Swamplands

Let the Games Begin…Tribal Survival:

We've made it through rainforests and deserts, but will we survive the swamp? Have students continue to work together as tribes. Throughout the units, tribes will compete in fun, non-competitive activities that will challenge their intellectual, cooperative, and athletic skills. Remind them that everything they do matters to the tribe and helps us survive (or not…)

Surviving the Swamp Part One

Day One: Feeling Mucky?

Access prior knowledge by having students watch the clip from BBC's Planet Earth: Swamplands https://www.youtube.com/watch?v=49cQ747WT0U One of Earth's best kept secrets is unveiled through captivating footage. Narration by the Horrocks'.

Option: Also, show students the following gallery: The10 Most Beautiful Swamps on Earth, http://scribol.com/environment/10-most-beautiful-swamps-on-earth

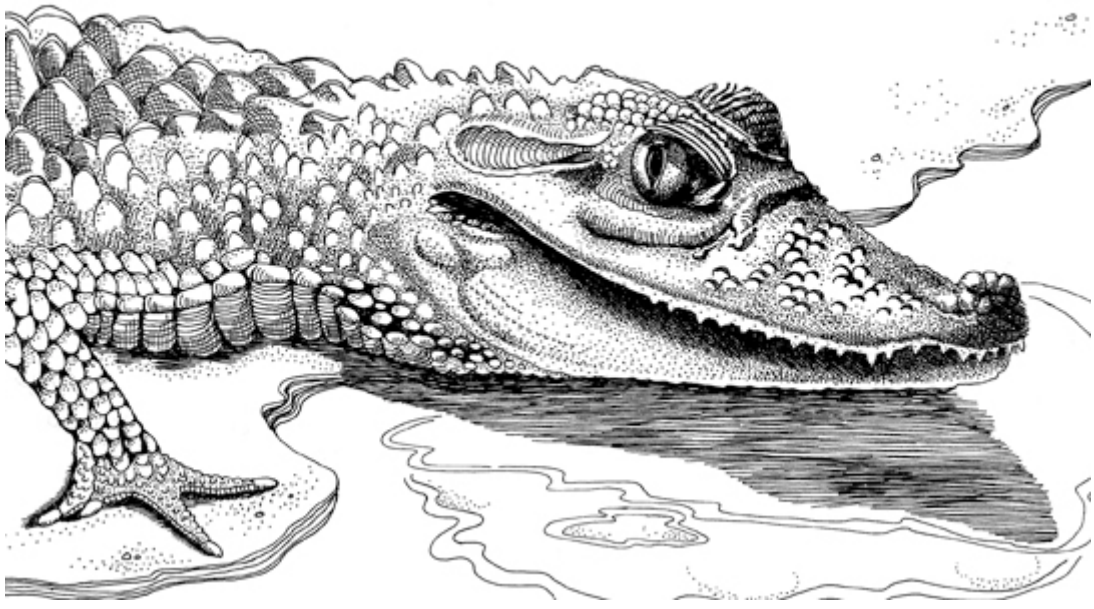
They are mighty ecosystems that rarely get a mention, some of them bigger than small countries. The most massive wetlands on the planet are vital to the health of the natural world.

When you think swamp you imagine a misty, murky place in which the sponge-like ground beneath your feet seems to suck relentlessly at your shoes. The bog wants to swallow you whole, and if that weren't scary enough the wildlife in many swamps can seem much worse. The mighty constricting snake, the Anaconda – 25ft long and wide as a man – or the tiny frogs that each hold enough toxin in their skins to kill 1500 people.

The Everglades and Okefenokee Swamp of Florida, the swamplands in

Okefenokee Swamp

Okefenokee is a Native American word that means "trembling earth." At the Okefenokee Swamp in the U.S. states of Georgia and Florida, the land is so soggy that the trees do not have a stable hold in the ground and shake, or tremble, when people trod heavily nearby.



the Gulf Coast, the Sudd in Africa and the Vasyugan Swamp in western Siberia, all places where you don't want to find yourself stuck without some knowledge and training. A swamp is a large area of flooding containing shallow bodies of water and dry-land protrusions. In the U.S. swamps are usually littered with a large amount of woody vegetation. The makeup of swamps makes them the perfect location for a number of animals including the highly dangerous alligator.

A swamp is an area of land permanently saturated, or filled, with water. Many swamps are even covered by water. There are two main types of swamps: freshwater swamps and saltwater swamps (Because the young of many marine animals find food and shelter in saltwater swamps, these wetlands are sometimes called the nurseries of the ocean.)

Most swamps are relatively small, but there are a few whose size will take your breath away. The biggest on the planet is the Vasyugan swamp in Russia. 20% wider than the whole of Switzerland and 53,000 square kilometres in total area. Within the bounds of the swamp there are more than 800 lakes, and many rivers and streams begin here.

Of course the USA has its own huge swamps, but by far the largest is the Okefenokee. Covering 700 square miles of South Georgia and North Florida, lies a huge bowl-shaped depression in which the Okefenokee Swamp developed. About 25 miles across and 40 miles long, this is a unique 1,000 sq mile area of primitive wetland, hosting hundreds of species of wildlife, many of which are endangered or threatened.

Plant life in the Okefenokee varies from towering bald cypress to a seemingly infinite variety of water plants, many of which were put to medicinal use by the Indian inhabitants long before the first Europeans arrived in the area. Early settlers learned from their Indian hosts the value of natural life and balance with nature.

Many swamps, not just the Okefenokee, are dominated by trees. They are often named for the type of trees that grow in them, such as cypress swamps or hardwood swamps. Freshwater swamps are commonly found inland, while saltwater swamps are usually found along coastal areas. Swamps are transition areas. They are neither totally land nor totally water.

Most people seem to think them filthy places filled with mosquitoes, snakes and spiders, but swamps not only protect the land from soil erosion and the effects of storms, they also act as a form of pollution control, naturally filtering out industrial and human waste. Like other wetlands, they are important components of the water cycle, absorbing excess water flow during times of flooding.

Swamps exist in many kinds of climates and on every continent except Antarctica. They vary in size from isolated prairie potholes to huge coastal salt marshes. Some swamps are flooded woodlands. Some are former lakes or ponds overtaken by trees and shrubs.'

Tips: Avoiding Jungle Rot

Jungle rot is a fungal skin infection that results from constant moisture. To avoid this remember to take off your shoes, socks and wet clothes and allow your skin to dry out every few hours.

Wet and Wild!

More than half of the world's known insects and invertebrates reside in some sort of wetland.

What is it all about?

A wetland is any place where the land is soaked with water for long enough that it create its own ecosystem. Wetland ecosystems are filled with numerous different types of plants and animals. Wetlands provide food, shelter, breeding and resting places for a large number of plants, mammals, birds, reptiles, amphibians, fish and invertebrates.

Each wetland is a carefully balanced ecosystem in which living creatures live off each other. There are many types of wetlands, and they include marshes, bogs, swamps, ponds and fens.

Water saturation, permanence, and the different types of plants and animal communities they support characterize each type of wetland. Wetlands are just one piece in the **watershed** puzzle. Wetlands act as a buffer zone between land areas and open aquatic areas like lakes and rivers. Wetlands act as a filtration system for lakes and rivers. When it snows or rains the water runs off the land and towards open bodies of water and the wetland filters this water by removing some of the minerals, **sediments** and polluting substances.

