GALVESTON ISLAND

Homeschool Curriculum

IT'S ISLAND TIME
EST. 1839
GALVESTON, TX

SCIENCE

WWW.VISITGALVESTON.COM

ABOUT THIS CURRICULUM

What most people consider Galveston is the coastline that runs along Galveston Island, and the 3 different bays southwest of Houston that lead into the Gulf of Mexico. Galveston and the surrounding bay area constantly deal with problems like pollution, destruction of habitats and erosion. Galveston Bay is Texas' largest estuary and is one of the most productive ecosystems in the world. It provides many benefits to society, including fisheries/seafood, water quality improvement, flood and storm protection, regulation of local climate, aesthetics and recreational opportunities such as swimming, boating and bird watching.

Galveston beaches offer exciting things for families to do, but they are also home to increasing amounts of trash and pollutants that end up in the ocean water as well. Water is an essential thing for life on earth and when the beaches, oceans and bodies of water around us are polluted it affects the life of organisms in the water but it can also affect us. All different types of trash take a really, really long time to decompose. Let's look at how pollution affects us and the organisms around us and how we can begin to help make a better, cleaner planet to live on. How? Watch the video below to help you understand how pollution is a big problem.

TEKS

4th Grade Science
4C, 5A, 5B, 6A, 6B, 7A, 7B, 8A, 8B, 8C, 9A, 9B, 9C, 12B, 12C, 12E, 20B, 20C, 21B, 21C, 21D, 21E, 22A, 22B, 22C, 22D, 22E, 23A, 23B
Grades: 3-6 (TEKS from Grade 4 Social Studies, given their tie to Texas History)

ESSENTIAL QUESTIONS

- What are the effects of pollution on coastal regions?
- How do roller coasters keep moving?
- What factors contribute to the Gulf of Mexico's appearance?
- What are the different characteristics of the rainforest?
- How are different trains powered?

POLLUTION AND ITS EFFECTS ON THE WORLD AROUND US

LOCATION Any beachfront location will work for this activity.

BEFORE YOUR VISIT

Play this quizlet to help you with pollution vocabulary. Take a look at the map of Galveston Bay and Galveston Island to get oriented with the area. Watch the Pollution video before you head to the beach.

DURING YOUR VISIT

Fill out the Beach Clean Up Activity Chart as you work.

Things you will need:

- Pencil
- Beach Clean Up Activity/ Decomposition Infographic print out

AFTER YOUR VISIT

Discuss the experience you had as you answer the Post-Activity Questions

Things you will need:

- Post Activity Questions

VOCABULARY

Pollution: substances that make land, water, air, etc., dirty and not safe or suitable to use

Water Quality: describes the condition of the water, including chemical, physical, and biological characteristics

Estuary: an area where a river flows into the sea

Bay: a large area of water that is part of an ocean or lake and partly surrounded by land

Decomposition: the process of something being slowly destroyed and broken down by natural processes, chemicals, etc.

Ecosystem: a biological community of interacting organisms and their physical environment.

Pollutant: a substance that makes land, water, air, etc., dirty and not safe or suitable to use : something that causes pollution

