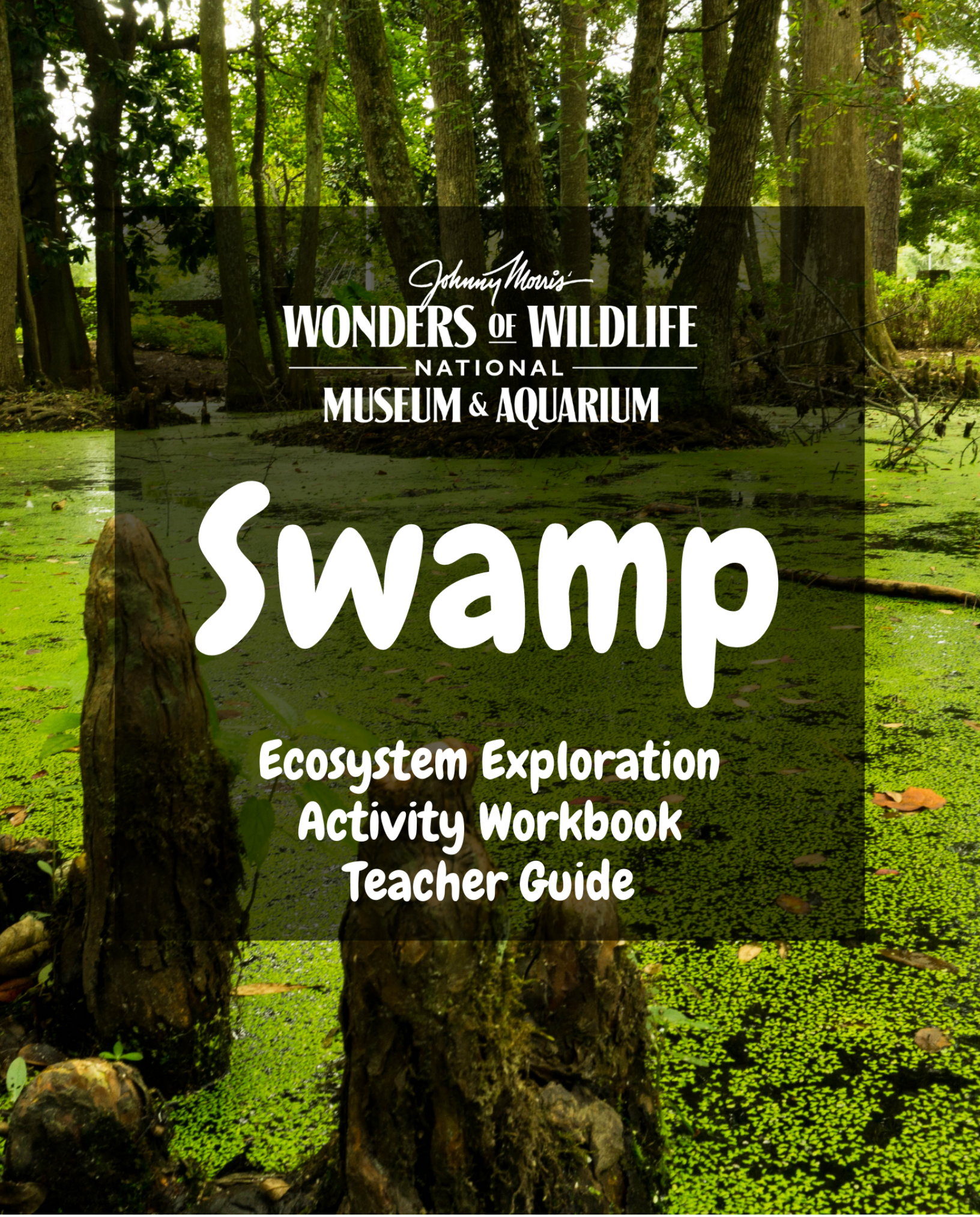


Johnny Morris's
WONDERS OF WILDLIFE
NATIONAL
MUSEUM & AQUARIUM

Swamp

Ecosystem Exploration Activity Workbook Teacher Guide

Vocabulary

Adaptation: A characteristic or trait that allows an organism to be better suited for survival and reproduction within a given habitat.

Aquatic Animals: Animals that live predominantly or entirely in the water.

Biodiversity: When many different types of animal and plant species live in a particular ecosystem or habitat.

Biodiversity Hotspot: An ecosystem or region with a significantly high amount of biodiversity that is also currently under threat of being destroyed.

Conservation: Prudent use without waste; especially in the interest of wildlife, natural resources, and land management.

Ecosystem: A community of living organisms in conjunction with the nonliving components of their environment, interacting as a system.

Endangered Species: A species of animal or plant that is in danger of going extinct.

Erosion: The process of wind, water, or other natural forces breaking down something over a period of time.

Habitat: The natural home of a living thing.

Organism: An individual living thing.

Pollution: When a harmful substance is out in the wrong place and/or in the wrong quantity and has a harmful effect on the environment.

Survive: To continue to live or exist, especially in spite of danger or hardship.