Did you know that wetlands are often referred to as the kidneys of the land because as water trickles through a wetland sediments and pollutants are filtered out and settles on the bottom? Just like your kidneys! The water that stays in a wetland is often cleaner than the water that flows into it!

What does it mean?

Water saturation - amount of water in a given space
Watershed - the area of land that catches snow and rain and then drains into a body of water
Sediments - includes minerals, small pieces of plants and other organic matter

Wetland in a Pan

Source: http://www.miseagrant.umich.edu/lessons/lessons/by-broad-concept/earth-science/wetlands/activity-wetland-in-a-pan/ **or** http://www.epa.gov/gmpo/education/pdfs/Activity-WetlandPan.pdf Adapted from "A Wetland in a Pan: from WOW! The Wonder of Wetlands, for the Great Lakes Education Program.

Through this activity **s**tudents observe a simple wetland/swamp model that demonstrates wetland/swamp functions. The first part of the procedure demonstrates how wetlands/swamps prevent flooding and soil erosion. The second part of the procedure demonstrates how wetlands improve water quality by filtering sediments and pollutants.

You Need:

- Modeling clay
- Rolling paint pan (or small aluminum pan)
- Sponges
- Scraps of old carpet or florist oasis foam (or sponges)
- Watering can or similar device
- Cup of soil
- Jar of muddy water

Build a Model Wetland

The first part of the procedure demonstrates how wetlands prevent flooding and soil erosion.

- Explain that wetlands, like all habitats, are complicated natural systems. They perform some very important functions such as filtering pollutants, reducing flood damage, and preventing soil erosion. Some wetlands, at times, recharge groundwater supplies.
- Explain that you will make a wetland model to demonstrate some of these functions in a very simplified way.
- Put the clay along one side of the pan. Fit the piece of carpeting or sponge into the wetland area along the edge of the clay. Slowly sprinkle some rain on land (the clay) and let the students observe and describe what is happening. Ask: If I make it rain on the model, what do you think will happen to the rainwater? (Rain will flow downhill.) The wetland (carpeting) will slow the rate of flow, and the excess rain will slowly enter the body of water. Point out that the wetland absorbed some of the water—pick up the wetland and squeeze some water out to prove it.
- Ask students: What do you think will happen if the wetland/swamp is removed?
    - Answer: The water will not be absorbed; it will flow more quickly into the body of water.
- Remove the carpeting and water.
- Pour the same amount of water on the model at the same spot and rate as before.
- Have the students note any differences. The water should fill the body of water much more quickly and may eventually overflow and flood the land. That's because it is no longer retained by the wetland.

Discuss the Results

- Explain that most wetlands are shallow basins that collect water and slow its rate of flow and also retain water for a time. This slowing process helps reduce flooding and also helps prevent soil erosion.

- Ask students: If a wetland is destroyed, and houses are built in its place, what might happen to the houses during a severe rainstorm? Why?
    - Answer: They might be flooded because the wetland will not be there to absorb and slow the rush of water from higher ground.
    - In many areas, wetlands are drained and filled, and houses and marinas are built right along the water. Without a wetland buffer, these developed areas, particularly along the coast, are often subjected to severe flooding and erosion, especially during violent storms.

Part 2 – Modify the Wetland Model

The second part of the procedure demonstrates how wetlands improve water quality by filtering sediments and pollutants.

- Pour the water from the last demonstration out of the model, squeeze out the "wetland" and replace the piece of carpeting.
- Spread a layer of soil over the clay.
- Explain that this demonstration will be just like the first, except that topsoil will cover the clay.
- Ask students: What do you think will happen to the bare soil when it rains?
    - Answer: The rain should pick up and carry some sediment over the land and into the body of water.
- Explain that this water represents polluted runoff such as silt from farmlands and construction sites or salt from snow-covered streets.
- Ask the students to compare the water that ends up in the body of water with the muddy water in the jar.
- Explain that the carpeting trapped the soil particles, making the water in the body of water much clearer. The uphill side of the wetland should be coated with trapped sediment.
- Remove the carpeting, pour out the water, and try the experiment again.
- What happens without the wetland in place? Ask the students why all the soil particles end up in the body of water this time.
    - The thick mat of plant roots in a wetland helps trap silt and some types of pollutants, much as the carpet or foam did in the model. Without a wetland, excessive amounts of silt and pollutants can end up in lakes, rivers and other bodies of water.

Discuss the Results

- How might muddy water affect fish?
    - Makes it harder for them to see and breathe with clogged gills, and could lead to death.
- How might the muddy water affect other animals and plants?

    - Settling sediment smothers clams, plants do not get sunlight needed for growth, birds and other animals that eat fish or plants have less to eat if food sources die or cannot be seen in muddy water, etc.

- How might the muddy water affect boats and ships?
    - The mud settles out and eventually fills channels important for navigation.
- How might all of this affect you?
    - Decrease in natural resources and food sources; decline in quality of drinking water; impacts on recreation such as swimming and fishing; change in aesthetics; change in community economy, such as shipping problems that affect jobs and industry, etc.
- How can we prevent these undesirable effects?
    - By protecting wetlands and helping to make their benefits known!
- Ask students to describe how wetlands function to reduce flooding and retain sediments.
- Ask students to analyze what would happen to water, sediments, homes and wildlife if wetlands were destroyed.

Standards Alignment for Day One K-8

K

7.5.2 Create a model of an ecosystem and compare the characteristics of animals and plants within that environment.

7.5.3 Determine animal and plant characteristics needed for survival to appropriate environments.

Students will meet these standards while learning about wetlands/swamps during discussion (we will also compare and contrast what we're learning about the swamps to what we've already discovered and the animals and plants we've learned about while traveling through rainforests and deserts.) and while building the wetlands in a pan model. Students will determine what characteristics animals (including us) and plants need to survive in the water-rich environment of the swamps.

1

7.2.1 Distinguish between living and non-living things in an environment.

7.3.2 Describe what plants and animals need in order to grow and remain healthy.

Students will determine what things are living in a wetlands/swamp ecosystem (plants, animals, humans, etc), and what things are not living (sun, soil, water). We'll discuss the the basic needs of the plants and animals in the ecosystem as well as the negative impacts on

the health of the plants and animals in the wetlands if humans destroy them, increase sediment, or add pollution.

2

7.2.3 Construct a model that demonstrates how plants, animals, and the environment interact to provide basic life requirements.

7.2.1 Investigate the habitats of different kinds of plants and animals.

Students will meet these standards as we investigate the wetlands/swamps through books, resources, videos, discussion, and websites about swamps and wetlands. We will build the Wetlands in a Pan model and demonstrate what we've learned through our research how the wetlands provide the food and nutrition rich environment and protection for many species through their 'sponge' like behavior, and protection for the world's water systems and soil.

3

7.5.4 Determine how changes in an environmental variable can affect plants and animals of an area.

7.2.1 Investigate the habitats of different kinds of plants and animals.

Students will meet these standards as we investigate the wetlands/swamps through books, resources, videos, discussion, and websites about swamps and wetlands. They will learn about the effects of too much drainage, pollution, sediment, and human construction can have on the wetlands/swamp ecosystem and the chain reaction that has effecting other environments.

