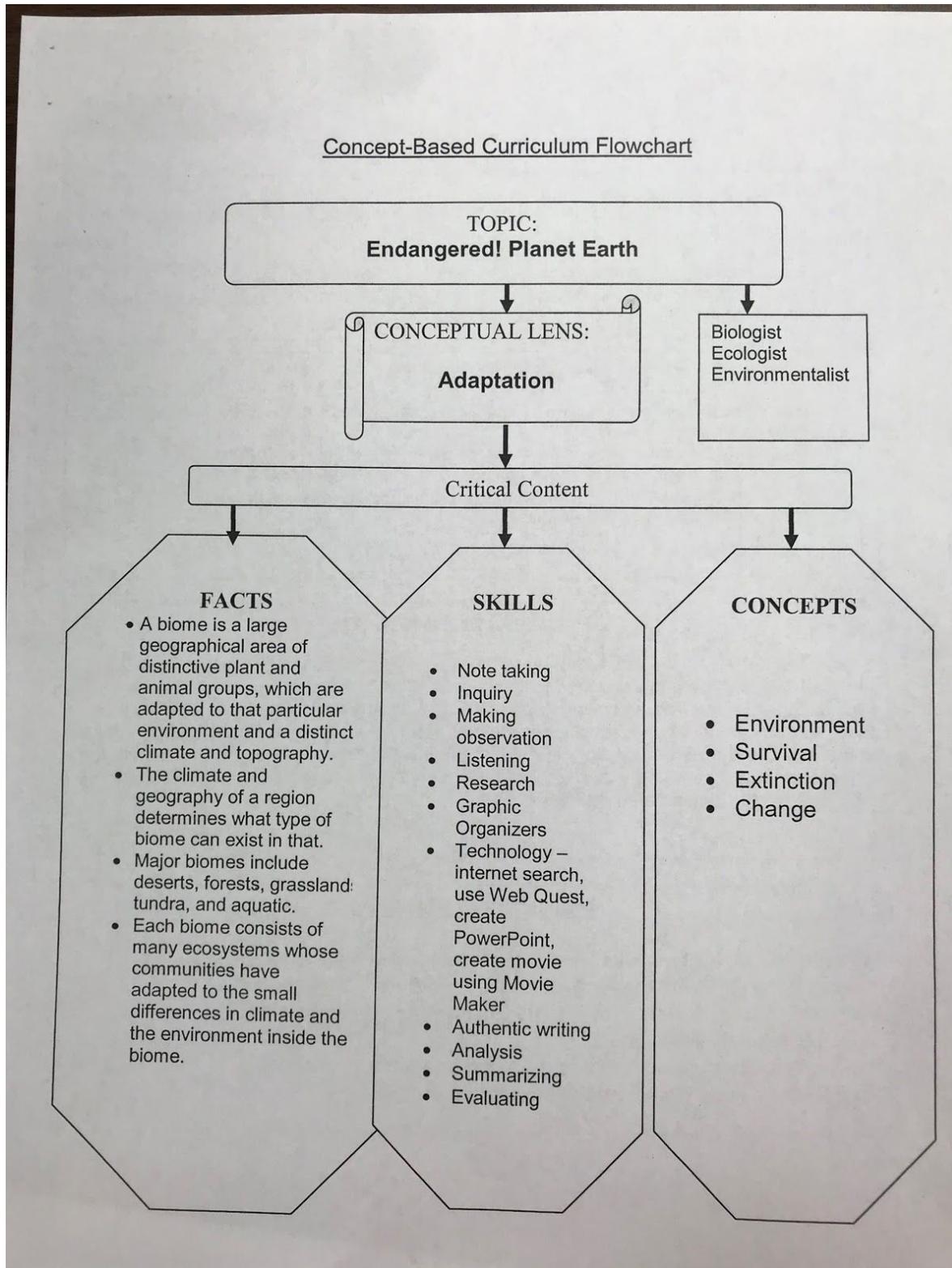


Debra Rust - Concept Unit for September/October 2019



Concept Unit Continued--Endangered Planet Earth

ESSENTIAL UNDERSTANDINGS

- *The living organisms of a biome must learn to adapt and change to the environment in order to survive.
- *If adaptation does not take place, extinction may occur.
- *Environmental changes may be caused by human actions.
- *The survival and well being of a biome and its organisms depends on ecological relationships throughout the world.

ESSENTIAL QUESTIONS

- *Why must living organisms of a biome learn to adapt and change to the environment in order to survive?
- *Why would adaptation not come about, or occur, resulting in extinction?
- *How may environmental changes be caused by human actions?
- *How does the survival and well being of a biome and organisms depend on ecological relationships throughout the world?

CULMINATING PERFORMANCE TASKS

Scenario- IN THE NEWS: "YOU" will work with a team of scientists/journalists from the Animal Planet Network. Your group has been assigned to investigate a type of species (mammals, birds, reptiles, amphibians, fish and invertebrates) that are endangered. "YOU" will travel around the United States, Africa and Tropical Rainforests as an embedded scientist/journalist in search of your chosen species. Students will work with professional videographers to create a digital story and share with other students. *Findings will be presented to the Animal Planet Network-making recommendations for the protection of your "animal in peril" under the Endangered Species Act.