Gulf: an arm of a sea or ocean partly enclosed by land

Vocabulary Quizlet: https://quizlet.com/_92fad4?x=1qqt&i=3baamk

INTRODUCTION

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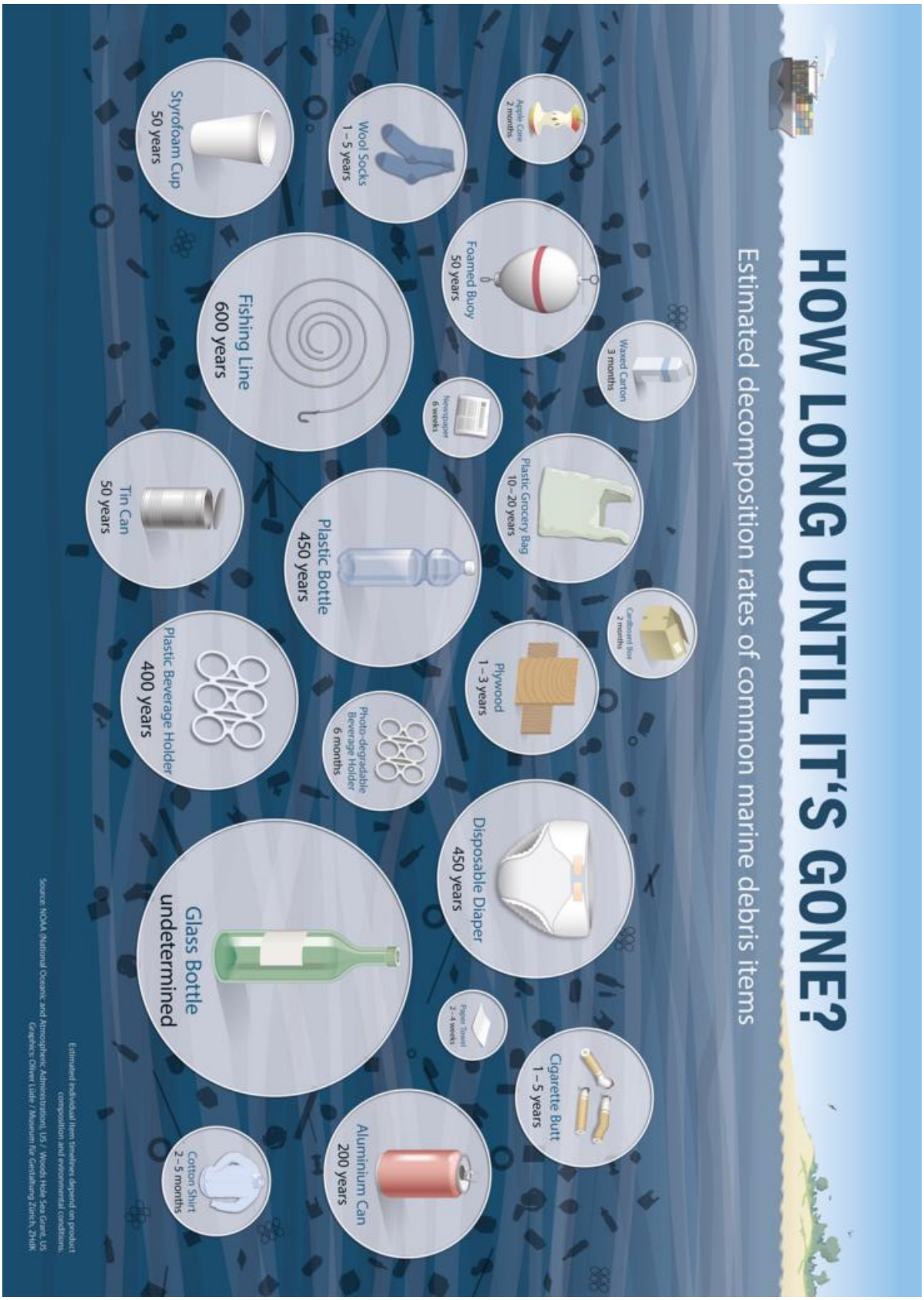
Use this video on pollution to help you complete the activity below:
https://www.youtube.com/watch?v=MEb7nnMLcaA

Beach Clean Up Activity

As you clean up on the beach, pick 6 pieces of trash you would like to document and fill out the activity chart below, then answer the questions that follow.

Identify the pieces of trash: What do you think it is?	Draw a quick sketch of your piece of trash.	How do you think this piece of trash affects different animals?	How do you think this piece of trash affects the environment?	Based off of the decomposition infographic on the next page, how long do you think this piece of trash will take to decompose?


HOW LONG UNTIL IT'S GONE?
Estimated decomposition rates of common marine debris items
Apple Core 2 months
Wool Socks 1 – 5 years
Styrofoam Cup 50 years
Foamed Buoy 50 years
Waxed Carton 3 months
Newspaper 6 weeks
Fishing Line 600 years
Cardboard Box 2 months
Plastic Grocery Bag 10 – 20 years
Plywood 1 – 3 years
Plastic Bottle 450 years
Tin Can 50 years
Photo-degradable Beverage Holder 6 months
Plastic Beverage Holder 400 years
Disposable Diaper 450 years
Paper Towel 2 – 4 weeks
Glass Bottle undetermined
Cigarette Butt 1 – 5 years
Aluminium Can 200 years
Cotton Shirt 2 – 5 months
Estimated individual item timelines depend on product composition and environmental conditions.
Source: NOAA (National Oceanic and Atmospheric Administration), US / Woods Hole Sea Grant, US
Graphics: Oliver Lüthi / Museum für Gestaltung Zürich, ZHdK

