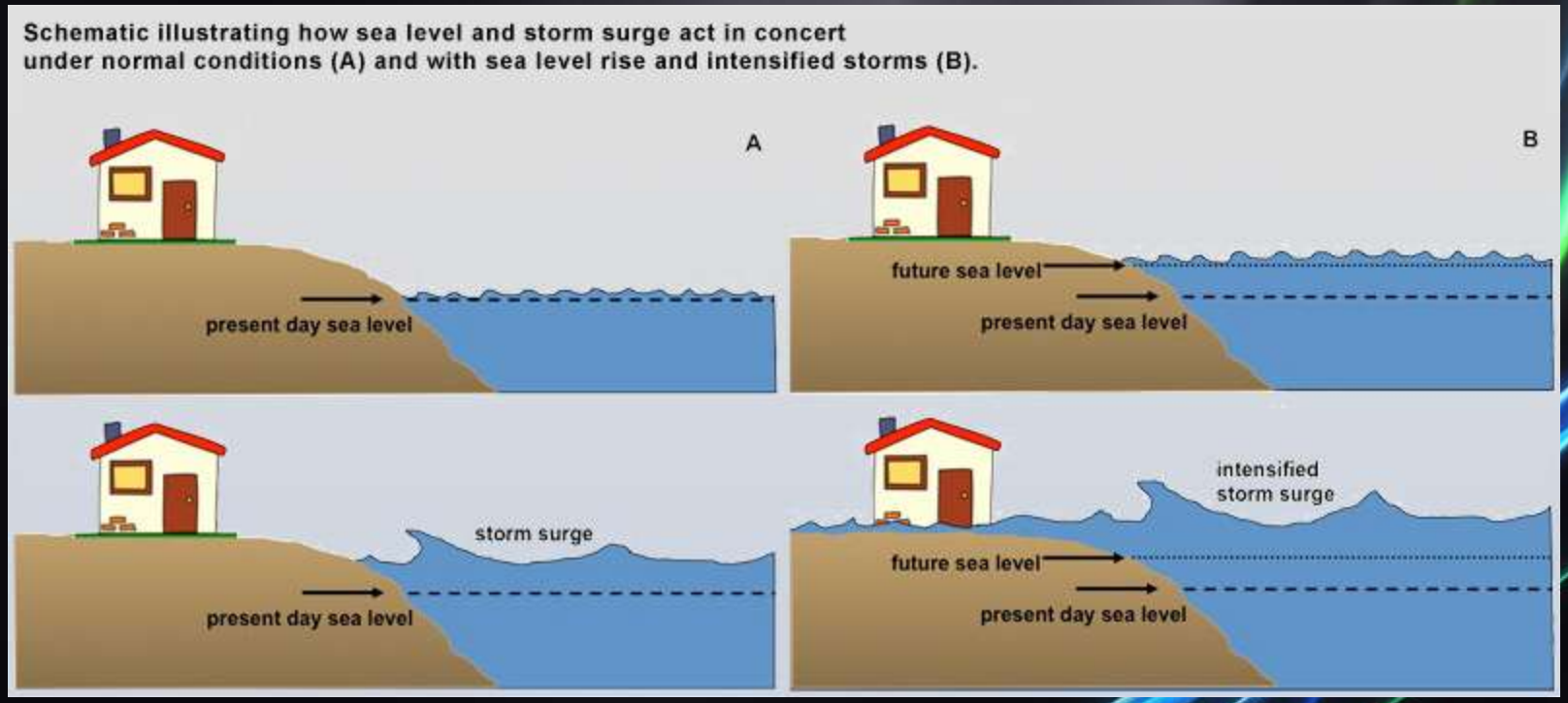
1. Higher temperatures.



2. Melting of the polar ice caps.

3. Rising sea levels and the flooding of coastal cities.

4. More severe storms.



5. Changes in rainfall patterns affecting crops.

6. Extinction of animals who cannot adjust to change of climate.

THE NITROGEN CYCLE

Nitrogen is the most common gas in the troposphere. Plants and animals need nitrogen to grow, but we cannot use nitrogen gas, as it is found in the atmosphere. We need something to make it usable to us.

