

# POLLUTION

Dice Simulation  
with Writing Connection

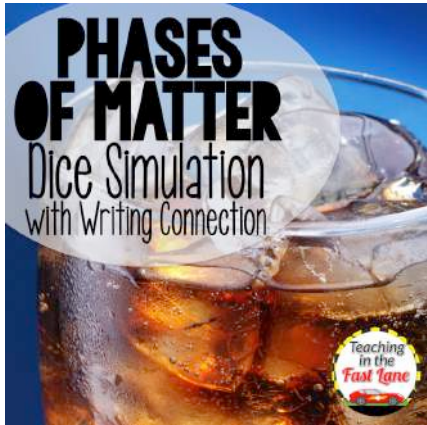




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# Teaching in the Fast Lane

## FOR MORE SIMULATIONS!



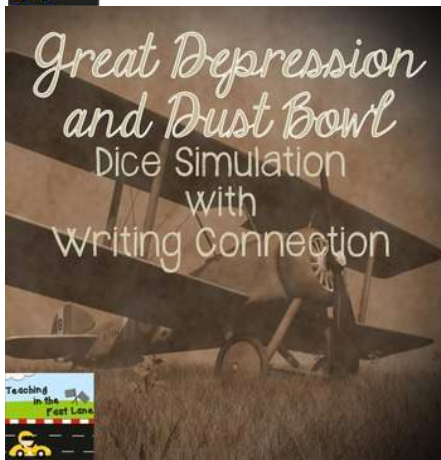
**TURKEY IN HIDING**  
Dice Simulation  
AND WRITING CONNECTION



**CIRCULATION OF A DOLLAR**  
Dice Simulation  
AND WRITING CONNECTION



**REINDEER GAMES**  
Dice Simulation  
AND WRITING CONNECTION



# MANY MORE TO COME!

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# 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 how pollution makes its way through the environment. This simulation is a great way to connect science and writing within your curriculum.