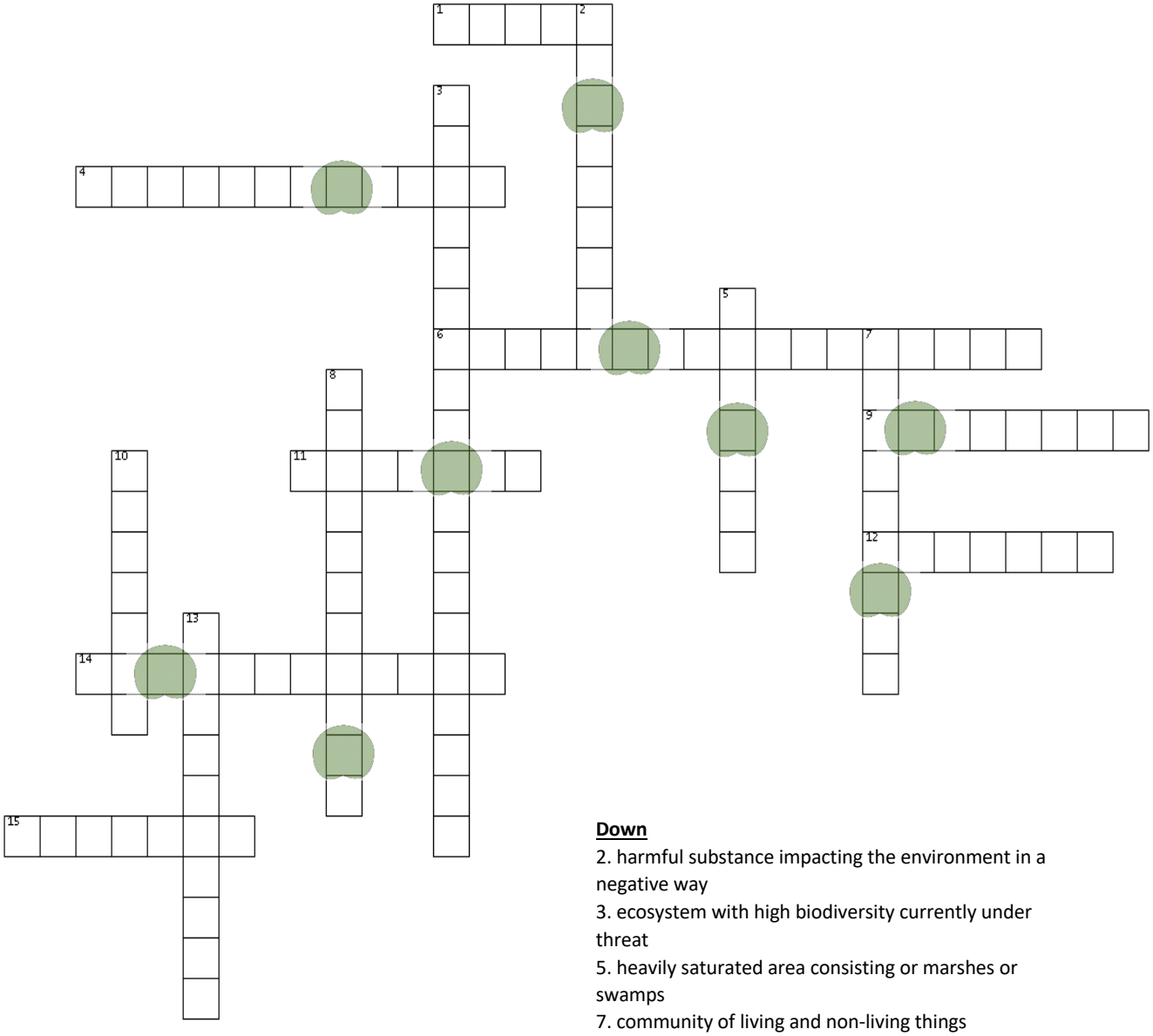
Swamp: An area of low-lying, uncultivated ground where water collects. Often considered to be transition zones of both land and water.

Terrestrial Animals: Animals that live predominantly or entirely on land.

Wetland: land consisting of marshes or swamps; saturated land.

Student Name:

Hidden Message Among The Lily Pads



Down

2. harmful substance impacting the environment in a negative way
3. ecosystem with high biodiversity currently under threat
5. heavily saturated area consisting or marshes or swamps
7. community of living and non-living things interacting as a system
8. lives predominately or entirely on land
10. lives predominately or entirely in water
13. traits that allow organism to be better suited for survival

Across

1. often considered as transitional zones between land and water
4. prudent use without waste
6. a species in danger of going extinct
9. an individual living thing
11. process where natural forces break something down over time
12. continuing to live in spite of danger or hardship
14. many different organisms living together in a particular ecosystem
15. the natural home of a living thing

Swamp Search

Student Name:_____

B V A Z R N M N C V Q P T X C E Q W S M
F S P M Y X O O V J L S A I J W U S S L
C P O L L U T I O N G W T F I E T I I J
D O D D Q F A T S K L A I A G E N G W E
P N N Q R M J A E O U M B H C A L Y C C
X S A S F H C T I Q R P A A G R R U J O
V R X L E B U P A T W E H R O Y D N J S
U Y L X T R T A G M X X O I F C G J O Y
G R S N J E V D L A I R T S E R R E T S
Q T S U K W W A G Z D G R R L L D O U T
N L M Q R E K Q T T J Y J F Q Z F G T E
B I O D I V E R S I T Y H O T S P O T M
H U W K L A I S T O O T D T Y V R T S I
C M C M Y Q H V V Q C N T N G Q K E T X
S E I C E P S D E R E G N A D N E M R B

-Adaptation -Aquatic Animals -Biodiversity -Conservation

-Ecosystem -Endangered Species -Erosion -Habitat -Organism -Pollution -Survive

-Swamp -Terrestrial Animals -Wetland

Kindergarten and First Grade Activities

Band Aid Firefly Craft

Materials

- Black sheet of construction paper
- Yellow and White crayon
- Colorful band-aids
- Plain band-aids
- Glue
- Wiggly eyes
- Yellow puffy paint

Directions

- Draw a moon and stars on your black sheet of construction paper
- Place the plain band aids on the paper to serve as the body of your fireflies
- Take two colored bandaids of the same color and place the over the body, forming an "X" to make the wings
- Glue the wiggly eyes onto the top of your fireflies. You can use a marker to add more details to the faces if you'd like
- Use the yellow crayon to draw antennae on the fireflies
- Use the yellow puff paint on the bottom of the fireflies to create a 3D effect glow.

