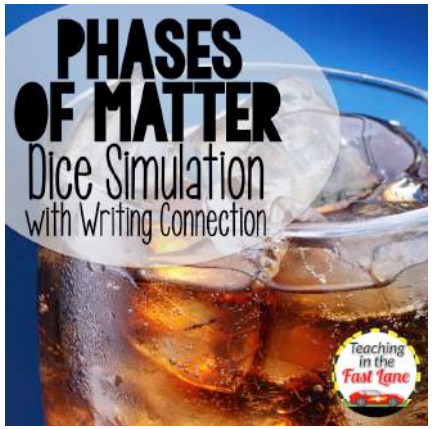
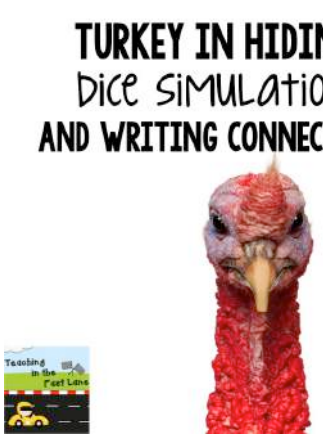
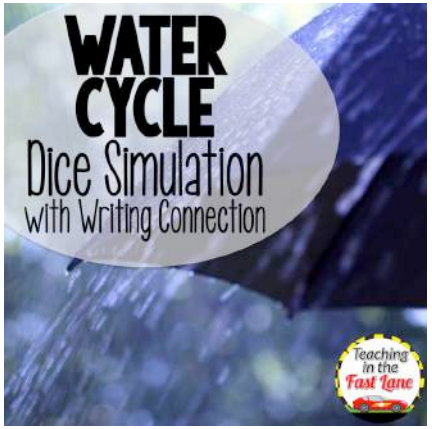
PLEASE VISIT MY TEACHERSPAYTEACHERS STORE

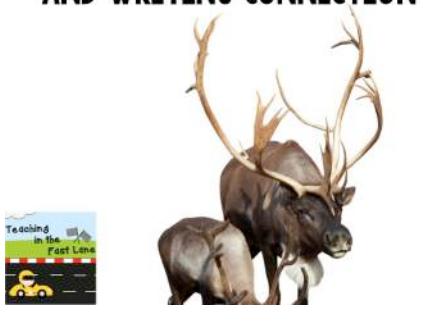
Teaching in the Fast Lane

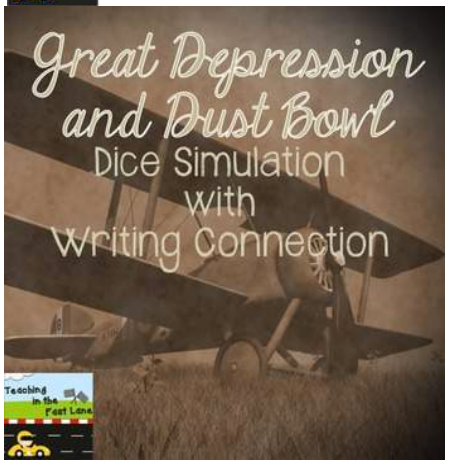
FOR MORE SIMULATIONS!











MANY MORE TO COME!

INCLUDED IN THIS PRODUCT:

- Teacher and student directions for simulation
- Recording sheet
- Sample recording sheet
- Teacher directions for narrative
- Sample narrative based on sample recording sheet
- Rubric for narrative
- Signs for each location with directions
    - For larger classes, I would make multiple copies of each poster and directions, so that lines at each don't get too long.

You will need six dice to complete this simulation. I recommend the large foam dice that can be found at the dollar store.

NOTE TO TEACHER

This is a simulation meant to reinforce students' knowledge of the nitrogen cycle. This simulation is a great way to connect science and writing within your curriculum.