# TEACHER DIRECTIONS FOR SIMULATION

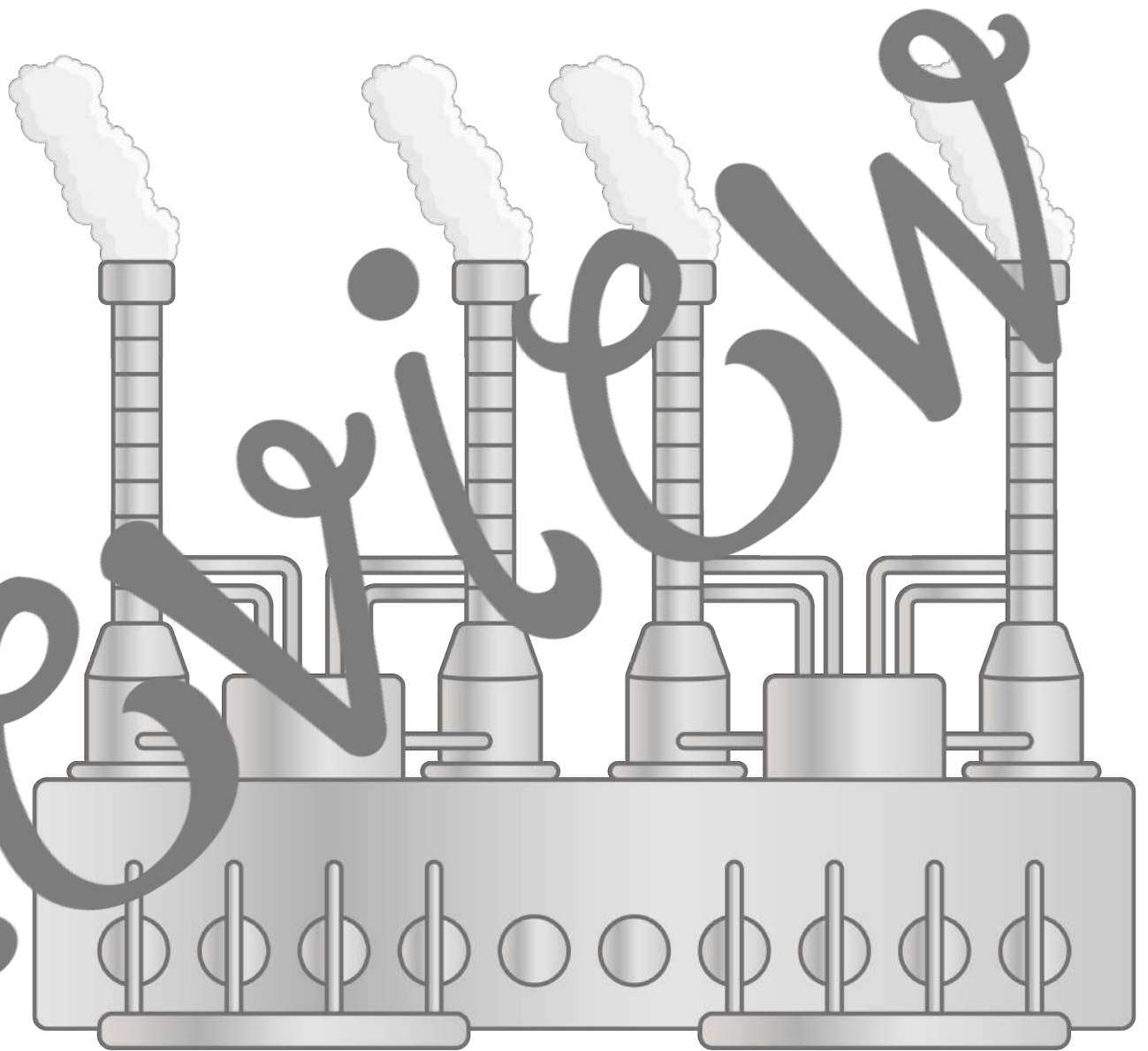
- Print and laminate each of the location signs and student directions.
- Hang the location signs and student directions around your classroom and place one die by each poster.
- Hand out recording sheets to students and review the directions with them:
  - Directions are found on the next page.
- Monitor students as they travel around the classroom during the simulation and complete their recording sheet.
- Assign students to their starting location.
  - Do this by numbering students off #1-6 and assign them to the following locations:
    - 1. Factory
    - 2. In a Stream
    - 3. Ingested by a Fish
    - 4. Ingested by an Eagle
    - 5. On Crops
    - 6. Water Treatment Plant