Swamp Slime Sensory Bin

Materials

- Small Tray or Bin
- Small Bowl
- Corn Flour
- Water
- Green Food Coloring
- Spoon
- River Rocks
- Celery Stalk
- Celery Tops
- Peas
- Swamp Creature Toys

Directions

- To make the Oobleck, or your murky water, mix corn flour and water until you reach the desired consistency. Start with 1 cup of each ingredient and adjust from there.
- Add food coloring to the mixture to achieve desired shade.
- Pour the mixture into a tray and let it settle evenly on the bottom of the tray.
- Once the mixture has settled, start adding rocks and other decorative items to the edge of the tray, leaving the middle of the tray open for play.
- Add your animals and peas in the middle area, and let your students interact. Have them discuss what roles each animal plays in the food chain and larger ecosystem.

~Edible~ Swamp Cup

- Materials
  - Zip lock bags- sandwich size
  - Oreos
  - Gummy worms/frogs
  - Chocolate pudding mix
  - Vanilla pudding mix
  - Milk
  - Whipped topping
  - Blue food coloring
  - Clear plastic cups
  - Whisk
  - Spoon
  - Multicolored sprinkles
  - Pretzel sticks

- Preparation- This needs to be done *at least* one hour prior to the lesson but can be sooner if needed.

  - You are going to need to make both a chocolate pudding and vanilla pudding for this activity. You will be adding blue food coloring to the vanilla pudding to represent the water of the marsh.

  - You can always double or triple the amount depending on the size of the group.

    1. In a medium bowl whisk together chocolate pudding mix and 2 cups milk in a medium bowl for 2 minutes. Let stand 5 minutes.
    2. Fold in whipped topping into chocolate pudding.
    3. Whisk together vanilla pudding mix and milk in a medium bowl for 2 minutes.
    4. Add blue food coloring next. You can add any desired amount of the color for any shade of blue.
    5. After the vanilla pudding is colored, fold in whipped topping into the blue pudding. Let stand for 5 minutes.

- Instruction
    - Each student needs:
        - One clear plastic cup, baggie, spoon, three Oreos, two gummy worms, and four pretzel sticks
    - Start by separating the Oreos and scraping out the filling. Once the filling is out, put the Oreos in a bag and crush up into small pieces.
    - Put a *thin* layer of Oreo at the bottom of the clear plastic cup.
    - Next, put one spoon full of chocolate filling on top of the Oreos.
    - You are going to top the chocolate filling with Oreos and some of the multicolored sprinkles.
        - Students are adding the colors sprinkles to represent the abundant minerals that are present in swamps. These minerals allow organisms in swamps to be broken down easily, to prevent overpopulation.
    - Once the Oreo-sprinkle layer is down, add another filling layer, but use the *blue* filling this time.
        - The difference in color resembles the water of swamps.
        - This water area is predominately covered with trees, unlike marshes which are mostly herbaceous plants. These distinguishing characteristics are the main difference between the two.
    - Again, you are going to top the blue filling with a thin layer of Oreo crumbles.
    - On top of the last Oreo crumbles, top with gummy worms and stick pretzel sticks in the pudding.
        - Gummy worms represent the critters that find their homes in swamps.
        - The pretzels represent the trees that dominate swamps.
        - Swamps are often named after the types of trees that take up most of the swamp, such as hardwood and cypress swamps.

- As students enjoy their tasty treat, use this time to discuss the differences why swamps are so beneficial.

    - Swamps serve as *transitional* areas between land and water. Whether they are on the coastal regions or inland around rivers or lakes, they act as giant sponges. These areas catch overflowing water and serves as a protective layer to inland areas.
    - Think of what would happen if there was a huge rainfall event and there was nowhere for overflowing water to go around a lake. *Where would the water go if there were no swampy areas?* The same goes for coastal areas. Without these areas, land would be destroyed during hurricanes.
    - For a long period of time, wetlands were looked at as a wasteland. Officials tried draining them to prevent pesky insects like misquotes. They quickly learned that these areas where extremely crucial to inland areas.
    - Swamps also serve as a huge ecosystem for hundreds of different species of fish, insects, and even birds!

~Edible~ Marsh Cup

- Materials
    - Zip lock bags- sandwich size
    - Oreos
    - Gummy worms
    - Swedish fish
    - Chocolate pudding mix
    - Vanilla pudding mix
    - Milk
    - Whipped topping
    - Blue food coloring
    - Clear plastic cups
    - Whisk
    - Spoon
    - Green sprinkles

- Preparation- Preparation for this will be the same as the swamp cup. This needs to be done *at least* one hour prior to the lesson but can be sooner if needed.

- Instruction
    - Each student needs:
        - One clear plastic cup, baggie, spoon, three Oreos, two gummy worms, one Swedish fish
    - Start by separating the Oreos and scraping out the filling. Once the filling is out, put the Oreos in a bag and crush up into small pieces.
    - Put a thin layer of Oreo at the bottom of the clear plastic cup.
    - Next, put one spoon full of chocolate filling on top of the Oreos.
    - Cover the last Oreo layer with one more thin layer of chocolate filling then top with another Oreo layer.
        - These layers represent the dense soil of marshes.
        - The deepness of the soil makes the perfect environment for grasses and herbaceous plants to grow. The roots of the plants bind to the muddy soil.

