



Name: _____ ODD Period: _____

Week: 19-20

Dates: 1/4-1/15

Unit: Biogeochemical Cycles

MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
4 E	5 O *SAE PROJECTS *VOCABULARY *WATER CYCLE	6 E	7 O *CARBON CYCLE *CARBON GAME *CYCLE MINI POSTERS CLEMENT GONE	8 E CLEMENT GONE
11 O FLEX DAY *NITROGEN CYCLE	12 E	13 O *FARM CASE STUDY *STUDY GUIDE	14 E	15 O *UNIT QUIZ *PACKET DUE

ASSIGNMENT	YOUR SCORE	TOTAL POINTS POSSIBLE
GOOD TO KNOW VOCABULARY WORDS		20
YOUR SAE PROJECT WORKSHEET		20
WATER CYCLE CORNELL NOTES		40
WATER CYCLE DRAWING AND EXPLANATION		20
CARBON NOTES CORNELL NOTES		40
CARBON CYCLE DRAWING AND EXPLANATION		20
CARBON CYCLE GAME		40
NITROGEN NOTES CORNELL NOTES		40
NITROGEN CYCLE DRAWING AND EXPLANATION		20
FARMING CASE STUDY		40
STUDY GUIDE		40
TOTAL		340

AG EARTH SCIENCE FACT OF THE WEEK

PUT BIOLOGY, GEOLOGY, AND CHEMISTRY TOGETHER, AND YOU GET BIOGEOCHEMICAL! WHEN YOU TALK ABOUT THE "CIRCLE OF LIFE," THE CIRCLE TO WHICH YOU ARE REFERRING IS A BIOGEOCHEMICAL CYCLE. THE PLANTS AND ANIMALS THAT LIVE AND THEN DIE ARE THE BIO PART; THE EARTH THAT THEY DECOMPOSE INTO COMPRISES THE GEO PART; AND THE PROCESS BY WHICH ORGANIC MATTER RETURNS TO THE CHEMICAL ELEMENTS IN THE EARTH IS EXPLAINED BY THE CHEMICAL PART.

GOOD TO KNOW VOCABULARY WORDS

Word	Definition
Water Cycle	
Discharge	
Infiltration	
Transpiration	
Gradient	
Evaporation	
Condensation	
Precipitation	
Nitrogen Cycle (see index)	
Nitrogen (see index)	
Carbon Cycle (see index)	

SAE PROJECT REQUIREMENTS

All students enrolled in an agriculture class at Santa Ynez High School must complete an SAE project. SAE is 5% of your grade. Here are the requirements:

- *SAE must be an agriculture related work experience or project approved by instructor
- *Must be able to earn work experience hours or money doing this project
- *Must have a minimum of 10 hours working on this project before the end of the semester. Ask your instructor for the official due date.
- *Students who have continuous projects throughout the year are eligible to carry over hours from one semester to another.
- *The project you choose to do in FFA must be different than a project you may have in 4H. Those of you interested in science may choose to complete an agriscience research project instead. If you are interested in helping around your home, you may do a Home Improvement project (see sample Business Agreement for guidance).

WHAT DO I HAVE TO TURN IN?

