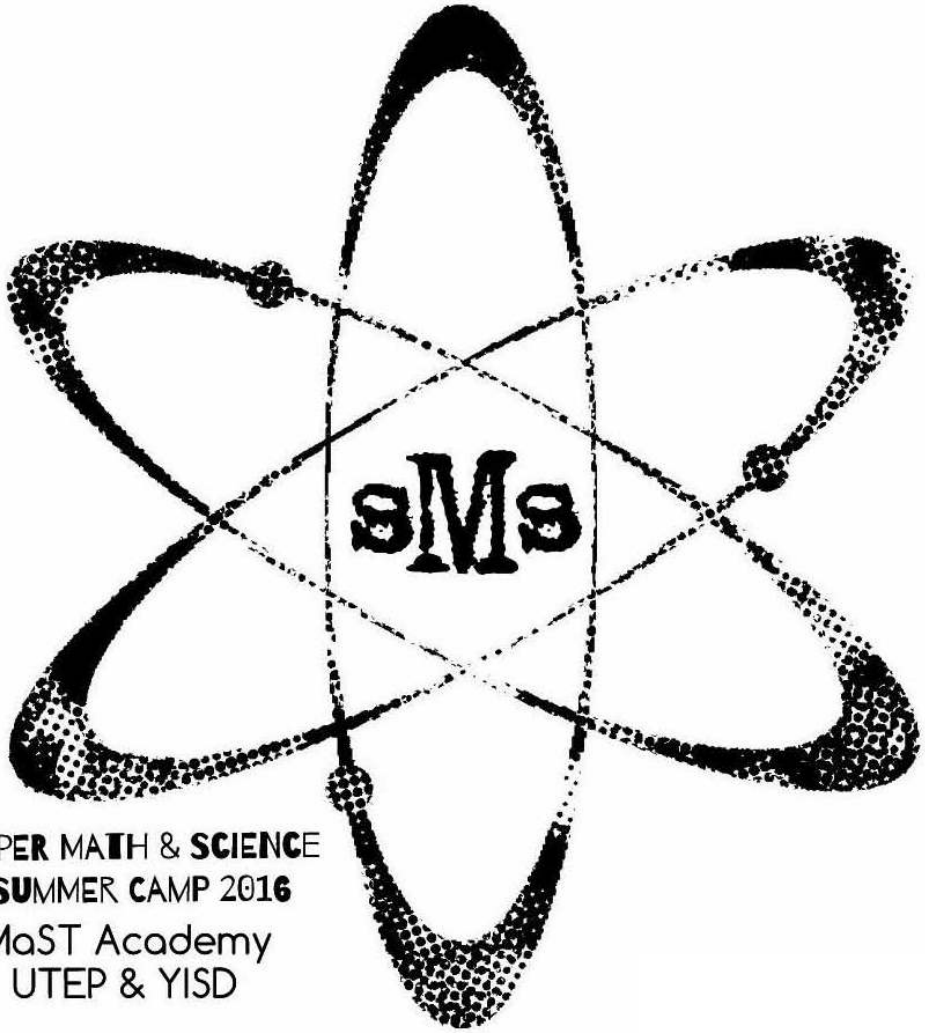


SUPER MATH & SCIENCE
SUMMER CAMP 2016
MaST Academy
UTEP & YISD

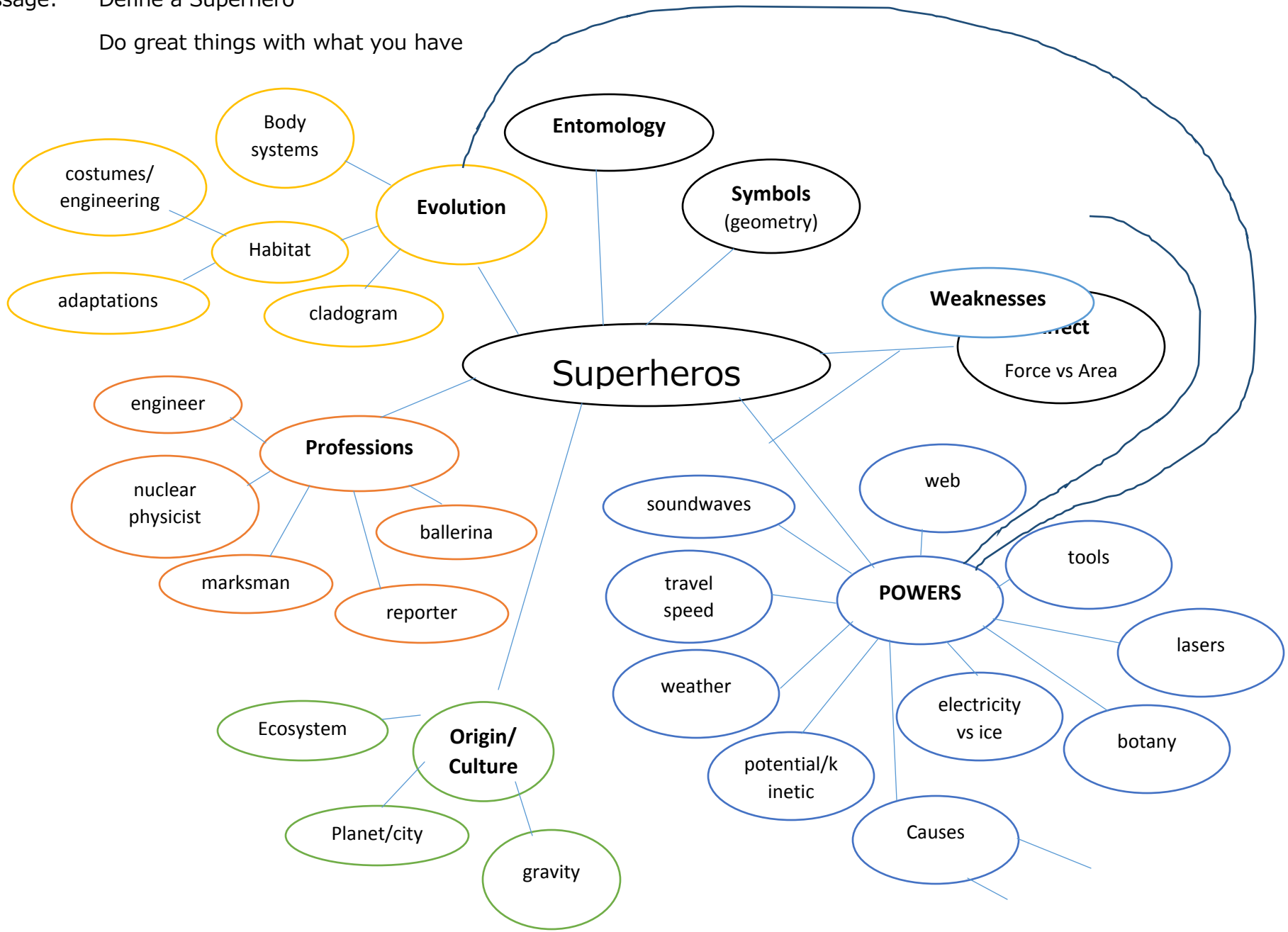
Table of Contents

	Monday-13th	Tuesday- 14th	Wednesday- 15th	Thursday- 16th
7:45-8:00	Students Arrive	Students Arrive	Students Arrive	Students Arrive
8:00-8:15	Introduce the camp	Superhero Tag TB	Foldable for Calculating Slope and Superhero Speed Lesson	Slope in Superhero Logo Lesson
8:15-8:30	School Rules, Class Rules	Superhero Organelles Poster Lesson		
8:30-8:45	Procedures			
8:45-9:00	Name Game Team Builder			
9:00-9:15				
9:15-9:30	Introduce Notebook	Shoe Pair-Up TB	Super Slope Frizbee Lesson (TB built in)	Get to know you BINGO TB
9:30-9:45	TB for Superhero Squads	Superhero Tools and Financial Responsibility Lesson		Investigating Newton's Laws with Stations Lesson
9:45-10:00	Create Squad Names			
10:00-10:15	Personal Skills + Share			
10:15-10:30	Personal Power Pros/Cons			Creating Superhero Costumes
10:30-10:45	Defining a Hero			
10:45-11:00	Wrap up, Journal (Hero Similarities)	Wrap up, Journal	Wrap up, Journal	Wrap up, Journal
11:00	Students Leave	Students Leave	Students Leave	Students Leave

	Monday- 20th	Tuesday- 21st	Wednesday- 22nd	Thursday- 23rd
7:45-8:00	Students Arrive	Students Arrive	Students Arrive	Students Arrive
8:00-8:15	Electrostatics Exploration and Foldable	Pick Up Cups TB	Beach Ball Toss Review TB	Student Choice TB
8:15-8:30		Superhero Storytelling Lesson	Investigating Gravity Lesson	Magnetism Lesson
8:30-8:45				
8:45-9:00				
9:00-9:15				Sound Bottles Songs TB
9:15-9:30	Balloon Can Race TB	Building Play-Doh City TB	Sound Bottles TB	Plate Tectonics Lesson
9:30-9:45	Mirror Laser Competition	City Damage Lesson	Ocean Tides Lesson	
9:45-10:00				
10:00-10:15				
10:15-10:30	Superhero Project Sidekick Super Nouns		Superhero Project Wrap up, create model	
10:30-10:45		Superhero Project Origin Story		Fairwell Teambuilder and Final Message
10:45-11:00	Wrap up, Journal: Bloo prompt.	Wrap up, Journal: Origin Story/Comic	Wrap up, Journal	Wrap up, Journal
11:00	Students Leave	Students Leave	Students Leave	Students Leave

Message: Define a Superhero

Do great things with what you have



Name:_____

Superhero Camp Assessment

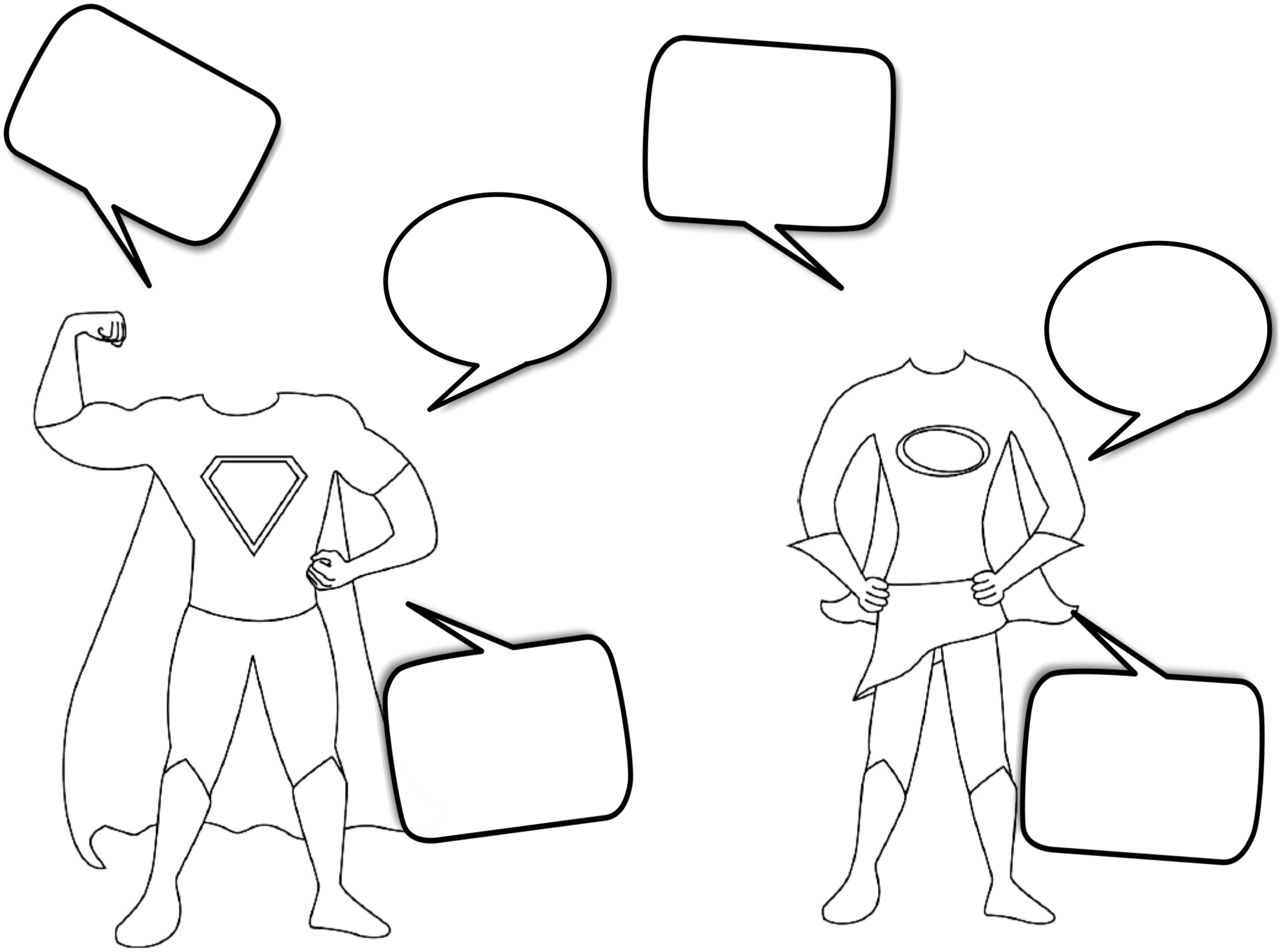
Please answer the following questions as complete as you can. Hulk! Smash!