        - The ability for lots of plants to grow in wetland areas like this slows the water down, which creates a largest marsh area.

- Top the Oreo layer with another thin layer of filling, but use the *blue filling* this time.

    - The difference in color resembles the water of marshes.

- Again, you are going to top the blue filling with Oreo crumbles.

- On top of the last Oreo crumbles, top with green sprinkles, gummy worms, and Swedish fish.

    - These green sprinkles represent the grassland that dominates marshes.
    - This would be a great opportunity to highlight that marshes are dominated by grassy areas and not trees. This is the main distinguishing factor between swamps and marshes.
    - Another important topic is that marshes are home to many different species of fish, insects, mammals, and birds! Depending on the type of marsh (fresh or salt water), depicts what different species call marshes home!

- As students enjoy their tasty treat, use this time to discuss the differences between the different types of marshes

    - What is the difference between *salt and freshwater marshes*? How are they the same?

        - Saltwater marshes are located on the coastal areas. They can be near bays and river mouths as well. The grassy areas of these marshes serve as a barrier between land and the ocean. Although marshes could never stop a hurricane, they can stop the surge to land and take some of the force away, protecting coastal areas from maximum areas. Most saltwater marshes are affected by the tide as well!
        - Freshwater marshes are farther inland than saltwater marshes. They can be found in open areas around rivers and lakes. After rainfall, water flows from bigger water sources into these wetlands. On average, freshwater marshes are only about 6ft deep. The largest freshwater marsh in the United States is the Florida Everglades! Like saltwater marshes, there are a ton of animals that call these home like mink, muskrats, beavers, turtles, frogs, insects, and birds!

❖ Conclusion

- If you choose to do both, compare how swamps and marshes are similar and different!

  - Both are transitional areas that are not fully land nor fully water.
  - They both serve as an ecosystem for many different species of animals.
  - Swamps and marshes are protection to inland areas no matter their location (salt water or freshwater)
  - Swamps are dominated by trees, whereas marshes are dominated mostly by grasslands.
  - Marshes have a very dense soil, which slows down the movement of water.

Second and Third Grade Activities

Ecosystem Mobile

- Materials:
  - Premade ecosystem cards
  - Paper towel roll, hanger, dowel to hang from
  - String
  - Markers/crayons/colored pencils
  - Scissors
  - Hole puncher
  - Standard printer
- Preparation:
  - Print out both the "element of a swamp ecosystem" and "properties of a swamp ecosystem" cards on plain white paper.
    - Students can also choose to get creative and make their own cards by using index cards or construction paper and drawing their own depiction of each element of a swamp ecosystem. If students choose to make their own, all their elements and properties should be the same (ex: wetland, soil, decomposition).
  - After each card it cut out, hole punch each out the top in the designated hole punch area.
- Instructions:
  - Students will be using a hanger to create & assemble their own swamp ecosystem.
    - Paper towel rolls, sticks from outside, or dowels can be substituted for the hanger.
  - Cut 5 pieces of string and tie each individual piece of string to the hanger
  - Next hang the "element" cards on the strings. Loop the string through the hole punched area and tie the cards on the strings.
    - Take this time to explain why the properties and elements are positioned as they are.
      - The *elements* represent what makes up a swamp ecosystem. These are the larger components. The ecosystem can be broken down past the elements into individual properties. The *property* cards are hanging below because these are examples of species that help make up make up *each individual ecosystem within a swamp*.
  - Cut 7 more pieces of string next. These pieces should be longer than the previous so that they will hang longer than the "elements of an ecosystem" cards.
  - Finally tie the "properties" cards on the longer pieces of string.
    - Have students try to sort and hang each "property" close to the "element" they think matches it the best.
    - For example—the bird card could hang between both the tree and grassland card, because birds use both tree and grassland habitats.

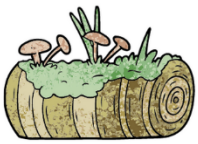
This is also good opportunity to explain to students about how different species use more than one habitat of the whole ecosystem to survive. Birds use trees for shelter and raising young as well as grasslands for hunting.

Elements of a Swamp Ecosystem

Trees

Wetland

Soil



Decomposition

Grassy Areas

Tree Frog

Whitetail Deer

Cottonmouth

Heron

Alligator

Termite

Alligator

Crocodile

Identification T Chart

Name: _____

Traits

Only teeth from the upper jaw can be seen

Can be found in fresh, brackish, and salty waters

Has a V-shaped snout and narrower head

Has countershading camouflage to help hide for ambushing prey

Only has two different species

Has the largest species that can reach lengths of 20ft and weights up to 2,000lbs

Band Aid Firefly Craft

Materials

- Black sheet of construction paper
- Yellow and White crayon
- Colorful band-aids
- Plain band-aids
- Glue
- Wiggly eyes
- Yellow puffy paint

Directions

- Draw a moon and stars on your black sheet of construction paper
- Place the plain band aids on the paper to serve as the body of your fireflies
- Take two colored bandaids of the same color and place the over the body, forming an "X" to make the wings
- Glue the wiggly eyes onto the top of your fireflies. You can use a marker to add more details to the faces if you'd like
- Use the yellow crayon to draw antennae on the fireflies
- Use the yellow puff paint on the bottom of the fireflies to create a 3D effect glow.