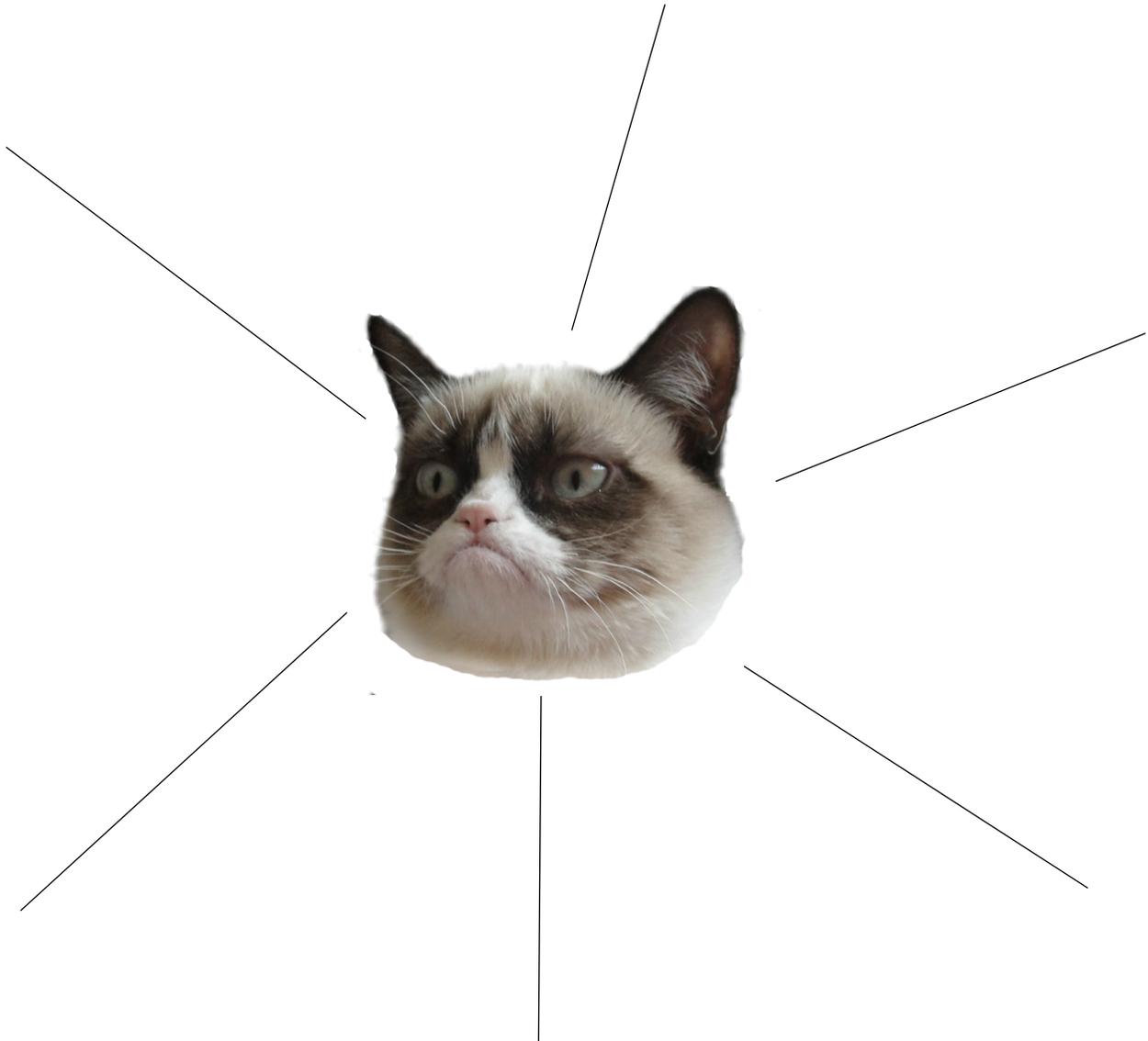
1. Updated online record book for the current calendar year (January- December)
 - Calendar
 - Budget
 - Signed Business Agreement (printed out)
 - Journal Entries (shows at least 10 hours worth of work)
 - FFA Activities and Log
 - Community Service (extra credit)
2. SAE Report Questions with pictures of you working on your SAE project with captions explaining what you are doing

WHEN IS THIS ALL DUE?

Requirement	EVEN PERIODS	ODD PERIODS
Record Book (completed online)	Due May 19th	Due May 20th
Printed and signed Business Agreement	Due May 19th	Due May 20th
SAE Project Report (submitted online/printed)	Due May 13th	Due May 12th

YOUR SAE PROJECT!

Directions: Brainstorm some SAE project ideas that you think you would like to try out. Think about any resources (money, tools, equipment, teacher/parent help) you might need and the time commitment you are willing to take on.

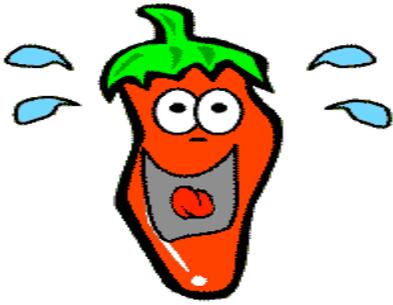


Some Ideas to Think About:

- Volunteer at a pet shelter
- Home improvement project (at your OWN house!)
- Lawn care
- Vineyard work
- Fair animals
- Growing vegetables or flowers
- Research an agriculture topic
- Job shadowing

What Do You Need For the Project:

- Money?
- Equipment?
- Tools?
- Ride to work?
- Land?
- Parent or adult help?
- How much time per week/month?



Do plants sweat?

Well, sort of.... people perspire (sweat) and plants transpire. **Transpiration** is the process by which plants lose water out of their leaves. Transpiration gives evaporation a bit of a hand in getting the water vapor back up into the air.