4

7.2.1 Analyze the effects of changes in the environment on the stability of an ecosystem.

7.7.2b Investigate how water travels and is influenced by different types of materials and surfaces.

Students will meet these standards as we investigate the wetlands/swamps through books, resources, videos, discussion, and websites about swamps and wetlands. They will learn about the effects of too much drainage, pollution, sediment, and human construction can have on the wetlands/swamp ecosystem and the chain reaction that has effecting other environments.

We will explore the movement of water through the Wetlands in a Pan experiment and demonstrate how the presence or lack of 'wetlands' (carpets/sponges) affects the movement of the water.

5

7.2.3 Establish the connections between human activities and natural disasters and their impact on the environment.

7.2.5 Create a model to illustrate how human activities and natural disasters affect the environment.

Students will meet these standards as we investigate the wetlands/swamps through books, resources, videos, discussion, and websites about swamps and wetlands. They will learn about the effects of too much drainage, pollution, sediment, and human construction can have on the wetlands/swamp ecosystem and the chain reaction that has effecting other environments.

We will explore, using the Wetlands in a Pan model, the effects of human interference, silt, increased pollution, and lack of wetlands/swamps has on the ecosystem of the wetlands/swamps, the animal and plant life's ability or inability to thrive, and the environments around the swamp, including human lives.

6

7.2.3 Draw conclusions from data about interactions between the biotic and abiotic elements of a particular environment.

6.3.03 a. Describe how physical processes shape the characteristics of a place, [environment, or ecosystem.]

Through our discussion of how the water itself creates and affects the wetlands ecosystem students will draw conclusions on how changes to this one single abiotic element (among others) affects the rest of ecosystem. We will determine through the Wetlands in a Pan experiment how the processes of erosion and deposition shape the swamps/wetlands and what animals and plants can thrive there.

7

7.7.9 Evaluate how human activities affect the condition of the earth's land, water, and atmosphere.

7.7.7 Analyze and evaluate the impact of man's use of earth's land, water, and atmospheric resources.

Students will meet these standards as we investigate the wetlands/swamps through books, resources, videos, discussion, and websites about swamps and wetlands. They will learn about the effects of too much drainage, pollution, sediment, and human construction can have on the wetlands/swamp ecosystem (the plants and animals (including humans) that depend on it) and the chain reaction that has effecting other environments.

We will explore, using the Wetlands in a Pan model, the effects of human interference, silt, increased pollution, and lack of wetlands/swamps has on the ecosystem of the

wetlands/swamps, the animal and plant life's ability or inability to thrive, and the environments around the swamp, including human lives.

8

0.2.5 Conduct research on how human influences have changed, or can change an ecosystem.

0.2.4 Predict how various types of human activities affect the environment.

Students will meet these standards as we investigate the wetlands/swamps through books, resources, videos, discussion, and websites about swamps and wetlands. They will learn about the effects of too much drainage, pollution, sediment, and human construction can have on the wetlands/swamp ecosystem (the plants and animals (including humans) that depend on it) and the chain reaction that has effecting other environments.

We will explore, using the Wetlands in a Pan model, the effects of human interference, silt, increased pollution, and lack of wetlands/swamps has on the ecosystem of the wetlands/swamps, the animal and plant life's ability or inability to thrive, and the environments around the swamp, including human lives.

Students will predict how reclaiming swamplands/wetlands would benefit the ecosystem/environment and determine whether they think a lack of wetlands could negatively impact the environment.

Day Two: Survivor Challenge! Reclamation

Wetlands are important to us humans too; we need and use them to fulfill a variety of purposes. But sometimes our activities harm the wetlands, so it's up to us to do what we can to rebuild them.

Reclamation is the process of returning changed land to restore its function. Wetland reclamation means creating wetlands either where there was never a wetland or where a wetland was lost or damaged.

Reclaiming a wetland isn't simple though. So when reclaiming a wetland we need to think about all the components that make up a wetland, and we need to ask ourselves: will the new wetland fulfill its function and will it remain a healthy wetland/swamp ecosystem over time?

Students, individually or as small groups, will make their own detailed model of the wetland/swamp we're traveling through using small aluminum foil pans, clay, and florist's foam, carpet or sponges, and other craft materials.

Resources: http://www.wonderville.ca/asset/rebuildingwetlands Here is students' chance to explore wetlands in whatever way they want. There are 5 sections that will give you heaps of facts about wetlands and reclamation as well as the about the impacts of land use on wetlands as we try to rebuild them.

There are some other awesome links to explore too down below on the web page.

After students explore also:

- Provide reference books with pictures of different types of wetlands.
- Students can use an assortment of collected material to decorate their models.
- Have students present their models by explaining their particular characteristics.

Some ideas:

- Use long pine needles for reeds and toothpicks to attach plants.
- Shape wetland creatures from clay, or glue paper cutouts to toothpicks.
- Dried flower heads make nice trees, and small pine cones painted green form evergreens.
- For cattails, use cotton swabs. Paint sticks green and cotton parts brown, or paint toothpicks green, and attach bits of brown clay to the tops.

Survivor Challenge- Make your own swampland!

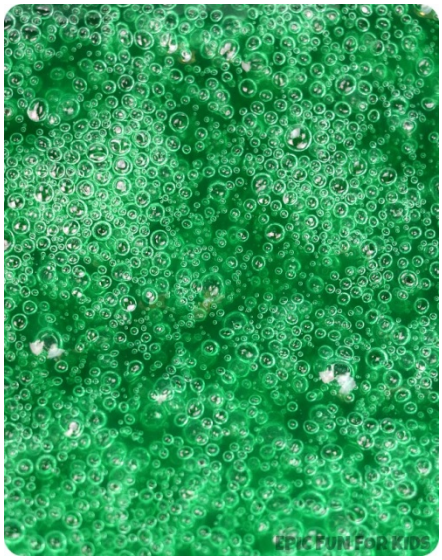
Have students use the chocolate slime and bubbling slime recipes as the base of their swamp replicas. Have them gather materials and make their own mini swamp. Hold a contest to see which tribe can

make the most realistic replica of the swamp. This should be done after they have visited some of the links provided to learn even more about swamps.

Bubbling slime option:

Image and Instruction Source: Epic Fun for Kids http://epicfunforkids.com/bubbling-slime-recipe-sensory-tubs/ Copyright © 2014 Jessica Petersen, All Rights Reserved. All trademarks are the property of their respective owners.

This slime recipe is made entirely with edible ingredients, and the key to it is xanthan gum, a common ingredient in gluten-free baking. While all of the ingredients are edible, and this should be safe enough if a child tastes it once or twice, xanthan gum is a substance that thickens water. Not toxic, but watch the kiddies so they don't eat it.



The bubbling action is caused by a thin layer of baking soda at the bottom of the 'swamp' tub. With the slime at just the right consistency, it slows down the reaction between the vinegar in the slime and the baking soda at the bottom of the tub. In the source test, they kept reacting for at least 24 hours!

Of course, you can stir the slime and the baking soda up and speed up the reaction, like they did above. (Make sure you're prepared for overflow!) But even then it lasts much, much longer than plain baking soda and vinegar, and the slimy foam holds the bubbles for a long time.