POST ACTIVITY QUESTIONS

1. What ways do you think that you could take part in taking care of the environment?

2. Do you think that there are things that should change in order to protect animals? Name some of those things.

3. What did you find interesting about the decomposition infographic?

4. How does the trash we throw away affect the water we drink?

5. What were 5 different things that you learned or found interesting while you were helping clean up the beach?

ROLLER COASTER PHYSICS

LOCATION Pleasure Pier
ADDRESS 2501 Seawall Blvd, Galveston, TX 77550 **PHONE** 409-766-4950 **VISIT WEBSITE**

BEFORE YOUR VISIT
1.Finish the pre-activity pages.
2.Watch the video below to begin the activity:
https://www.youtube.com/watch?v=VcRFh-dCxWE

DURING YOUR VISIT
Enjoy your time at Pleasure Pier and point out the different aspects of physics interacting with the rides.

AFTER YOUR VISIT
Finish the post-activity pages.

BY THE END OF THIS LESSON, STUDENTS WILL:

1. Know Newton's Laws of Motion
2. Have a general understanding of gravity
3. Know how roller coasters function using laws of physics

PLEASURE PIER PREPARATION ACTIVITY PAGE

Use the Definition Bank to put the correct definition with the correct term. Write it in the Definition box. Then write 3 everyday examples you have experienced because of these terms.

TERM	DEFINITION	3 EVERYDAY EXAMPLES
FRICTION		1. 2. 3.
GRAVITY		1. 2. 3.
FORCE		1. 2. 3.

DEFINITION BANK

a. a push or a pull on an object. A force happens when two objects interact—that is, when one object does something to the other object.

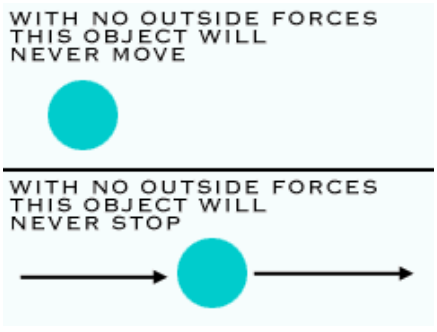
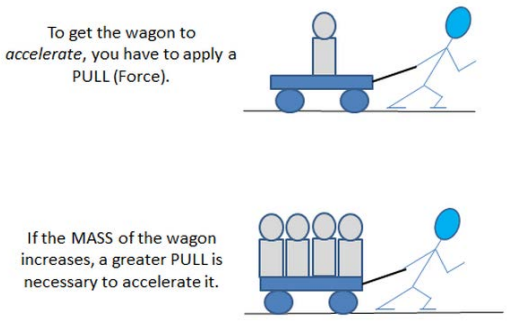
b. a force that acts between two objects that are in contact with one another. It slows or stops movement between the two surfaces that are touching.

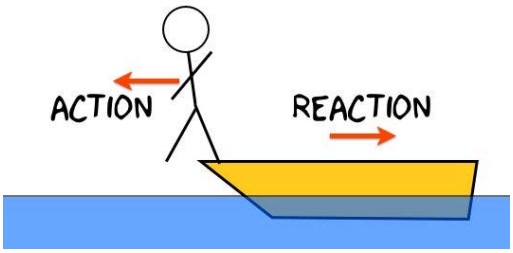
c. is the force by which a planet or other body draws objects toward its center. This force keeps all of the planets in orbit around the sun.

Who is Sir Isaac Newton?