1. Explain in your own words a definition for slope. How does it vary?

2. We encounter electric static almost every day. Give a scientific explanation of why/how static occurs.

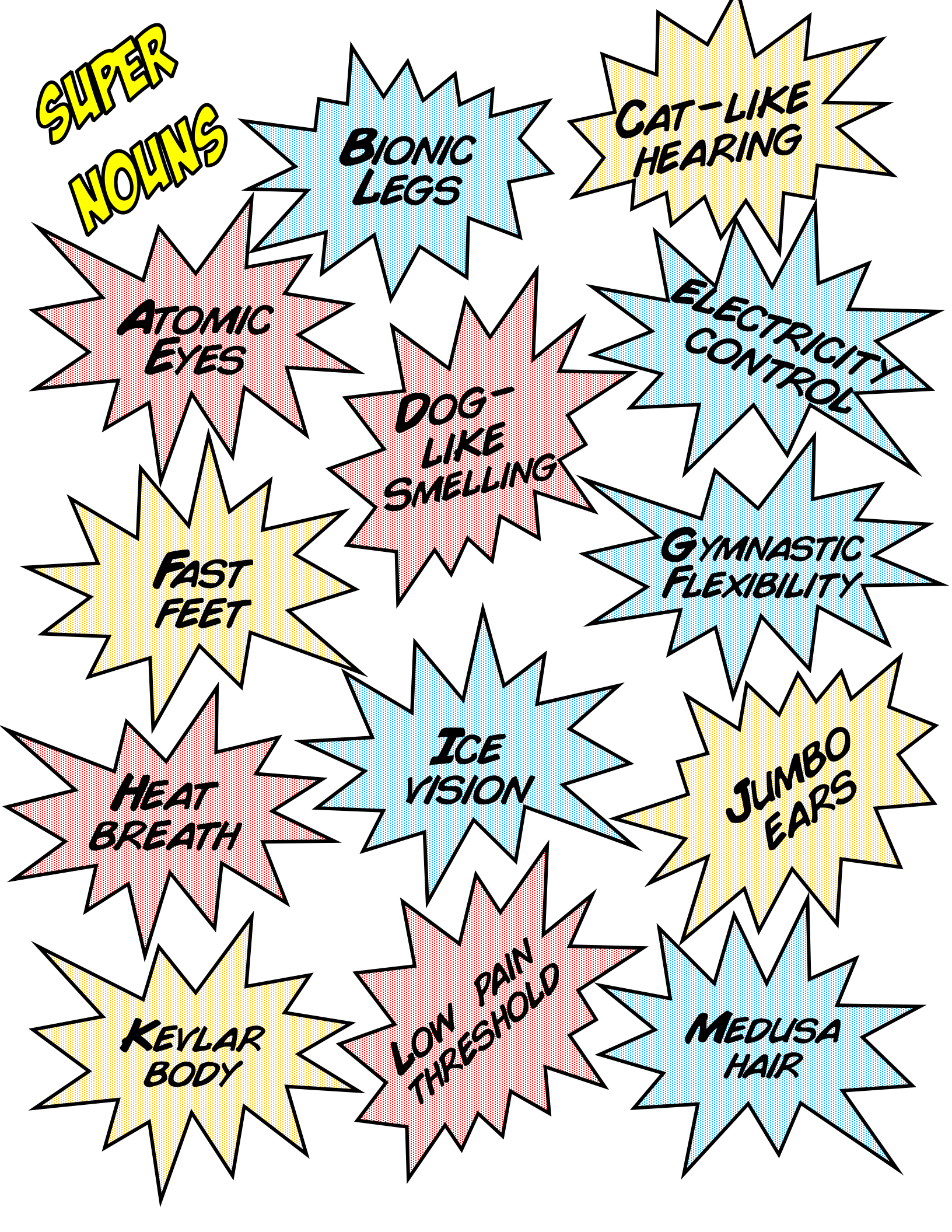
3. State Newton's third law, and give a superhero example of what it means.

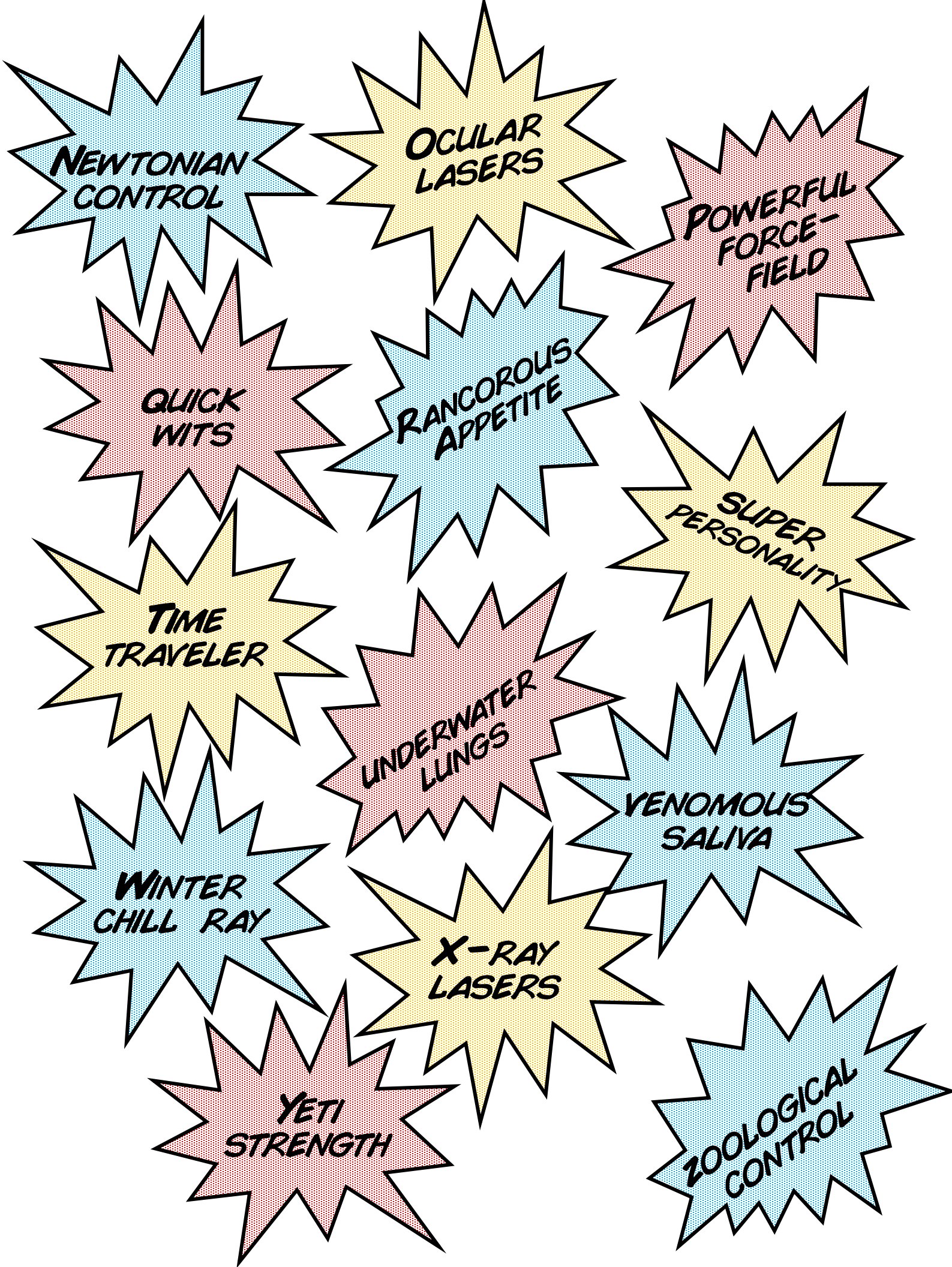
4. Have you seen or heard of tax? If so, how do you calculate it? If not, what do you think it is?



MY POWER: _____

MY POWER: _____


SUPER NOUNS
BIONIC LEGS
CAT-LIKE HEARING
ATOMIC EYES
ELECTRICITY CONTROL
DOG-LIKE SMELLING
FAST FEET
GYMNASTIC FLEXIBILITY
ICE VISION
HEAT BREATH
JUMBO EARS
KEVLAR BODY
LOW PAIN THRESHOLD
MEDUSA HAIR


NEWTONIAN CONTROL
OCULAR LASERS
POWERFUL FORCE-FIELD
QUICK WITS
RANCOROUS APPETITE
SUPER PERSONALITY
TIME TRAVELER
UNDERWATER LUNGS
VENOMOUS SALIVA
WINTER CHILL RAY
X-RAY LASERS
YETI STRENGTH
ZOOLOGICAL CONTROL

Superhero Project

DISCLAIMER: DESIGNED AS A TIME FILLER. ASSIGNMENTS CAN BE ALTERED/DELETED TO FIT SCHEDULES

-Create superhero squads (MON, 13th 10:15-10:30)

*Team builder: 5 corners thing.

When students arrive they write down 3 traits they think are most important in a superhero. On board as they walk in: "What are 3 traits/characteristics that you think a Superhero should have?"

During the name game, the teacher mentor will write down the top 5 and place in various locations around the room.

Students then go to the location they think is most important (ONLY 5 kids are allowed at each trait). That becomes their Superhero Squad.

-Create Superhero Squad name (MON, 13th 10:30-10:45)

*Students are instructed to use their initials/letters in their name to create the superhero squad name

*Students start identifying their personal abilities. List 3(-5) things you can contribute to the group, skills you have, personality traits and write them down on a notecard. Students should write their name on the card as well.

-Teachers and Mentor should model by listing several of their own personal abilities

*Students come up with superpower/superhero based off of one of their own REAL abilities- 2 benefits and 1 possible con of having that superpower utilizing the graphic organizer.

-Teacher can model using their own idea of a superpower.

-Defining a hero (MON, 13th 11:00-11:15)

1. Within superhero squad groups, identify personal heroes.
2. Share heroes with group and pick one person and their hero to share with class.
3. Each student lists personality traits that their personal hero has (group pick 2 to share), conduct a discussion: are superpowers necessary for a person to be a hero?

*Journal for Monday: Describe your hero, why, how you are similar to them, what you can do to be like them. Student can be provided with comic strips/superhero template to support their construction of ideas.

-Teacher can model an example if necessary.

-Creating Costumes (THUR, 10th 10:45-11:15)

- Create/color build themselves as a superhero.

-Templates of bodies, arms, legs, heads, masks, and capes are provided for students to cut out and construct the 3D hero. Support can be given to students who require (perhaps have several parts pre-made).

-Students are encouraged to be creative and decorate the character.

*Journal for Thursday: Ask students to reflect on the week and write the super favorite thing they learned, something they think they would have liked better, or what they think they will see on their field trip to UTEP on Friday.

-Inventing Sidekick (MON, 20th 11:00-11:15)

*Pass out "SUPER NOUNS" Poster.

*Instruct students that they will use their initials to pick the Superhero nouns that will be their sidekick's abilities.

*Utilize the Superhero template with speech bubbles to create their sidekick.

*Journal for Monday: Write 3-5 sentences describing the sidekick and name him/her. Students can also use comic strips to draw out a story with their sidekick.

-Creating Origin Story (TUE, 21st 11:00-11:15)

*Students are provided half sheet detailing the sections that their origin story should contain. Students will FIRST write out their simple ideas (informal writing encouraged).

-Teacher should model an origin story to show what is expected.

*Once details are written out, students can cut out the sections and use them to create the "pedestal" on which their Superhero will stand on.

*Journal for Tuesday: Use their origin story to write or draw out (with comic strips) their origin story.

-Creating background to pose superhero (WED, 22nd 10:45-11:15)

*Use template (foldable for project) to create a background for superhero

*Write index cards description for parents to read

*Include "who is your hero?" writing assignment, list of personal abilities, and sidekick with the presentation.

JOBS (SUPERPOWERS)

1. *Resource monitor* (supplies, asks questions, organizes clean up)
2. *Recorder/Reporter* (gives updates on progress, makes sure everyone is recording answers, does group reports)
3. *Team Captain* (encourager and "praiser", follows procedures, finds compromise, substitutes for absent person)
4. *Facilitator* (Makes sure everyone understands task, reads directions out loud to group, organizes to complete task)
5. *Checker* (manages time to stay on time, makes sure team is reaching its goals)

Name: Gallery Walk Finding Slope in a Super Hero's Logo by Caludia Torres

Date: 05/01/2016

Subject area / course / grade level: 8th grade math, Algebra1

Duration: 75 min

Materials/resources:

- Grid Poster Paper
- Secret Logo Coordinates
- Graphic Organizer
- Pencil
- Rulers
- Crayons

TEKS: What TEKS # & content will you address? Write the standard here.

A.3(C) Graph linear functions on the coordinate plane and identify key features, including x-intercept, y-intercept, zeroes and slope, in mathematical and real-world problems.

A. 3(B) Calculate the rate of change of a linear function represented tabularly, graphically, or algebraically in context of mathematical and real-world problems.

Lesson objective(s):

Students will demonstrate their understanding of positive slope, negative slope, a slope of zero,

Lesson Hook:

Students will play a game "Super Slope Says"

Tell students to pretend they are looking at the graph as they make their motions. While you judge them in front of the room, their positive slopes look like negative slopes and vice versa.

Super Slope Says...

Rules:

- If Super Slope doesn't say it, don't do it
- If you flinch, you're out
- If you hesitate, you're out
- Last one standing wins!!

Lesson activities: How will you explain the topic? What activity will you use to have students learn the topic and apply their new knowledge? Include timing if appropriate.

1. Students will be split into teams of 4 and they will be given the coordinates of points to graph a superhero symbol in a big grid poster paper. Then the posters will be posted on the walls.
2. Teams will have a gallery walk and identify some lines with different directions of the slopes and record the coordinates in a graphing organizer.
3. Teacher introduce the formula to find slope and give some examples to the students
4. Students find the slope for the coordinates already found in the graphing organizer.
5. Students glue their graphic organizer in the composition book.
6. If time is left, students color their projects.

Coordinate Plane Secret Logo

Directions:

Holding the paper horizontally, label your x-axis from -17 to 16 and your y-axis from -12 to 13.