Nitrogen fixing -

When unusable nitrogen is made usable for plants and animals.

Two main forms of fixed nitrogen -

Nitrates (NO_3) and nitrites (NO_2).

Nitrates are often used to make fertilizer.

Bacteria in the soil fix nitrogen and make it usable. This fixed nitrogen make fertilizers for plants that help them grow.

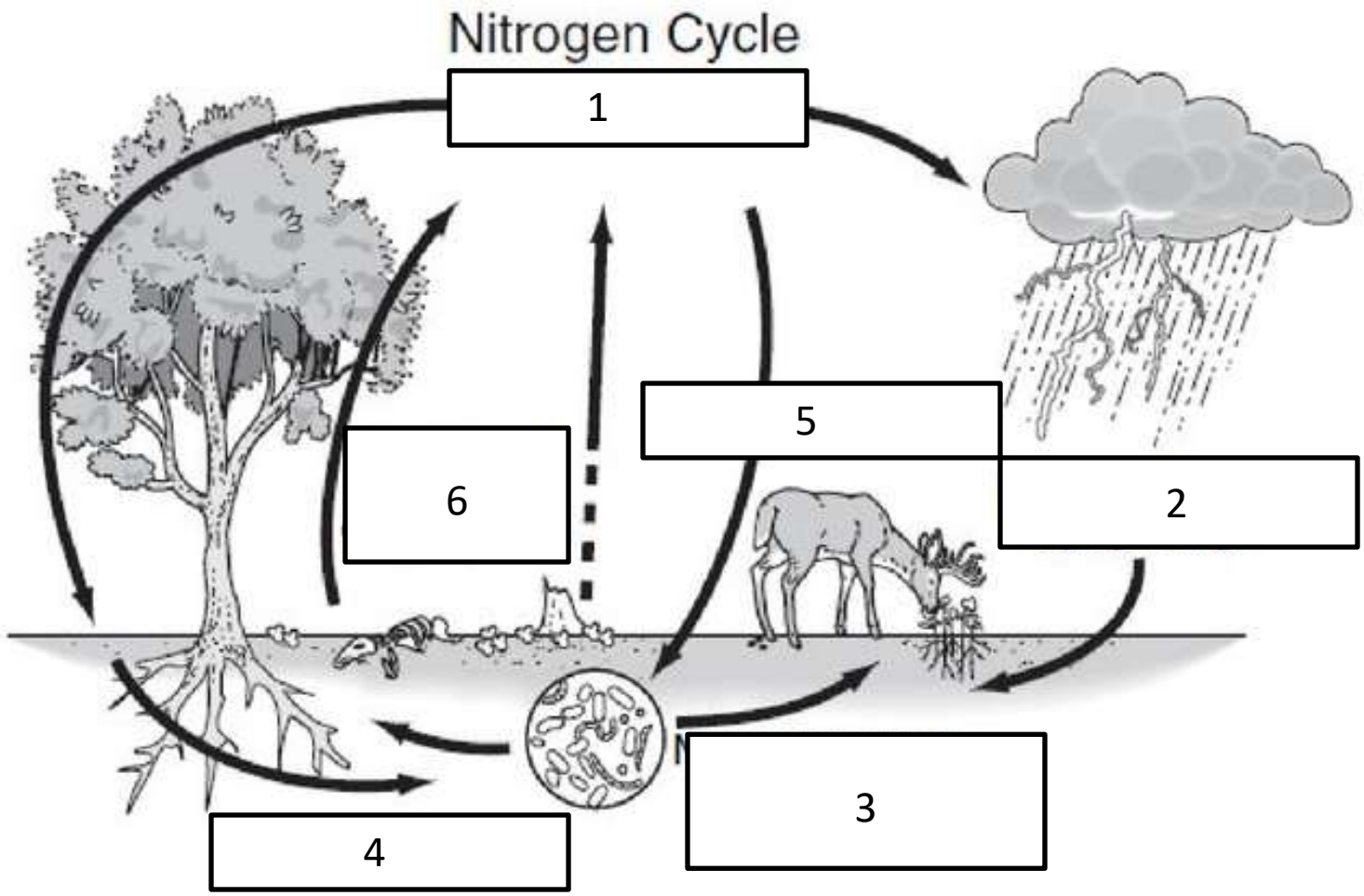
Nitrogen fixing bacteria on plant roots.