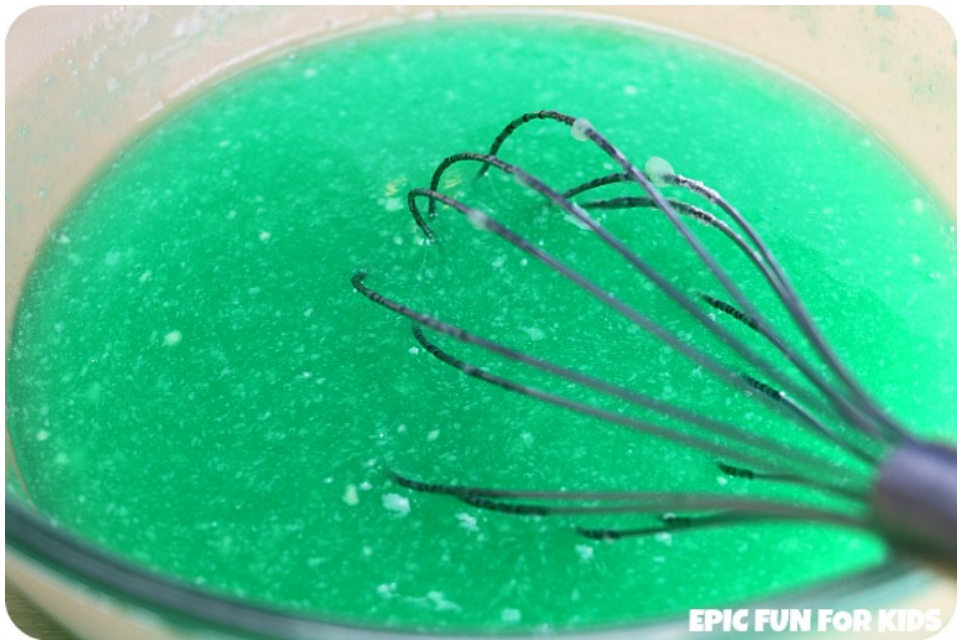
BUBBLING SLIME RECIPE

INGREDIENTS

- 2 cups of white vinegar
- 1 1/4 teaspoons xanthan gum
- Food coloring (optional)
- Enough baking soda to cover the bottom of your tub

DIRECTIONS

1. Pour the vinegar into a bowl. Whisk vigorously as you shake the xanthan gum over the surface of the vinegar little by little. Add food coloring, if desired, and whisk it in.
2. At this point, your slime will have lots of little white clumps of xanthan gum in it (see the photo below). These will slowly hydrate, so put the slime in the fridge for 2-3 hours or overnight.
3. Whisk the slime until it's smooth. It should be cloudy, and the texture should look almost creamy. But gooey.
4. Test the consistency by lifting some of the slime up on the whisk and letting it run back into the bowl. If it's too thick to run and pour, whisk in a little extra vinegar to thin it out.



5. Pour the slime over the baking soda in your swamp/tub and enjoy!

And now, for the swamp land, but swamp land is water saturated and…wait…chocolate slime play dough!

CHOCOLATE SLIME PLAY DOUGH RECIPE

Okay, let's get this out of the way right now: yes, this stuff looks pretty gross! Despite the appearance, this chocolate slime play dough is really fun to play with. When you roll a ball of it between your hands, it gets all wobbly and gels back together. But when you squish it into a shape, it holds its structure. The texture is lightly slimy and powdery at the same time. Plus, this play dough recipe only takes a minute or two to make, it only uses edible ingredients (not that you'd want to eat it, but it's safe if a kid tastes it), and it smells super chocolatey!

Safety Note: While all of the ingredients are completely edible, and this should be safe enough if a child tastes it once or twice, xanthan gum is a substance that thickens water. To be on the safe side, don't let students eat this slime play dough, and, of course, supervise any activity where it's used.

INGREDIENTS

- 1 cup baking soda
- 1/2 tablespoon xanthan gum
- 1 tablespoon unsweetened cocoa powder
- 1/3 cup + 1 tablespoon water

DIRECTIONS

1. Combine the baking soda, xanthan gum, and cocoa powder in a bowl and whisk together until thoroughly mixed.
2. Pour in the water and stir.
3. When the play dough is as mixed as you can make it with the fork, knead it until smooth with your hands.

NOTES

Store the slime covered in the fridge. Because it's made with edible ingredients, wouldn't keep it around for more than a week or so.

Xanthan gum is relatively easy to find these days, because it's become a common ingredient in gluten-free baking.

Now that you've read about how to make the slimes you can see them in action in a video at http://epicfunforkids.com/lego-star-wars-yodas-swamp-slime-activity/

Tips from the video: Bubbling Slime: They used about four batches of the bubbling slime recipe in the swamp, tinted with a lot of green food coloring plus a few drops of red to make the color "swampier." Go easy on the red, though. A little goes a long way!

Chocolate Slime Playdough: They made five batches of the chocolate slime playdough recipe to create the land for Yoda's hut to sit on.

Standards Alignment for Day Two K-8

K

7.5.2 Create a mural or model of an ecosystem and compare the characteristics of animals and plants within that environment.

7.7.1 Identify non-living materials found on the surface of the earth.

Students will meet these standards while building a detailed model of the reclaimed swamplands we are 'traveling' through including models of the plants and animals that live within it. They will point out the similarities and differences between these animals. They will identify the living and non-living elements of the swamp ecosystem.

1

7.1.2 Use materials, ex. clay, etc., to create a whole from the parts.

7.2.1 Distinguish between living and non-living things in an environment.

Students will meet these standards while building a detailed model of the reclaimed swamplands we are 'traveling' through including models of the plants and animals that live within it. They will identify the living and non-living elements of the swamp ecosystem.

2

7.2.3 Construct a model that demonstrates how plants, animals, and the environment interact to provide basic life requirements.

7.2.1 Investigate the habitats of different kinds of plants and animals.

Students will meet these standards while researching the swamp ecosystem, learning about the different animals and plants that live in this ecosystem, and while building a detailed model of the reclaimed swamplands we are 'traveling' through including models of the plants and animals that live within it and depend upon each other. They will have to include at least one example of predators and one example of prey (which can include plants) that live within that ecosystem within their model.

3

7.5.5 Construct a model that shows plants and animals in an appropriate environment.

7.5.1 Create representations of animals that have characteristics necessary to survive in a particular environment.

Students will meet these standards while researching the swamp ecosystem, learning about the different animals and plants that live in this ecosystem, and while building a detailed model of the reclaimed swamplands we are 'traveling' through including models of the plants and animals that live within it

4

7.7.1 Prepare a demonstration or model which illustrates how water affects the earth's surface features [and how the earth's surface features affect water.]

7.11.2c Identify factors that influence the motion of an object or material.

Students will meet these standards while researching the swamp ecosystem, learning about how water and processes that form this ecosystem, then they will demonstrate their understanding while building a detailed model of the reclaimed swamplands we are 'traveling' through including models of the plants and animals that live within it. They will be required to be able to explain how water and the swamp ecosystem interact (ex. filtration, deposition, erosion, etc) and what factors affect the motion of the water through the swamp.