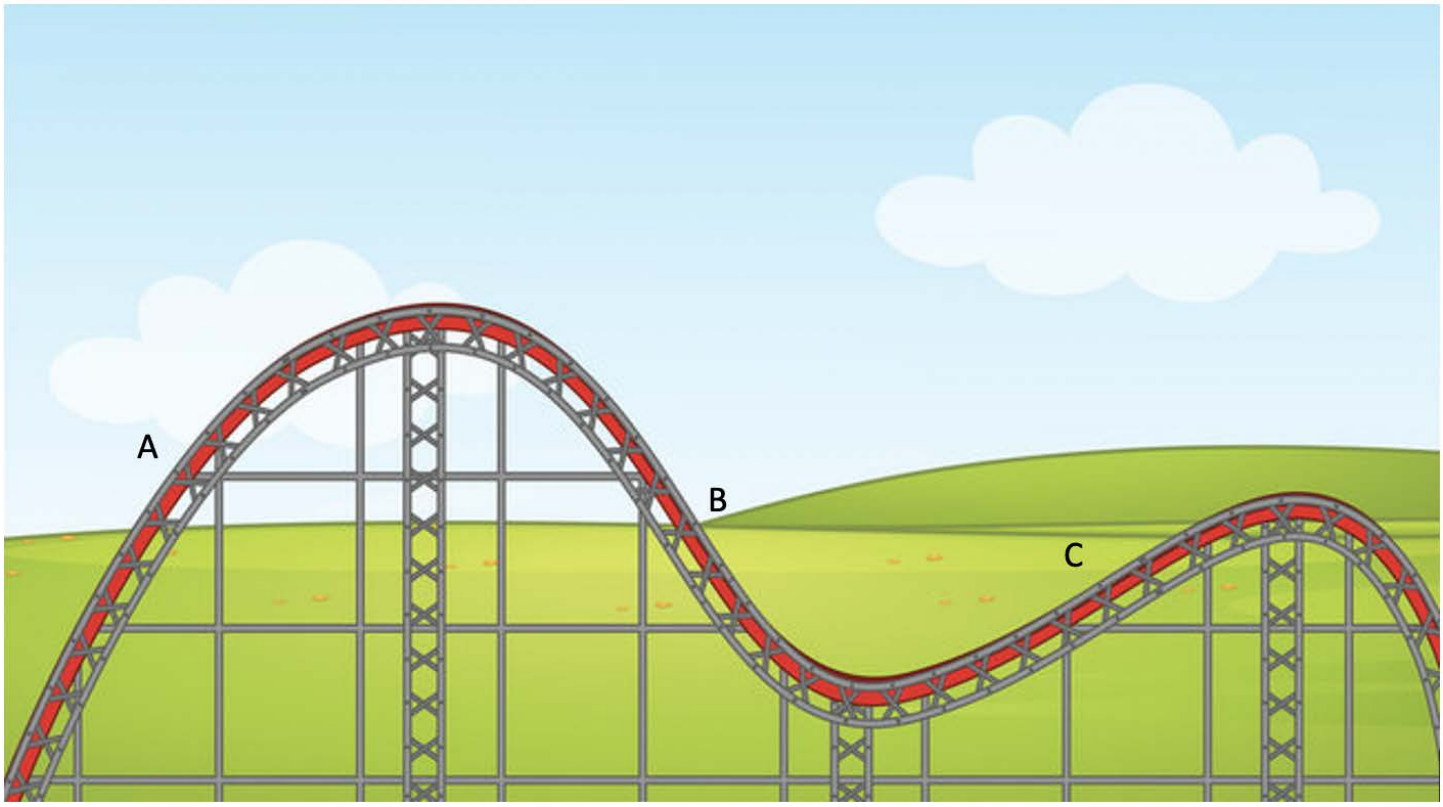
Isaac Newton was born on December 25, 1642 in Woolsthorpe, England. He is extremely popular in the scientific and mathematical fields. He began his career studying light and came up with Newton's Theory of Color. He then went on to study gravity and how it functions. While studying gravity he also created Newton's Laws of Motion, which are now the basis of the physics that we study today. He is often pictured with an apple in his hand because it is said that he began studying gravity because he noticed the way that apples fell out of their trees and he wondered what caused them to move towards the ground. His Laws of Motion inform the way forces and objects operate and their way they interact with each other. After a very successful and long career in the sciences,Newton died in London, England, on March 20, 1727.

NEWTON'S LAWS OF MOTION

TERM	DEFINITION	PICTURE EXAMPLE	YOUR EXAMPLE
Newton's 1st Law of Motion	An object that is sitting at rest will stay at rest, and an object that is in motion will stay in motion until a force acts upon it.		
Newton's 2nd Law of Motion	The greater the force the greater the *acceleration. The greater the mass, the greater the force needed to move the object. F=ma		

Newton's 3rd Law of Motion	For every action there is an equal and opposite reaction.		