Condensation:

Water vapor in the air gets cold and changes back into liquid, forming clouds. This is called condensation.

You can see the same sort of thing at home... pour a glass of cold water on a hot day and watch what happens. Water forms on the outside of the glass. That water didn't somehow leak through the glass! It actually came from the air. Water vapor in the warm air, turns back into liquid when it touches the cold glass.



Precipitation:

Precipitation occurs when so much water has condensed that the air cannot hold it anymore. The clouds get heavy and water falls back to the earth in the form of rain, hail, sleet or snow.



Collection:

When water falls back to earth as precipitation, it may fall back in the oceans, lakes or rivers or it may end up on land. When it ends up on land, it will either soak into the earth and become part of the "ground water" that plants and animals use to drink or it may run over the soil and collect in the oceans, lakes or rivers where the cycle starts

all over again.

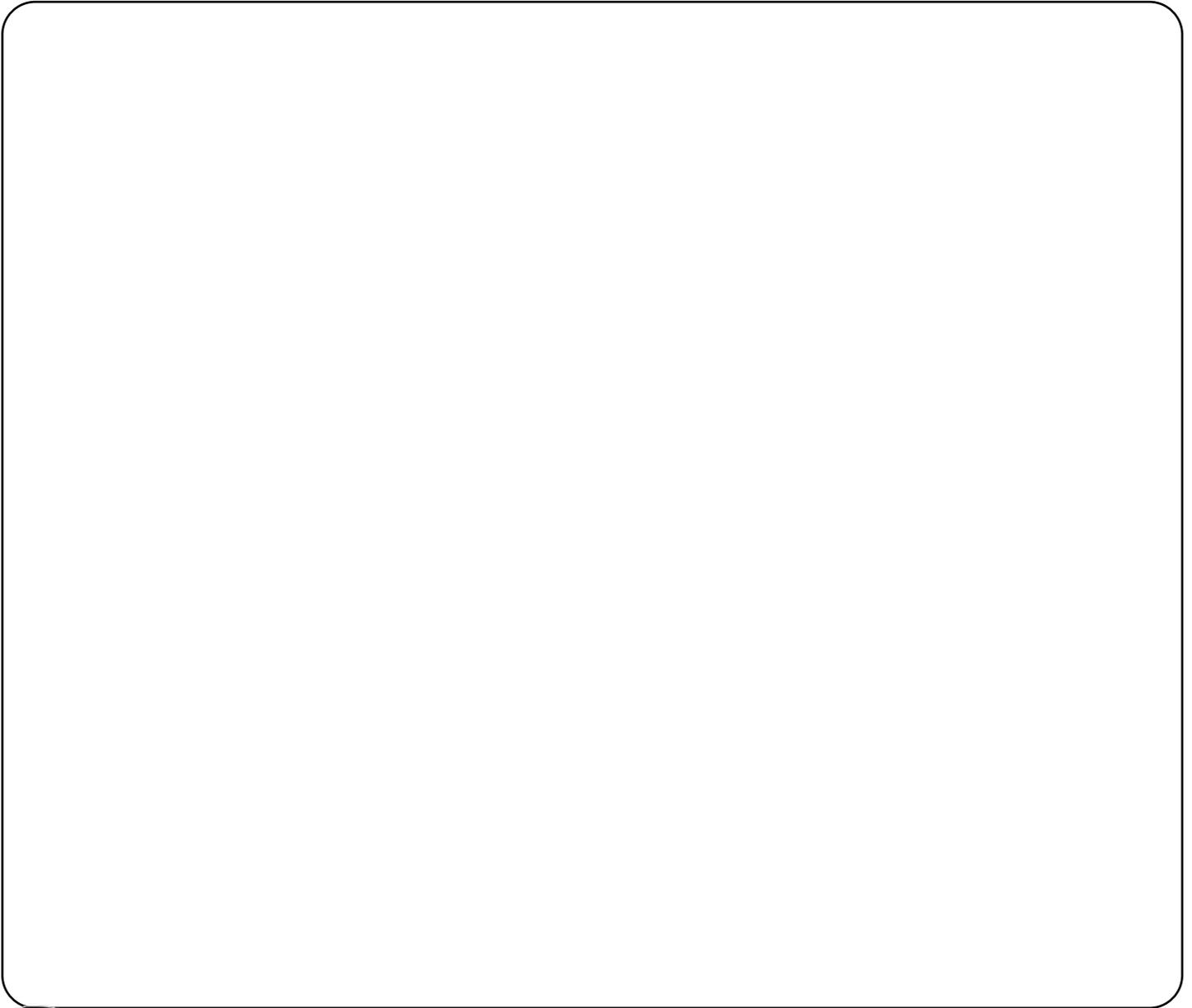


Cue Column (titles, vocab, big ideas, test questions)	The Water Cycle

Summary
(briefly describe the main concepts, major points)