~Edible~ Swamp Cup

- Materials
  - Zip lock bags- sandwich size
  - Oreos
  - Gummy worms/frogs
  - Chocolate pudding mix
  - Vanilla pudding mix
  - Milk
  - Whipped topping
  - Blue food coloring
  - Clear plastic cups
  - Whisk
  - Spoon
  - Multicolored sprinkles
  - Pretzel sticks

- Preparation- This needs to be done *at least* one hour prior to the lesson but can be sooner if needed.

  - You are going to need to make both a chocolate pudding and vanilla pudding for this activity. You will be adding blue food coloring to the vanilla pudding to represent the water of the marsh.

  - You can always double or triple the amount depending on the size of the group.

    6. In a medium bowl whisk together chocolate pudding mix and 2 cups milk in a medium bowl for 2 minutes. Let stand 5 minutes.
    7. Fold in whipped topping into chocolate pudding.
    8. Whisk together vanilla pudding mix and milk in a medium bowl for 2 minutes.
    9. Add blue food coloring next. You can add any desired amount of the color for any shade of blue.
    10. After the vanilla pudding is colored, fold in whipped topping into the blue pudding. Let stand for 5 minutes.

- Instruction
    - Each student needs:
        - One clear plastic cup, baggie, spoon, three Oreos, two gummy worms, and four pretzel sticks
    - Start by separating the Oreos and scraping out the filling. Once the filling is out, put the Oreos in a bag and crush up into small pieces.
    - Put a *thin* layer of Oreo at the bottom of the clear plastic cup.
    - Next, put one spoon full of chocolate filling on top of the Oreos.
    - You are going to top the chocolate filling with Oreos and some of the multicolored sprinkles.
        - Students are adding the colors sprinkles to represent the abundant minerals that are present in swamps. These minerals allow organisms in swamps to be broken down easily, to prevent overpopulation.
    - Once the Oreo-sprinkle layer is down, add another filling layer, but use the *blue* filling this time.
        - The difference in color resembles the water of swamps.
        - This water area is predominately covered with trees, unlike marshes which are mostly herbaceous plants. These distinguishing characteristics are the main difference between the two.
    - Again, you are going to top the blue filling with a thin layer of Oreo crumbles.
    - On top of the last Oreo crumbles, top with gummy worms and stick pretzel sticks in the pudding.
        - Gummy worms represent the critters that find their homes in swamps.
        - The pretzels represent the trees that dominate swamps.
        - Swamps are often named after the types of trees that take up most of the swamp, such as hardwood and cypress swamps.

- As students enjoy their tasty treat, use this time to discuss the differences why swamps are so beneficial.

    - Swamps serve as *transitional* areas between land and water. Whether they are on the coastal regions or inland around rivers or lakes, they act as giant sponges. These areas catch overflowing water and serves as a protective layer to inland areas.
    - Think of what would happen if there was a huge rainfall event and there was nowhere for overflowing water to go around a lake. *Where would the water go if there were no swampy areas?* The same goes for coastal areas. Without these areas, land would be destroyed during hurricanes.
    - For a long period of time, wetlands were looked at as a wasteland. Officials tried draining them to prevent pesky insects like misquotes. They quickly learned that these areas where extremely crucial to inland areas.
    - Swamps also serve as a huge ecosystem for hundreds of different species of fish, insects, and even birds!

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    - Gummy worms
    - Swedish fish
    - Chocolate pudding mix
    - Vanilla pudding mix
    - Milk
    - Whipped topping
    - Blue food coloring
    - Clear plastic cups
    - Whisk
    - Spoon
    - Green sprinkles

- Preparation- Preparation for this will be the same as the swamp cup. This needs to be done *at least* one hour prior to the lesson but can be sooner if needed.

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    - Cover the last Oreo layer with one more thin layer of chocolate filling then top with another Oreo layer.
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        - The deepness of the soil makes the perfect environment for grasses and herbaceous plants to grow. The roots of the plants bind to the muddy soil.

        - The ability for lots of plants to grow in wetland areas like this slows the water down, which creates a largest marsh area.

- Top the Oreo layer with another thin layer of filling, but use the *blue filling* this time.

    - The difference in color resembles the water of marshes.

- Again, you are going to top the blue filling with Oreo crumbles.

- On top of the last Oreo crumbles, top with green sprinkles, gummy worms, and Swedish fish.

    - These green sprinkles represent the grassland that dominates marshes.
    - This would be a great opportunity to highlight that marshes are dominated by grassy areas and not trees. This is the main distinguishing factor between swamps and marshes.
    - Another important topic is that marshes are home to many different species of fish, insects, mammals, and birds! Depending on the type of marsh (fresh or salt water), depicts what different species call marshes home!

- As students enjoy their tasty treat, use this time to discuss the differences between the different types of marshes

    - What is the difference between *salt and freshwater marshes*? How are they the same?

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        - Freshwater marshes are farther inland than saltwater marshes. They can be found in open areas around rivers and lakes. After rainfall, water flows from bigger water sources into these wetlands. On average, freshwater marshes are only about 6ft deep. The largest freshwater marsh in the United States is the Florida Everglades! Like saltwater marshes, there are a ton of animals that call these home like mink, muskrats, beavers, turtles, frogs, insects, and birds!

❖ Conclusion

- If you choose to do both, compare how swamps and marshes are similar and different!

  - Both are transitional areas that are not fully land nor fully water.
  - They both serve as an ecosystem for many different species of animals.
  - Swamps and marshes are protection to inland areas no matter their location (salt water or freshwater)
  - Swamps are dominated by trees, whereas marshes are dominated mostly by grasslands.
  - Marshes have a very dense soil, which slows down the movement of water.