Animals then eat the plants, and they get the fixed nitrogen they need to help them grow.

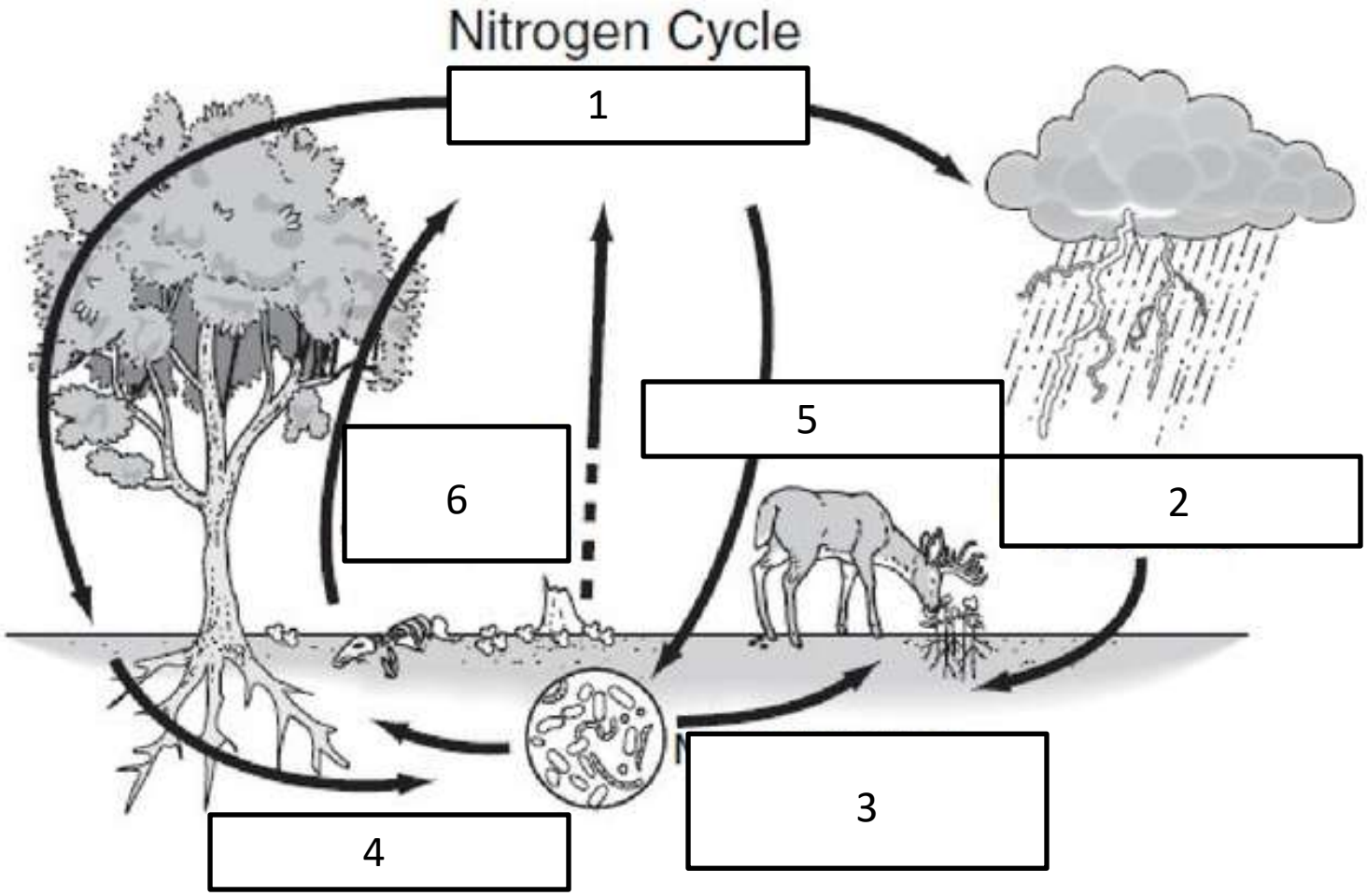
Nitrogen can also be fixed when lightning strikes the ground.