TEACHER DIRECTIONS FOR SIMULATION

- Print and laminate each of the location signs and student directions.
- Hang the location signs and student directions around your classroom and place one die by each poster.
- Hand out recording sheets to students and review the directions with them:
  - Directions are found on the next page
- Monitor students as they travel around the classroom during the simulation and complete their recording sheet.
- Assign students to their starting location.
  - I do this by numbering students off #1-6 and assign them to the following locations:
    - 1. In the Atmosphere
    - 2. Soil Nitrate
    - 3. Nitrification
    - 4. A Plant
    - 5. Ammonification
    - 6. Denitrification

DIRECTIONS FOR SIMULATION

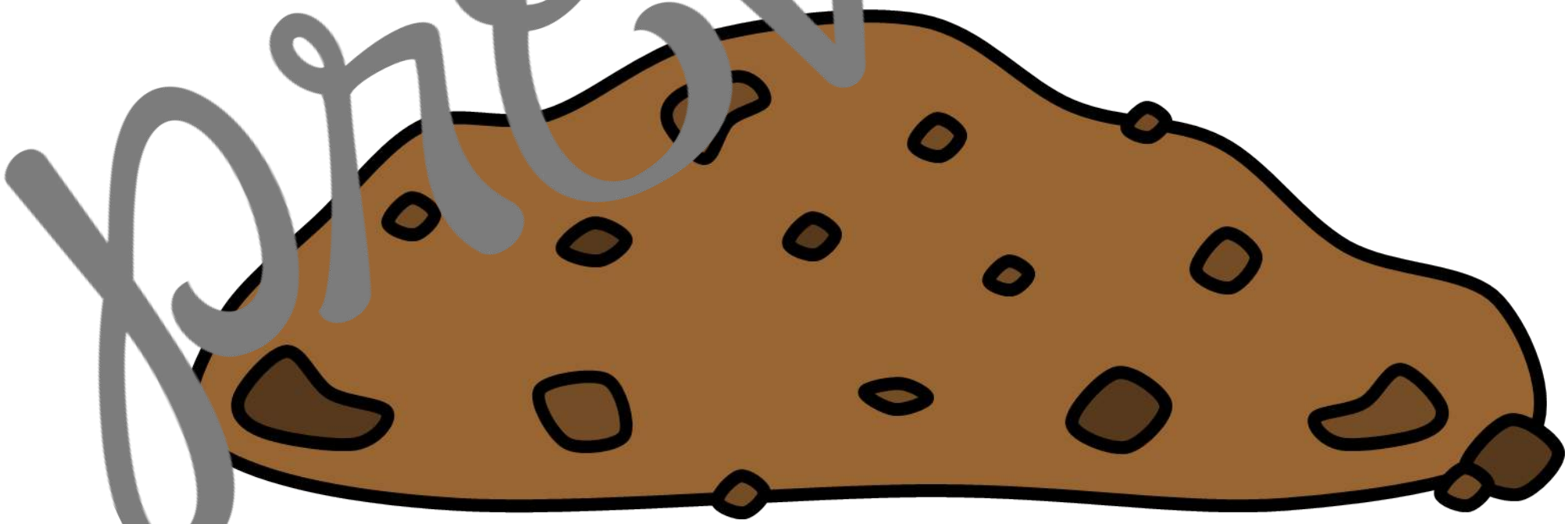
- After each student has their starting location, they should begin to circulate.
- At each location, roll the die and read the event associated with the number rolled. Use the underlined words to record your progress and travel to the next location.
- Once you have established your location, travel there quietly and wait in line to roll the die.
  - If your directive is to stay in the same location, then go to the end of the line and take another turn rolling the die.
- Students should continue to travel from location to location until they complete their recording sheet or time is up.
  - I would recommend allowing students to complete the simulation for about 10-15 minutes.

IN THE ATMOSPHERE

IN THE ATMOSPHERE

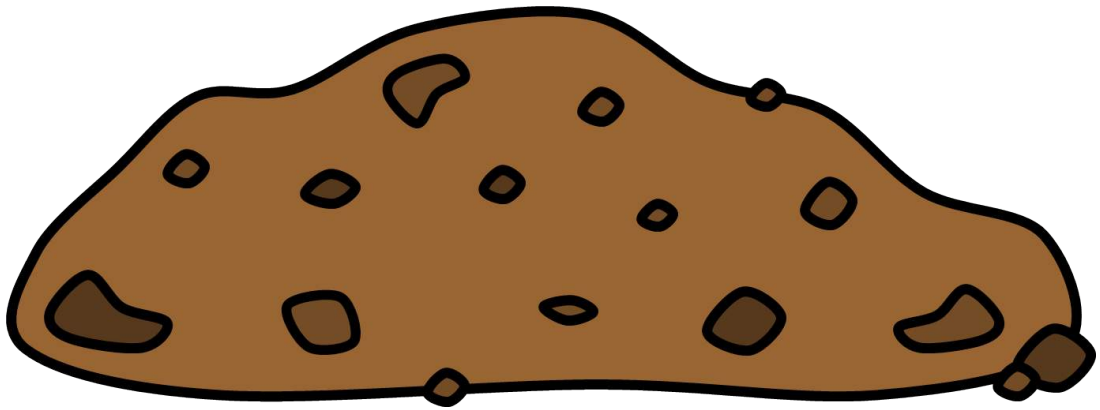
1. Lightning strikes causing fixation.
2. Bacteria create soil nitrates.
3. Lightning strikes causing fixation.
4. Bacteria create soil nitrates.
5. Lightning strikes causing fixation.
6. Bacteria create soil nitrates.