5

7.2.1 Investigate different nutritional relationships among organisms in an ecosystem.

7.8.1 Analyze and predict how atmospheric conditions can/could affect major landforms and bodies of water.

Students will meet these standards while researching the swamp ecosystem, learning about the different animals and plants that live in this ecosystem, how they interact. And then they will implement and demonstrate their understanding while building a detailed model of the reclaimed swamplands we are 'traveling' through including models of the plants and animals that live within it

We will discuss what affect a change in weather/climate could have on this ecosystem, ex. a long drought in another area reducing the amount of water that comes in through rain/rivers/etc. Or, what effect a major increase in rain or water could have on the ecosystem.

6

7.2.2 Create a model that illustrates how biotic and abiotic elements of an environment interact.

6.3.03 a. Describe how physical processes shape the characteristics of a place, [environment, or ecosystem.]

Students will meet these standards while researching the swamp ecosystem, learning about how water (abiotic) and its processes (seepages, erosion, etc) form this ecosystem. They then will demonstrate their understanding while building a detailed model of the reclaimed swamplands we are 'traveling' through including models of the plants and animals that live within it. They will be required to be able to explain how water and the swamp ecosystem interact (ex. seepage, filtration, deposition, erosion, etc) and how those processes shape the unique aspects of the swamp, ex. what kinds of animals and plants live there, etc.

7

7.3.06 Understand how physical processes shape the Earth's natural landscapes and affect environments and ecosystems.

0.5.1 Compare and contrast the structural, functional, and behavioral adaptations of animals or plants found in different environments.

Students will meet these standards while researching the swamp ecosystem, learning about how water (abiotic) and its processes (seepages, erosion, etc) form this ecosystem. They then will demonstrate their understanding while building a detailed model of the reclaimed swamplands we are 'traveling' through including models of the plants and animals that live within it. They will be required to be able to explain how water and the swamp ecosystem interact (ex. seepage, filtration,

deposition, erosion, etc) and how those processes shape the unique aspects of the swamp, ex. what kinds of animals and plants live there, etc.

They will examine the unique lifeforms that live in the swamp ecosystem and what features and adaptations allow them to thrive and survive in the swamp. We will compare and contrast these animals, plants, and their features to those we already met and learned about while traveling through the rainforest and desert.

8

0.2.2 Construct and maintain a model of an ecosystem.

0.2.5 Make inferences about how a specific environmental change can affect the amount of biodiversity.

Students will meet these standards while building their model of the reclaimed swamp we are traveling through. During discussion they will have to determine, using what they've learned from the previous day's experiments, what kinds of effects increased pollution, increased sediment, a drought, construction, or other kinds of environmental changes could have on the ecosystem and the capability of the different species of plants and animals to continue to survive there.

Day Three: What Bubbles Beneath?

It's Bedtime at the Swamp

Access Prior Knowledge by watching ***(Miniscule: The Monster Of The Haunted Swamp) Букашки (2 сезон) 14. Монстр заколдованного болота*** *http://vk.com/video225451863_166210850 and then compare and contrast the treatment of monsters and swamps to swamp monster related story such as:*

Bedtime at the Swamp by Kristyn Crow Splish splash/rumba-rumba/bim bam boom! It's bedtime at the swamp—except somebody's not ready. Somebody's still splashing in the water and the mud. Is there a monster on the loose? Kristyn Crow has taken every child's worst nightmare and transformed it into a fun frolic through swampland.

Little Goblins Ten by Pamela Jane, *The Island of the Skog* by Steven Kellogg , etc.

Swamp monsters have been a staple of and inspired some pretty fantastic fiction for years. Some have been hunters of humans and some have only desired to help. In every region of America, there are legends of strange, unidentified creatures that stretch back for centuries. In the Northwest, many credible people swear to have sighted Bigfoot. Near Lake Champlain, locals have sworn up and down to seeing a strange, prehistoric-like creature in the water. And down south in the swamplands, it's no different–some of the most deep-rooted and fearsome monster stories have endured.

Storytellers were our first magicians, our first history keepers, society builders, culture shapers and spiritual and emotional filters, making sense of the world long before written communication.

For all our sophisticated technology and mass electronic entertainment, we still need those voices in the dark, by the fire, in the hall. A master storyteller connects us and intimately affirms our lives with resonant truths, no matter how embroidered, funny, mysterious or strange the tale.

Cryptic Cryptids

Long before they were recognized as real creatures, animals like the giant squid, the kangaroo and the mountain gorilla were all thought to be little more than tall tales or zoological curiosities. Could it be possible that other unknown beasts are still lurking on the outskirts of the

civilized world? Legends of 8-foot-tall ape-men, swamp monsters and other unidentified creatures have existed for centuries and each year brings fresh eyewitness accounts, unexplained photographs and heaps of new speculation supporting the existence of these "cryptids."

One of the great tales is the **Legend of the Rougarou** from the southern cypress swamp ecosystem, the Atchafalaya Basin, the largest swamp in the United States, is an example. As we journey through the Atchafalaya, we will read and discuss legends of the Rougarou (a werewolf or sasquatch-like creature supposed to live there alternately spelled as Roux-Ga-Roux, Rugaroo, or Rugaru).

As is the norm with legends transmitted by oral tradition, stories often contradict one another. Just like the creature itself, the Cajun legend of the Rougarou can take on multiple forms. Originally derived from French stories of the "loup-garu," or "wolf man," the monster is most commonly described as a bayou-dwelling werewolf with glowing red eyes and razor-sharp teeth. The beast is usually said to be a cursed man who must shed another's blood in order to break its spell and reassume human form, but the tale varies according to the teller. In some versions, the Rougarou can turn its victims just by locking eyes with them; in others, it takes the form of a dog or pig rather than a wolf. Still others paint it as a shape shifter that can assume different human and animal forms at will. Because it can switch its appearance so easily, some even conflate the creature with the legendary Skunk Ape of southeastern U.S. swamp lore. In most Louisiana parishes, the Rougarou myth is employed as a kind of cautionary tale. Children are told that the fiend will come for them if they don't behave, and Catholics are warned that it hunts down those who break Lent.

Discuss elements with students that they think might influence legends such as fear or superstitious beliefs. Students will share any similar legends they know with the class. Ask students to identify whether there is a moral to them or not and support their opinions with details from the stories. Analyze whether the moral or message seems to be common or different in the stories we read.

Website/video: http://www.history.com/shows/cryptid-the-swamp-beast/videos/legend-of-the-rougarou. In this scene, the team is told the legend of the Rougarou. [NOTE: Watch before you show your students to make sure that it's appropriate for them!]

Swamp Mysteries: Will-o'-the-Wisps:

[To introduce this section we will show a clip of the wisps from Pixar's Brave, ex. https://www.youtube.com/watch?v=ymcen0EjmiU] It is said—though by whom is a bit of a mystery—that on certain days for certain travelers in certain parts of the world, little lights dance on the horizon, whispering tempting invitations… pledging the answers to lifelong questions, the realization of dreams, a key to secret treasures—a change of fate. We'll have to watch for them as we travel through the swamps! "Those pesky will-o'-the-wisps, are they made of swamp gas or magic?"

The will o' the wisps are in a lot of Scottish folktales. The Will o' the Wisp is the most common name given to the mysterious lights that were said to lead travellers from the well-trodden paths into treacherous marshes. The tradition exists with slight variation throughout Britain, the lights often bearing a regional name.