When animals and plants die, bacteria breaks them down. Some bacteria take the fixed nitrogen and return it back to the air.

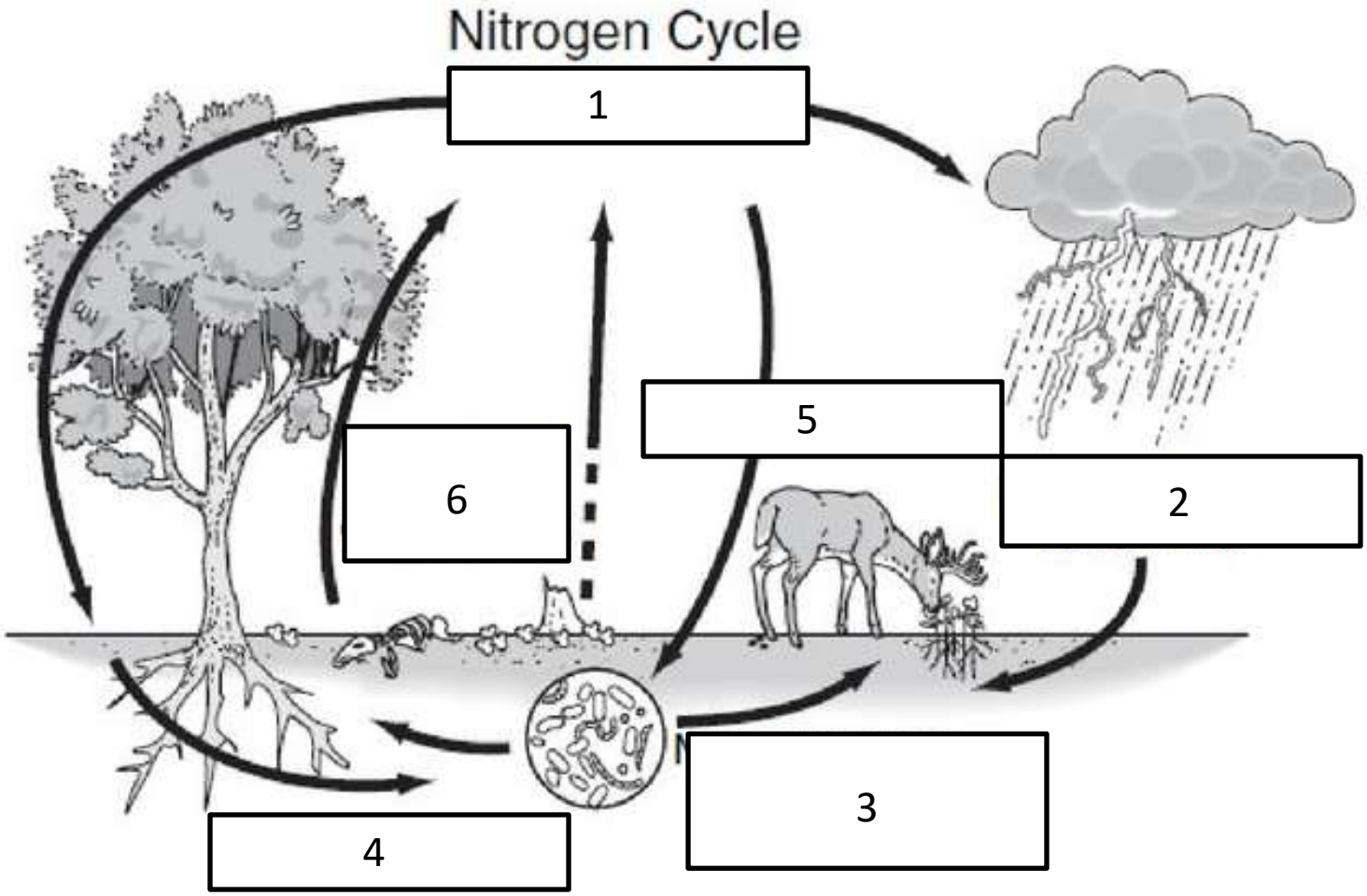
1. There is unusable nitrogen in the air.