Fourth and Fifth Grade Activities

Ecosystem Mobile

- Materials:
  - Premade ecosystem cards
  - Paper towel roll, hanger, dowel to hang from
  - String
  - Markers/crayons/colored pencils
  - Scissors
  - Hole puncher
  - Standard printer
- Preparation:
  - Print out both the "element of a swamp ecosystem" and "properties of a swamp ecosystem" cards on plain white paper.
    - Students can also choose to get creative and make their own cards by using index cards or construction paper and drawing their own depiction of each element of a swamp ecosystem. If students choose to make their own, all their elements and properties should be the same (ex: wetland, soil, decomposition).
  - After each card it cut out, hole punch each out the top in the designated hole punch area.
- Instructions:
  - Students will be using a hanger to create & assemble their own swamp ecosystem.
    - Paper towel rolls, sticks from outside, or dowels can be substituted for the hanger.
  - Cut 5 pieces of string and tie each individual piece of string to the hanger
  - Next hang the "element" cards on the strings. Loop the string through the hole punched area and tie the cards on the strings.
    - Take this time to explain why the properties and elements are positioned as they are.
      - The *elements* represent what makes up a swamp ecosystem. These are the larger components. The ecosystem can be broken down past the elements into individual properties. The *property* cards are hanging below because these are examples of species that help make up make up *each individual ecosystem within a swamp*.
  - Cut 7 more pieces of string next. These pieces should be longer than the previous so that they will hang longer than the "elements of an ecosystem" cards.
  - Finally tie the "properties" cards on the longer pieces of string.
    - Have students try to sort and hang each "property" close to the "element" they think matches it the best.
    - For example—the bird card could hang between both the tree and grassland card, because birds use both tree and grassland habitats.

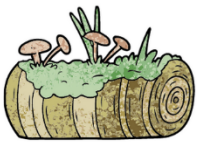
This is also good opportunity to explain to students about how different species use more than one habitat of the whole ecosystem to survive. Birds use trees for shelter and raising young as well as grasslands for hunting.

Elements of a Swamp Ecosystem

Trees

Wetland

Soil



Decomposition

Grassy Areas

Tree Frog

Whitetail Deer

Cottonmouth

Heron

Alligator

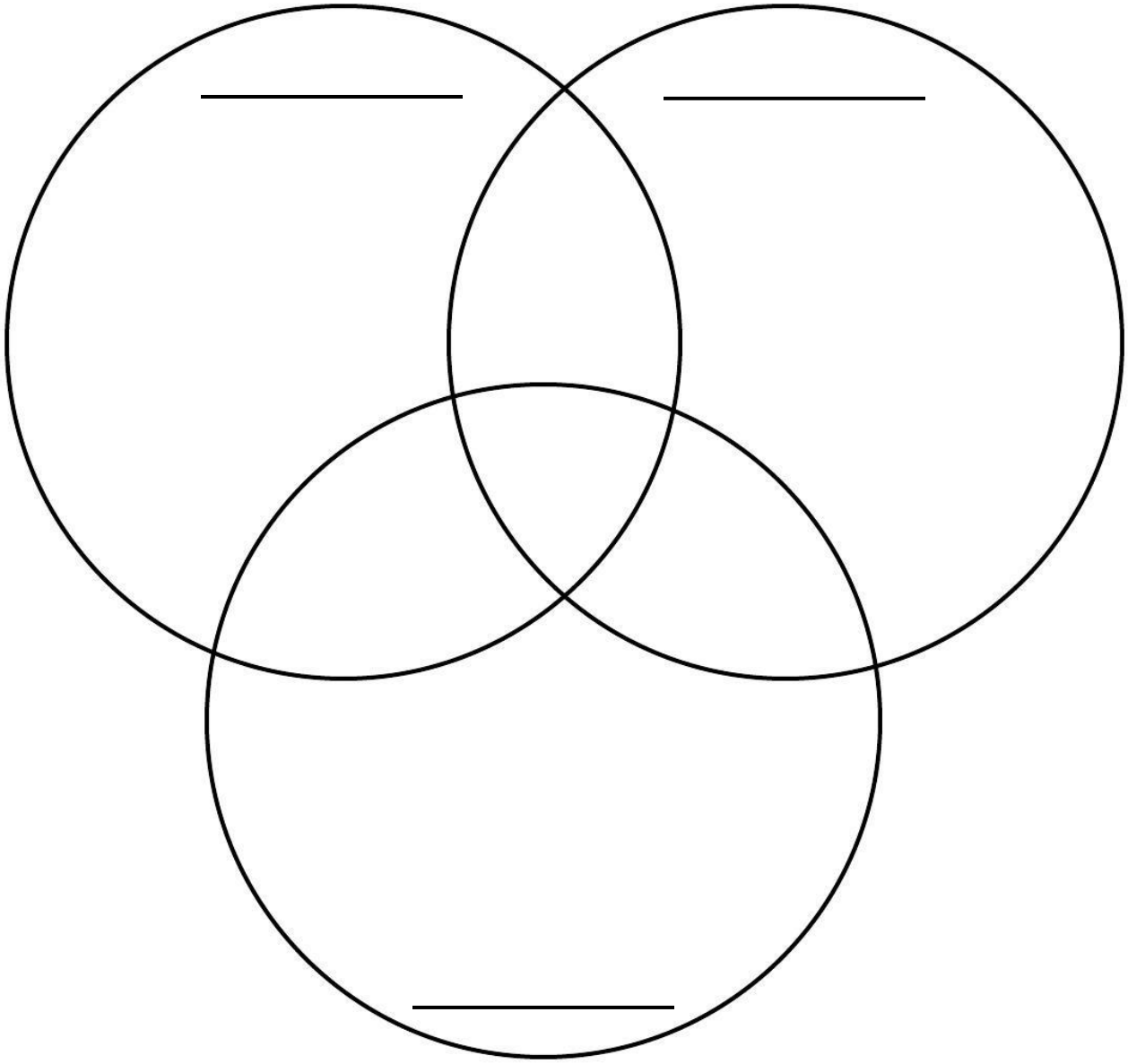
Termite

Student Name:

Swamps, Marshes, & Bogs Oh My!