*Acceleration- or how fast an object or person speeds up.



1. If there were a roller coaster on these tracks, where do you think it would experience friction that would slow it down the most?
   A. Point A
   B. Point B
   C. Point C

2. If there were a roller coaster on these tracks, what forces do you think would be acting on the roller coaster cars?
   A. Gravity
   B. Friction
   C. Friction & Gravity

Use the next few lines to explain what you have learned about how gravity, different forces and friction affect a roller coaster. How are you able to recognize these forces on a day to day basis now?

_____

_____

_____

ROLLER COASTER PHYSICS ANSWER KEY

Friction - a force that acts between two objects that are in contact with one another. It slows or stops movement between the two surfaces that are touching.

Gravity - is the force by which a planet or other body draws objects toward its center. This force keeps all of the planets in orbit around the sun

Force - a push or a pull on an object. A force happens when two objects interact—that is, when one object does something to the other object.

Everyday examples will vary.

Newton's laws of motion example will also vary.

1. A
2. C

WHAT'S IN THE WATER?

LOCATION Artist Boat Kayak Adventure
ADDRESS 13330 Settegast Rd, Galveston, TX 77554 **PHONE** 409-632-0388 **VISIT WEBSITE**

BEFORE YOUR VISIT
Print off and read through the worksheet and make sure that you have the questions you want to ask your kayak guide filled.

DURING YOUR VISIT
You will need:

- a pencil
- The questions you came up with

Ask your guide the questions you were interested in finding the answer to and record it on your paper

AFTER YOUR VISIT
Answer the post-activity questions

INTRODUCTION

Have you ever spent some time thinking about the ocean and wondered how all beaches look incredibly different?

If you've already been down to the beach you will have noticed that Galveston is pretty unique. It has brown sand and brown murky water. What's interesting is that every now and then the water will turn clear, just like the beaches in Florida.

Let's take a look at these 4 different characteristics of water and see what makes these things possible.

WORD	DEFINITION
Sediment	material (as stones and sand) carried onto land or into water by water, wind, or a glacier.
Ocean Currents	the continuous, predictable, directional movement of seawater driven by gravity, wind (Coriolis Effect), and water density
Algae	Algae are organisms, or living things, that are found all over the world. Algae are very important because they make much of Earth's oxygen, which humans and other animals need to breathe. Some algae, such as seaweed, look like plants.

Wind Patterns	Are ways that the wind blows across the earth's surface. These wind patterns change the ocean waves and currents.

All of these things affect the ocean. Especially when they are all rolled into one. When hurricane Alberto blew into the Gulf of Mexico in 2018, it caused the sediment that usually comes out of the mouth of the San Jacinto River turning Galveston's water brown to shift up the coast. When the sediment shifted up the coast it made the water turn clear.

FIND THE DIFFERENCE

Look at the pictures below and circle where you see the brown murky sediment. Then draw a box around where you see the sediment gone.

*This is the same picture, the left one is just zoomed out further.

ALGAL BLOOMS

Sediment isn't the only thing that can change the color of the water. Sometimes when algae is in bloom (when it is growing at a rate that is out of control), it causes the ocean water to change color. It can be a very drastic difference and sometimes even dangerous. There are types of algae that are toxic to humans and sea animals.

For example, microscopic algae can "bloom" usually because of unusually high temperature and cause the ocean water to look red which is why experts call it the Red Tide. This can cause skin irritation to humans, it can also kill marine organisms and make the air nearby have a bad smell.

If algal blooms like red tide occur, what are some of the problems they might cause? (Extra Fact: Red Tide blooms are so dense that oftentimes, light can't get through them to the ocean below.)

Before you go on your kayak adventure, think about three different questions that you might want to ask them after learning about the different characteristics of water.

QUESTION #1

ANSWER

QUESTION #2

ANSWER

QUESTION #3

ANSWER

POST-ADVENTURE

As you were on your Kayak adventure, what new things did you learn about water and its composition?