# 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.

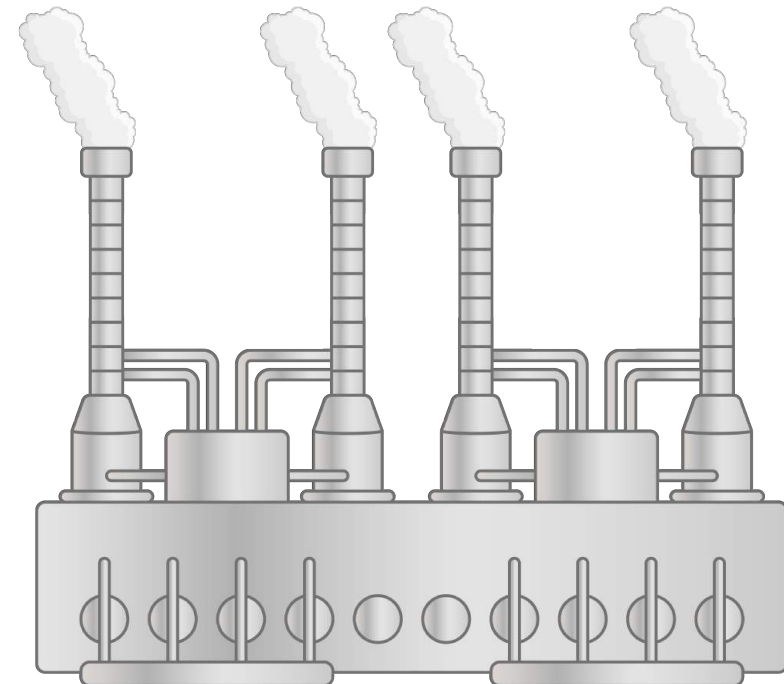


# IN A FACTORY



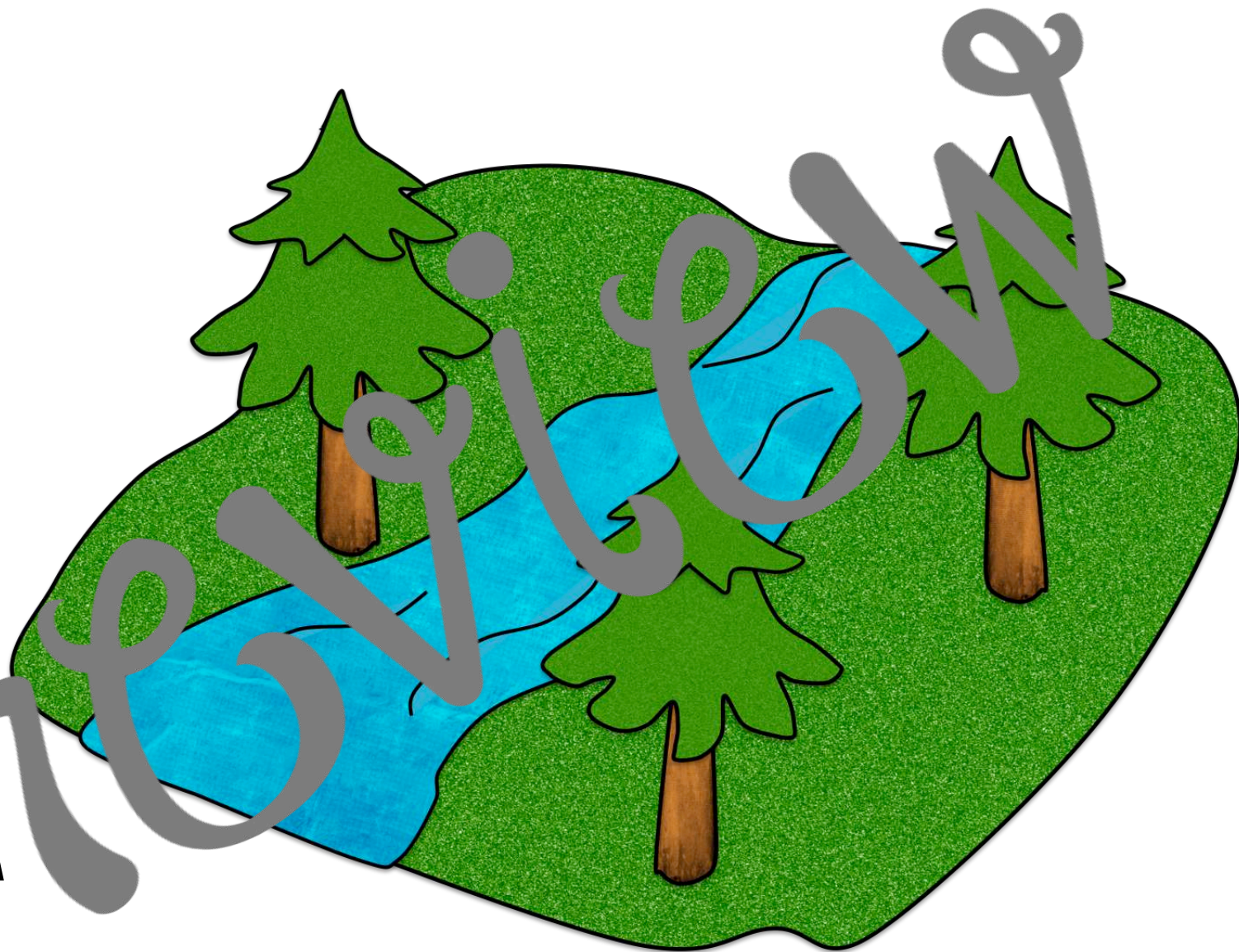
# IN A FACTORY

1. Your runoff finds its way into a stream.
2. Your waste is released into the atmosphere and is released onto crops when it rains.
3. Your waste is sent directly to a treatment plant.
4. Your waste is released into the atmosphere and is released onto crops when it rains.
5. Your runoff finds its way into a stream.
6. Your waste is sent directly to a treatment plant.