The Water Cycle

Draw a diagram of the water cycle below and provide an explanation (page 159):



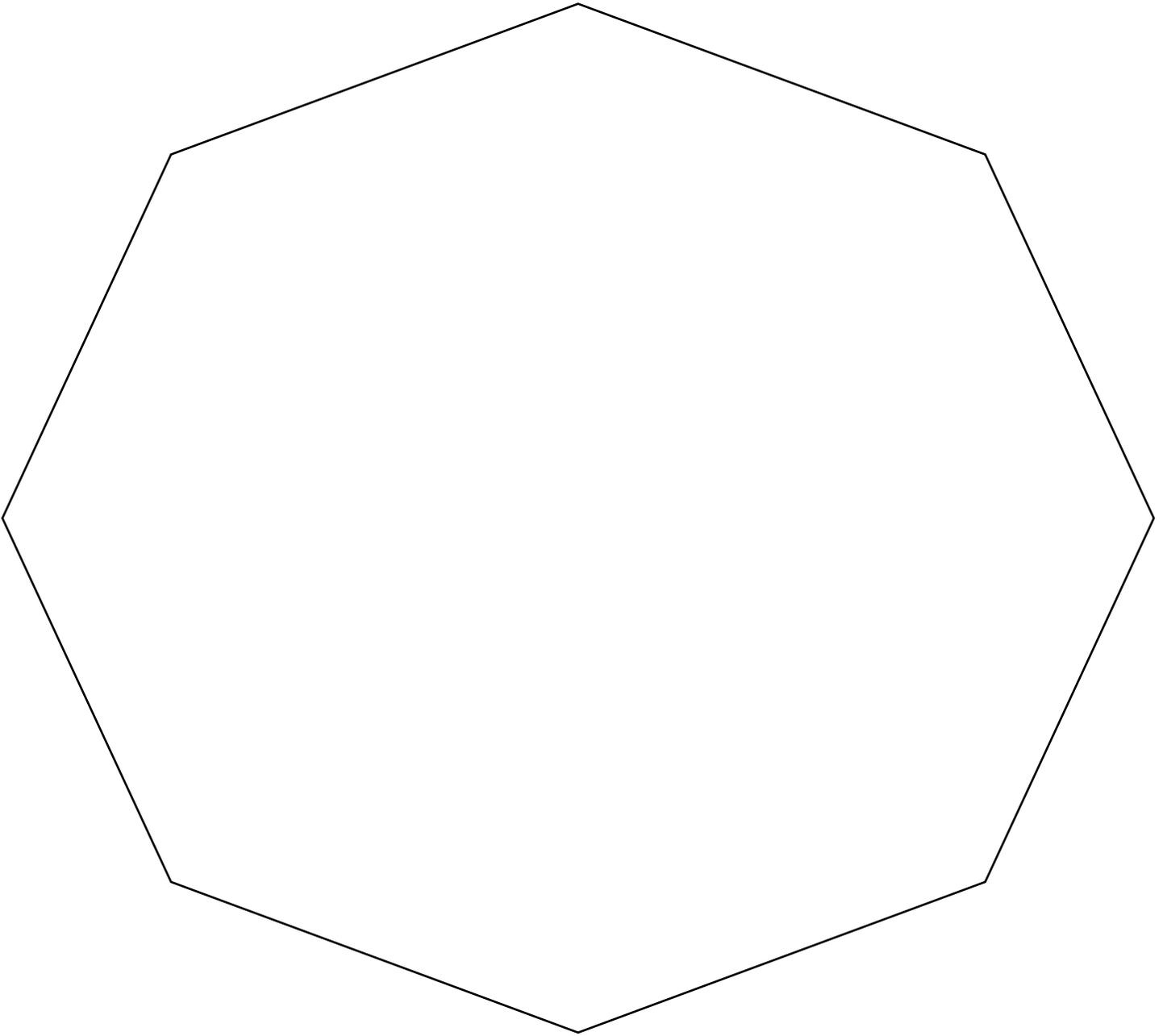
So this is how the Water Cycle works dude...