WHAT'S IN THE WATER ANSWER KEY

Algal Bloom question: answers may vary but should fall along the lines of the dying of seaweed and vegetations in the ocean because of the lack of sunlight getting to them. This then causes food supply for fish and ocean floor dwelling creatures to be depleted.

All other answers will vary based on student preference of answer.

UNDER THE TREETOPS

LOCATION Moody Gardens Rainforest Exhibit
ADDRESS 1 Hope Blvd, Galveston, TX 77554 **PHONE** 409-683-4200 **VISIT WEBSITE**

BEFORE YOUR VISIT
Read through all of the activity pages and fill out the animal and plant chart.

DURING YOUR VISIT
Enjoy your time at Moody Gardens!

AFTER YOUR VISIT
After you leave the exhibit take some time to look at the post activity.

INTRODUCTION

Did you know that more than half of the world's animals live in rainforests? Many of the plants and animals haven't even been discovered yet!

Do you know how much rain you get where you live every year? If not, look it up!
_____ **Inches**

In some rainforests it rains more than an INCH a DAY!! Compare that to where you live, what is the **difference** in inches?
_____ **Inches**

Isn't that crazy? Because it rains so much on rainforests there are often very thick white clouds above the treetops. These clouds are formed by something called **transpiration**.

THE RAINFOREST

Rainforests are structured in 4 layers: emergent, canopy, understory, and forest floor. Each layer has very unique characteristics differing on sunlight, water and air circulation. Each layer is distinct yet dependent on the nearby layers to be able to function properly.

With each layer being very different, there are many different animal species that are unique to their own specific rainforest layer. This is what allows the rainforest to be teeming with thousands of different species. One 4 square mile patch of forest can house up to 1500 flowering plants, about 750 tree species, 400 different birds and over 150 different species of butterflies. There are different types of rainforests on every continent except for Antarctica, but the largest one surrounds the Amazon River in South America and the Congo River in Africa.

EMERGENT LAYER (100-200ft) 	This is the top layer of the rainforest. Trees as tall as 200 feet fill the sky. The tree leaves are sparse on the trunk but spread wide from the branches as they are able to catch the rays of the sun. Trees commonly found in the layer are the Brazil Nut Trees and Kapok Tree. The Brazil Nut tree, **vulnerable species,** can live up to 1000 years in an undisturbed rainforest habitat. Animals often travel throughout the flimsy branches of the emergent layer by flying or gliding. Animals that live in the emergent layers include bats, birds, gliders and butterflies. White-tailed hawks and harpy eagles are its top predators. Trees in the emergent layer rely on the wind to scatter their seeds.
CANOPY LAYER (56-95ft) 	The canopy lies directly below the emergent layer and is a thick layer of **vegetation** that is roughly 20 feet thick. The canopy forms a "roof" over the two remaining layers of the forest. It is difficult for the wind to blow through the canopy, so most of the plant's seeds are inside their fruit. Fruit brings in all kinds of animals to eat. Because the canopy is so dense, there is so much more food available which causes the canopies to be teeming with all kinds of creatures. Animals like the Scarlet Macaw and the keel-billed toucan, howler monkeys and two-toed sloths. There are thousands and thousands of insect species found hanging out in the canopies and well as reptiles like the draco lizards.
UNDERSTORY LAYER (16-55ft) 	Located below the canopy is the understory, which without the sun being able to fully pass through the canopy, is a darker and even more humid environment. Plants in the understory are shorter and have much larger leaves to catch as much sunlight as they can. The plants also often produce big bright flowers easy to see so they can attract pollinators in the darker condition. Like the canopy, the understory also has lots of edible fruit. The shrubs are also enjoyed by the animals and insects. The dense foliage allows the perfect environment for **camouflage**. The understory is home to many creatures including the jaguar, the anaconda and python(as well as other snakes), gorillas and antelope.
FOREST FLOOR LAYER (0-15ft) 	This is the darkest of all of the layers which makes it very hard for plants to grow. Leaves that fall onto the floor decay very quickly. **Decomposers** such as termites, slugs, scorpions, worms and fungi thrive on the forest floor. WIld pigs, armadillos and anteaters look for tasty insects in the decomposing brush. Rats and pacas use the roots from the tall trees and shrubs to hide from predators. Rivers run through the floor layer of rainforests and create freshwater habitats. The Amazon River, for example, is home to the pink river dolphin, black caiman which is in the alligator family is also part of this habitat.