INSTRUCTIONAL ACTIVITIES

Research trade books, textbooks, internet

Create Photo Story- 3D Instruction Board

Create a DVD to share with classes

Field Trip to Camp McDowell in May

Field Trip or on site visitor from B'ham Southern College, Camp McDowell (Big Dave) and Jones Valley Urban Farm

Additional Activities

1.) **TITLE:** Up the Creek Without A Paddle

CHALLENGE: Students are embedded reporters with Animal Planet Network. They must canoe on the local river system in order to travel to location. Build a boat that can paddle across a container/body of water “on it’s on”.

MATERIALS: Cardboard, foam sheets, duct tape, craft sticks, rubber bands

HINT: Use the rubber bands to power the paddle. How do they store energy?

WHAT’S GOING ON?: Potential energy is stored energy. When potential energy is released, it will do work. A stretched spring has potential energy. Kinetic energy is motion. When the wind blows leaves around, kinetic energy is at work.

The third law of motion states that every action has an equal/opposite reaction. A propeller applies force on the water in a backward direction, which moves the boat ahead in a forward direction.

EXPANDING STEAM: ASK STUDENTS

- What force makes the boat move forward?
- How can you redesign the paddle to make your boat go farther than it did the first time? Are there better materials to use?
- What other boats can you design? Raftes? Canoes? Cruise ships? Design one!!
- Make a flag for your boat. Does this addition change the distance your boat can cover?
- Measure the distance your boat covers five times. How far can your boat travel? What is the greatest distance it traveled? Least?

2.) **TITLE:** Stay A-Float

CHALLENGE: As an embedded reporter for Animal Planet News, students may be asked to travel by water to remote locations. Each student must create a flotation device for the boat/canoe that will keep them afloat. (Create a device to help an “action” figure float.)

MATERIALS: Action figure that sinks in the water, resealable plastic bags, pool noodle pieces, rubber bands, straws, bubble wrap.

HINT: The flotation device must be balanced to work properly.

WHAT'S GOING ON?: Flotation devices add buoyancy to the person using them. Swim floats are often filled with air. Air is less dense than water, so the device floats. Pool noodles and life jackets are made of foam, which have air bubbles that help them float.

When people take a breath and go underwater, air in the lungs helps the person float back to the surface. Ask students: Have you ever blown out air when underwater? Where did the bubbles go?

EXPANDING STEAM: ASK STUDENTS

- Look up the word buoyancy. Use the definition to explain how your flotation device works.
- Boats often use weights for balance/stabilization. What tool could you use to add balance/stability to your design?
- Even if your device works, what can be done to improve the design?
- Use what you have learned from the challenge to create a water safety poster for the indigenous people that you are working with in the village/town.
- How much weight can your flotation device hold/ Add paper clips one at a time. Each clip weighs about 1 gram.

3.) TITLE: Are You Sinking Like A Rock Or Floating Like a Marshmallow?

CHALLENGE: If traveling by water, you want to float like a marshmallow!! How can you make the marshmallow sink instead of float?

MATERIALS: Marshmallows,, cornstarch or flour, bowl of water, bowl of oil

HINT: Marshmallows float because of the air inside of them. Can you get rid of the air?

WHAT'S GOING ON?: Different materials have different densities. Density has to do with how much mass there is in a substance. Some materials are denser, such as chocolate. Others are less dense, such as marshmallows, which are mostly air.

Liquids have different densities too. Water is denser than oil. Honey is denser than water. Objects will sink more easily in the less dense liquid. Try layering several liquids in a clear cup. What happens?

EXPANDING STEAM: ASK STUDENTS

- Did the marshmallow sink more easily in the water or the oil? Why? Which is denser?
- What is the purpose of the cornstarch or flour in this activity? How did you use it as a tool?

- Use what you learned to design a raft that will float in water or oil. What materials can you use?
- After you have found a way to make the marshmallow sink, design a life preserver that will hold it up.
- List various kinds of candy. Ask your classmates to guess which ones will float. Graph the survey results. Then, try it.

4.) **TITLE:** Pretty Petal Patterns

CHALLENGE: You are in the tropical rainforest today! Look all around you and describe what you see. Use your imagination!! Create flower petals. Find a way to spread color throughout each petal without coloring the whole petal with markers

MATERIALS: Plastic cups, coffee filters, water, eyedroppers, washable markers

HINT: What material could be used to spread the color throughout each petal?

WHAT'S GOING ON?: The coffee filters show capillary action, which means that water can move through narrow spaces against gravity. The filters are made of special paper with spaces between its fibers. Water molecules want to stay together, so they climb up through the spaces. Plants use capillary action to draw water up through their stems to their leaves.

Petals are colorful to attract pollinators, such as bees and other insects. Without pollination, new plants will not grow.

EXPANDING STEAM: ASK STUDENTS

- Flowers provide food for bees and other insects. What part of the flower is needed to feed them? Research more to find out.
- Compare and contrast how using the eyedropper versus the water cup affected the colors and patterns.
- Design a flower garden so that bees and other insects can easily reach their food.
- Use what you learned to create different patterns on petals. Can you make petals that look like real flowers?
- How long does it take water to travel from one end of the coffee filter to the other? Can you make it move faster or slower?