There are various explanations for the Will o' the Wisps, the most general being that they are malevolent spirits either of the dead or non-human intelligence. They have a mischievous and often malevolent nature, luring unwary travellers into dangerous situations. Wirt Sikes in his book British

Goblins alludes a common story about a Welsh Will o' the Wisp (Pwca or Ellylldan); a peasant, who is travelling home late in the evening sees a bright light travelling before him, looking closer he sees that the light is a lantern held by a "dusky little figure" which he follows for several miles, suddenly he finds himself standing on the edge of a great chasm with a roaring torrent of water rushing below him. At that moment the lantern carrier leaps across the fissure, raises the light over its head and lets out a malicious laugh, after which it blows out the light leaving the unfortunate man far from home, standing in pitch darkness at the edge of a precipice. They were not always so dangerous, and there are tales told about the Will o' the Wisp being guardians of treasure, leading those brave enough to follow them to sure riches.

Wisps were said to lead you to treasure or doom—to change your fate—but more mundane explanations for the Will o' the Wisp come in the form of marsh gasses - natural methane - formed from rotting vegetation.

Some scientists believe they're an actual phenomenon of swamp and bog gas seeping up through the earth and interacting with the natural resources to create the blue flames (though scientists still haven't figured it all out yet). The gas was thought to sometimes ignite spontaneously forming standing flames over boggy ground. It has also been suggested that the little understood phenomena of ball lightning may have been the cause of sightings.

The American anthropologist John G. Owens in Folk-Lore from Buffalo Valley (1891) said: This is a name that is sometimes applied to a phenomenon perhaps more frequently called Jack-o'-the-Lantern, or Will-o'-the-Wisp. It seems to be a ball of fire, varying in size from that of a candle-flame to that of a man's head. It is generally observed in damp, marshy places, moving to and fro; but it has been known to stand perfectly still and send off scintillations. As you approach it, it will move on, keeping just beyond your reach; if you retire, it will follow you. That these fireballs do occur, and that they will repeat your motion, seems to be established, but no satisfactory explanation has yet been offered that I have heard. Those who are less superstitious say that it is the ignition of the gases rising from the marsh. But how a light produced from burning gas could have the form described and move as described, advancing as you advance, receding as you recede, and at other times remaining stationary, without having any visible connection with the earth is unclear to some. However, the apparent retreat of wisps upon being approached might be explained simply by the agitation of the air by nearby moving objects, causing the gases to disperse.

This was observed in the very detailed accounts of several close interactions with wisps published earlier in 1832 by Major Louis Blesson after a series of experiments in various localities where they were known to occur. Of note is his first encounter with wisps in a marshland between a deep valley in the forest of Gorbitz, Newmark, Germany. Blesson observed that the water was covered by an iridescent (soap bubble like) film, and during day-time, bubbles could be observed rising abundantly from certain areas. At night, Blesson observed bluish-purple flames in the same areas and concluded that it was connected to the rising gas. He spent several days investigating the phenomenon, finding to his dismay that the flames retreated every time he tried to approach them. He eventually succeeded and was able to confirm that the lights were indeed caused by ignited gas. The British scientist Charles Tomlinson in On Certain Low-Lying Meteors (1893) describes Blesson's experiments as thus:

On visiting the spot at night, the sensitive flames retired as the major advanced; but on standing quite still, they returned, and he tried to light a piece of paper at them, but the current of air produced by his

breath kept them at too great a distance. On turning away his head, and screening his breath, he succeeded in setting fire to the paper. He was also able to extinguish the flame by driving it before him to a part of the ground where no gas was produced; then applying a flame to the place whence the gas issued, a kind of explosion was heard over eight or nine square feet of the marsh; a red light was seen, which faded to a blue flame about three feet high, and this continued to burn with an unsteady motion. As the morning dawned the flames became pale, and they seemed to approach nearer and nearer to the earth, until at last they faded from sight.

Blesson also observed differences in the color and heat of the flames in different marshes. The wisps in Malapane, Upper Silesia (now Ozimek, Poland) could be ignited and extinguished, but were unable to burn pieces of paper or wood shavings. Similarly, the wisps in another forest in Poland coated pieces of paper and wood shavings with an oily viscous fluid instead of burning them. Blesson also accidentally created wisps in the marshes of Porta Westfalica, Germany, while launching fireworks.

In modern science, it is generally accepted that most wisps are caused by the oxidation of phosphine (PH3), diphosphane (P2H4), and methane (CH4). These compounds, produced by organic decay of plants and matter, can mix and spontaneously ignite upon contact with the oxygen in air, and only small quantities of it would be needed to ignite the much more abundant methane to create ephemeral fires.

The Columbia Encyclopedia, sixth edition, defines will-o'-the-wisp in the following way: The phenomenon known also as wisps and jack-o'-lantern. It is seen at night as a pale, flickering light over marshland. There is no generally accepted explanation for it; it may result from the spontaneous ignition of gases (e.g., methane) produced by the disintegration of dead plant or animal matter or it may be a form of phosphorescence. The eerie lights have given rise to many superstitions. People would follow these lights thinking they were little fairies, and basically drown or get sucked down into the bogs.

Cute and Creepy!

Have all students draw/paint and design a new swamp creature (where does it live, what is it called, what/who does it eat?).

With a balanced blend of cute and creepy, have students take inspirations such as Tony DiTerlizzi and Chris Ryniak and use some paper clay and their sculpting skills to bring their own swamp critter to life!

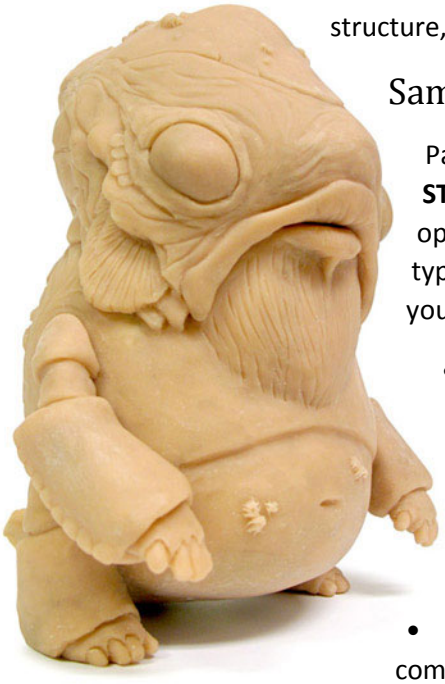
Option: Then they'll trade! Other art students, after trading out (at random may be best) take those monster drawings and in turn create monster figures. Or choose an inspirational artist's image from a book, ex. Tony DiTerlizzi's, or the following pictures and try and recreate it,

still answering the questions, where does it live, what is it called, what/who does it eat?.

Materials:

- Aluminum foil (to create support armatures/structures)
- Wire (to create support armatures/structures)
- Clay (many options are available, such as polymer clay (aka Sculpey), air dry clay, paper clay, etc)
- Acrylic paints
- Paint brushes
- Paper (to plan out designs and answer questions)
- Pencils
- Images for inspiration

An armature is a fundamental part of a sculpture. In very basic terms it is the skeleton or support structure that will hold their clay as they sculpt the figure. Start out by building up the forms using materials like insulation foam and tinfoil. Once the have a pretty good under-structure, they can start applying the clay.