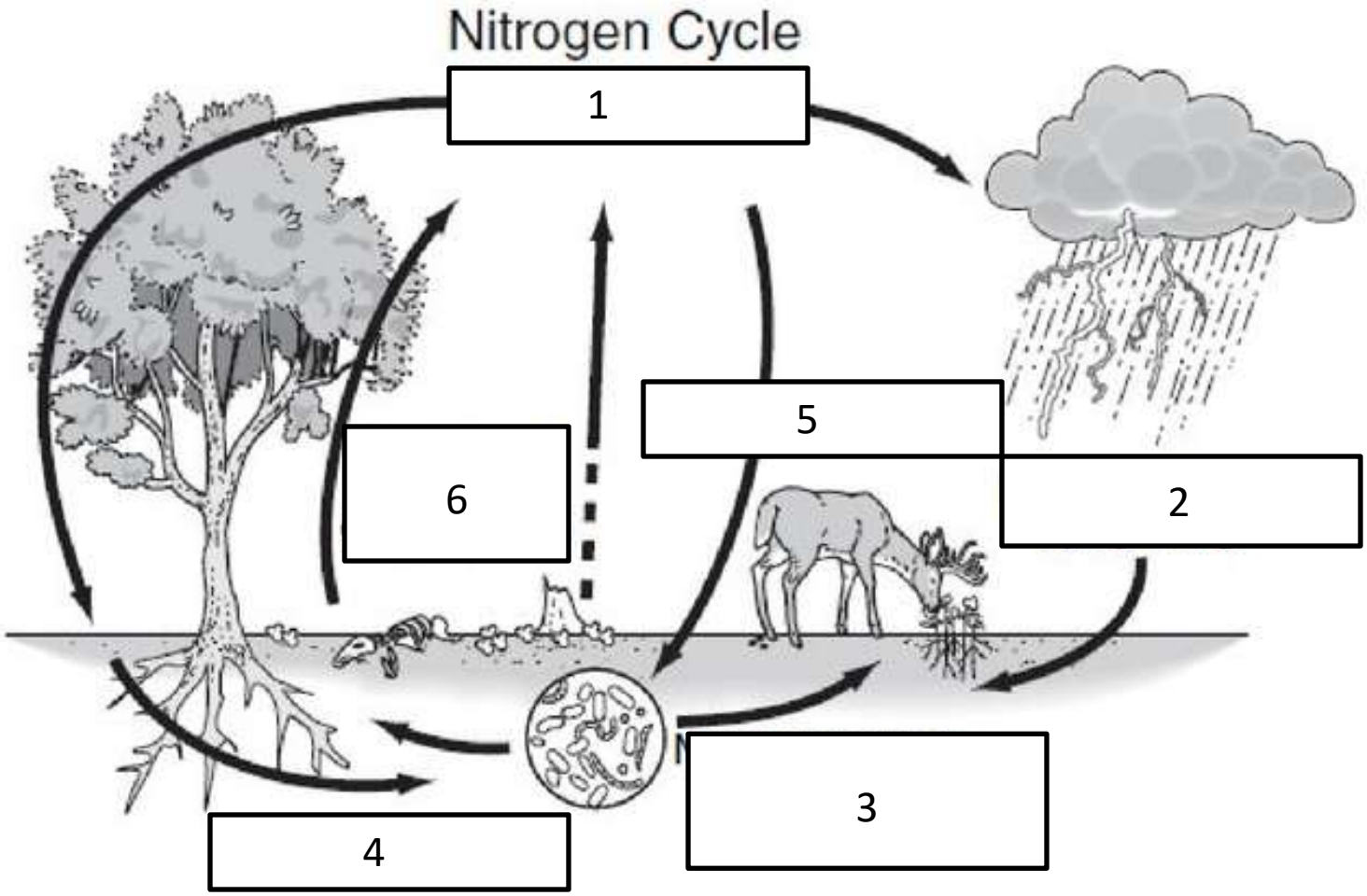
2. Lightning fixes some nitrogen as it hits the ground.