Plot the points on the graph. As you plot them, connect the points with line segments using a ruler

START	(15, 2)	(9, 4)	(-5, 6)
(-12, -7)	(15, -3)	(7, 5)	(-9, 5)
(-13, -6)	(13, -7)	(7, -3)	(-12, 0)
(-15, -2)	(11, -10)	(3, -1)	(-12, -2)
(-15, 0)	(8, -11)	(3, 6)	(-11, -4)
(-14, 3)	(1, -12)	(-3, -3)	(-10, -5)
(-12, 6)	(-2, -12)	(3, -3)	(-12, -7)
(-10, 8)	(-7, -10)	(3, -2)	STOP
(-8, 9)	(-5, -8)	(7, -4)	
(0, 9)	(-2, -9)	(3, -7)	START
(2, 12)	(5, -9)	(3, -6)	(7, -5)
(7, 12)	(9, -8)	(-5, -6)	(7, -8)
(7, 8)	(11, -5)	(-9, -12)	(3, -8)
(11, 6)	(12, -3	(-14, -12)	(7, -5)
(14, 4)	(12, 1)	(-2, 6)	STOP

Coordinate Plane Secret Logo

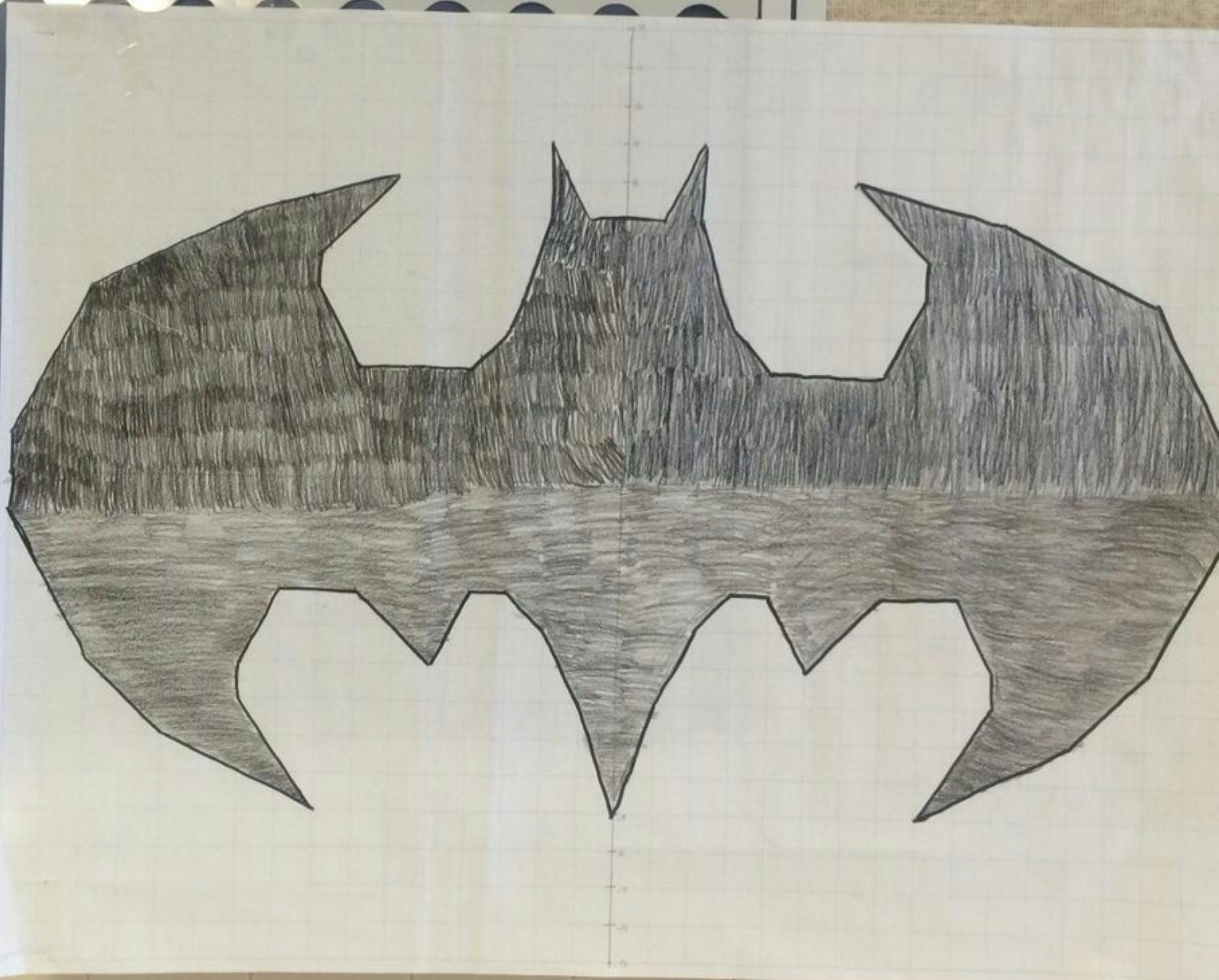
Directions:

Holding the paper horizontally, label your x-axis from -17 to 16 and your y-axis from -12 to 13.

Plot the points on the graph. As you plot them, connect the points with line segments using a ruler

START

(1, 7)	(14, -5)	(-1, -6)	(-16, 0)
(2, 9)	(12, -7)	(-2, -4)	(-16, 1)
(2, 7)	(8, -9)	(-3, -3)	(-14, 5)
(3, 4)	(9, -8)	(-4, -3)	(-10, 7)
(4, 3)	(10, -6)	(-5, -5)	(-6, 8)
(7, 3)	(10, -5)	(-7, -3)	(-8, 6)
(8, 5)	(9, -3)	(-9, -3)	(-8, 5)
(8, 6)	(7, -3)	(-10, -5)	(-7, 3)
(6, 8)	(5, -5)	(-10, -6)	(-4, 3)
(10, 7)	(4, -3)	(-9, -8)	(-3, 4)
(14, 5)	(3, -3)	(-8, -9)	(-2, 7)
(16, 1)	(2, -4)	(-12, -7)	(-2, 9)
(16, 0)	(1, -6)	(-14, -5)	(-1, 7)
(16, -1)	(0, -9)	(-16, -1)	(1, 7)
			STOP



Coordinate Plane Secret Logo

Directions:

Holding the paper horizontally, label your x-axis from -16 to 17 and your y-axis from -12 to 13.

Plot the points on the graph. As you plot them, connect the points with line segments using a ruler

START

(1, 10)

(4, 9)

(7, 7)

(9, 4)

(10, 1)

(10, -1)

(9, -4)

(7, -7)

(4, -9)

(1, -10)

(-1, -10)

(-4, -9)

(-7, -7)

(-9, -4)

(-10, -1)

(-10, 1)

(-9, 4)

(-7, 7)

(-4, 9)

(-1, 10)

(1, 10)

STOP

START

(1, 11)

(6, 9)

(9, 6)

(11, 1)

(11, -1)

(9, -6)

(6, -9)

(1, -11)

(-1, -11)

(-6, -9)

(-9, -6)

(-11, -1)

(-11, 1)

(-9, 6)

(-6, 9)

(-1, 11)

(1, 11)

STOP

START

(-11, -12)

(-3, -2)

(-8, -2)

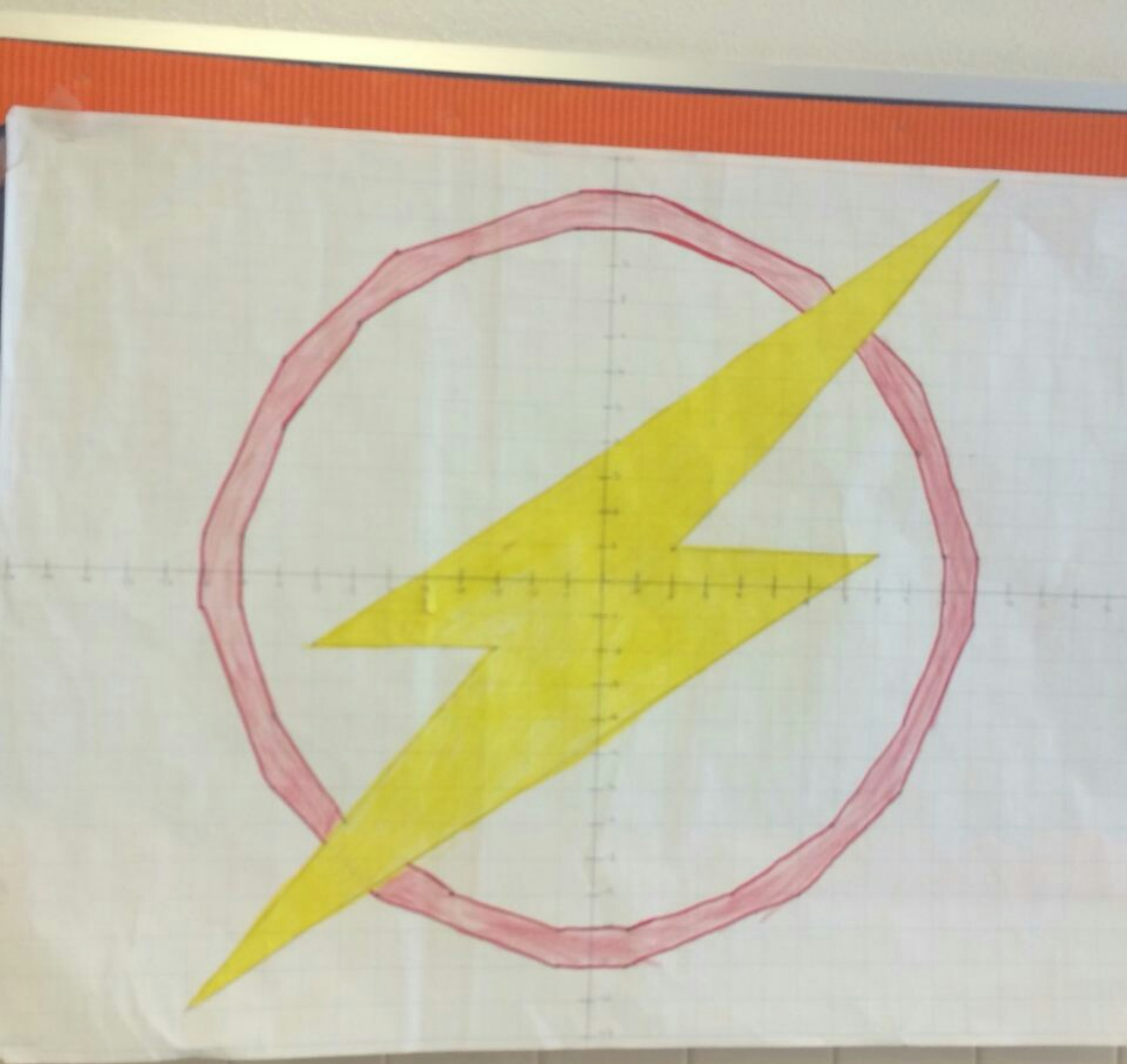
(11, 12)

(2, 1)

(8, 1)

(-11, -12)

STOP



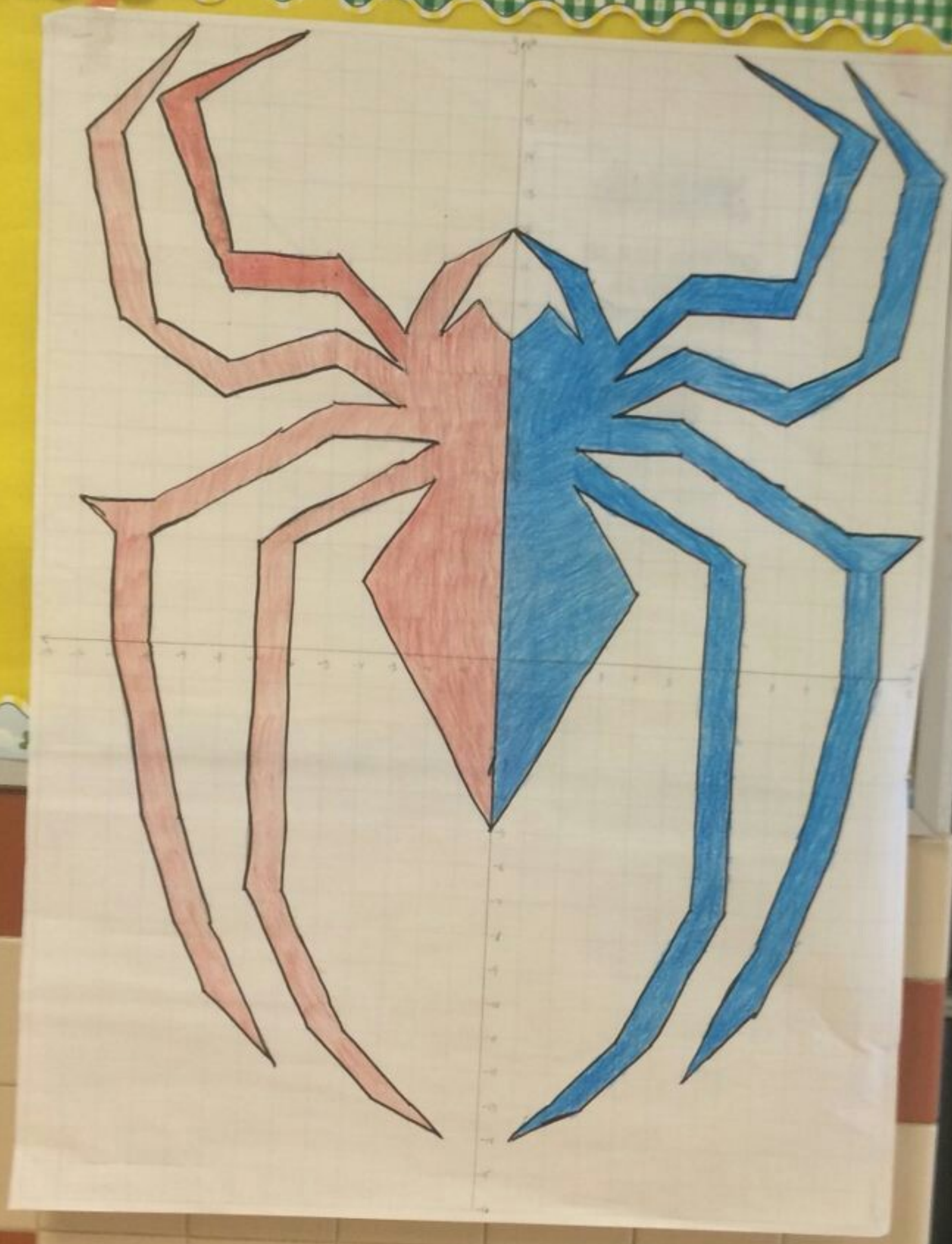
Coordinate Plane Secret Logo

Directions:

Holding the paper vertically, label your x-axis from -12 to 13 and your y-axis from -16 to 17.