Cue Column (titles, vocab, big ideas, test questions)	The Carbon Cycle

Summary
(briefly describe the main concepts, major points)

The carbon cycle

Draw a diagram of the carbon cycle below and provide an explanation (page 85):



So this is how the Carbon Cycle works dude...

The Carbon Cycle Game

DIRECTIONS: Go to the following web address. Follow the instructions to play the game. Write down each question that is asked and the correct answer in COMPLETE sentences!

Website: http://www.windows2universe.org/earth/climate/carbon_cycle.html

1.

2.

3.

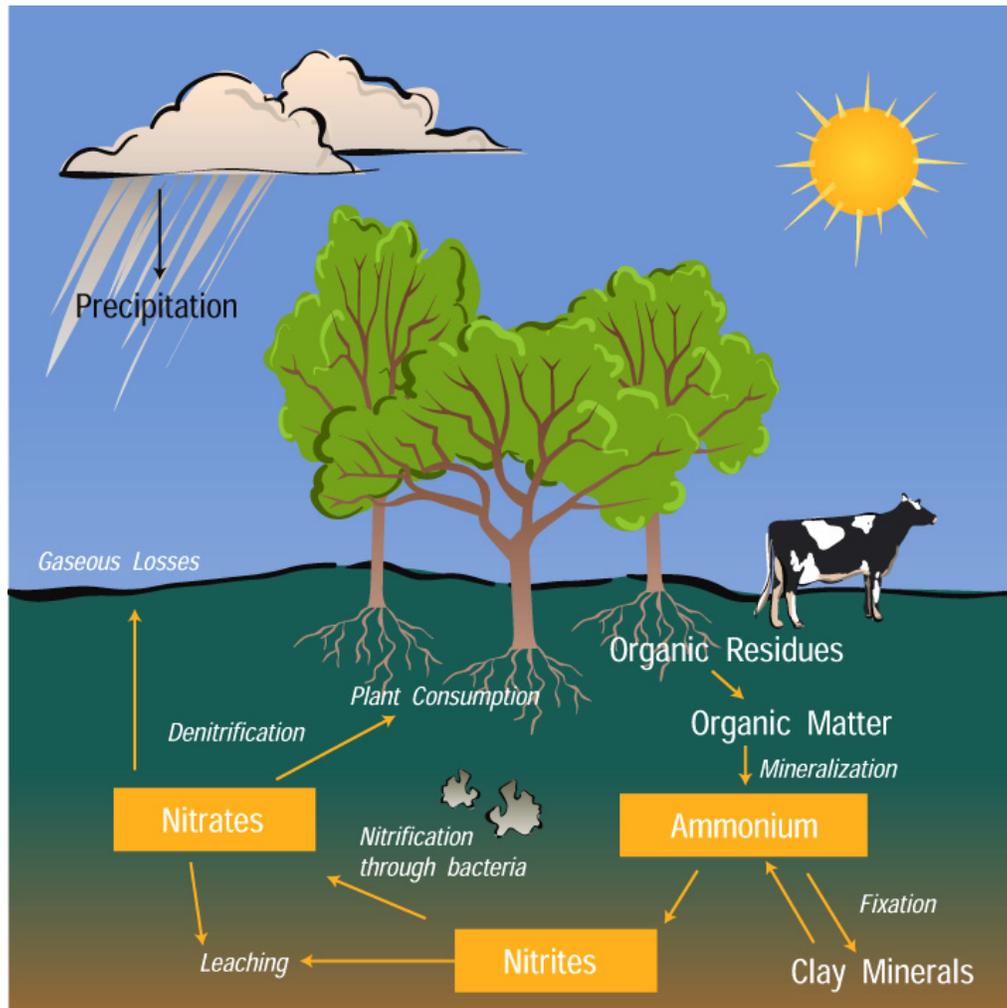
4.

5.

6.

7.