SOIL NITRATE

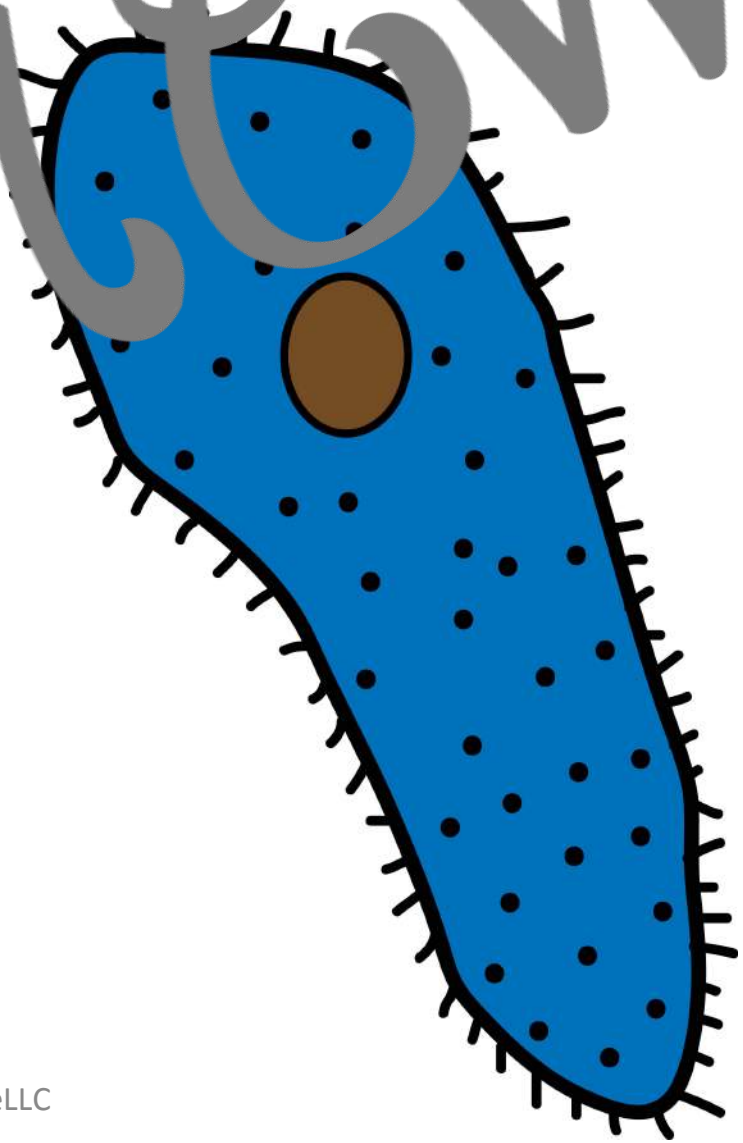


SOIL NITRATE

1. You are taken into a plant through its roots.
2. You undergo denitrification.
3. You are taken into a plant through its roots.
4. You are reintroduced into the atmosphere.
5. You are taken into a plant through its roots.
6. You undergo denitrification.