Plot the points on the graph. As you plot them, connect the points with line segments using a ruler

START	(12, 14)	(7, -7)	(-7, 3)	(-9, 17)
(0, 9)	(11, 9)	(5, -11)	(-2, 6)	(-11, 14)
(1, 10)	(8, 7)	(3, -13)	(-5, 6)	(-10, 9)
(2, 9)	(5, 8)	(1, -14)	(-10, 3)	(-8, 8)
(1, 11)	(3, 7)	(2, -13)	(-10, 0)	(-5, 9)
(0, 12)	(5, 7)	(4, -11)	(-9, 5)	(-3, 8)
(2, 11)	(10, 4)	(6, -7)	(-8, -8)	(-5, 10)
(3, 9)	(12, 4)	(6, 3)	(-6, 12)	(-8, 10)
(5, 11)	(11, 3)	(2, 5)	(-8, -10)	(-10, 15)
(8, 11)	(11, 0)	(4, 2)	(-9, -8)	(-6, 17)
(9, 15)	(10, -5)	(0, -5)	(-10, -5)	(-9, 15)
(6, 17)	(9, -8)	(-4, 2)	(-11, 0)	(-8, 11)
(10, 15)	(8, -10)	(-2, 5)	(-11, 3)	(-5, 11)
(8, 10)	(6, -12)	(-6, 3)	(-12, 4)	(-3, 9)
(5, 10)	(8, -8)	(-6, -7)	(-10, 4)	(-2, 11)
(3, 8)	(9, -5)	(-4, -11)	(-5, 7)	(0, 12)
(5, 9)	(10, 0)	(-2, -13)	(-3, 7)	(-1, 11)
(8, 8)	(10, 3)	(-1, -14)	(-5, 8)	(-2, 9)
(10, 9)	(5, 6)	(3, -13)	(-8, 7)	(-1, 10)
(11, 14)	(2, 6)	(-5, -11)	(-11, 9)	(0, 9)
(9, 17)	(7, 3)	(-7, -7)	(-12, 14)	STOP



Coordinate Plane Secret Logo

Directions:

Holding the paper horizontally, label your x-axis from -17 to 16 and your y-axis from -12 to 13.

Plot the points on the graph. As you plot them, connect the points with line segments using a ruler

START
(-10, 8)
(10, 8)
(15, 3)
(0, -12)
(-15, 3)
(-10, 8)
STOP

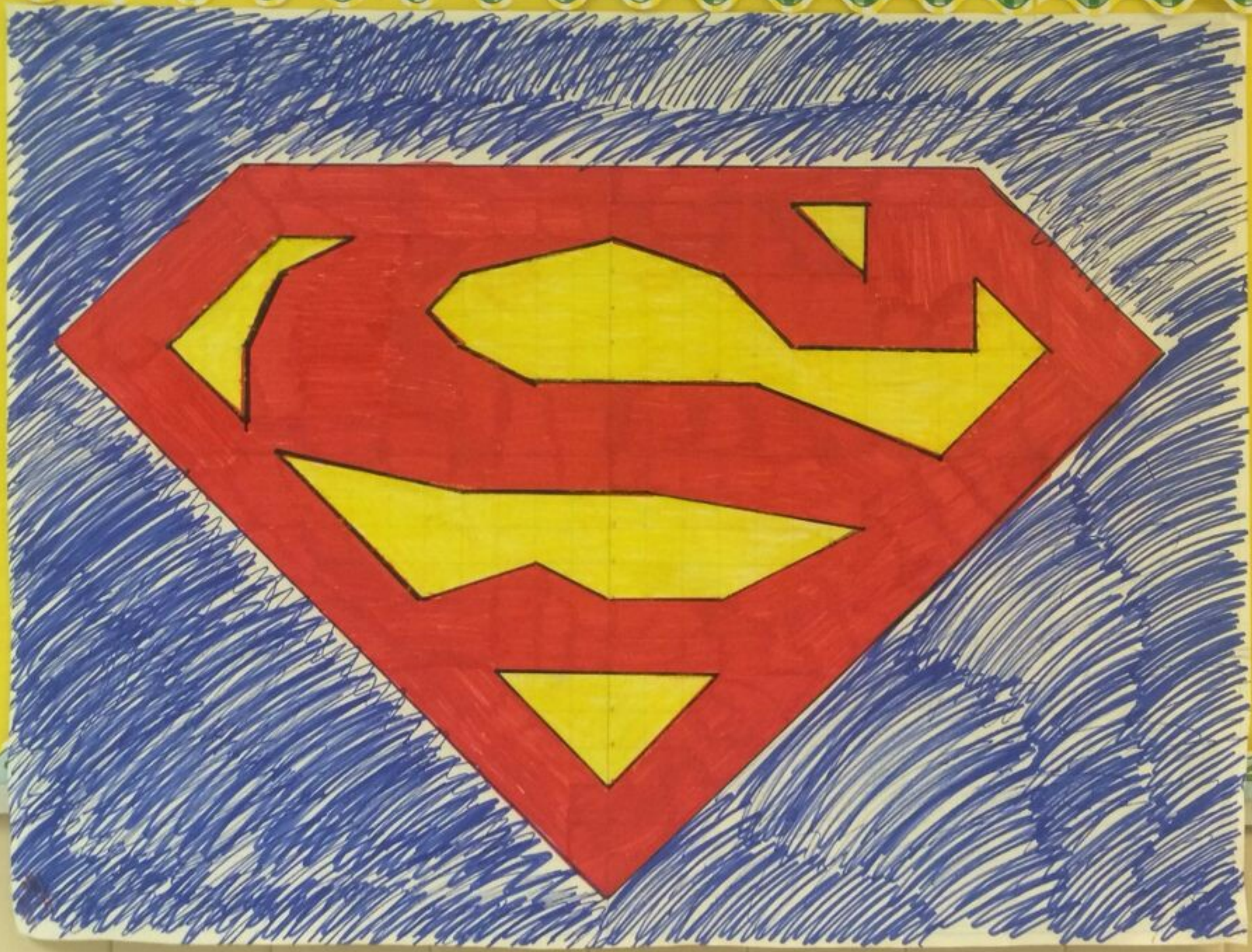
START
(0, -9)
(-3, -6)
(3, -6)
(0, -9)
STOP

START
(0, -4)
(-2, -3)
(-5, -4)
(-9, 0)
(-4, -1)
(1, -1)
(7, -2)
(3, -4)
(0, -4)
STOP

START
(-2, 2)
(-4, 3)
(-5, 4)
(-4, 5)
(0, 6)
(3, 5)
(5, 3)
(10, 3)
(10, 5)
(12, 3)
(9, 0)
(4, 2)
(-2, 2)
STOP

START
(7, 5)
(7, 7)
(5, 7)
(7, 5)
STOP

START
(-10, 1)
(-12, 3)
(-9, 6)
(-7, 6)
(-9, 5)
(-10, 3)
(-10, 1)
STOP



Coordinate Plane Secret Picture

Directions:

Holding the paper horizontally, label your x-axis from -17 to 16 and your y-axis from -12 to 13.

Plot the points on the graph. As you plot them, connect the points with line segments using a ruler

START
(-16, 7)
(-4, 7)
(-2, 2)
(0, 7)
(2, 2)
(4, 7)
(16, 7)
(16, 5)
(6, 5)
(2, -4)
(0, 1)
(-2, -4)
(-6, 5)
(-16, 5)
(-16, 7)
STOP

START
(-15, 5)
(-15, 3)
(-5, 3)
STOP

START
(15, 5)
(15, 3)
(5, 3)
STOP

START
(-14, 3)
(-13, 1)
(-7, 1)
(-6, 0)
(-2, -9)
(0, -4)
(2, -9)
(6, 0)
(7, 1)
(13, 1)
(14, 2)
STOP

NAME_____

Observe the different logos and find the start and end point of a line with a positive, negative, zero or undefined slope and write down the ordered pairs for each point.

POSITIVE SLOPE	Logo:_____
(,), (,)	Quadrant: _____

POSITIVE SLOPE	Logo:_____
(,), (,)	Quadrant: _____

NEGATIVE SLOPE	Logo:_____
(,), (,)	Quadrant: _____

NEGATIVE SLOPE	Logo:_____
(,), (,)	Quadrant: _____

ZERO SLOPE	Logo:_____
(,), (,)	Quadrant: _____

UNDEFINED SLOPE	Logo:_____
(,), (,)	Quadrant: _____

Name: Static Electricity – Exploring Stations by Blanca Estrada

Date: 4/28/2016

Subject area / course / grade level: 8th Grade Science

Duration: 35-45 minutes

Materials/resources:

1. **Station #1: Repelling balloons**
   i. Two balloons
   ii. String
2. **Station #2: Separating Salt and Pepper**
   i. Balloon
   ii. Salt
   iii. Pepper
3. **Station #3: The Flying Bag**
   i. Plastic bag
   ii. Scissors
   iii. Balloon
4. **Station #4: Creating Electricity**
   i. Small fluorescent light
   ii. Comb
5. **Station #5: Static Electricity and Water**
   i. Stream of water- if not, create with a suspended cup with a small hole and a bowl at the bottom.
   ii. Small pipe piece
6. **Station #6: Electromagnetism and Static Electricity**
   i. Old Television
   ii. Foil
   iii. Positive and Negative cables
   iv. Two empty aluminum cans
   v. Plastic pen
   vi. String
   vii. Aluminum cap
   viii. Power

TEKS: What TEKS # & content will you address? Write the standard here.

Science 8th Grade: (5) Matter and energy. The student knows that matter is composed of atoms and has chemical and physical properties. The student is expected to: (A) describe the structure of atoms, including the masses, electrical charges, and locations, of protons and neutrons in the nucleus and electrons in the electron cloud.

Lesson objective(s): In this science experiment we will explore static electricity and electromagnetism. We will learn about positive and negative charges as we seek to understand atoms and electrons. We will also explore which materials conduct electricity or which repel against it.

Lesson Hook: For the lesson introduction, we will discuss why hair is attracted to the balloon when we rub the balloon against our heads. Then, students will be given a small comic explaining what

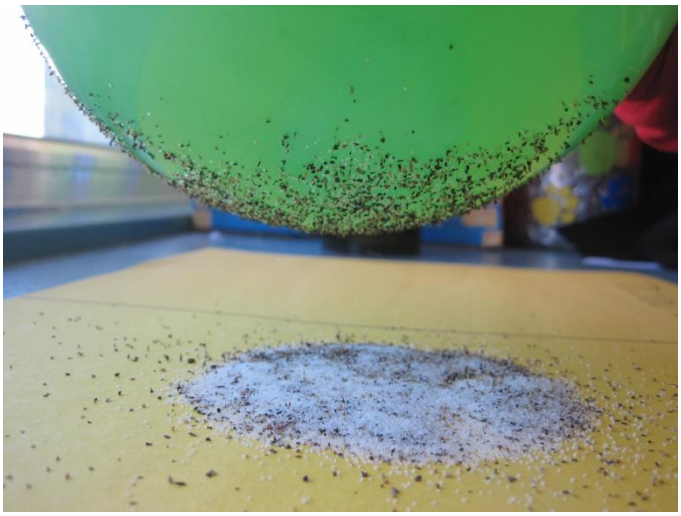
happens scientifically with static electricity. Students will also be given a small foldable with questions to answer as they explore the stations that will demonstrate different static situations.

Lesson activities: How will you explain the topic? What activity will you use to have students learn the topic and apply their new knowledge? Include timing if appropriate.

For this lesson, Students will be separated into groups. Each group will explore one station at a time for 5 minutes each. Each station will have instructions and questions students should ask themselves.

Station #1: Repelling Balloons

Station #2: Separating Salt and Pepper

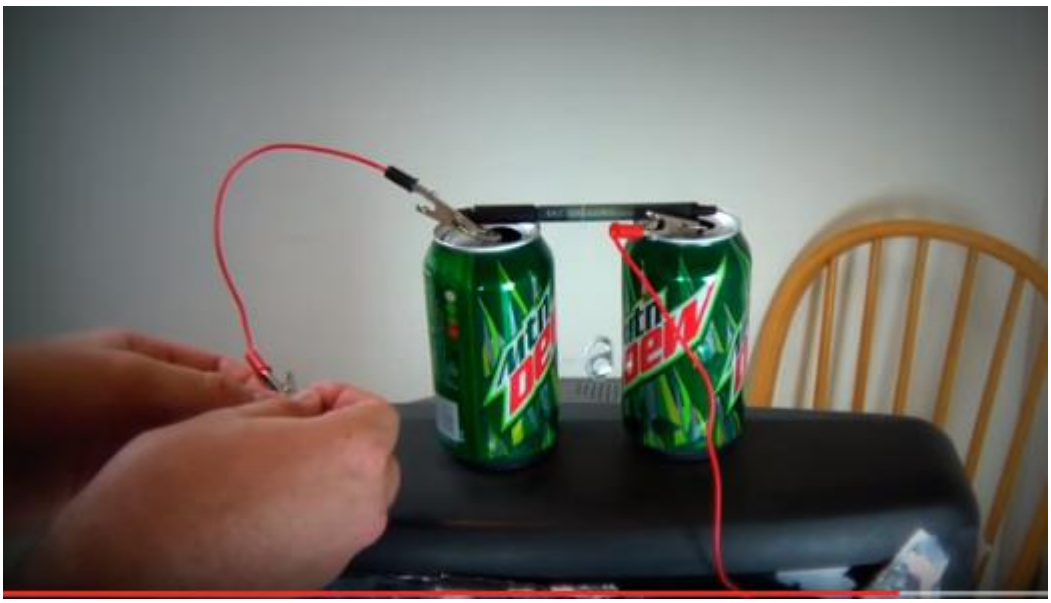


Station #3: The Flying Bag

Station #4: Creating Electricity

Station #5: Static Electricity and Water

Station #6: Electromagnetism and Static Electricity



Station #1: Illustrate the atom behavior in the ***Repelling Balloons***. Use the first square to show BEFORE the balloons have been charged, and the second AFTER.

Station #2: ***Salt, Pepper and Static***. How did the salt and pepper react? Which seemed to react the most and why do you think?