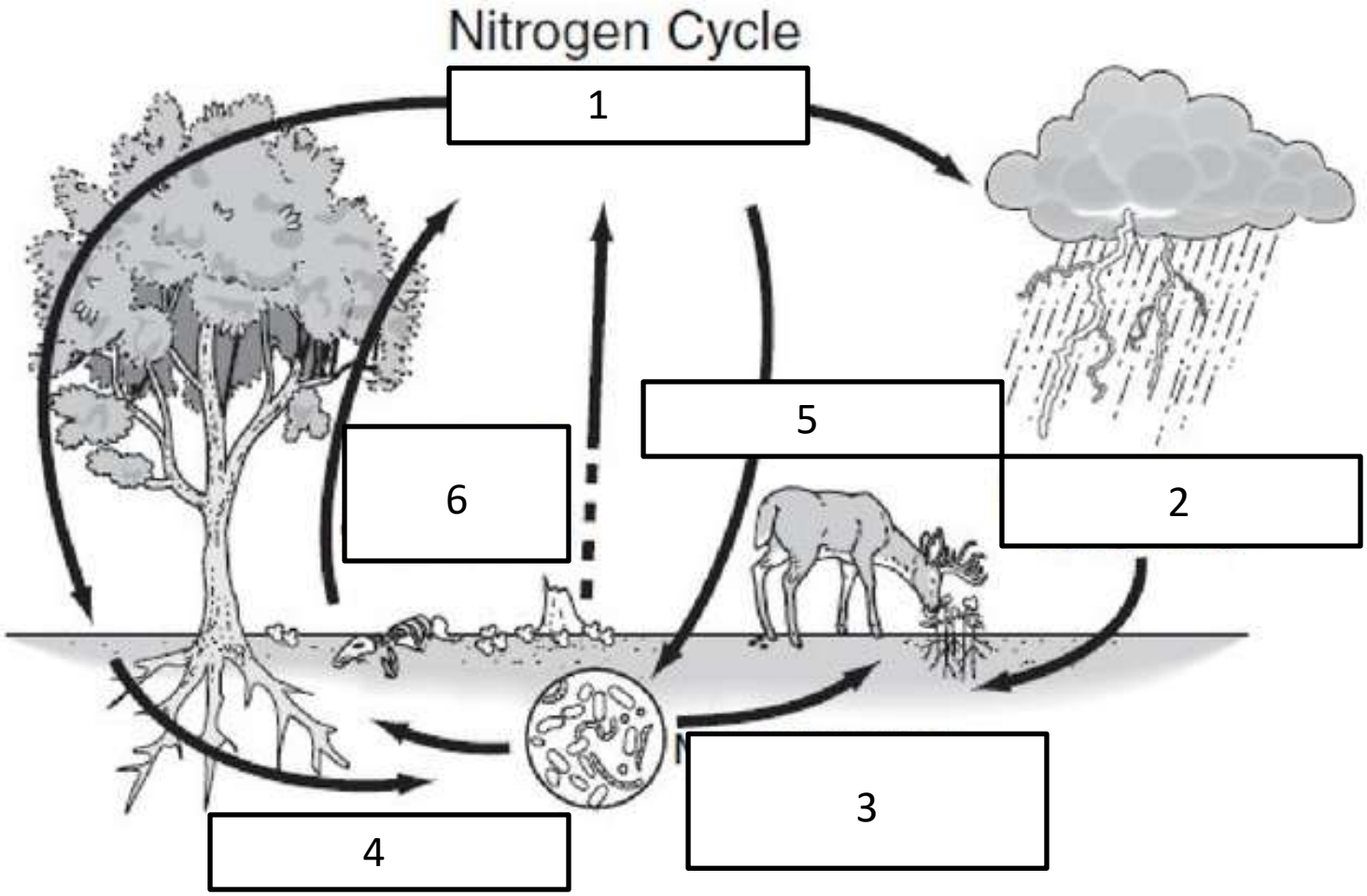
3. Bacteria in the soil fix nitrogen.



4. Plants pick up fixed nitrogen with their roots and use it to grow.



5. Animals eat plants and get the fixed nitrogen. They use it to grow.



6. Bacteria break down dead plants and animals and return some of nitrogen back to the air.