The Nitrogen Cycle

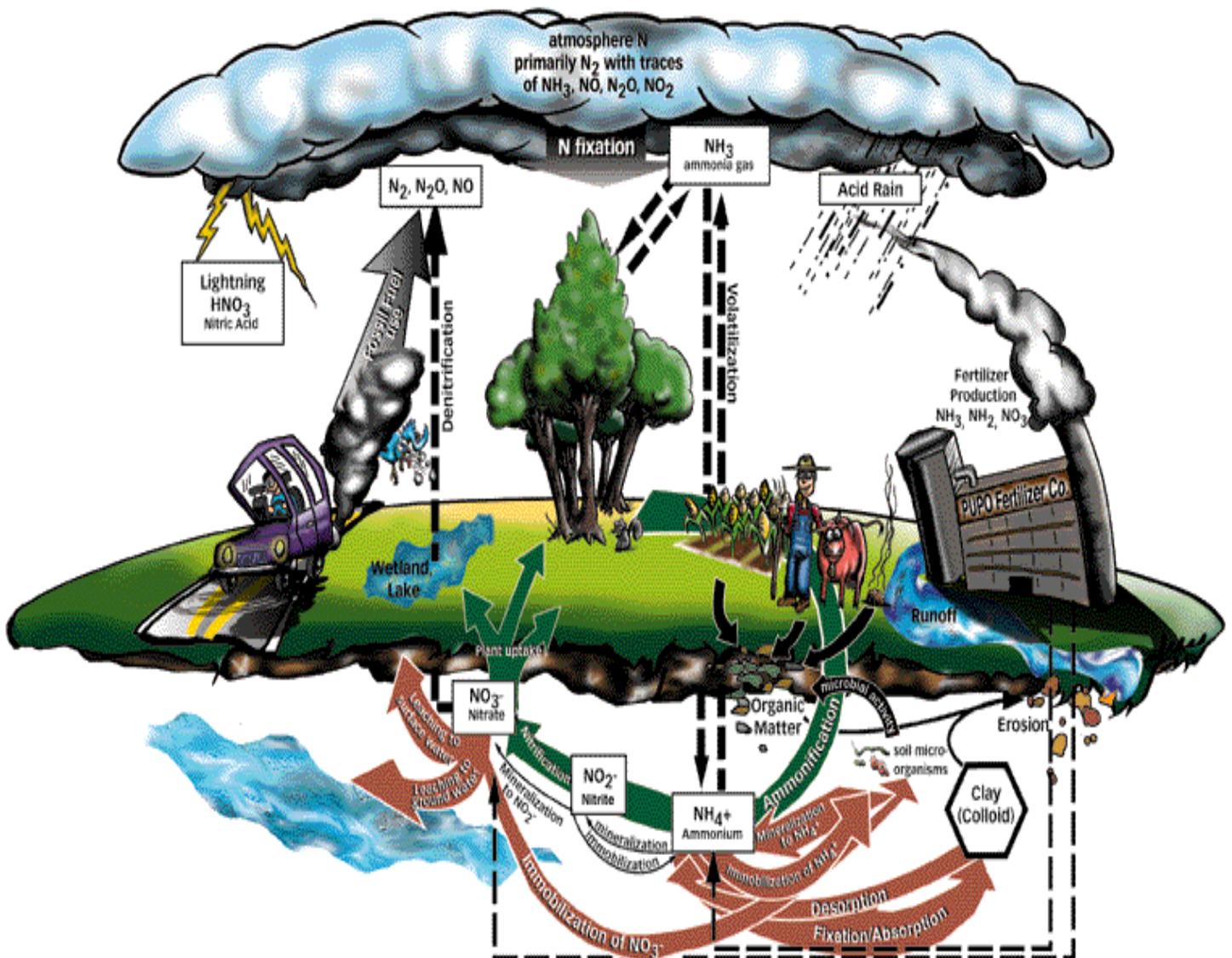


Nitrogen is an [element](#). It is found in [living things](#) like [plants](#) and [animals](#). It is also an important part of non-living things like the air above and the dirt below. [Atoms](#) of nitrogen don't just stay in one place. They move slowly between living things, dead things, the air, soil and water. These movements are called the **nitrogen cycle**.

Most of the nitrogen on Earth is in the [atmosphere](#). Approximately 80% of the molecules in Earth's atmosphere are made of two nitrogen atoms bonded together (N_2). All plants and animals need nitrogen to make amino acids, proteins and DNA, but the nitrogen in the atmosphere is not in a form that they can use. The molecules of nitrogen in the atmosphere can become usable for living things when they are broken apart during lightning strikes or fires, by certain types of bacteria, or by bacteria associated with bean plants.

Most plants get the nitrogen they need to grow from the soils or water in which they live. Animals get the nitrogen they need by eating plants or other animals that contain nitrogen. When organisms die, their bodies decompose bringing the nitrogen into soil on land or into ocean water. Bacteria alter the nitrogen into a form that plants are able to use. Other types of bacteria are able to change nitrogen dissolved in waterways into a form that allows it to return to the atmosphere.