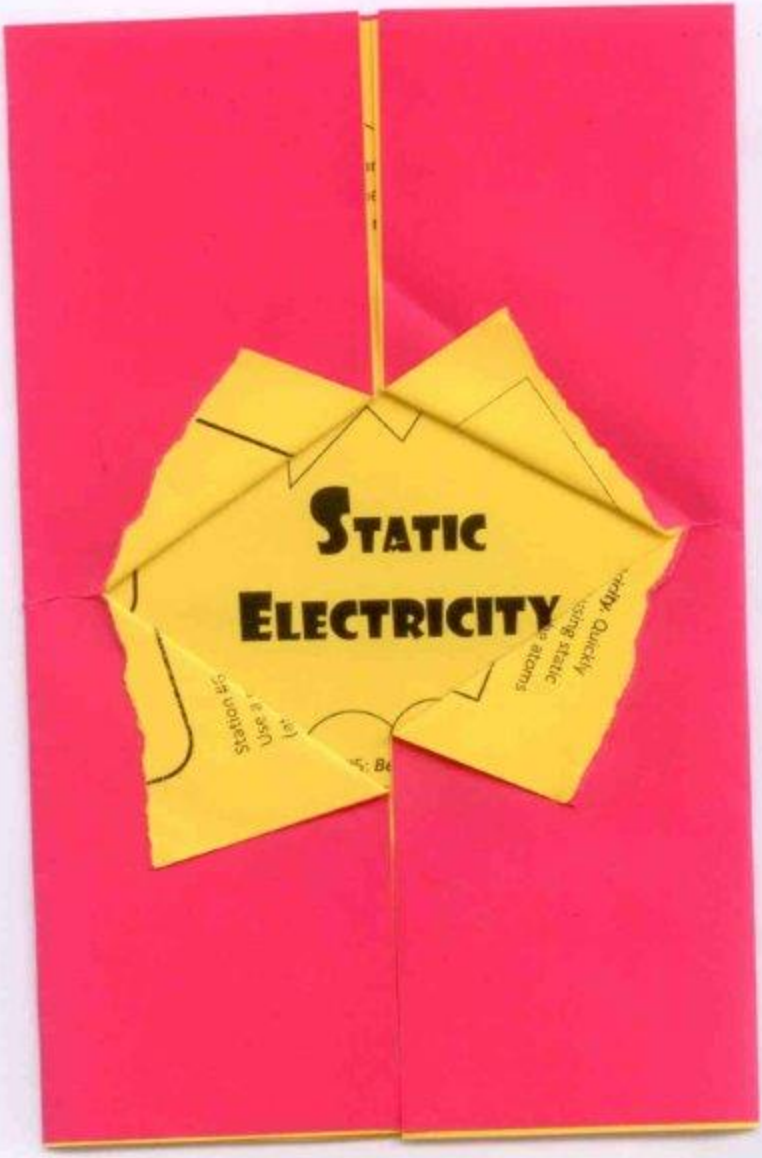
Station #3: ***The Flying Bag.*** What is causing the plastic to levitate? Is this an example of an Attraction or Repelling charge?

Static Electricity

Station #4:***Creating Electricity.*** Quickly illustrate the creation of light using static electricity! (Make sure you show the atoms behavior)

Station #5: ***Bending Water***. REPEAT procedures using the foam pipe and then using a balloon. How do the different materials affect the water's reaction? Why do you think that is?

Station #6: ***Electromagnetism and Static Electricity.*** Use a system of arrows to show where the static begins (at Old TV) and where it has to travel through in order to reach it's target! (the Can Cap).


STATIC
ELECTRICITY

Name: Rice Krispies and Static Electricity by Blanca Estrada

Date: 4/28/2016

Subject area / course / grade level: 8th Grade Math and Science

Duration: 30 minutes (Not including Lesson Hook)

Materials/resources:

- Rice Krispies
- Large Balloons
- Wool
- Table and Graphing paper

TEKS: What TEKS # & content will you address? Write the standard here.

Science 8th Grade: (5) Matter and energy. The student knows that matter is composed of atoms and has chemical and physical properties. The student is expected to: (A) describe the structure of atoms, including the masses, electrical charges, and locations, of protons and neutrons in the nucleus and electrons in the electron cloud.

Math 8th Grade: (11) Measurement and data. The student applies mathematical process standards to use statistical procedures to describe data. The student is expected to: (A) construct a scatterplot and describe the observed data to address questions of association such as linear, non-linear, and no association between bivariate data.

Lesson objective(s): In this science experiment we will explore static electricity. We will learn about positive and negative charges as we seek to understand atoms and electrons.

Lesson Hook: Students will first explore six different stations that will demonstrate various static electricity situations and other experiments revolving around electricity. Before they go off to their stations, students will be given a small foldable with a few questions that they will answer following their explorations. These stations will allow them to see how static and electricity works using a variety of household items. Stations should take between about five minutes each for a total of 30 minutes. (Students will be in groups of 4 or 5). (Stations and materials for these specified in another page)

Lesson activities: How will you explain the topic? What activity will you use to have students learn the topic and apply their new knowledge? Include timing if appropriate.

For this lesson, Students will remain in groups. Each group will have one cup of rice krispies, a few balloons, a piece of wool, notepaper and graphing paper.

- Students will spread the cereal on their desks or table.
- One student will stroke the balloon only once using the wool and will then pass the balloon over the rice krispies.
- Another student will count the amount of rice krispies that got stuck to the balloon, while the last student records the information in their table.

- This process will be repeated by adding one more stroke each time, until they reach a total of 15 strokes.
- The collected information will be arranged in a scatterplot and students will be asked to make a report to see if there is correlation between the number of strokes and the static charge on the balloon. They should also observe that the balloon can only be charged up to a certain point- it will not end up collecting ALL of the rice krispies at the end.

Name: Creating Lightning by Blanca Estrada

Date: 4/28/2016

Subject area / course / grade level: 8th Grade Math and Science

Duration: 30-45 minutes

Materials/resources:

- Worksheet
- Balloons
- Spoons
- Foil Plate
- Scissors
- Tape
- Styrofoam tray
- Wool
- Dark Classroom

TEKS: What TEKS # & content will you address? Write the standard here.

Science 8th Grade: (5) Matter and energy. The student knows that matter is composed of atoms and has chemical and physical properties. The student is expected to: (A) describe the structure of atoms, including the masses, electrical charges, and locations, of protons and neutrons in the nucleus and electrons in the electron cloud.

Math 8th Grade: (5) Proportionality. The student applies mathematical process standards to use proportional and non-proportional relationships to develop foundational concepts of functions. (E) solve problems involving direct variation. (F) distinguish between proportional and non-proportional situations.

Lesson objective(s): In this activity, we will first introduce some facts about lightning and have the students explore how lightning relates to time and distance by answering a few mathematical questions. We will also create our own lightning.

Lesson Hook: Students will observe as we create a lightning spark using a balloon and a spoon.

Lesson activities: How will you explain the topic? What activity will you use to have students learn the topic and apply their new knowledge? Include timing if appropriate.

Students will use proportion to calculate how far away thunder is occurring in miles by counting how many seconds lightning and thunder are apart. Then they will use a calculator to calculate how many lightning strikes happen per second in a day.

After they get an idea of how lightning works mathematically, students will then be able to create their own lightning using a foil plate and Styrofoam.

1. Cut a piece off one corner of the Styrofoam tray and bend the long piece. Then tape it to the foil

plate to create a handle.

2. Rub the Styrofoam tray on your hair really fast. Place the tray upside down on the desk or table.
3. Pick up the tin plate using the handle and drop it over the Styrofoam. (Do not touch the Styrofoam)
4. Turn off all the lights and slowly touch the tin plate with your finger. This should create a spark. You may also hold the tin plate by the handle and lift it slowly and touch it with your finger to create another spark. If the class is really quiet, you should be able to also hear the spark.
5. Whenever charge is gone, just rub the Styrofoam tray on your head again and start over.

THE SCIENCE OF LIGHTNING: Lightning Strikes: Time and Distance

During every minute of every day, roughly 1,800 thunderstorms cause lightning strikes somewhere on Earth. Though the chances of being struck by lightning are estimated at 1 in 600,000, these huge electrical sparks are one of the leading causes of weather-related deaths in the United States each year. Did you know that we can calculate how far away lightning is?

Here are some interesting facts about lightning:

- Thunder and lightning actually occur at the same time!
- Since light travels faster than sound, the light reaches you at once. Sound takes some time to reach you. Usually you see the lightning stroke before you hear the thunder.
- As soon as you see lightning, count the seconds you hear the thunder. If there are 5 seconds, the lightning was about a mile away. (Sound travels about 1,000 feet a second.)
- If you see lightning and hear the thunder at just about the same moment, watch out! The storm is right above you, only a few hundred feet away.

Suppose you see a bolt of lightning and count 2 seconds between your sighting and when you hear the clap of thunder. How close would you approximate the lightning was from you location? _____

There are more than 8,000,000 lightning strikes each day.

1. How many lightning strikes would there be per second? _____

Show your work:

Name: Laser Powers by Blanca Estrada

Date: 4/28/2016

Subject area / course / grade level: 8th Grade Math and Science

Duration: 30 minutes

Materials/resources:

- Laser pointer
- 6 mirrors
- Protractor
- Graph paper

TEKS: What TEKS # & content will you address? Write the standard here.

Science 8th Grade: (b.2) (B) design and implement comparative and experimental investigations by making observations, asking well-defined questions, formulating testable hypotheses, and using appropriate equipment and technology;

Math 8th Grade: (8.1) (C) select tools, including real objects, manipulatives, paper and pencil, and technology as appropriate, and techniques, including mental math, estimation, and number sense as appropriate, to solve problems;

Lesson objective(s): In this science experiment we will explore the Law of Reflection.

Lesson Hook: Students will first explore using lasers and mirrors and see how the laser light bounces off of the mirror.

Lesson activities: How will you explain the topic? What activity will you use to have students learn the topic and apply their new knowledge? Include timing if appropriate.

Students will be placed in groups of 4. Each group will be at a table with 6 mirrors, a target and a laser pointer.

- Students will have a path of graph paper on the table. They will need to arrange the mirrors so that the light of the laser (which will be set in a fixed spot) hits the mirror and bounces off to the next one.
- Using the protractor, they will find the angle of the laser beam and calculate the angle of reflection and set move the mirrors so that it hits the final target.

Name: Aftermath City by Salvador Navar

Date: 04-29-16

Subject area / course / grade level: 8th Grade Level

Duration: 1 Hour

Materials/resources:

- Play-Doh
- Rulers
- Balls(tennis balls, baseballs)
- Paper

TEKS: What TEKS # & content will you address? Write the standard here.

Math 8Th Grade

(7)B. Use previous knowledge of surface area to make connections to the formulas for lateral and total surface area and determine solutions for problems involving rectangular prims, triangular prisms, and cylinders.

Math 8Th Grade

(12)B. Calculate the total cost of repaying a loan, including credit cards and easy access loans, under various rates of interest and over different periods using an online calculator.

Lesson objective(s):

The students will learn how distance plays a factor on playdoh; they will also use geometric buildings to construct a city.

Lesson Hook:

Showing students how the place where they fight looks afterwards, which sometimes consist anywhere from broken windows to cities torn apart.

Lesson activities: How will you explain the topic? What activity will you use to have students learn the topic and apply their new knowledge? Include timing if appropriate.

Students will be shown aftermaths from superhero battles, looking at the terrain and how buildings were completely destroyed. Students will be set into groups and they will work together to build a city. Using playdoh they will come together with rectangular prisms and build a city. They will be allowed only ten minutes to build their buildings. Each student will construct two rectangular prisms, and measure the height of their buildings. They will measure their buildings height with a ruler, once it's completed. The buildings would be set a value through their height in centimeters. Once they are done they will drop tennis balls/baseballs with 5 impacts to the city. Then they will see how much the city was affected by the drops. After the destruction they will analyze how much need to be repaired, according to the new height.

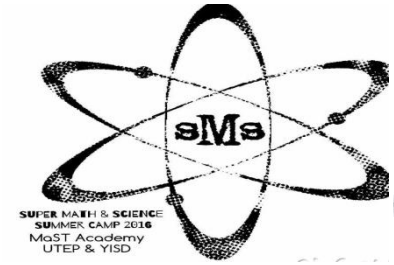
YouTube Links:

https://www.youtube.com/watch?v=dj335fMQemE

https://www.youtube.com/watch?v=61HO3D3TdPM

https://www.youtube.com/watch?v=VWuJBoq1bFo

Superhero Camp



7873 7437 6226 7016

VALID FROM 06/16 EXPIRES END 06/16

MR/MRS

012345 SORT CODE 01234567 ACCOUNT NUMBER

SECURE

THE COST OF BEING BATMAN

- Custom Graphite Cowl $1,000,000
- Retinal Projection System $10,000
- Carbon Fibre Reinforcements $1,150
- Kevlar Nomex Body Armour $3,000
- Kevlar Nomex Elbow Pads $150
- Kevlar Nomex Groin Armour $1,000
- Forearm Blades $1,000
- Kevlar Nomex Gloves $150
- Memory Cloth Polymer Cape $40,000
- Kevlar Nomex Knee Pads $150
- Ultrasonic Bat Attractor $1,000
- Kevlar Nomex Custom Boots $1,000

VEHICLES

BATMAN'S VEHICLES COST A TOTAL OF ALMOST $80,000,000

The Tumbler
$18,000,000

The tumbler was developed for Wayne Enterprises Applied Sciences Division as a military bridging vehicle. It boasts stealth, jet engine, self-destruct, armour plating, front mounted machine guns, remote control system, GPS & Batpod escape vehicle - all for just $18 million.

The Batpod
$1,500,000

The Batpod acts as an escape vehicle from the Tumbler when Batman initiates its self-destruct sequence in the Dark Knight. Its 20" wheels form the front wheels of the Tumbler. The Batpod is steered by shoulder movements, rather than by hand, and the rider's forearms are protected by shields - not bad for $1.5 million.