In the bubbles below, label them individually “Swamps”, “Marshes”, “Bogs”.

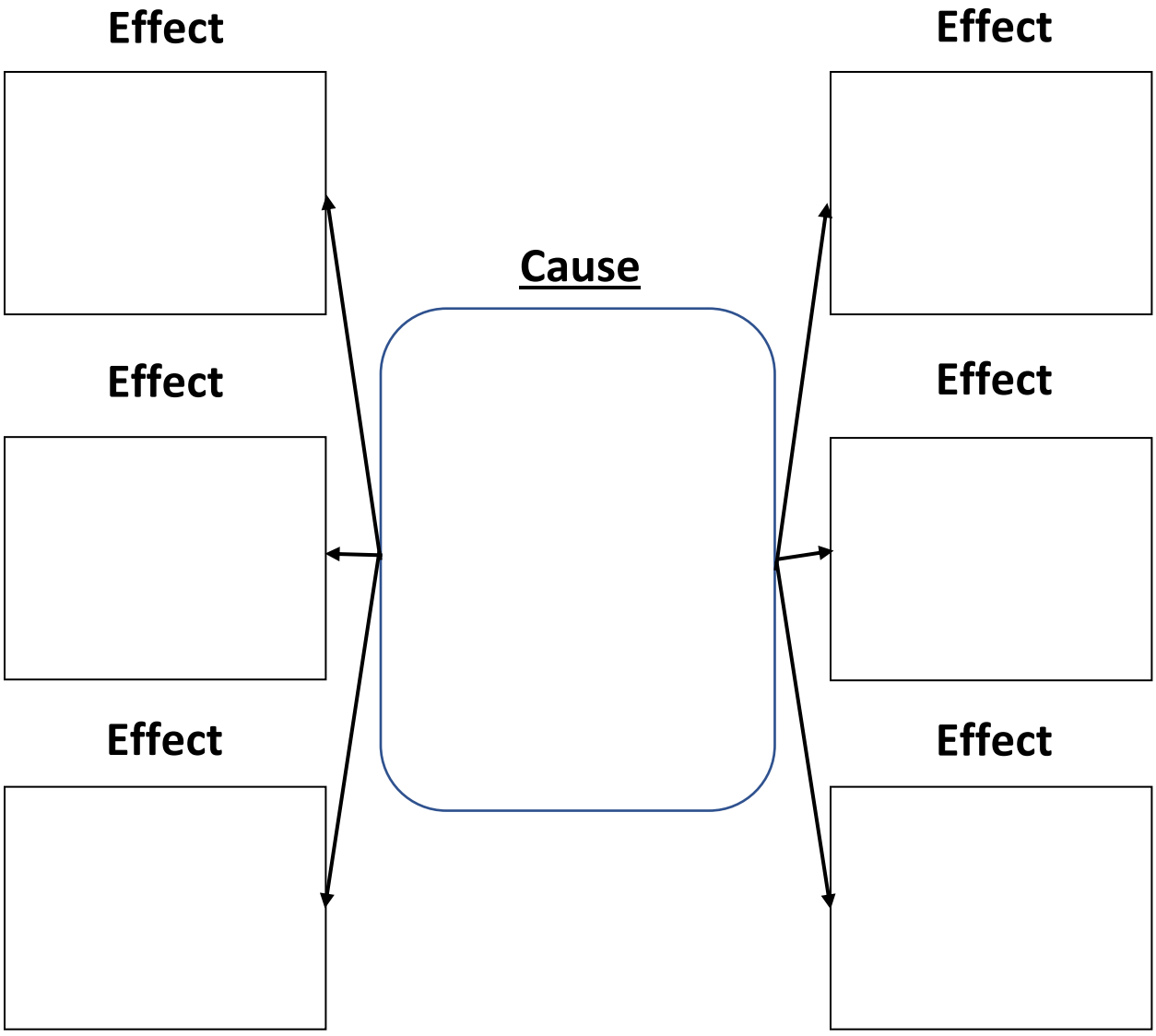
In overlap zones, write in facts that are shared by two of or all three options.



What else do you want to know?

Cause & Effects

Name: _____ **Date:** _____



_____

_____

_____

_____

~Edible~ Swamp Cup

- Materials
  - Zip lock bags- sandwich size
  - Oreos
  - Gummy worms/frogs
  - Chocolate pudding mix
  - Vanilla pudding mix
  - Milk
  - Whipped topping
  - Blue food coloring
  - Clear plastic cups
  - Whisk
  - Spoon
  - Multicolored sprinkles
  - Pretzel sticks

- Preparation- This needs to be done *at least* one hour prior to the lesson but can be sooner if needed.

  - You are going to need to make both a chocolate pudding and vanilla pudding for this activity. You will be adding blue food coloring to the vanilla pudding to represent the water of the marsh.

  - You can always double or triple the amount depending on the size of the group.

    11. In a medium bowl whisk together chocolate pudding mix and 2 cups milk in a medium bowl for 2 minutes. Let stand 5 minutes.
    12. Fold in whipped topping into chocolate pudding.
    13. Whisk together vanilla pudding mix and milk in a medium bowl for 2 minutes.
    14. Add blue food coloring next. You can add any desired amount of the color for any shade of blue.
    15. After the vanilla pudding is colored, fold in whipped topping into the blue pudding. Let stand for 5 minutes.

