Traveling Nitrogen Passport

Name: _____

Directions:

1. Stamp your start location in the space below.

Start location
Stamp above

2. Roll the die to find out where to go next. Write ***How I traveled*** in the Trip #1 box below (see example at right).
3. Go to that location in the room and stamp the Trip#1 ***Where I went*** box. Then, roll the die to find out where to go next.

Guess what! In this game you are a nitrogen atom. You are going to travel the nitrogen cycle stopping in many exciting locations - some of which you probably never have been to before.

For each stop along your journey, remember to record where you went and how you got there.

Here's an example of how to fill out each stop along the way:

Trip#1:How I traveled:	Where I went:
Fertilizer washed into stream	

Trip #1: How I traveled:	Where I went:
	Stamp above

Trip #2: How I traveled:	Where I went:
	Stamp above

Trip #3: How I traveled:	Where I went:
	Stamp above

Trip #4: How I traveled:	Where I went:
	Stamp above

Trip #5: How I traveled:	Where I went:
	Stamp above

Trip #6: How I traveled:	Where I went:
	Stamp above

Trip #7: How I traveled:	Where I went:
	Stamp above

Trip #8: How I traveled:	Where I went:
	Stamp above

DICE CODES

Instructions:

- **These pages are for the Traveling Nitrogen activity from Windows to the Universe.**
- **Print the following dice code pages.**
- **Cut each reservoir apart.**
- **Place dice codes at each reservoir stations.**

RESERVOIR	POTENTIAL ROUTES
You've arrived at the: **Atmosphere** *Stamp your passport and then roll the die to see where you will travel next!*	<u>If your die reads: 1 or 2</u> Lightning strikes! Nitrogen gas is make into a solid and travels to the **soil**! <u>If your die reads: 3</u> Blue green algae and bacteria convert you into a solid bringing you to the **soil**! <u>If your die reads: 4</u> Bean plants extract you from the air and bring you to the **soil**! <u>If your die reads: 5 or 6</u> Some nitrogen can get into the water in clouds and then fall as **rain**!

RESERVOIR	POTENTIAL ROUTES
You've arrived at the: **Surface water** *Stamp your passport and then roll the die to see where you will travel next!*	<u>If your die reads: 1 or 2</u> You are just the sort of nitrogen that plants need to live. You are now within a **live plant**! <u>If your die reads: 3 or 4</u> You travel through the rivers and streams to the **ocean**! <u>If your die reads: 5 or 6</u> You percolate deep underground in the **groundwater**!

RESERVOIR	POTENTIAL ROUTES
You've arrived at: **Rainwater** *Stamp your passport and then roll the die to see where you will travel next!*	<u>If your die reads: 1</u> You fall into a lake or stream so now you are part of **surface water.** <u>If your die reads: 2 or 3</u> You fall on the land and become part of the **soil**! <u>If your die reads: 4</u> You percolate deep underground in the **groundwater**! <u>If your die reads: 5 or 6</u> You rain into the **ocean**!

RESERVOIR	POTENTIAL ROUTES
You've arrived at: **Groundwater** *Stamp your passport and then roll the die to see where you will travel next!*	<u>If your die reads: Odd numbers (1, 3, or 5)</u> The groundwater you are dissolved within travels and you become part of the **surface water**! <u>If your die reads: Even numbers (2, 4, or 6)</u> The groundwater you are dissolved within travels and you become part of the **ocean**!

RESERVOIR	POTENTIAL ROUTES
You've arrived at: **Fertilizers** *Stamp your passport and then roll the die to see where you will travel next!*	<u>If your die reads: 1 or 2</u> You dissolve and wash into the **surface water**! <u>If your die reads: 3 or 4</u> You become part of the **soil**! <u>If your die reads: 5 or 6</u> You are just the sort of nitrogen that plants need to live. You are now within a **live plant**!

RESERVOIR	POTENTIAL ROUTES
You've arrived at: **Soils** *Stamp your passport and then roll the die to see where you will travel next!*	<u>If your die reads: 1</u> You dissolve and wash into the **groundwater**! <u>If your die reads: 2</u> You dissolve and wash into the **surface water**! <u>If your die reads: 3 or 4</u> You are just the sort of nitrogen that plants need to live. You are now within a **live plant**! <u>If your die reads: 5 or 6</u> Bacteria have transformed you into nitrogen gas and you are now part of the **atmosphere**!

RESERVOIR	POTENTIAL ROUTES
You've arrived at the: **Ocean** *Stamp your passport and then roll the die to see where you will travel next!*	<u>If your die reads: 1</u> Look out! Water is on the move! You have washed into the **groundwater**! <u>If your die reads: 2 or 3</u> You are just the sort of nitrogen that plants need to live. You are now within a **live plant**! <u>If your die reads: 4, 5, or 6</u> Bacteria have transformed you into nitrogen gas and you are now part of the **atmosphere**!