The Bat
$60,000,000

Powered by two large propellers on either side of its undercarriage that create a vortex of air to lift the vehicle off the ground. The closest thing to a real life Bat Wing is the US Marines V-22 Osprey - A tilt rotor aircraft with the functions of a plane & helicopter

RESIDENCE

WAYNE MANOR'S RUNNING COSTS - $37,000 PER YEAR

WAYNE MANOR & THE BAT CAVE

Following the destruction of Wayne Manor & the Bat Cave in the Dark Knight, the Wayne Estate was re-built at an estimated cost of

$600,000,000

ALFRED -

ROLES & SALARY PER YEAR...
Butler - $80,000
Estate Manager - $150,000

PREVIOUS ROLES...
Carer for young Bruce Wayne
$55,000

GADGETS

BATMAN'S HUGE ARSENAL OF GADGETS COSTS $213,610

$5,000 - $50,000

- TPLS Grappling Hook Launcher - $50,000
- Laser Microphone - $50,000
- Portable Spectrometer - $30,000
- Thermal Camera - $15,000
- Hand-held Grenade Launcher - $6,000
- Night-Vision Monocular - $5,000

TOTAL WEAPONS COST OVER $10,000

$100 - $1,000

- Batarang Throwing Stars x3 - $1,000
- Exploding Batarang x3- $1,000
- Remote Detonating Batarang x3- $1,000
- Long Range Microphone - $1,000
- Grenade (Mini) x3 - $600
- Tear Gas Grenade x3 - $600
- GPS Tracking Device- $500
- Automatic Lock Pick - $500
- Periscope - $300
- Encrypted Memory Stick - $250

TRAINING

BATMAN'S TRAINING & EDUCATION COSTS $213,610

MILITARY PILOT TRAINING
$500,000

SPECIAL FIREARMS TRAINING
$500,000

SEVERAL ENGINEERING DEGREES
$500,000

TOTAL COST OF BEING BATMAN

$682,450,750*

SOURCE: RESEARCH CARRIED OUT BY MONEYSUPERMARKET.COM
IMAGE SOURCE: DC COMICS & WARNER BROTHERS
* TOTAL COST OF ITEMS SHOWN ON INFOGRAPHIC

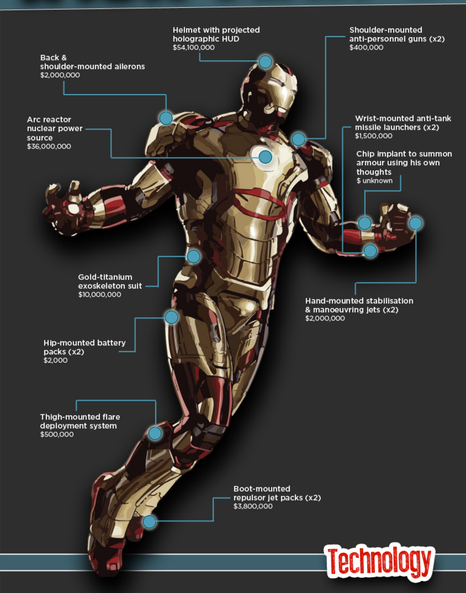
MoneySupermarket.com

MoneySupermarket.com

Boys and grown men alike dream of filling Tony Stark's rocket-propelled shoes, but living that dream doesn't come cheap. A state of the art Malibu mansion and a fleet of luxury super-cars are just the beginning. By the end of Iron Man 3, Tony Stark will have constructed at least 42 sets of Iron Man armour.

We take a look at a small selection from Stark's armoury and bring you our updated version of...

The Cost of Being IRON MAN 3



Technology

Arc Reactor
A clean nuclear power source that protects Tony Stark's heart from the shrapnel embedded in his chest, and provides the power to the Iron Man suits.
$36,000,000

Gold-titanium Exoskeleton Suit
Stark's latest Iron Man exoskeleton suit utilises more of the gold-titanium alloy to protect him against bullets, missiles, impact and the effects of G-force.
$15,000,000

Mind-controlled Armour
The latest Iron Man suit uses nano-technology and can be assembled using a remote synaptic link – in other words, Stark can summon the pieces of the armour to his body using his thoughts. This is rumoured to be the Extremis technology from the comics.
$ unknown

Repulsor Jet Packs
Jets built into Iron Man's boots provide propulsion for flight, while those on the palms of his hands are used for stabilisation and manoeuvring. The hand jets can also fire a repulsor ray.
$15,800,000

Computer System and Helmet
The Iron Man suit is loaded with advanced 'wearable' computers, controlled via Jarvis and the holographic HUD (heads up display) in the helmet. The US Air Force is developing similar systems.
$54,100,000 (HUD) + $1,020,000 (computer system)

Guns and Missiles
Fire power comes courtesy of shoulder-mounted guns and forearm mounted anti-tank missile launchers. Controlled via the helmet HUD, the missiles will seek and destroy multiple targets.
$1,500,000 (wrist-mounted missile launcher) + $400,000 (shoulder-mounted guns)

Computer

Stark's artificial intelligence computer is used to control his home, workshop and aspects of the Iron Man suits. The computer's name is a reference to Stark's butler, Edward Jarvis, from the comics. US defence providers have attempted to build similar computers.
$10,000,000

House

Tony Stark's Malibu Cliffside mansion is a stunning work of CGI effects digitally constructed on Point Dume National Park, Los Angeles – a highly desirable spot on which building is forbidden. During the making of the movie, scouts could only find multi-millionaires' homes so had to resort to CGI to construct a billionaire's mansion in Hollywood's most decadent area. Many features of Stark's home couldn't feasibly be built using bricks and mortar.
$25,000,000

Suits

Mark 1
$0

Mark 2
$80,000,000

Mark 3
$119,000,000

Mark 4
$120,000,000

Mark 5
$400,000,000

War machine
$115,000,000

Mark 6
$120,000,000

Mark 7
$500,000,000

Total
$1,464,000,000

Suits of Iron Man 3

Mark 17
Artillery "Heartbreaker"

Mark 33
Enhanced energy "Silver Centurion"

Mark 35
Disaster rescue "Red Snapper"

Mark 38
Heavy lifting "Igor"

Mark 39
Sub orbital "Gemini"

Mark 40
Hyper velocity "Shotgun"

Mark 42
Latest version of 'standard' armour

War machine mark 2
"Iron Patriot"

Estimated total
$7,000,000,000

Cars

1932 Ford Flathead Roadster
$40,000

1967 Shelby Cobra
$45,000

Saleen S7
$550,000

Audi R8
$130,000

Tesla Roadster
$110,000

1978 Wolf WR1 Ford Race Car Replica
$ Unknown

Rolls Royce Phantom
$388,000

Audi R8 Spyder
$152,000

Audi R8 e-Tron Electronic Car
$250,000

Grand Total

$10,086,485,000

MoneySupermarket.com

Refs
http://www.digitalspy.co.uk/
http://screenrant.com/
http://comicbook.com/
http://www.comicbookmovie.com/
http://www.beyondhollywood.com/
http://uk.marvel.com/iron-man-3/
http://io9.com/
http://www.empireonline.com/

Name: Flash vs Superman, What is your super speed? by Paula Reichert

Date: 04-29-16

Subject area / course / grade level: 8th Grade Level/ Algebra I

Duration:

Materials/resources:

- instructions handout for each student
- a big poster paper for each group
- measuring tape for each group
- stapler for foldables
- basketball court(gym)

TEKS: What TEKS # & content will you address? Write the standard here.

- A.2 (B) write linear equations in two variables in various forms, including y = mx + b, Ax + By = C, and y – y1 = m(x – x1), given one point and the slope and given two points.
- A.2 (E) write the equation of a line that contains a given point and is parallel to a given line;
- A.2 (F) write the equation of a line that contains a given point and is perpendicular to a given line;
- A.3(A) determine the slope of a line given a table of values, a graph, two points on the line, and an equation written in various forms, including y = mx + b, Ax + By = C, and y - y1 = m(x - x1);
- A.3(B) calculate the rate of change of a linear function represented tabularly, graphically, or algebraically in context of mathematical and real-world problems;

Lesson objective(s):

- using proportions
- Write linear equations in two variables in various forms
- Determine the slope of a line given a table of values
- calculate the rate of change of a linear function algebraically in context of mathematical and real-world problems

Lesson Hook:

Lesson activities: How will you explain the topic? What activity will you use to have students learn the topic and apply their new knowledge? Include timing if appropriate.

1. Explain what a function is, dependent and independent.
2. Explain fantastic four.
3. Explain what they will be doing at the gym. Give them 8 minutes to collect their data.
4. The students will be put into groups of 4 (optimally) and everyone will receive a handout with the instructions.
5. **Groups will collect data:** Each group will physically measure the width of the basketball court which should be 50ft and each student will walk/stroll at a constant pace and record the time. The process should be in partners of two in their groups.

Two students walking and the other two recording the time of their partner.

6. **Back to Classroom:** once they get back they will start filling in their foldable in the following steps
    a. **Use data(in foldable) :** they will use the data they collected to create a table of points.
    b. **Groups will create a graph (in foldable):** the students will create a distance-time graph using the table they made. So that path they measured would be x and the time it took would be y (so there should be a table of points for each superhero/student). If there is time students should graph also on a big poster paper.
    c. Then continue the slope section of the foldable
    d. Then continue with how to find linear equations from a graph.
7. **Groups will find the linear equations:** so they will find the slope for each line and the equation for each line. They will also write this in their foldable if it fits in their if not in their handouts.
8. **Speed:** the equation for speed will be given to the students to find their speeds and will be asked if there is any connections between speed and the slopes of the linear equations.

Lesson Information:

Linear Functions

1st – do they even know what a function is

Definition**: A function is the relationship (correlation) between two quantities (things that can be measured) where one depends on the other**, i.e. the amount of money you make depends on how many hours you work, the amount of money you pay at the pump depends on how may gallons you put in your tank, the number of points you make in a basketball game depends on how many baskets you make, the number of Rice Krispies you pick up depends on the number of seconds you rub the balloon to generate electricity, etc.

Functions are **superheroes** in math, they can explain mathematically how the world works. We use the **TOOLS** called **"The Fantastic Four"** to do this.

Two dependent quantities can be expressed by the **Fantastic Four** tools:

1) A **Graph** (In the math world we designate the y axis to be the dependent and x the independent. So what axis would the money and hours be on, etc.)
2) **Data** (table of values, ordered pairs, mappings)
3) An **Equation**
4) **Words**, as a story problem.

We are going to find the relationship between the distance traveled and how long you've been traveling. Is this a dependent relationship? What is dependent on what? How can we express this relationship?

THE FANTASTIC FOUR

We need to collect data? From where?

- Group them into groups of 4. Have two walk while two time, then switch roles.
- Have them walk (fast, slow, glamour stroll), but it must be at a **CONSTANT rate (the same pace)** across the width of the gym.
- With a cell phone timer, time the distance it took them to cross to the other side.
- Measure the distance they walked (the basketball court is 50ft wide)
- Have them set up the ratio of $\frac{feet}{second}$. They will get $\frac{50\ feet}{?\ second}$, explain that **per** means divide and they need to divide to get $\frac{?\ feet}{\mathbf{1}\ second}$.
- Go back to the classroom and have them set up **tables** for each person, starting with 0 time, then progress in intervals of 2 seconds**. Graph** all their results on the same graph.
- Find an equation of their graph?

No. of sec	Distance(ft)
0	0
2	
4	
6	
8	
etc.	

Once they graph all four of their results, have them discuss what they see on the graph. Look at the steepness and compare it to how fast they were going. Discuss the steepness and the definition of slope. Have them add to the four graphs the imaginary graph of Flash (the speed of light), and Superman (the speed of sound). Where would the superheroes' graphs lie in comparison to the group?

Now do the mathematical processes on the foldable for slope and finding the equation of a line

Collecting Data

1. What is the distance of the path you measured in feet (the width of the basketball court?

2. Record the time of all the members in your group here

Linear Equations and Speed

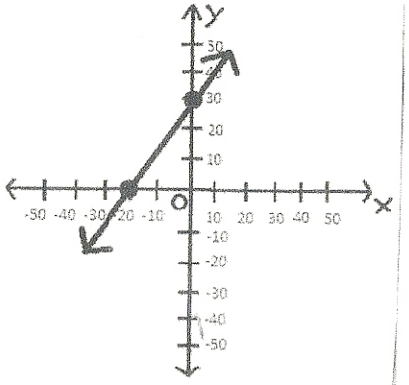
1. What are the linear equations for all the lines on your graph y-intercept form? When you are done, copy how to solve the linear equation of your line in your foldable under the graph.

2. The formula for speed is s=distance/time what are the speeds of each member in your group?

3. Do you see a connection between the linear equations of all of your group members and their speeds? If yes, what is it?

Find the equation of the line given on the graph.

First we need to find two points on the graph: (-20, 0) and (0, 30)



Next we need to find the slope

1. $m = \frac{Rise}{Run} = \frac{30}{20} = \frac{3}{2}$

2. $m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{30-0}{0-(-20)} = \frac{30}{20} = \frac{3}{2}$

Start with ⇨ $y = mx + b$

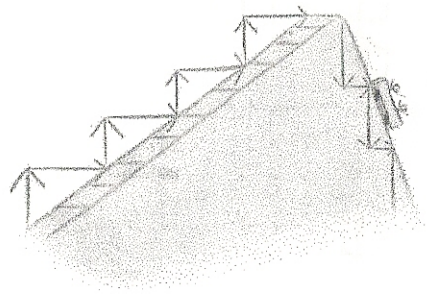
Plug in m ⇨ $y = \frac{3}{2}x + b$

Plug in a point ⇨ $(30) = \frac{3}{2}(0) + b$

Solve for b ⇨ $(30) = 0 + b$

⇨ $30 = b$

Slope



Definition:

_____

_____

$m =$

Fun Fact!

The letter we use for slope is a lowercase ____
Why? Because it comes from the French word *monter* which means to climb or to rise.