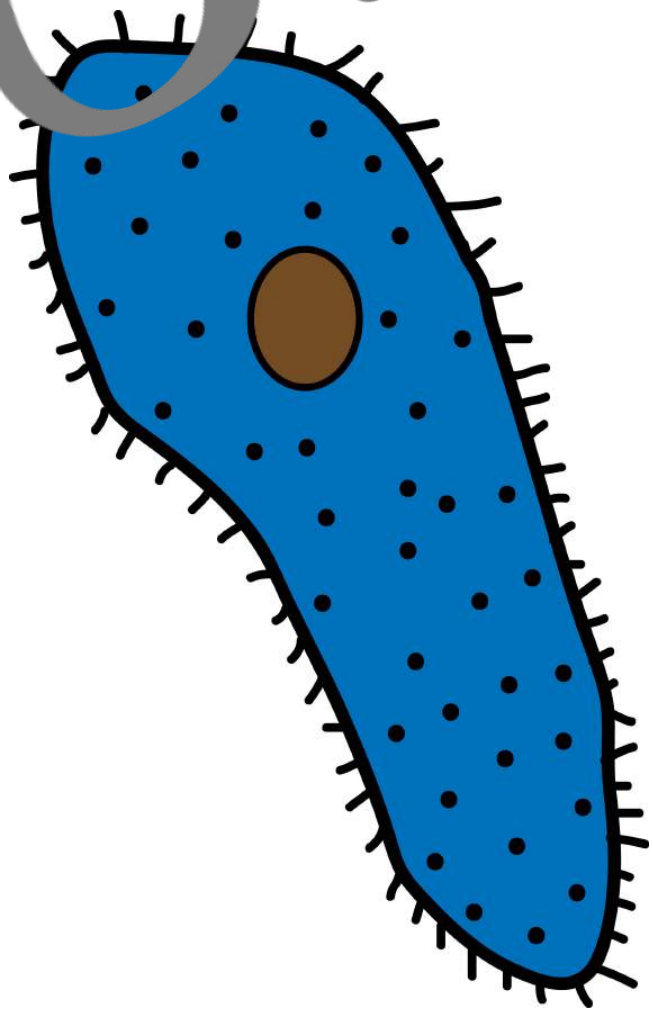


DENITRIFICATION



DENITRIFICATION

1. Denitrifying bacteria release you into the atmosphere.
2. Denitrifying bacteria release you into the atmosphere.
3. Denitrifying bacteria release you into the atmosphere.
4. Denitrifying bacteria release you into the atmosphere.
5. Denitrifying bacteria release you into the atmosphere.
6. Denitrifying bacteria release you into the atmosphere.

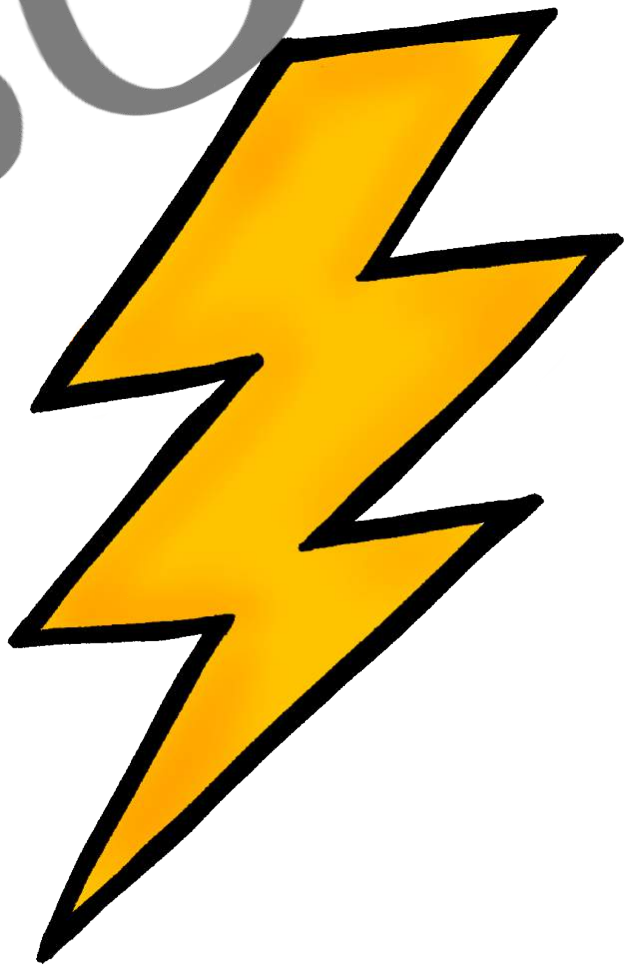


FIXATION

preview

FIXATION

1. You are taken in by plant roots.
2. You are taken in by plant roots.
3. You are taken in by plant roots.
4. You are taken in by plant roots.
5. You are taken in by plant roots.
6. You are taken in by plant roots.