RESERVOIR	POTENTIAL ROUTES
You've arrived at: **Live animals** *Stamp your passport and then roll the die to see where you will travel next!*	<u>If your die reads: Odd numbers (1, 3, or 5)</u> The animal that you are within has died. Go to **dead plants and animals**. <u>If your die reads: Even numbers (2, 4, or 6)</u> Congratulations! The animal that you were within has excreted and you are in its waste. Go to **animal waste**!

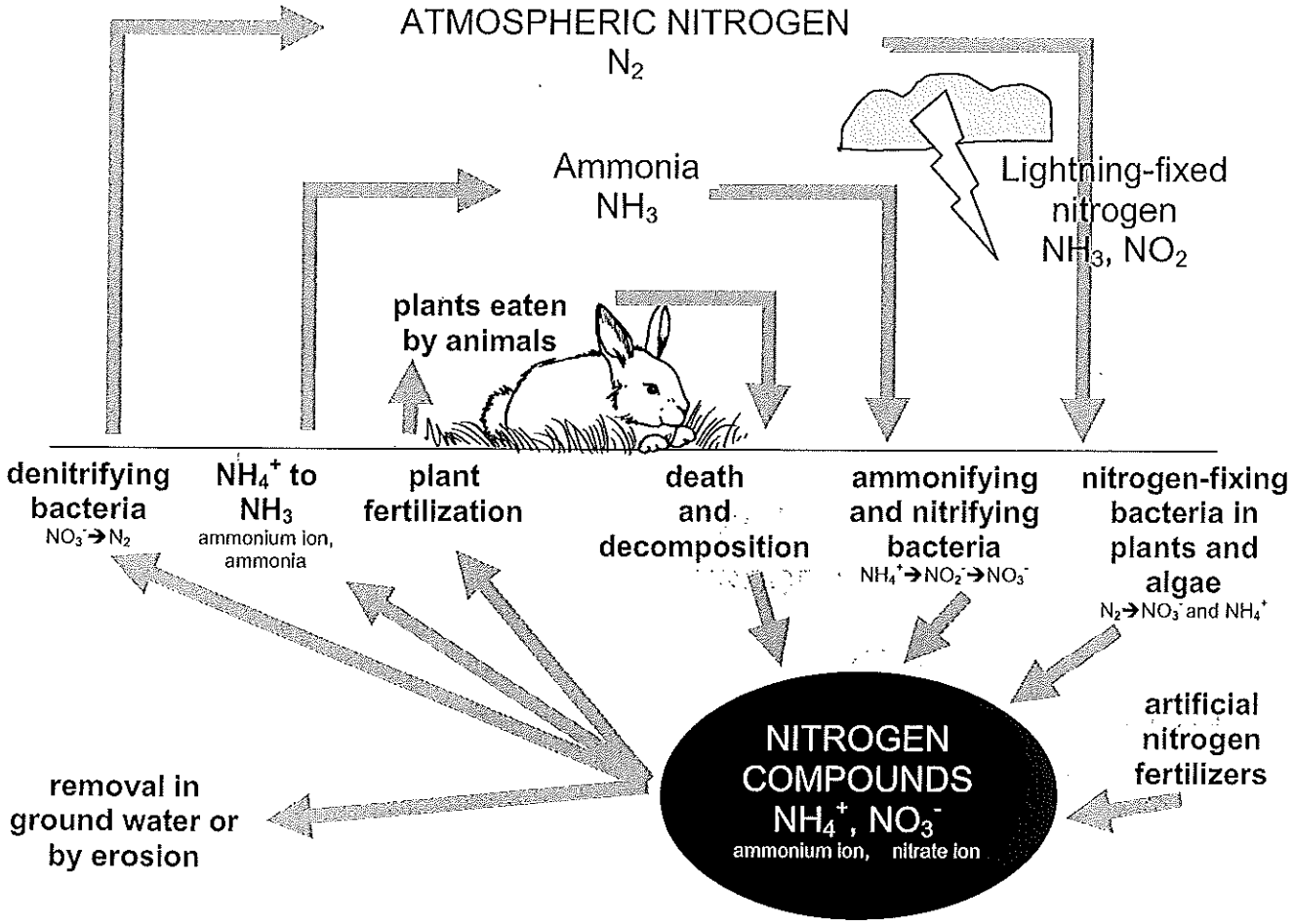
RESERVOIR	POTENTIAL ROUTES
You've arrived at: **Animal waste** *Stamp your passport and then roll the die to see where you will travel next!*	<u>If your die reads: 1or 2</u> Look out before someone steps in you! Now you are decomposing in the **soil**! <u>If your die reads: 3 or 4</u> A farm supply company has picked you up and made you into **fertilizer**! <u>If your die reads: 5 or 6</u> What's that in the water? You have dissolved into **surface water!**