Find the slope of the line that passes through the given pair of points:

(1, 5) (3, 6)

(2, -4) (6, 3)

(-2, 1) (-5, 5)

If you are given two points:

(x_1, y_1) and (x_2, y_2)

$$m = \frac{y_2 - y_1}{x_2 - x_1}$$

Example:

$(-2, -1)$ $(4, 3)$

x_1 y_1 x_2 y_2

$$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{3 - (-1)}{4 - (-2)} = \frac{4}{6} = \frac{2}{3}$$

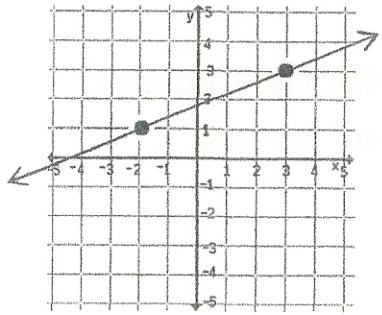
Name: _____

Name: _____

Name: _____

Name: _____

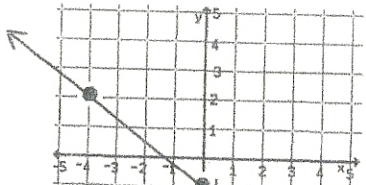
How to find the slope of a line when given a graph of a line:

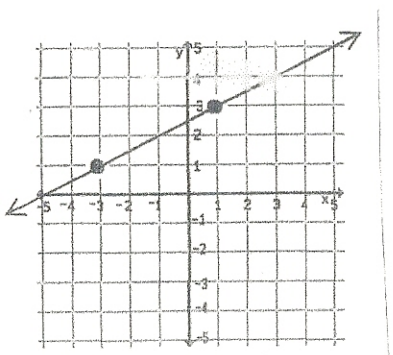


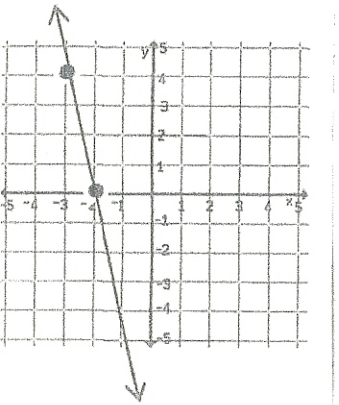
1) Start at the point farthest to the _____!

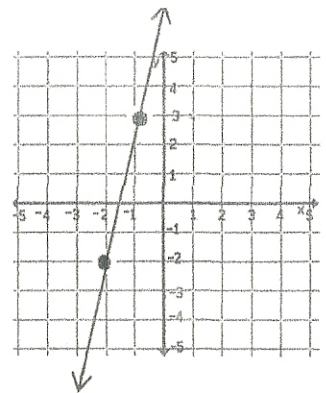
2) Find the *rise!* Up: _____
Down: _____

3) Find the *run!* Right: _____
Left: _____









Name: Graphing a Superhero Story by Paula Reichert

Date: 04-29-16

Subject area / course / grade level: 8th Grade Level/ Algebra I

Duration:

Materials/resources:

- Instructions handouts
- Poster per group
- Markers

TEKS: What TEKS # & content will you address? Write the standard here.

- A.2 (B) write linear equations in two variables in various forms, including $y = mx + b$, $Ax + By = C$, and $y - y1 = m(x - x1)$, given one point and the slope and given two points.
- A.2 (E) write the equation of a line that contains a given point and is parallel to a given line;
- A.2 (F) write the equation of a line that contains a given point and is perpendicular to a given line;
- A.3 (A) determine the slope of a line given a table of values, a graph, two points on the line, and an equation written in various forms, including $y = mx + b$, $Ax + By = C$, and $y - y1 = m(x - x1)$;
- A.3 (B) calculate the rate of change of a linear function represented tabularly, graphically, or algebraically in context of mathematical and real-world problems;

Lesson objective(s):

- The students will apply what they know about linear equations to fine the linear equations to graph out the story
- Using the properties they know about linear equations they will create their own story and graph it out.

Lesson Hook:

Lesson activities: How will you explain the topic? What activity will you use to have students learn the topic and apply their new knowledge? Include timing if appropriate.

1. The students will be grouped in 4(optimally)
2. The students will each be given a handout with a short story of superman and flash and will have to plot it out the superheroes path and find the linear equations of the story.
3. In their groups, the students will create their own superhero short story that creates linear equations and each student is responsible for one sentence in the story. In the story it should tell different ways to find at least one linear equation for each group member. Then on a poster they will write and graph their story out.

Superhero Story Telling

Find and graph the linear equations of the Flash and Superman in the following Story:

Superman was at his house in Smallville at point (-5,0) when he got a call from his friend the Flash who needed his help to fight some villains at an intersection that is only a few blocks down the same street from where he lives at point (1,3). So Superman traveled up the street to go help the Flash and together they beat the villains. When they were done fighting they handcuffed the villains but the villains had also taken some hostages that needed to go to the hospital. So Superman said he would wait for the police to pick up the villains and told The Flash that the hospital is at point (3,-5) and is straight from the intersection they were already on. So the Flash and Superman saved the day once again.

Group Instructions

Now as a group you will make your own superhero story. Each group member is responsible to make at least one linear equation in the story so your story should contain a linear equation for each group member. You will write your story on a separate paper and graph out your story on a poster as a group. Then tape your story page to the poster.

YouTube Links:

Name: Superhero Laws of Motion by Jacklyn Rodriguez

Date: 4-29-16

Subject area / course / grade level: 8th Grade

Duration: 1 Hour

Materials/resources:

- **tennis balls**
- **bead necklaces**
- **Plastic play balls**
- **floor scooter**
- **baseball**
- **ping pong balls**
- **Bendy straws**
- **calculators**
- **buckets/pails**

TEKS: What TEKS # & content will you address? Write the standard here.

A(1)B
A(1)C
8(6)C

Lesson objective(s):

To engage students in learning the laws of motion through hands on activities.

Lesson Hook:

Lesson activities: How will you explain the topic? What activity will you use to have students learn the topic and apply their new knowledge? Include timing if appropriate.

Students will do a series of activities at different stations that relate to Newton's 3 Laws. They will follow the instructions at the station in order to complete each activity. Based on what they learned and what they see happening at their station, students will answer the questions at each station and justify their answers in their journal

Calculation of Data

Take all information recorded on the data worksheet and using the formulas on the worksheet, do the following, make sure to write down all answers:

1. Convert distance in feet to meters
2. Use this distance and the time(seconds) and calculate acceleration
3. Use weight of objects, ex. Civilian A and B, baseball, tennis ball…., to find their mass
4. Take the acceleration and mass to calculate force

What does this force mean and what part did it play in the experiments?

Newton Beads

1. Take ball and place it in the center of the table, make sure it does not move
2. Watch the ball for 15 seconds and write down what happened in your journal.
3. Take bucket of beads and place near edge of the table
4. Watch for 15 seconds and write down what happened in journal
5. Now, take the strand of beads that is hanging out of the bucket and quickly pull it down
6. Write down your observation and answer the following questions

Did the ball make any movement in step 2? Why or why not?

Did the beads make any movement in step 4?

For the beads, did anything change between your observation in step 4 and the observation in step 6? Explain why or why not there was a change.

if you finish early, you may do the experiment again

Clean up

1. To place the beads how they were, take one end of the beads and place it in the bucket along the entire bottom edge, making a circle.
2. Continue to wind the beads in a circle until only the other end of the beads is left
3. Make sure the end is left hanging over the edge of the bucket how you first should have found it.
4. Put all supplies back to their original spot and throw away any trash you find around the station.

Ball Race

1. Start off by having everyone choose a ball, make sure no more than 2 people have the same type of ball
2. You will also find straws at the station, make sure everyone gets a straw
3. Once everyone has their materials, place ball on starting line

The point of the race is to use your straws to blow air on the ball and cross the finish line. The first person to get their ball to cross the finish line will be the winner. Once you have the winner, answer the following questions in your journal.

Who won the race and what ball did they use?

Why do you think they won?

If you had the same race between a volleyball and a bowling ball, which would win? Why?

If you were to do the race over again, what would you do differently?

if you finish early, you may do the race again

Clean up

1. Throw all used straws in the trash
2. Make sure all balls are put back into the proper container
3. Pick up and throw away any other trash you find around the station

Scooter Test

1. Choose a person for the following roles
    a. Time keeper
    b. Measurer
    c. Hero
    d. Civilian A
    e. Civilian B
2. After everyone has their role, record the weight of the Civilians on the worksheet, if unknown take an approximate weight and use that on the sheet.
3. Tell the teacher you are ready and take all materials to designated area when told
4. Once in designated area, have Civilian A sit on the scooter and make sure they hold tightly on the handles
5. When Civilian A is ready, have the hero wait for the time keeper's mark and push the scooter when told.
6. The time keeper will stop time once the scooter and civilian have stopped moving, make sure to record the time in seconds on the worksheet.
7. Once stopped, the measurer will measure the distance between the starting and ending points, making sure to record the data onto the worksheet.
    a. Tip: Use floor tiles to measure distance, they measure at about one foot.

Stop once weight, time, and distance(feet) have been recorded, do not make any calculations yet.

Clean up

1. Make sure all appropriate data has been recorded,
2. Clean up any mess you find around you
3. Place all objects back to their station as you originally found them

Designated Area: _____

Baseball Throw

1. Choose a person for the following roles
    a. Reader
    b. Time keeper
    c. Measurer
    d. Data Manager
    e. Thrower (Do NOT throw at full force)
2. After everyone has their role, record the weight of the objects provided below on the worksheet.
3. Tell the teacher you are ready and take all materials to designated area when told
4. Thrower will take their position and measurer will measure the distance between the thrower and the target, make sure to write down all data.
5. On the time keeper's mark, the thrower will throw the ball at target, the time keeper will stop time when the ball has hit the target.
6. Data manager will write down all information given and make sure team has also written down the data correctly.

7. Repeat steps 4, 5, and 6 using all the balls, making sure to run each experiment at least 2 times.

Clean-up

1. Make sure all appropriate data has been recorded,
2. Clean up any mess you find around you
3. Place all objects back to their station as you originally found them

Weight of:

1. Baseball: 0.3125 pounds
2. Colorful play ball: 0.026 pounds
3. Ping pong ball: 0.01225

Designated Area: _____

Name:

Object	Distance (feet)	Distance (meters)	Time (seconds)	Acceleration	Weight (pounds)	Mass	Force

$$Distance(meters) = \frac{Distance(feet)}{3}$$

$$Mass = \frac{Weight}{9.8}$$

$$Acceleration = \frac{Distance(meters)}{time^2}$$

Object	Distance (feet)	Distance (meters)	Time (seconds)	Acceleration	Weight (pounds)	Mass	Force

Name: Superhero Cell Structure by Jacklyn Rodriguez

Date: 4-29-16

Subject area / course / grade level: 8th Grade

Duration: 1 Hour

Materials/resources:

- **Foldable**
- **Color pencils/crayons**
- **Markers**
- **Large self-stick pads**
-

TEKS: What TEKS # & content will you address? Write the standard here.

B.4.A

Lesson objective(s):

Students will learn basic cell structure and the jobs of different organelles.

Lesson Hook:

Lesson activities: How will you explain the topic? What activity will you use to have students learn the topic and apply their new knowledge? Include timing if appropriate.

Students will use knowledge and think how cell structure of superheroes may differ. Teams of students will then be given 3 organelles, create their own superhero squad using given organelles, and describe roles/powers of the organelles, they may incorporate other organelles as well if they wish to expand their super squad.

Cell membrane

All cells are contained by a cell membrane that keeps the pieces of the cell inside. The cell membrane is not a solid structure. It is made of millions of smaller molecules that create a flexible and porous container, which are spaces/holes that allow certain liquid, air, and other things to pass through

Nucleus

The cell nucleus acts like the brain of the cell. It helps control eating, movement, and reproduction. If it happens in a cell, chances are the nucleus knows about it. The nucleus is not always in the center of the cell. There is something called chromatin in the nucleus, which is made of DNA, RNA, and nuclear proteins.

Vacuole

Vacuoles are storage bubbles found in cells. Vacuoles store food or any variety of nutrients a cell might need to survive. They can even store waste products so the rest of the cell is protected from contamination. Eventually, those waste products would be sent out of the cell.

Lysosome

Lysosomes hold enzymes that were created by the cell. The purpose of the lysosome is to digest things. They might be used to digest food or break down the cell when it dies. Since lysosomes are little digestion machines, they go to work when the cell absorbs or eats some food. Once the material is inside the cell, the lysosomes attach and release their enzymes. The enzymes break down complex molecules that can include complex sugars and proteins. The lysosomes go to work even if there is no food for the cell. When the signal is sent out, lysosomes will actually digest the cell organelles for nutrients.

Cytoplasm

Cytoplasm is the fluid that fills a cell and suspends the cell organelles. The cytoplasm has many different molecules that are dissolved in solution. You'll find enzymes, fatty acids, sugars, and amino acids that are used to keep the cell working. It uses its dissolved enzymes to break down all of those larger molecules. The products can then be used by the organelles of the cell. Waste products are also dissolved before they are taken in by vacuoles or sent out of the cell.

Mitochondrion

Mitochondria are free floating organelles that are known as the powerhouses of the cell. They are organelles that act like a digestive system which takes in nutrients, breaks them down, and creates energy rich molecules for the cell. Some cells have several thousand mitochondria while others have none.

Golgi Complex

The Golgi apparatus or Golgi complex is found in most cells. It is another packaging organelle like the endoplasmic reticulum (ER). The Golgi apparatus gathers simple molecules and combines them to make molecules that are more complex. It then takes those big molecules, packages them in vesicles, and either stores them for later use or sends them out of the cell. It is also the organelle that builds lysosomes (cell digestion machines).

Endoplasmic Reticulum (ER)

The ER functions as a manufacturing and packaging system. It works closely with the Golgi apparatus, ribosomes, mRNA, and tRNA. There are two types of ER, Smooth ER and Rough ER.

Smooth ER (SER) acts as a storage organelle. It is important in the creation and storage of lipids and steroids. The sarcoplasmic reticulum (SR) is a variation of the SER. It is able to store many ions in solution that the cell will need at a later time. When a cell needs to do something immediately, instead of searching the environment for extra ions that may or may not be floating around it is easier to have them stored in a pack for easy use. The SR can release those ions immediately and when you are resting, they are able to store them for later use.

Rough ER (RER) was also mentioned in the section on ribosomes and is very important in the synthesis and packaging of proteins. Ribosomes are attached to the membrane of the ER, making it “rough.” The ribosome builds the amino acid chain, the chain is pushed into the cisternal space of the RER. When the proteins are complete, they collect and the RER pinches off a vesicle. That vesicle, a small membrane bubble, can move to the cell membrane or the Golgi apparatus. Some of the proteins will be used in the cell and some will be sent out

Name: Magnetism by Ruben Ramos

Date: 05-21-16

Subject area / course / grade level: Science/Math/ 8th grade

Duration: 1 hour

Materials/resources:

- **Bar Magnet**
- **Cylindrical Magnet**
- **Disk Magnet**
- **Iron Filings**
- **Two rulers**
- **String**
- **Paper clips**

TEKS: Science 8.6 The student knows there is a relationship between force, motion, and energy. (a-c)
Math 8.5 The student applies mathematical process standards to use proportional and non-proportional relationships to develop foundational concepts of functions

Lesson objective(s):
Students will be able to explain what a magnet is, identify magnetic field lines, identify what it means to be polar North or polar South and understand how magnetism plays an important part in our everyday lives.