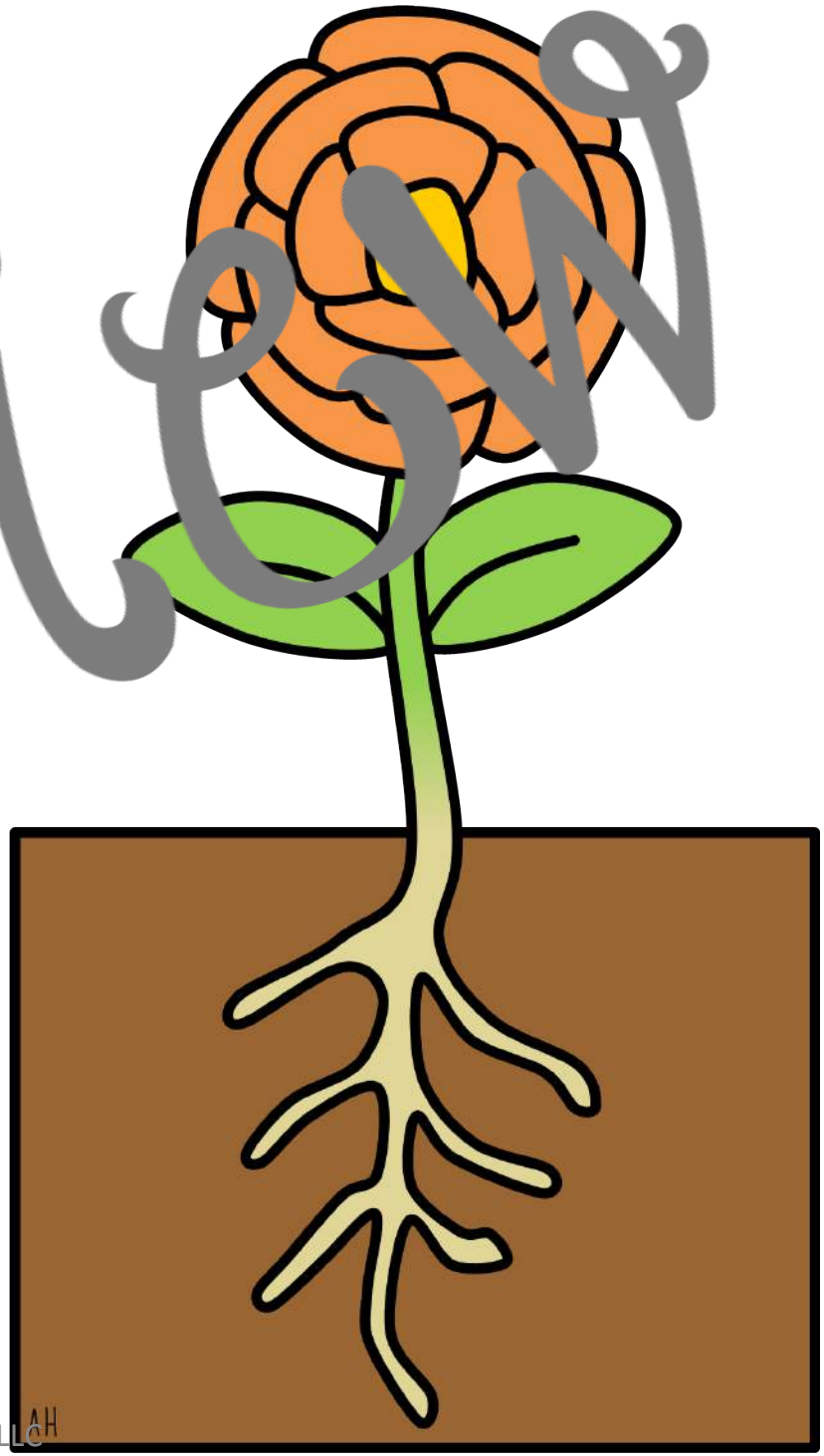


AMMONIFICATION

AMMONIFICATION

1. Nitrifying bacteria turn you into soil nitrates.
2. Nitrifying bacteria turn you into soil nitrates.
3. Nitrifying bacteria turn you into soil nitrates.
4. Nitrifying bacteria turn you into soil nitrates.
5. Nitrifying bacteria turn you into soil nitrates.
6. Nitrifying bacteria turn you into soil nitrates.

PLANTS.