Sample Paper Clay Recipe:

Paper clay can be bought or you can work with students to create a **VERY STRONG clay-like substance** using paper from a shredder (or, another option, buy a big block of recycled paper insulation from a home depot type store. One giant block of paper insulation costs around $11.50 and you can make tons projects out of it.)

- Mix up some papier-mache paste (made from a box of Art Paste – , ex. Elmers Paper Paste, which can be purchased very inexpensively. It comes in a little box and mixes to make 4 quarts! It lasts forever, doesn't spoil, and it harmless and non-toxic.)
- And you need some premixed joint compound.
- Stir together six cups of your art paste goo, and 1 cup of joint compound until smoothly blended. Then begin to add in dry cellulose insulation (paper insulation). Keep adding and squishing it to break down the paper fiber. Hand lumps to kids to knead some more until it resembles a paper-clay.
- You can then squish it, or mold it over an armature, and/or make figurines. It costs next to nothing for the sheer bulk of clay you can make.

Option: Whispering Wisps

- Have students create their own version of the will-o-the-wisps (Look at other authors interpretations, such as Tony DiTerlizzi's explanation and illustrations in his book *Arthur Spiderwick's Field Guide* for inspiration], what they really are, and illustrate their tales. And/or students will sculpt their drawing of the will-o-the-wisp (or other monster) out of glow in the dark clay, or using glow in the dark paints. (Inspiration will be given by showing the work of artists such as Álvaro Herranz of Fuego Fatuo http://diterlizzi.com/home/friday-fan-art-39/ &

https://www.etsy.com/shop/FuegoFatuo/sold?ref=shopinfo_sales_leftnav)

Further inspirational samples of Chris Ryniak's Monstrously Cute Swamp Monster Sculptures

Standards Alignment for Day Three K-8

K

7.3.2 Record information about the care, feeding, and maintenance of a living thing.

7.5.3 Determine animal and plant characteristics needed for survival to appropriate environments.

Students will meet these standards while designing and building their swamp creatures. They will have to include an accompanying scientific fact sheet/field guide with a name, description of what it eats, where it lives, and how it is built and adapted perfectly (what features allow it) to survive in the swamp.

1

7.1.2 Use materials, ex. clay, building blocks, etc. to create a whole from the parts.

7.2.1 Identify the basic characteristics of living things.

Students will meet these standards while designing and building their swamp creatures. They will have to include an accompanying scientific fact sheet/field guide with a name, description of what it eats (food), how it drinks (water), how it breathes (air) where it lives (shelter), and how it is built and adapted perfectly (what features allow it) to survive in the swamp.

2

7.1.1 Design a new living thing and explain how it would acquire food, water, and air.

7.3.1 Describe the habitat of a particular organism based on its food, water, and air requirements.

Students will meet these standards while designing and building their swamp creatures. They will have to include an accompanying scientific fact sheet/field guide with a name, description of what it eats (food), how it drinks (water), how it breathes (air) where it lives (shelter), and how it is built and adapted perfectly (what features allow it) to survive in the swamp.

3

7.5.1 Create representations of animals that have chracteristics necessary to survive in a particular environment.

7.5.2 Demonstrate the connection between an organism's characteristics and its ability to survive in a specific environment.

Students will meet these standards while designing and building their swamp creatures. They will have to include an accompanying scientific fact sheet/field guide with a name, description of what it eats (food), how it drinks (water), how it breathes (air) where it lives (shelter), and how it is built and adapted perfectly (what features allow it) to survive in the swamp.

4

7.5.2 Describe how animal (or plant) behaviors, ex. migration, defense, means of locomotion, and hibernation might enable them to survive in an environment.

7.5.1 Determine how a physical or behavioral adaptation can enhance the chances of survival.

Students will meet these standards while designing and building their swamp creatures. They will have to include an accompanying scientific fact sheet/field guide with a name, description of what it eats (food), how it drinks (water), how it breathes (air) where it lives (shelter), and how it is built and adapted perfectly (what unique and interesting features allow it) to survive in the swamp.

5

7.5.2 Design a model to illustrate how an animal's physical characteristics enable it to survive in a particular environment.

7.5.1 Investigate physical characteristics associated with different groups of animals.

Students will meet these standards while designing and building their swamp creatures and their characteristics, ex. eyes in front of head and sharp teeth or beak usually mean predator or carnivore, eyes on side of head and duller teeth or beak usually mean prey, omnivore or herbivore, etc. They will have to include an accompanying scientific fact sheet/field guide with a name, description of what it eats (food), how it drinks (water), how it breathes (air) where it lives (shelter), and how it is built and adapted perfectly (what unique and interesting features allow it) to survive in the swamp.

6

7.2.1 Compare and contrast the different methods that can be used by organisms to obtain nutrition in a biological community.

7.2.1 Classify organisms as producers, consumers, scavengers, or decomposers according to their role in an ecosystem/food chain.

Students will meet these standards while designing and building their swamp creatures. We will discuss the different techniques used by animals and plants to get food and discuss how we can incorporate some of these into our monsters, ex. maybe it absorbs the sun's energy through its skin for food and uses photosynthesis like a plant, maybe it drinks water through its skin like a frog, has hands like a monkey, or teeth like a dog.

They will have to include an accompanying scientific fact sheet/field guide with a name, description of what it eats (food), how it drinks (water), how it breathes (air) where it lives (shelter), and how it is built and adapted perfectly (what unique and interesting features allow it) to survive in the swamp. They will also need to determine whether their creature is a decomposer, consumer, producer, or scavenger.

7

7.5.3 Compare and contrast the ability of an organism to survive under different environmental conditions.

7.1.7 Explain how different organ systems interact to enable complex a multicellular organism to survive.

Students will meet these standards while designing and building their swamp creatures and their characteristics, ex. eyes in front of head and sharp teeth or beak usually mean predator or carnivore, eyes on side of head and duller teeth or beak usually mean prey, omnivore or herbivore, etc. We will discuss how the form (sharpness of or shape teeth or beak, presence of claws, etc, are always there to perform a function, ex. cracking open nuts or prying out seeds, catching prey etc.)

With their creature design they will have to include a name, description of what it eats (food), how it drinks (water), how it breathes (air) where it lives (shelter), and how it is built and adapted perfectly (what unique and interesting features of its organs allow it) to survive in the swamp, ex. does it have gills and lungs, camouflage skin, special claws, does it drink through its skin like a frog? Etc.

We will also discuss whether or not their creature could survive if we, as scientists, took it out of its native environment. Would we have to make special carriers or modifications in order for it to survive as we continued on our journey through and then out of the swamp. Ex. would it have survived our journey through the desert? How/why/why not?

8

7.5.2 Use a simple classification key to identify a specific organism. (ex. predator, prey, carnivore, etc)

0.5.2 Recognize the relationship between form and function in living things.

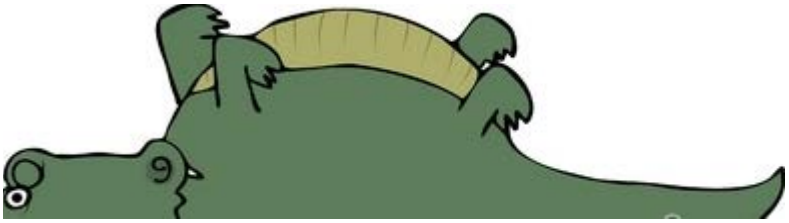
Students will meet these standards while designing and building their swamp creatures and their characteristics, ex. eyes in front of head and sharp teeth or beak usually mean predator or carnivore, eyes on side of head and duller teeth or beak usually mean prey, omnivore or herbivore, etc. We will discuss how the form (sharpness of or shape teeth or beak, presence of claws, etc, are always there to perform a function, ex. cracking open nuts or prying out seeds, catching prey etc.)