Certain actions of humans are causing [changes to the nitrogen cycle](#) and the amount of nitrogen that is stored in the land, water, air, and organisms. The use of nitrogen-rich fertilizers can add too much nitrogen in nearby waterways as the fertilizer washes into streams and ponds. The waste associated with livestock farming also adds large amounts of nitrogen into soil and water. The increased nitrate levels cause plants to grow rapidly until they use up the supply and die. The number of plant-eating animals will increase when the plant supply increases and then the animals are left without any food when the plants die.

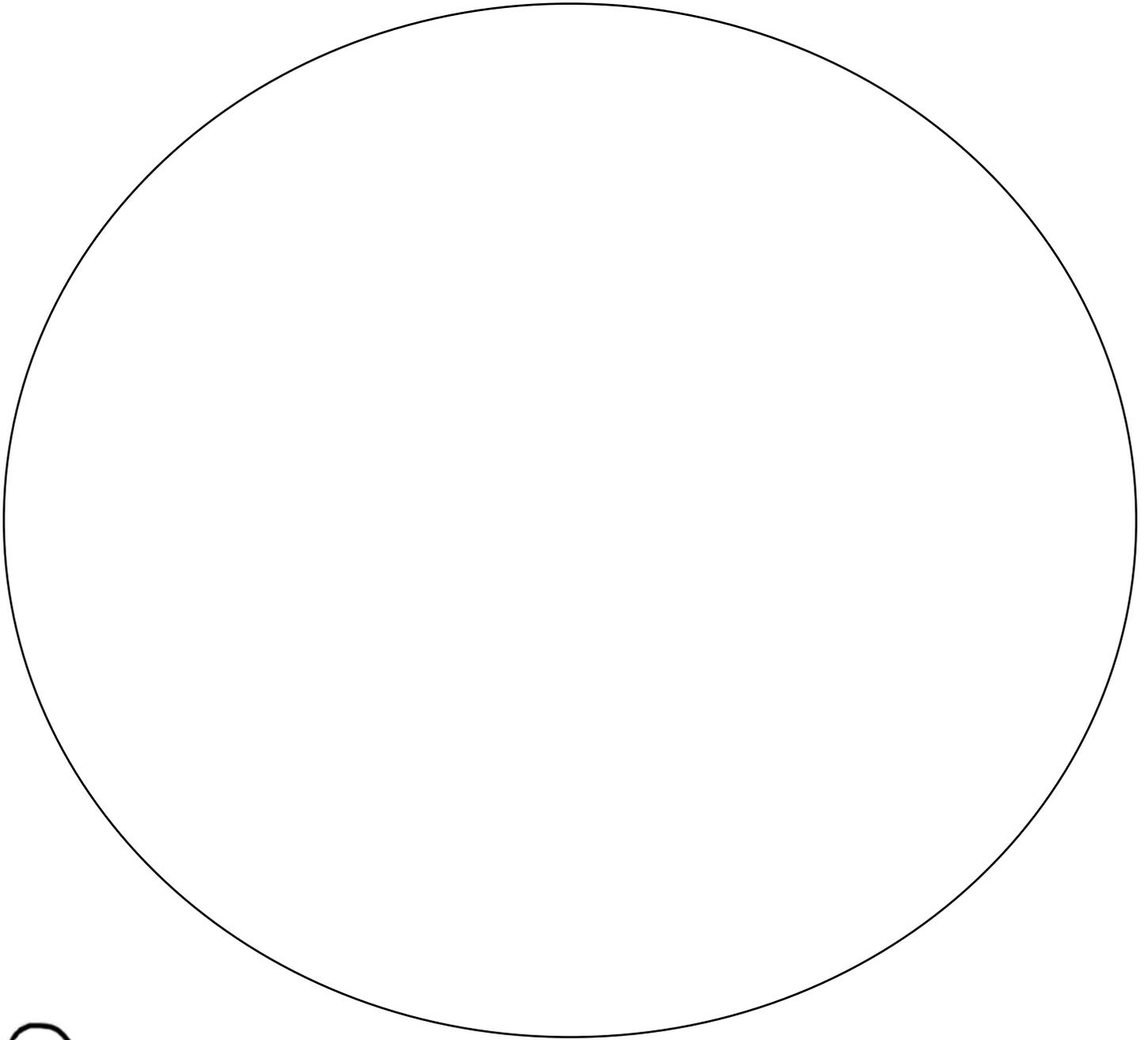


Cue Column (titles, vocab, big ideas, test questions)	The Nitrogen Cycle

Summary
(briefly describe the main concepts, major points)

The Nitrogen Cycle

Draw a diagram of the nitrogen cycle below with an explanation (page 137):



So this is how the Nitrogen Cycle works dude...