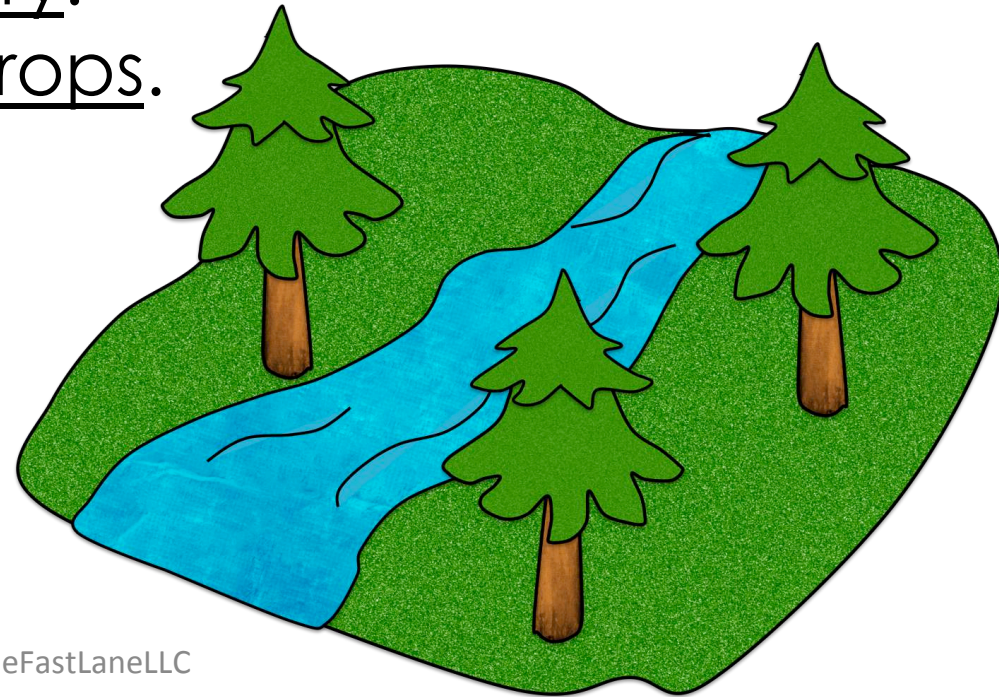


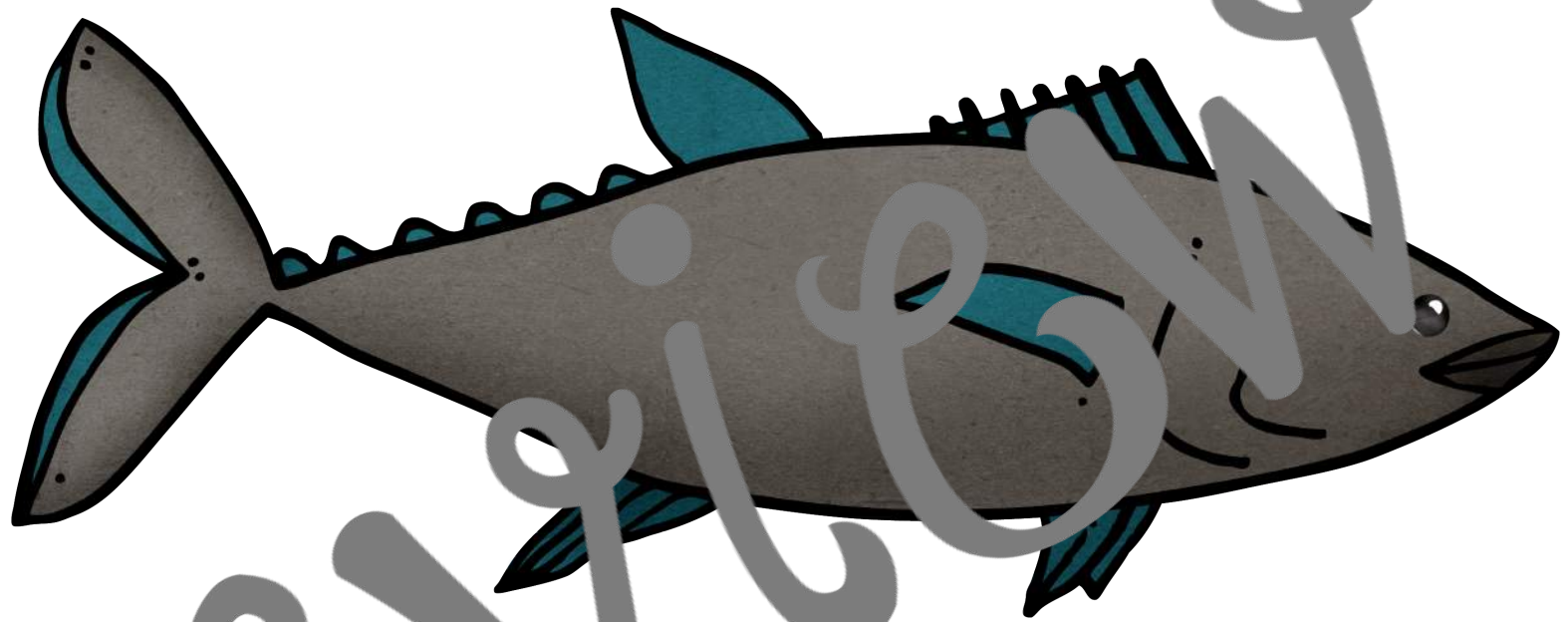
**IN A  
STREAM**



# IN A STREAM

1. You are moving with the current and continue down the stream.
2. You are ingested by a fish while it swims.
3. An eagle drinks from the stream and ingests you.
4. You are taken into a treatment plant.
5. You are used by a factory.
6. You are used in water crops.