5.) TITLE: Build a Better Nest

CHALLENGE: You have been hired to work at the Birmingham City Zoo for a week! Use the materials to build a bird nest.

MATERIALS: Play dough, straw, sticks, leaves, bits of cloth and string

HINT: Birds often use sticky materials like spider webs and mud to hold their nests together. What material could you use?

WHAT'S GOING ON?: Birds build nests to provide safe places for eggs and young birds to hatch and grow. Some birds do not make nests at all, Instead they lay eggs in shallow holes in the ground. Other birds make nests from natural materials like grass mud, and animal fur or from man-made materials such as paper, plastic and yarn. Nests can be found every where such as-trees, burrows, sides of cliffs, in man made structures and on the ground.

EXPANDING STEAM: ASK STUDENTS

- Different birds require different nests. Research a type of bird and nest. Design a nest to fit the bird's needs.
- Birds use their beaks/feet to create nests. Try making a nest using two clothespins instead of your hands.
- Design an ostrich habitat for the Birmingham Zoo. What materials will you include in the habitat so the mother ostrich can build her nest?
- Write a story about a mother bird and the baby birds in "YOUR" nest.
- Measure your bird nest with a measuring tape. Measure a friend's nest. What size bird would fit in each nest?

6.) TITLE: Weave a Web

CHALLENGE: Create a strong realistic spider web that will hold a plastic spider.

MATERIALS: Dental floss, thread, yarn, two chairs, plastic spider

HINT: Spiders attach their webs to tall, strong objects like trees and walls. What materials do you have like that?

WHAT'S GOING ON?: When a spider begins to spin a web, it releases a silk thread made from spinneret glands on its abdomen. When the web is spun, the spider sits back and waits. A spider can feel vibrations in its web with the sensory hairs on its legs. If a spider senses a weak vibration, it will ignore it. If the vibration is too strong, the spider will know it is probably a predator and will stay away. A vibration of just the right amount will tell the spider it is time to eat!

EXPANDING STEAM: ASK STUDENTS

- Have a friend touch the web and close his eyes. Pluck a string in the web. Can your friend feel the vibrations? Why?
- Spiders use their eight legs as tools when building their webs. What tools would be helpful when building your web?
- Design a way to move a spider web from one place to another without tearing it.
- Draw a comic strip about a bug that has been caught in a spider web and is trying to escape.
- What shapes do you see in your web? Make a chart of the shapes you see and how many of each shape there are.

7.) TITLE: Help! Hide Me!

CHALLENGE: Discuss the concept of CAMOUFLAGE and create a hideout to help a wild turkey escape from another animal/or hunter. Why do wild animals need to hide?

MATERIALS: Paper turkey (or brown cube), wooden blocks, construction paper, paper towel rolls, plastic straws, cloth or felt

HINT: Think about how other animals hide. Green bugs hide on green leaves. White hares disappear in the snow.

WHAT'S GOING ON?: Wild turkeys live in the woods in parts of North America. They like to eat acorns, seeds, small insects, and wild berries. They sleep at night on low branches of trees. They can also fly!

Wild turkeys are covered with dark feathers that help them blend into their environment. The bare skin on the throat and head of a turkey can change color from gray to bright shades of red, white, or blue when the bird becomes scared or excited.

EXPANDING STEAM: ASK STUDENTS

- What do turkeys look like? Research more about them to help you design your hideout.
- If your hideout doesn't work the first time, use different materials to create a better hideout. What other materials would be helpful?
- Design a hideout for a giraffe. How will it differ from your turkey hideout?
- Write a short story about a turkey who is trying to escape becoming dinner. Use your design in the story.
- Measure the perimeter of your hideout. How will making it larger or smaller help your design?

Student Skills/Outcomes Utilized/Gifted Standards

1. Metacognition Skills: (a). Abstract Thinking Skills-The student will observe, analyze and implement abstract thinking skills modeled by others.

(b.) Reflective Thinking-The student will ask questions before, during and after reading and/or instruction to develop a deeper understanding of the concept

2. Critical Thinking Skills: (a.) Students will be able to analyze, compare/contrast attributes of various information/data. They will use deductive reasoning skills and prove/disprove ideas by presenting evidence.

3. Creative Thinking Skills: Students will develop the ability to use brainstorming techniques. They will create many ideas to maximize the possibility of finding a solution to a problem. They will use originality to create ideas in order to maximize the possibility of providing solutions to problems and different/alternate outcomes to real-world situations.

4. Problem Solving: The student will develop divergent and convergent thinking skills. They will identify the main problem, underlying problems and determine/implement solutions.

5. Communication and Creative Expression: Students will plan, create and present information orally in order to share information to a variety of authentic audiences.

6. Information Literacy; Technology: Students will use digital tools/strategy to locate, collect, organize, evaluate and synthesize information. (Students will work with professional videographers.)

**Enrichment students will participate in the Concept Unit Activities during the months of September/ October from 12:00-1:15 each Wednesday.