Farming Nitrogen

Purpose

The purpose of this lab is to explore the nitrogen cycle by evaluating a farming case study.¹

Procedure

Materials

1. Case study

Sequence of Steps

1. Read the following background information and highlight important facts.

Background Information

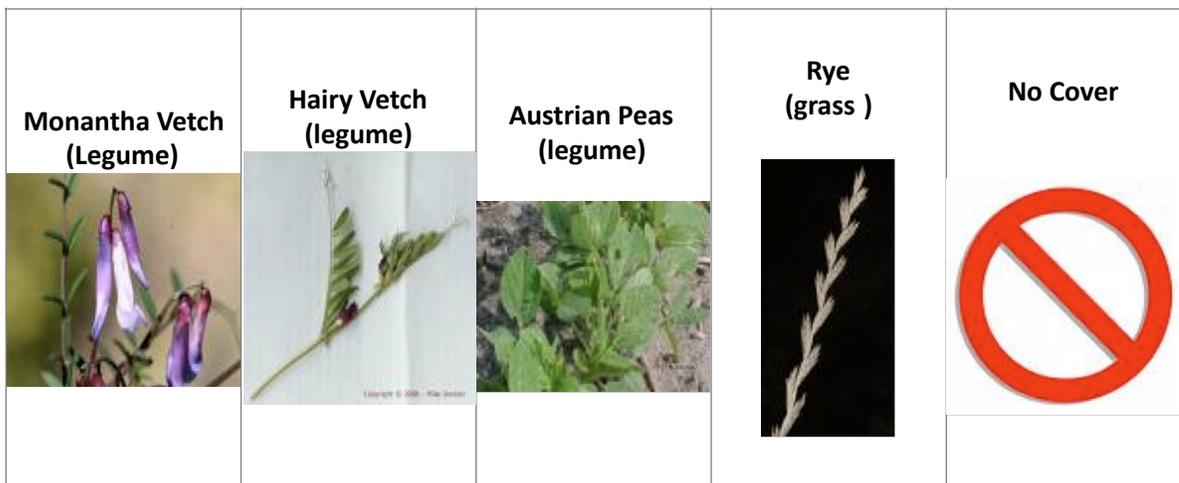
Sometimes farmers grow crops of rye and other grasses and then plow them under the soil to decay. This farming practice helps to increase crop yields of other plants. Farmers may also plow under legumes such as peas, vetch, and lentils. Legumes are plants that have colonies of nitrogen- fixing bacteria living in nodules on the plant roots.

2. Read the case study and develop your hypothesis:

Case Study

In an effort to determine which practice produces the best crop yields, scientists performed an experiment. They grew corn on land that had previously received one of five treatments. Three fields had previously been planted with different legumes. A fourth field had been planted with rye. The fifth field was left bare. All of the fields were then plowed under and corn was planted. None of the fields received a fertilizer treatment while the corn was growing.

Aerial View of Fields



Hypothesis: Which treatment group will help the main crop grow?

¹ Knapp, Beth (2008).Farming Nitrogen, Lab.Atwater High School Ag Dept.

Biogeochemical Cycle Study Guide

Directions: **Answer the questions in complete sentences or phrases.** Attach pages to packet when done.

What are the three parts to the biogeochemical cycle?

What are the main components to the water cycle?

What are the main components of the nitrogen cycle?

What are the main components of the carbon cycle?

Evaporation is the movement of ...

Condensation is the movement of ...

What is precipitation and give 3 examples?

How are evaporation and transpiration similar?

How is condensation and precipitation different?

What is the term used when we artificially make fresh water out of salt water?

What happens to the water that is not evaporated from the land?

Plants take in _____ and release _____.

What natural phenomenon produces carbon?

What is the carbon compound that sea creatures need and what do they use it for?

Name 4 things that produce carbon dioxide (CO₂)

Where is the largest source of nitrogen found?

How is nitrogen removed from the air/atmosphere?

How does nitrogen get into the soil?

How is nitrogen returned to the atmosphere?

Plants use a carbon for two things, what are they?

Draw and label a quick replica of each of the 3 cycles