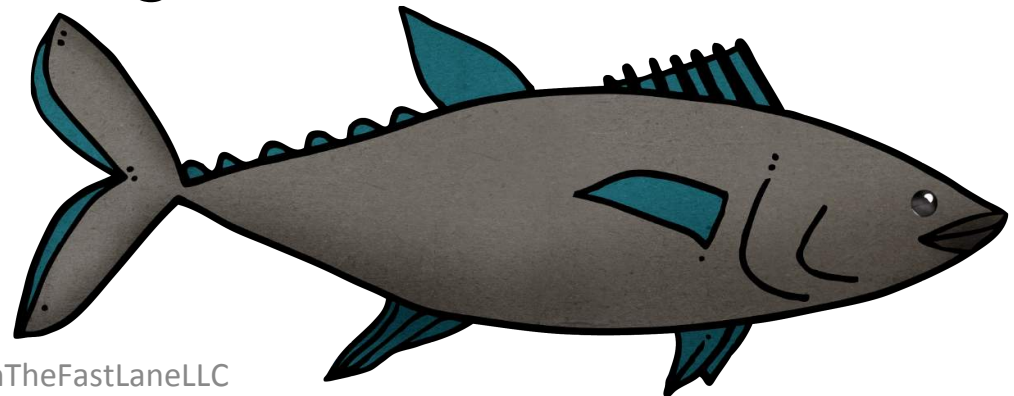


**INGESTED  
BY A FISH**



# INGESTED BY A FISH

1. After going through the fish's digestive system you return to the stream.
2. You are ingested by an eagle.
3. You are taken to a treatment plant along with the water around you.
4. You remain in the fish.
5. After going through the fish's digestive system you return to the stream.
6. You are ingested by an eagle.