Please use the detailed information above and fill in the blanks below.

ANIMALS

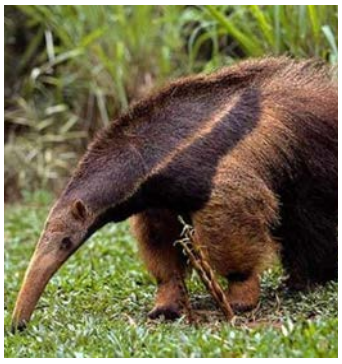
1. Animal Name:
Jaguar

Rainforest Layer I live in:
_____

Height of My Habitat:
_____

2. Animal Name:
Scarlet Macaw
Rainforest Layer I live in:
_____

Height of My Habitat:
_____



3. Animal Name:
Giant Anteater

Rainforest Layer I live in:
_____

Height of My Habitat:
_____

PLANTS

5. Plant Name:
Brazil Nut Tree

Rainforest Layer I live in:
_____

Height of My Habitat:
___100-200 Feet_____

6. Plant Name:
Zebra Plant

Rainforest Layer I live in:
_____

Height of My Habitat:
___16-55 Feet_____

7. Plant Name:
Rattan

Rainforest Layer I live in:
_____

Height of My Habitat:
___56-95 Feet_____

4. Animal Name:
Harpy Eagle

Rainforest Layer I live in:
_____

Height of My Habitat:

_____

8. Plant Name:
Rainforest Fern

Rainforest Layer I live in:

_____

Height of My Habitat:
___0-15 Feet_____

Rainforest Post-Activity

Did you know that rainforests play a very important role in our world?

- The help stabilize our climate,
- They provide a home to many plants and animal unique to rainforests alone
- They protect against floods, droughts and erosion.
- They are a source for medicines and foods

And much more.

Unfortunately a problem rainforests are facing around the world is deforestation. Rainforests are being destroyed for many different reasons. Troublingly, we are losing nearly 4,500 acres of rainforests every hour from illegal logging, mining, agriculture, forest fires, and oil drilling. Because the rainforests house so many unique animals one of the biggest problems of deforestation is **extinction**. When animals habitats are destroyed it

Ways we can help:

Mongabay gives some helpful steps for saving rainforests and, on a broader scale, ecosystems around the world can be abbreviated as TREES:

- **T**each others about the importance of the environment and how they can help save rainforests.
- **R**estore damaged ecosystems by planting trees on land where forests have been cut down.
- **E**ncourage people to live in a way that doesn't hurt the environment
- **E**stablish parks to protect rainforests and wildlife
- **S**upport companies that operate in ways that minimize damage to the environment

Take some time to come up with a way you would like to help:

_____

_____

_____

Using context clues, match the vocabulary words to their definition.

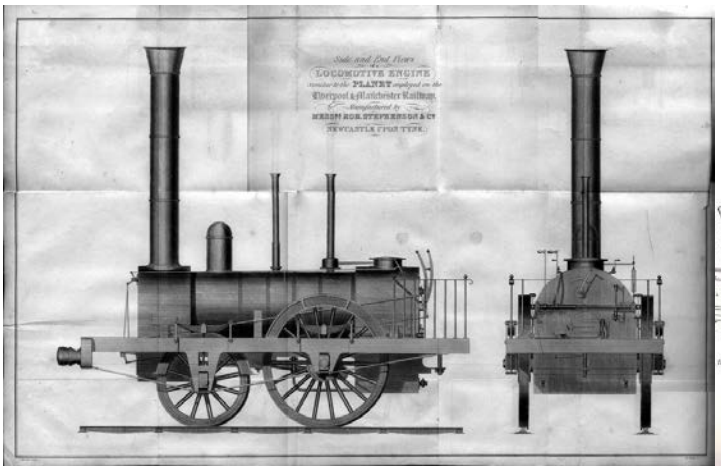
9._____Transpiration	A. tactic that organisms use to disguise their appearance, usually to blend in with their surroundings.
10._____Vulnerable Species	B. organism that breaks down dead organic material
11._____Vegetation	C. evaporation of water from plants
12._____Camouflage	D. level of conservation between "near threatened" and "endangered"
13._____Decomposers	E. the dying out or disappearance of a species from earth
14._____Extinction	F. all the plant life of a specific place