RESERVOIR	POTENTIAL ROUTES
You've arrived at: **Dead plants and animals** *Stamp your passport and then roll the die to see where you will travel next!*	<u>If your die reads: 1 or 2</u> You are decomposed and become part of the **soil**! <u>If your die reads: 3</u> You are decomposed and become dissolved in **surface water!** <u>If your die reads: 4</u> You are decomposed and become dissolved in the **ocean**! <u>If your die reads: 5 or 6</u> Forest Fire! The wood you were within is burnt and you have been released into the **atmosphere**.

RESERVOIR	POTENTIAL ROUTES
You've arrived at: **Live plants** *Stamp your passport and then roll the die to see where you will travel next!*	<u>If your die reads: Odd numbers (1, 3, or 5)</u> The plant that you are within has died. Go to **dead plants and animals.** <u>If your die reads: Even numbers (2, 4, or 6)</u> An animal has eaten the plant that you are within! Go to **live animals**!

Blackline Master #1

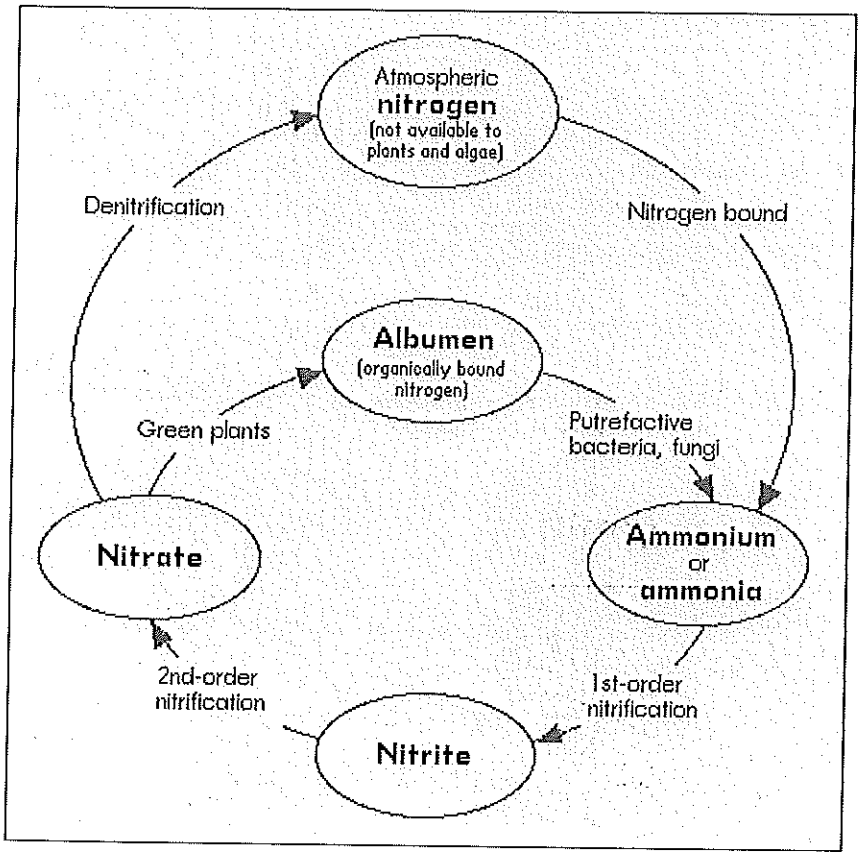
The Nitrogen Cycle



The Nitrogen Cycle

Since animals cannot absorb nitrogen from the air or the soil, they must obtain nitrogen by eating plants or other animals. When these animals die, their bodies are broken down through the action of decomposers. Animal waste and decaying plant materials also contain nitrogen and these materials are also broken down by decomposers. Some bacteria that live in the soil or in the roots of plants called legumes, can convert nitrogen gas into ammonia through a process known as nitrogen fixation. Other bacteria in the soil are able to take ammonium ions and convert them into nitrates, which is a form of nitrogen that plants can absorb and use to make protein. Consumers then eat the producers and reuse the nitrogen to make their own proteins. Some bacteria (denitrifying bacteria) are able to absorb nitrogen compounds from the soil and convert them back to nitrogen gas, thereby completing the nitrogen cycle.

Forms of Nitrogen in the Nitrogen Cycle



Accessed July 20, 2005, at http://www.water-garden.co.uk/expert/nahrstoff.html