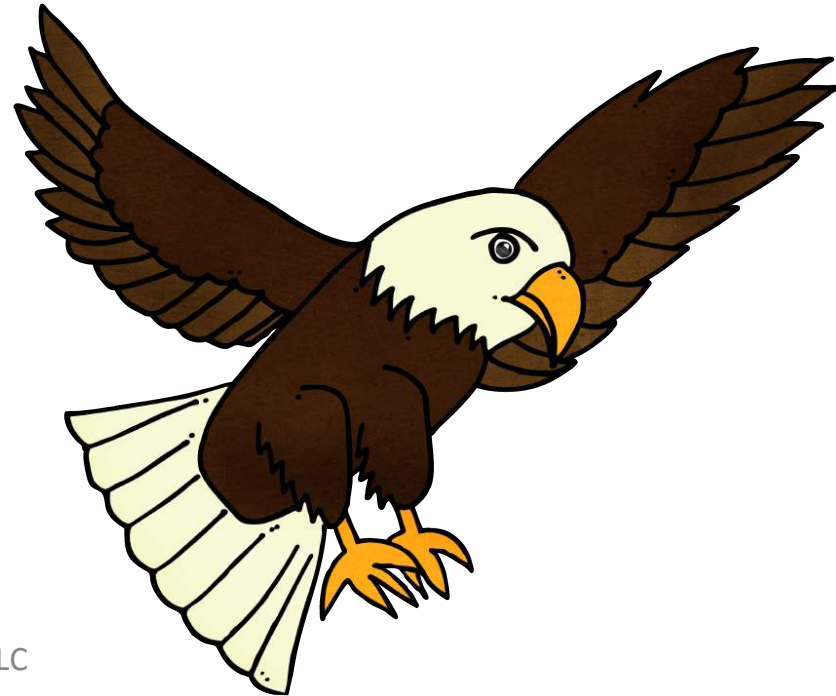


**INGESTED**

**BY AN EAGLE**

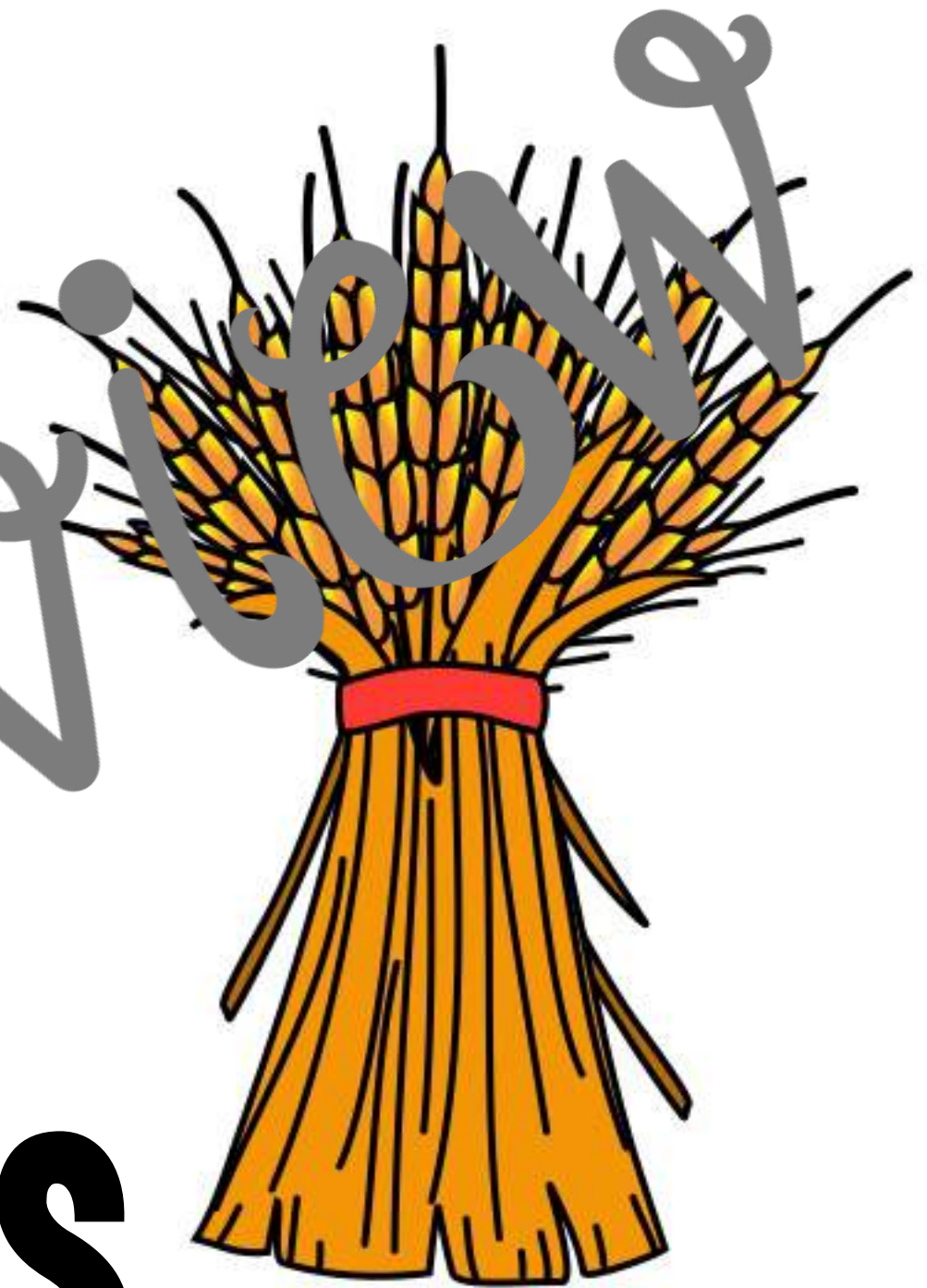
# INGESTED BY AN EAGLE

1. Your droppings fall on crops.
2. Your droppings fall in a stream.
3. You pass away and your remains decompose in a stream.
4. Your droppings fall on crops.
5. Your droppings fall in a stream.
6. You pass away and your remains decompose in a stream.