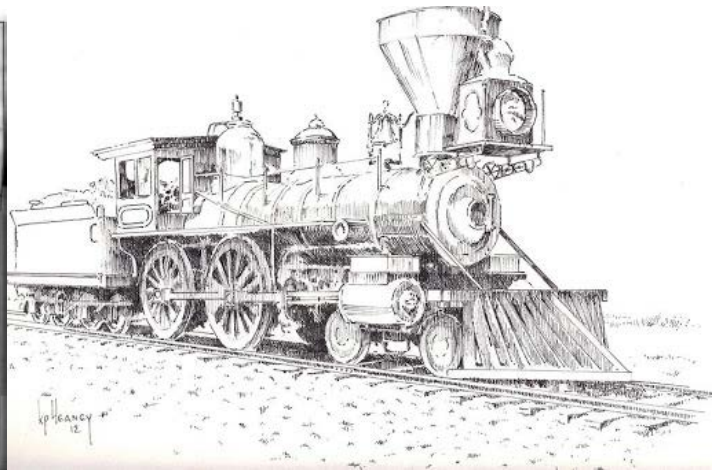
Under The Treetops Answer Key

1. Understory Layer
2. Canopy Layer
3. Forest Floor Layer
4. Emergent Layer
5. Emergent Layer
6. Understory Layer
7. Canopy Layer
8. Forest Floor Layer
9. C
10. D
11. F
12. A
13. B
14. E

TRAINS, TRAINS, TRAINS!!

LOCATION Railroad Museum
ADDRESS 2602 Santa Fe Pl, Galveston, TX 77550 **PHONE** 409-765-5700 **VISIT WEBSITE**





BEFORE YOUR VISIT
Take time to read over the different types of trains and how they operate.

DURING YOUR VISIT
Enjoy your time at the museum.

AFTER YOUR VISIT
Answer the post activity questions.

Can you think of a time that you have seen a train? Whether it be on a road trip or there are tracks near where you live. Have you ever wondered how trains work? For example, how trains are powered or how they stop, maybe even how their tracks work.

Different Types of Trains

Freight Train

Carries heavy goods and usually travels long distances.

Passenger Train

Carries passengers to and from destinations. These trains are all over the world and are used daily as a means of travel.

Monorail

These trains run on one track instead of two. They are often found in airports and amusement parks.

Subway Train

These are trains that are used everyday to get around large cities. They most often run underground and are powered by electricity.

How Trains are Powered

TYPE OF POWER	GENERAL INFORMATION	EXPLANATION OF THE POWER
Steam Power	Used as a means of travel since 1812. This was the main way of transportation since the middle of theIndustrial Revolution. These trains have used oil, coal and Bunker C Oil.	https://www.youtube.com/watch?v=UKiMMa0Z_7w
Diesel-Electric Power	Was used beginning in the 1930s, this engine replaced many steam locomotives. It was originally used for carrying freight, but became normally used for passenger trains as well.	https://www.youtube.com/watch?v=kRIiG5I5Zt0
Gas-Turbine Power	Developed in France in the 1940s, the Gas/Turbine powered train operated similarly to the diesel/electric powered engines. But due to the high cost of Bunker C Oil and poor fuel efficiency, they were only utilized for about 30 years.	Not Available
Electric Power	Usage of this train began widely being used in 1910 allowing for easy travel into the bustling city of Manhattan. Once electric trains gained popularity they began being used for high-speed projects all over the world.	https://www.youtube.com/watch?v=l-EZoVFxeQA

Post- Activity Questions

1. As you go through the museum, write down one or two things you learned at the exhibits that you didn't know before.

2. Based on what you have learned today, what do you think our world would be like if trains hadn't been invented? Would things be alot more difficult, how would they be different do you think?

3. What are some of the major benefits of having trains in our world?

Trains, Trains, Trains! Answer Key

1. Answers may vary
2. Answers may vary

3. Answers along the lines of, it allows for quick, safe and easy travel for people. It helps transport all kinds of materials in a fast and effective manner. It is a reliable source of transportation for all things.