With their creature design they will have to include a name, description of what it eats (food), how it drinks (water), how it breathes (air) where it lives (shelter), and how it is built and adapted perfectly (what unique and interesting features allow it) to survive in the swamp.

Day Four: Swamp Math Tag

Math Tag

Math tag is appropriate for children learning various math operations. Have students push the desks against a wall so there is a large space for running around. Write numbers up to 10 and the operation signs for addition, subtraction, multiplication and division on large pieces of paper and give one paper to each student. (If you have a large class, you can have several of each number or operation sign.) Call out a number, and have students form small groups that equal that number. For example, if you call out, "six," a student holding a two and one holding a three tag a student holding a multiplication sign (or a student holding a five and one holding a one tag a student holding an addition sign, and so on). Students stay in their small groups until as many students as possible have been included in equations. Then, call out another number and have students run to find new partners.



SWAMP Tag

A tag game that will wear your kids out!! Make really big boundaries.

One person is "it." This person has to chase the others. When he tags someone, that person must lay down with both hands and feet sticking straight up, like a dead alligator (because everyone knows that's what dead alligators look like). In order for the dead alligator to come alive, four people must tag one limb each.

Once someone has been a dead alligator three times (this is on the honor system), they are now "it". It's always possible to have multiple people being "it" and makes it crazier when you don't know who to run from!

If time is still remaining play other versions of tag and math tag related games.

Standards Alignment for Day Four K-8

K

- K.OA.2. Solve addition and subtraction word problems, and add and subtract within 10
- K.OA.5. Fluently add and subtract within 5.

Students will practice these math skills through the math problem review games

1st

- 1.OA.6. Add and subtract within 20, demonstrating fluency for addition and subtraction within 10.
- 1.OA.5. Relate counting to addition and subtraction (e.g., by counting on 2 to add 2).

Students will practice these math skills through the math problem review games

2nd

- 2.OA.1. Use addition and subtraction within 100 to solve one- and two-step problems
- 2.OA.2. Fluently add and subtract within 20 using mental strategies.

Students will practice these math skills through the math problem review games

3rd

- 3.OA.7.Fluently multiply and divide within 100, using strategies such as the relationship between multiplication and division (e.g., knowing that 8 × 5 = 40, one knows 40 ÷ 5 = 8)
- 3.OA.7.b) Fluently multiply and divide within 100, using strategies such as properties of operations.

Students will practice these math skills through the math problem review games

4th

- 4.NBT.4. Fluently add and subtract multi-digit whole numbers
- 4.NBT.5.a Multiply a whole number of up to four digits by a one-digit whole number

Students will practice these math skills through the math problem review games

5th

- 5.NBT.5. b Fluently multiply multi-digit whole numbers
- 5.NBT.5. a Perform operations (addition, subtraction, multiplication, division) with multi-digit whole numbers

Students will practice these math skills through the math problem review games

6th

- 6.NS.2. Fluently divide multi-digit numbers
- 6.NS.3. Fluently add, subtract, multiply, and divide multi-digit numbers using the standard algorithm for each operation

Students will practice these math skills through the math problem review games

7th

- 7.NS1.1 Apply and extend previous understandings of operations, ex. with fractions, to add, subtract, multiply, and divide rational numbers.
- 7.NS.3. Solve real-world and mathematical problems involving the four operations with rational numbers.

Students will practice these math skills through the math problem review games

8th

- A-APR.1. Add, subtract, and multiply polynomials.
- A-APR.7. b Solve real-world and mathematical problems involving the four operations with rational numbers and/or rational expressions.

Students will practice these math skills through the math problem review games

Academic Vocabulary Guide for Part One:

K

- Basic needs (food, clothing, shelter)
- Parts
- Wants
- Cooperation
- Story
- Water

1

- Continent
- Texture
- Location
- Living
- Non-living
- Environment
- Plant
- Insect
- Shelter
- Mixed
- Precipitation

2

- Natural resources
- Similarities
- Differences
- Renewable
- Non-renewable
- Habitat
- Investigate
- Infer
- Compare
- Consumer
- Producer
- Contrast
- Dissolve
- Organism
- Energy

3

- Threatened
- Water cycle
- Endangered
- Conservation
- Landforms
- Natural resources
- Population
- Mixture
- Decomposer
- Predator
- Prey

4

- Camouflage
- Carnivore
- Ecosystem
- Herbivore
- Physical Adaptation
- Producer
- Expansion
- Diversity
- Consumer
- Omnivore
- Mimicry
- Erosion
- Behavioral adaptation

5

- Parasitism
- Parasite
- Integration
- Human rights
- Significant
- Solution
- Surface
- Area
- Model
- Dissipate
- View
- Personification
- Point of view
- Visual image

6

- Imagery
- Hyperbole
- Relevant
- Criteria
- Abiotic
- Biotic
- Cause
- Effect
- Climate change
- Scavengers
- Protocol
- Sample
- Tides
- Biosphere

7

- Organ system
- Tissue
- Speed

- Impact
- Urbanization
- Topography
- Physical process
- Spatial

- Function
- Property
- Interaction with texts
- Characteristic

- Trait

8

- Element
- Order
- Relative
- Vernacular

- Species
- Variation
- Biodiversity
- Sensory

- Details
- Infer

Sample Supply List

Chosen books:

Activities:

Wetland in a Pan

You Need:

- Modeling clay
- Rolling paint pan (or small aluminum pan)
- Sponges
- Scraps of old carpet or florist oasis foam (or sponges)
- Watering can or similar device
- Cup of soil
- Jar of muddy water

BUBBLING SLIME RECIPE

Ingredients per Batch

- 2 cups of white vinegar
- 1 1/4 teaspoons xanthan gum
- Food coloring (optional)
- Baking Soda (enough to cover bottom of pan)

CHOCOLATE BUBBLING SLIME RECIPE

Ingredients per Batch

- 1 cup baking soda
- 1/2 tablespoon xanthan gum
- 1 tablespoon unsweetened cocoa powder
- 1/3 cup + 1 tablespoon water

CUTE & CREEPY CREATURES

Materials:

- Aluminum foil (to create support armatures/structures)
- Wire (to create support armatures/structures)
- Clay (many options are available, such as polymer clay (aka Sculpey), air dry clay, paper clay, etc)
- Acrylic paints
- Paint brushes
- Paper (to plan out designs and answer questions)
- Pencils
- Images for inspiration

SAMPLE PAPER CLAY RECIPE

- Paper from a shredder (or, another option, buy a big block of recycled paper insulation from a home depot type store
- A box of Art Paste made according to directions (makes one gallon of liquid paste)
- 1 Tub of premixed Joint compound

MATH GAMES

- Paper
- Markers
- Flashcards or other review questions