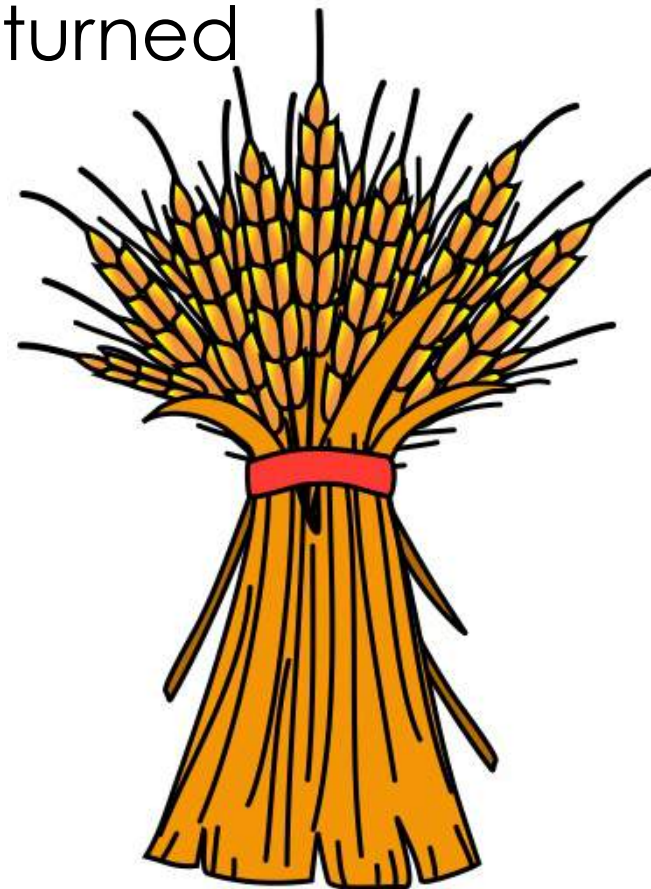


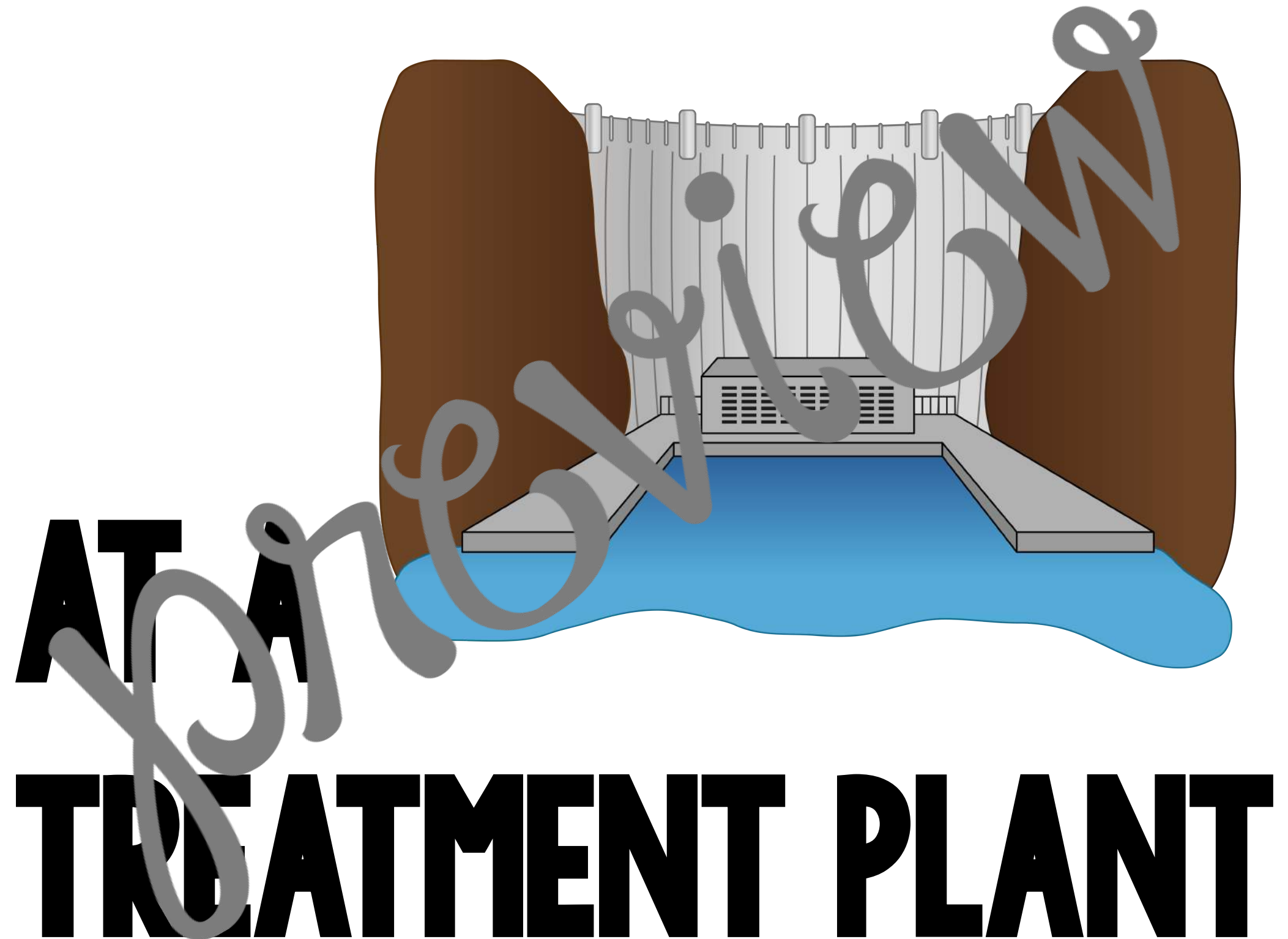
**ON CROPS**



# ON CROPS

1. The runoff from your irrigation is returned to a stream.
2. You are eaten by a mouse that is then ingested by an eagle.
3. The runoff from your irrigation is returned to a stream.
4. You are eaten by a mouse that is then ingested by an eagle.
5. The runoff from your irrigation is returned to a stream.
6. The runoff from your irrigation is returned to a stream.