- Instruction
    - Each student needs:
        - One clear plastic cup, baggie, spoon, three Oreos, two gummy worms, and four pretzel sticks
    - Start by separating the Oreos and scraping out the filling. Once the filling is out, put the Oreos in a bag and crush up into small pieces.
    - Put a *thin* layer of Oreo at the bottom of the clear plastic cup.
    - Next, put one spoon full of chocolate filling on top of the Oreos.
    - You are going to top the chocolate filling with Oreos and some of the multicolored sprinkles.
        - Students are adding the colors sprinkles to represent the abundant minerals that are present in swamps. These minerals allow organisms in swamps to be broken down easily, to prevent overpopulation.
    - Once the Oreo-sprinkle layer is down, add another filling layer, but use the *blue* filling this time.
        - The difference in color resembles the water of swamps.
        - This water area is predominately covered with trees, unlike marshes which are mostly herbaceous plants. These distinguishing characteristics are the main difference between the two.
    - Again, you are going to top the blue filling with a thin layer of Oreo crumbles.
    - On top of the last Oreo crumbles, top with gummy worms and stick pretzel sticks in the pudding.
        - Gummy worms represent the critters that find their homes in swamps.
        - The pretzels represent the trees that dominate swamps.
        - Swamps are often named after the types of trees that take up most of the swamp, such as hardwood and cypress swamps.

- As students enjoy their tasty treat, use this time to discuss the differences why swamps are so beneficial.

    - Swamps serve as *transitional* areas between land and water. Whether they are on the coastal regions or inland around rivers or lakes, they act as giant sponges. These areas catch overflowing water and serves as a protective layer to inland areas.
    - Think of what would happen if there was a huge rainfall event and there was nowhere for overflowing water to go around a lake. *Where would the water go if there were no swampy areas?* The same goes for coastal areas. Without these areas, land would be destroyed during hurricanes.
    - For a long period of time, wetlands were looked at as a wasteland. Officials tried draining them to prevent pesky insects like misquotes. They quickly learned that these areas where extremely crucial to inland areas.
    - Swamps also serve as a huge ecosystem for hundreds of different species of fish, insects, and even birds!

~Edible~ Marsh Cup

- Materials
    - Zip lock bags- sandwich size
    - Oreos
    - Gummy worms
    - Swedish fish
    - Chocolate pudding mix
    - Vanilla pudding mix
    - Milk
    - Whipped topping
    - Blue food coloring
    - Clear plastic cups
    - Whisk
    - Spoon
    - Green sprinkles

- Preparation- Preparation for this will be the same as the swamp cup. This needs to be done *at least* one hour prior to the lesson but can be sooner if needed.

- Instruction
    - Each student needs:
        - One clear plastic cup, baggie, spoon, three Oreos, two gummy worms, one Swedish fish
    - Start by separating the Oreos and scraping out the filling. Once the filling is out, put the Oreos in a bag and crush up into small pieces.
    - Put a thin layer of Oreo at the bottom of the clear plastic cup.
    - Next, put one spoon full of chocolate filling on top of the Oreos.
    - Cover the last Oreo layer with one more thin layer of chocolate filling then top with another Oreo layer.
        - These layers represent the dense soil of marshes.
        - The deepness of the soil makes the perfect environment for grasses and herbaceous plants to grow. The roots of the plants bind to the muddy soil.

        - The ability for lots of plants to grow in wetland areas like this slows the water down, which creates a largest marsh area.

- Top the Oreo layer with another thin layer of filling, but use the *blue filling* this time.

    - The difference in color resembles the water of marshes.

- Again, you are going to top the blue filling with Oreo crumbles.

- On top of the last Oreo crumbles, top with green sprinkles, gummy worms, and Swedish fish.

    - These green sprinkles represent the grassland that dominates marshes.
    - This would be a great opportunity to highlight that marshes are dominated by grassy areas and not trees. This is the main distinguishing factor between swamps and marshes.
    - Another important topic is that marshes are home to many different species of fish, insects, mammals, and birds! Depending on the type of marsh (fresh or salt water), depicts what different species call marshes home!

- As students enjoy their tasty treat, use this time to discuss the differences between the different types of marshes

    - What is the difference between *salt and freshwater marshes*? How are they the same?

        - Saltwater marshes are located on the coastal areas. They can be near bays and river mouths as well. The grassy areas of these marshes serve as a barrier between land and the ocean. Although marshes could never stop a hurricane, they can stop the surge to land and take some of the force away, protecting coastal areas from maximum areas. Most saltwater marshes are affected by the tide as well!
        - Freshwater marshes are farther inland than saltwater marshes. They can be found in open areas around rivers and lakes. After rainfall, water flows from bigger water sources into these wetlands. On average, freshwater marshes are only about 6ft deep. The largest freshwater marsh in the United States is the Florida Everglades! Like saltwater marshes, there are a ton of animals that call these home like mink, muskrats, beavers, turtles, frogs, insects, and birds!

❖ Conclusion

- If you choose to do both, compare how swamps and marshes are similar and different!

  - Both are transitional areas that are not fully land nor fully water.
  - They both serve as an ecosystem for many different species of animals.
  - Swamps and marshes are protection to inland areas no matter their location (salt water or freshwater)
  - Swamps are dominated by trees, whereas marshes are dominated mostly by grasslands.
  - Marshes have a very dense soil, which slows down the movement of water.