PLANTS

1. You are eaten by an animal and its waste undergoes ammonification.
2. Decaying plant matter is decomposed by fungus and undergoes ammonification.
3. You are eaten by an animal and its waste undergoes ammonification.
4. Decaying plant matter is decomposed by fungus and undergoes ammonification.
5. You are eaten by an animal and its waste undergoes ammonification.
6. Decaying plant matter is decomposed by fungus and undergoes ammonification.

Name_____ #___ Date_____

NITROGEN CYCLE DICE SIMULATION

1	Begin	11	
2		12	
3		13	
4		14	
5		15	
6		16	
7		17	
8		18	
9		19	
10		20	

SAMPLE RECORDING SHEET FOR NITROGEN CYCLE DICE SIMULATION

1	Begin as a plant	11	ammonification
2	ammonification	12	soil nitrates
3	soil nitrates	13	denitrification
4	denitrification	14	the atmosphere
5	the atmosphere	15	fixation
6	fixation	16	plants
7	plants	17	ammonification
8	ammonification	18	soil nitrates
9	soil nitrates	19	the atmosphere
10	plants	20	soil nitrates

TEACHER DIRECTIONS FOR NARRATIVE

- After completing the dice simulation, students are ready to write a narrative from the point of view of a molecule of nitrogen traveling through the nitrogen cycle.
- Students should use their recording sheet (the locations they visited) to write a narrative piece about their adventure.
- By following their recording sheet and adding details, students will have a narrative describing their adventure. It is also important for students to use their science vocabulary in the narrative.
- It is alright for students to not use all of the locations on their recording sheet, but they should include at least five events.
- A rubric for the narrative is included.

SAMPLE NARRATIVE

As a nitrogen molecule I sure do get around. My journey takes me everywhere from high in the sky to down deep in the soil. Who else can say that?

One day I was minding my own business just hanging out in my favorite plant's roots when before I knew it, I got word from the leaves that the plant was dying. I was so upset, but I also knew that this would mean I was just beginning the next chapter in my life.

As the plant started to decay I could feel the decomposing fungi taking over and knew what was coming. Immediately I felt the ammonification process beginning. Have you ever smelled ammonia? I will clue you in that it is not exactly a pleasant experience.

I quickly became a soil nitrate and dreamt of being returned to a plant where I felt most comfortable, but instead I felt myself being denitrified by bacteria and rising high into the atmosphere. I was pleasantly surprised to find so many nitrogen friends in the atmosphere. I also enjoyed the weightless feeling of floating around.

Just as I was getting used to the feeling of being in the atmosphere a storm began. You could feel the electricity in the air. Suddenly, I felt a surge of heat and felt myself plummeting towards the earth. Soon I found myself back in the soil below ground, frightened, but safe in the familiar surrounding. I spoke to other nitrogen friends and they informed me that the surge of heat was lightning that had fixated me into the soil.

I stayed in the soil for several days before I found myself in my favorite place, the roots of a plant. I hope to stay in the warm comfort of this plant's roots for as long as possible. For now, I sit and wait for the next part of my journey through the nitrogen cycle.

RUBRIC FOR NITROGEN CYCLE DICE SIMULATION NARRATIVE

	1 point	3 points	5 points
Grammar, Mechanics, & Spelling	Many mistakes that make it difficult for the reader to understand.	A few mistakes but the reader can still understand.	Only a few mistakes and the reader can understand.
Organization and Coherence	The story does not make sense or follow order of events.	The story follows order of events, but lacks coherence.	The story follows a logical order and is coherent.
Events from recording sheet	Includes 3 or less events from the simulation.	Includes 4-5 events from the simulation.	Includes 6 or more events from the simulation.
Details & Scientific Vocabulary	No details are added. Academic vocabulary is not present	A few obvious details are added along with some academic vocabulary.	Many imaginative details are added. Clear use and knowledge of academic vocabulary is present.

Total Score __/20

Thank you for your purchase. If you have time, please rate this product and leave me some feedback on how I can improve my products. All constructive criticism is greatly appreciated.

PLEASE VISIT MY TEACHERSPAYTEACHERS STORE

Teaching in the Fast Lane

FOR MANY DIFFERENT PRODUCTS!

Http://www.teachinginthefastlane.com

Creative Clips Digital Clipart Created by Krista Wallden

KG Fonts

Teaching in the Fast Lane

Casedilla Crumbs Designs

Ashley Hughes