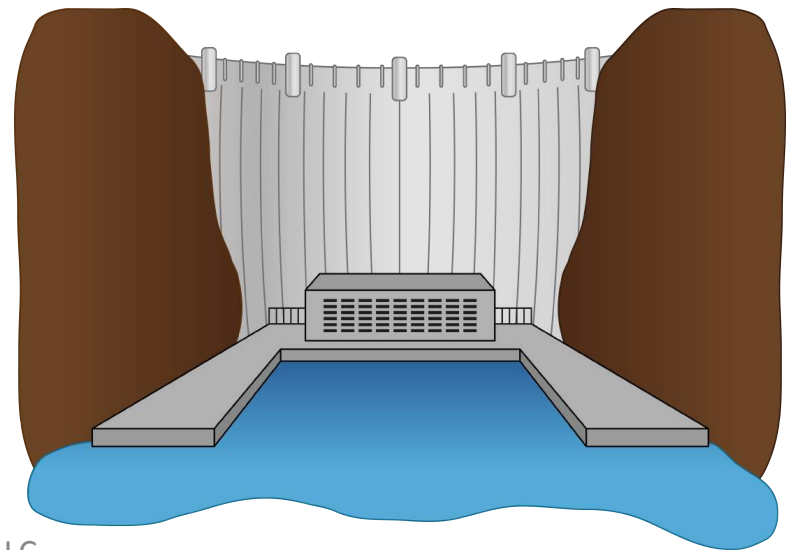


# AT A TREATMENT PLANT



# AT A TREATMENT PLANT

1. After being treated you are used to water crops.
2. After being treated you are released back into a stream.
3. After being treated you are released and ingested by fish.
4. You are used by a factory.
5. After being treated you are used to water crops.
6. You are used by a factory.



Name\_\_\_\_\_

#\_\_\_\_\_

Date\_\_\_\_\_

# POLLUTION DICE SIMULATION

1	Begin	1 1	
2		1 2	
3		1 3	
4		1 4	
5		1 5	
6		1 6	
7		1 7	
8		1 8	
9		1 9	
10		20	

# SAMPLE RECORDING SHEET FOR POLLUTIONS DICE SIMULATION

1	Begin in a factory	11	Treatment plant
2	Released into the air	12	Factory
3	Rain on crops	13	Stream
4	Runoff into stream	14	Ingested by a fish
5	Ingested by a fish	15	Ingested by an eagle
6	Released into stream	16	Stream
7	Ingested by a fish	17	Treatment plant
8	Ingested by an eagle	18	Used to water crops
9	Dropped on crops	19	Runoff into stream
10	Runoff into stream	20	Stream



# TEACHER DIRECTIONS FOR NARRATIVE

- After completing the dice simulation, students are ready to write a narrative from the point of view of pollution making its way through the environment.
- Students should use their recording sheet (the locations they visited) to write a narrative piece about their adventure.
- By following the 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

The day I was released from the factory I knew my journey was just beginning. I felt myself floating weightlessly in the atmosphere, but the other particles around me didn't seem very welcoming. They kept calling me pollution and cancerous, talk about rude.

Soon enough though I bonded with some water molecules in a large cloud and we rained down on the Earth. I fell on a drop of wheat and I was immediately absorbed into the ground. I stayed in the ground for several hours thinking that it might be the end of my short journey, but suddenly the ground became flooded by the irrigation system and I felt myself rising to the surface.

Once on the surface I was slowly washed away towards the stream. After reaching the stream the current rushed me away faster than I have ever moved. After moving along at a rapid pace for what seemed like days I felt myself being absorbed through a fish's gills.

The sensation of traveling through the fish's body was unlike any other that I have ever experienced, but before I knew it, I had been returned to the stream and was rushing right along with the water.

I was taken in by another fish, but this time I was ingested. I hung out in the fish's digestive system for a day or two before the fish was eaten by an eagle. I wasn't sure where I would wind up when the fish was torn apart, but I made it safely into the eagle's stomach. I slowly made my way through the eagle's digestive system before being dropped out onto some crops. The bacteria I was with seemed to think of themselves as fertilizer, but I knew better. I knew that I was no good for those crops.

# RUBRIC FOR POLLUTION DICE SIMULATION NARRATIVE

	1 point	3 points	5 points
<b>Grammar, Mechanics, &amp; Spelling</b>	Many mistakes that make it difficult for the reader to understand.	A few mistakes, but the reader can still understand.	Only 1-2 mistakes and the reader can understand.
<b>Organization and Coherence</b>	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.
<b>Events from coming sheet</b>	Includes 3 or less events from the simulation.	Includes 4-5 events from the simulation.	Includes 6 or more events from the simulation.
<b>Details and Scientific Vocabulary</b>	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.

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