Lesson Hook: A magnetic demonstration will be shown to the class and a video of a superhero using magnetic super powers will also be presented to the students.

Lesson activities: Introduce Magnetism. Students will be split into groups. Each group will be given magnets, iron filings, as well as compasses in order to identify magnetic field lines and their directions. First students will perform this activity with bar magnets and then cylindrical magnets. Students will be given an activity to create a gravity defying magnetic experiment using magnets.

Name: No Super Debt Please! By Salvador Navar

Date: 4-29-16

Subject area / course / grade level: 8th Grade level Mathematics

Duration: 1 Hour

Materials/resources:

- Super Hero Credit card(made of paper)
- White printer paper
- Foldable for tax
- Crayola's

TEKS: What TEKS # & content will you address? Write the standard here.

8Th Grade Math

8.12(F) Analyze situations to determine if they represent financially responsible decisions and identify the benefits of financial responsibility and the cost of financial responsibility

Lesson objective(s):

Students will learn to be financially responsible by having a budget and try to become their ideal superhero with the amount provided.

Lesson Hook:

Students will be shown a couple of tools used by super heroes. (http://i.amz.mshcdn.com/0A26HN1P-1D8-EtzfUdsifHHT8Y=/fit-in/1200x9600/2012%2F07%2F30%2F13_04_03_550_file)(http://mashable.com/wp-content/uploads/2013/04/IronMan3.jpg)

Lesson activities: How will you explain the topic? What activity will you use to have students learn the topic and apply their new knowledge? Include timing if appropriate.

The class will begin by showing the students that not all superheroes are made by having supernatural powers. Show them in detail how Iron man and Batman are superheroes because of their tools. Then, students will be shown all the tools that they can purchase, giving them a brief description of what they can all do. The students will be introduced to the foldable to understand the concept of taxes and how they work. Students will be a given a credit card with a starting amount of $500, along with balance sheet to keep track of their purchases. All items sold will have a 10% super tax. Students must show that they are able to purchase the items that they are trying to buy. Once student make purchases, they will add/ or draw their tools to their superhero outline. However, they will also explain why they choose the items they did, and what were some critical decisions they had to consider while picking tools.

Application Problems

(10% Super hero Tax)

1. Diana decides to purchase wonder women's Lasso ($124.99). How much is the cost going to be after the tax is included? If she has a total amount of $150.00, can she afford to purchase the Lasso?

2. Matt wants to purchase daredevil's baton ($49.99). How much is the cost going to be after the tax is included? If he only had $54 left, can Matt still be able to afford the baton?

Percent

Divide Century

Centimeter

100

20% =_____=20/100

50%=_.50_=_____

75%=_____=_____

10%=_____=_____

8%=_____=_____

Proportions w/percent's

When comparing two quantities, we can set up a proportion.

$$\frac{X}{100} = \frac{\text{Part}}{\text{Whole}}$$

1. What is 25% of 300?

2. What is the percentage of 60 to 400?

Shortcut

We can also use a shortcut because 10% = .10

1. What is 25% of 300?

2. What is 50% of 720?

Name: Super Slope Frisbee by Claudia Torres

Date: 05/01/2016

Subject area / course / grade level: 8th grade math, Algebra1

Duration: 75 min

Materials/resources:

- Paper Plates
- Color Tooth Picks
- Glue
- Scissors
- Markers
- Pencils

TEKS: What TEKS # & content will you address? Write the standard here.

A.3(C) Graph linear functions on the coordinate plane and identify key features, including x-intercept, y-intercept, zeroes and slope, in mathematical and real-world problems.

Lesson objective(s):

We will identify positive slope, negative slope, a slope of zero, and a slope that is undefined

Lesson Hook:

Students will see this short video about the adventure of Slope Dude, which uses the ski run of Slope Dude to demonstrate positive slope, negative slope, a slope of zero, and a slope that is undefined.
https://www.youtube.com/watch?v=ZcSrJPiQvHQ

Lesson activities: How will you explain the topic? What activity will you use to have students learn the topic and apply their new knowledge? Include timing if appropriate.

1. Students will be work individually. They will be given a paper plate and 4 tooth picks each
2. Students need to glue a tooth pick that raises from left to right, another that falls from left to right, another vertically and the last one horizontally.
3. Teacher then, instruct students to add a positive sign under the tooth pick that raises from left to right; a negative sign under the tooth pick that falls from left to right; a letter "u" under the vertical tooth pick; and the "0" next to the horizontal tooth pick.
4. Students will be given a second plate, and they will cut the center of it, and glue it to the other plate.

Frisbee Game

1. Students will be work in pairs. Each team decides which Frisbee they will play with and which Frisbee will be posted.
2. Students will need to place themselves in a previously ductaped slope path and throw the Frisbee as indicated by the teacher
3. If a student does not catch the Frisbee, it will be counted as a straight. Once they get three straights, they are out. If they get the whole path, they become semifinalist.
4. Once we have the semifinalist students, they will be placed under the undefined path and throw their Frisbee the farthest they can. The student that got his/her Frisbee farthest is the winner.


1
0
!
+

Name: Tools Budget by Salvador Navar

Date: 4-29-16

Subject area / course / grade level: 8th Grade level Mathematics

Duration: 1 Hour

Materials/resources:

- Handouts
- Monopoly like money
- Coloring supplies
- Paper

TEKS: What TEKS # & content will you address? Write the standard here.

8Th Grade Math

8.12(F) Analyze situations to determine if they represent financially responsible decisions and identify the benefits of financial responsibility and the cost of financial responsibility

Lesson objective(s):

Students will learn to be financially responsible by having a budget and try to become their ideal superhero with the amount provided.

Lesson Hook:

Students will be shown a couple of tools used by super heroes.

Lesson activities: How will you explain the topic? What activity will you use to have students learn the topic and apply their new knowledge? Include timing if appropriate.

It will begin by showing the students that some superheroes use tools to fight crime. From there we will analyze the cost of the said tools used by the superheroes. Then the students will be given an amount of money and students will choose the tools they want, also they must be able to afford them. Once they have chosen their tools and they are able to do so by their budget, they can draw how their superhero would look and customize. However, they will also explain why they choose the items they did, and what were some critical decisions they had to consider while picking tools.

Lesson: Ocean Tides By Yuliana Cardoza

Subject area / course / grade level: Rising 8th graders

Materials/resources:

- Wire
- Note cards one per student
- Styrofoam balls of different sizes (Moon, Earth, Sun)
- Painting items
  - Acrylic paint
  - Paint brushes

TEKS:

8th grade Science

8.7(C) relate the position of the Moon and Sun to their effect on ocean tides

Lesson objective(s):

Students will learn and relate the position of the Moon and the Sun to the effects of ocean tides, they will understand that the Sun is a medium-sized star.

Lesson Hook: How will you start the activity to get the student's attention?

Show them Acua Man fighting with other superheroes and ask them what they think about Acua Man in relation to ocean tides.

Lesson activities: How will you explain the topic? What activity will you use to have students learn the topic and apply their new knowledge? Include timing if appropriate.

We will start the lesson with a quick drawing of how they think the ocean tides work in relation to the Sun, Moon and Earth. They will also draw Acua Man and showcase his powers. (2-3 minutes the most)We will go around the room asking their peers what they think is the correct answer. You can do any type of partnering that you like. (4 minutes the most)Then we will go back to our seats and we will define Spring and Neap Tides on the board and talk about the correct way ocean tides work. We will now pass the handout out and have the students circle the correct answer. This should not take more than 5 minutes. We will now work on the Styrofoam/Wire project.

1. Pass out the 16 gauge wire. Make a very circular ellipse (a circle) with the first 17 inches of the wire and wrap it around leaving the 7 inches for the next part.
   a. Note that the Circular ellipse is extremely close to a circle but it is not quite a circle.
   b. Also note that the sun is not in the center of the universe, it is one of the Foci of the ellipse
2. Now make an L shape using the remaining of the wire as you fold the L shape into the center of the circle you have just created.
3. With the copper wire cut 6 inches of the wire provided. Wrap the other 3 inches around the 6 inches. Know wrap one end of the copper wire to the bottom of the L shape wire. Now wrap it around the circle with about 2 wraps. Work with these two wires to make sure that the small wire moves smoothly around the longer wire. Use pliers to compress them together.

Hand out the Styrofoam balls (should be 3 balls per student)
If time permits hand out the paint and let them decorate the balls.

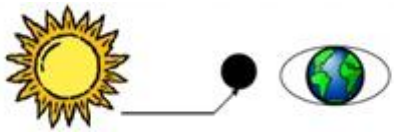
Spring and Neap Tides

Name_____

Circle the correct answer

Spring Tides Neap Tides

Spring Tides Neap Tides



Spring Tides Neap Tides

Spring Tides Neap Tides

Lesson: Graham Cracker Plate Tectonics by Yuliana Cardoza

Subject area / course / grade level: Rising 8th graders

Superhero Related:
Superhero have many powers but they are nothing compared to the powers of Earth. Over billions of years Earth has become what it is today and it will continue to evolve throughout time.

Materials/resources: (per student)

- **Fruit roll-up**
- **2 graham crackers**
- **1 large tablespoon of cake frosting**
- **1 sheet of parchment paper**
- **1 plastic spoon**
- **1 cup with water (per 4 students)**

TEKS:
Earth and Space Science: 10(B), 10 (C), 10(E)

Lesson objective(s):
Students will understand the 3 types of plate boundaries (divergent, convergent and transform) as well as characteristics associated with each of those boundaries (like mountain building or see floor spreading).

Lesson Hook: How will you start the activity to get the student's attention?
Show students a video showing the transformation of Earth's surface "From Pangea to Modern Continents" and ask them what they think the mechanism is for the changes. Build on their contribution. Guide students through creating the foldable and labeling what each material represents. https://www.youtube.com/watch?v=WaUk94AdXPA

Lesson activities: How will you explain the topic? What activity will you use to have students learn the topic and apply their new knowledge? Include timing if appropriate.
First, have students label the flap and define what the boundary is. Then, tell and model what they are to do to demonstrate the boundary with their materials. Have the students perform the boundary on their own and talk about what they observed happened. Elaborate on the boundary by returning to the foldable and writing the characteristics of the boundary. Repeat this process for the other two boundaries.

- Remember to drop the graham cracker lightly

First, students spread a thick layer of frosting on their parchment paper.
Divergent (Ocean-Ocean): (Middle Atlantic Ocean) tear fruit roll-up in half, places hard edges together on top of the frosting and press down slightly; then, push the fruit roll-ups away from each while still pressing down. The frosting should rise in between the two "oceanic plates".
Convergent (Ocean-Land): students remove one fruit roll-up and replace it with half of a

graham cracker lightly placed on the frosting. Students push the two together (keeping pressure on the fruit roll-up), the graham cracker should move on top of the fruit roll up.
Convergent (Land-Land): (Himalayas India, Africa, Asia) students now remove the fruit roll-up from the frosting. They take turns dipping the other graham cracker into the water 5 times (no longer!) and place this one next to the other "continental plate" on the parchment paper (wet side facing the inside). Students now push the two together, the wet part of the graham cracker should crumble upward, creating a "mountain".
Transform (Land-Land): (San Andreas Fault) students flip the graham crackers so that the two dry sides are touching each other. They push one cracker away from their body and the other towards them while still pushed together, the sides of the crackers should scrape and crumble slightly.

YouTube Links:

Graham Cracker Plate Tectonics (all layers): The layered flap-book works well for this lesson which has three subtopics and some main information; The closed front has the title and identifies the material while the lower three focus on the types of boundaries. The notes can be made more or less detailed depending on the desired coverage of material.

PLATE BOUNDARIES

- FROSTING - asthenosphere (viscuous layer of rock below plates)
- FRUIT ROLL-UP - dense oceanic plate
- GRAHAM CRACKER - thick, light-weight continental plate

DIVERGENT

CONVERGENT

TRANSFORM

- when 2 plates move away from each other
- magma rises
- ocean-ocean = mid-Atlantic ridge
  land-land = rift valley

DIVERGENT

CONVERGENT

TRANSFORM

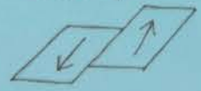
- when 2 plates come together
- ocean-land: oceanic plate subducted underneath continental

- land-land: mountain building (because both plates are too light to be subducted)

CONVERGENT

TRANSFORM

- when 2 plates slide past one another
- puts stress on plates, one will snap and release energy = earthquakes



TRANSFORM

Contact information for Superhero Summer Camp:

Ellen Esposito
Director, Secondary Education
MaST (Math and Science Teacher) Academy
The University of Texas at El Paso (UTEP)
El Paso, TX 79902
915.747.8468
edesposito@utep.edu

Debra Driscoll
MaST Outreach Manager
The University of Texas at El Paso
El Paso, TX 79902
915.747.8469
dhdriscoll@utep.edu

Dr. Amy Wagler
PI, Robert Noyce Scholarship for
Teaching Miners
Professor, Mathematics
The University of Texas at El Paso (UTEP)
El Paso, TX 79902
915.747.6847
awagler2@utep.edu

Cheryl Geach
Director of Academics
Middle School Division
Ysleta Independent School District
9600 Sims Dr.
El Paso, TX 79925
915.434.0603
cgeach@yisd.net

All materials were developed by UTEP MaST Academy Scholars, Noyce Scholars and members of Future Educators of Math and Science:

Blanca Estrada
Sue Ellen Huffman
Salvador Navar
Paula Reichert
YulianaCardoza
Ruben Ramos
Jacklyn Rodriguez
Claudia Torres

Superhero Summer Camp Resource Guide was edited in July 2016 by:
Yuliana Cardoza
UTEP undergraduate in Mathematics

Funding provided by Ysleta ISD, UTEP MaST Academy, NSF Robert Noyce Scholarship for Teaching Miners