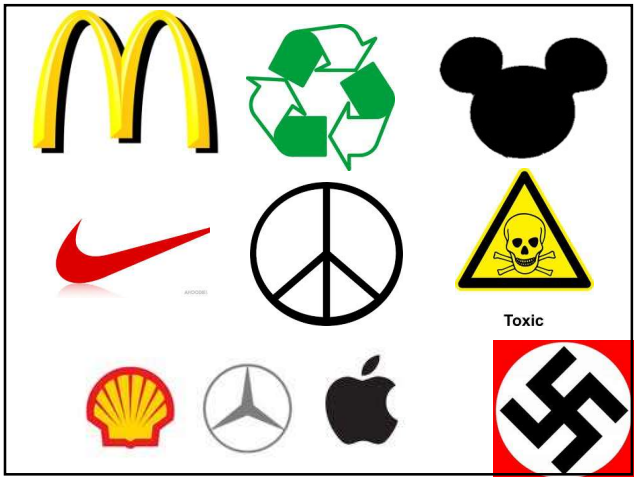
DEPTH & COMPLEXITY

We are surrounded by symbols.

SYMBOLS:

- share information
- create expectation
- convey emotion
- tell us what to do/not do
- can change meaning



Think of a Symbol.

Criteria:

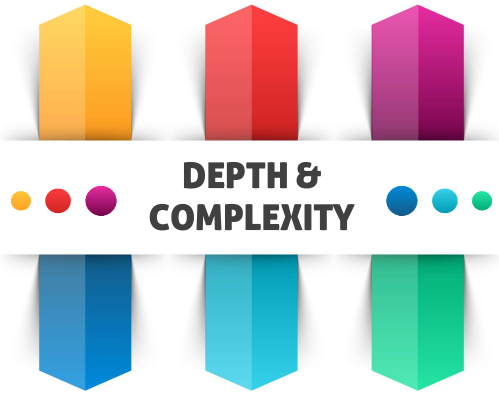
- easily recognizable
- emotion level ≥ 6
- be able to describe its effect (create expectation; convey info, etc.)

We're going to use a particular set of 11 symbols to help us engage with our learning.

And they will…

- share information
- create expectation
- give common vocabulary
- tell us what to do/not do
- change meaning

bit.ly/intro-icons



DEPTH & COMPLEXITY

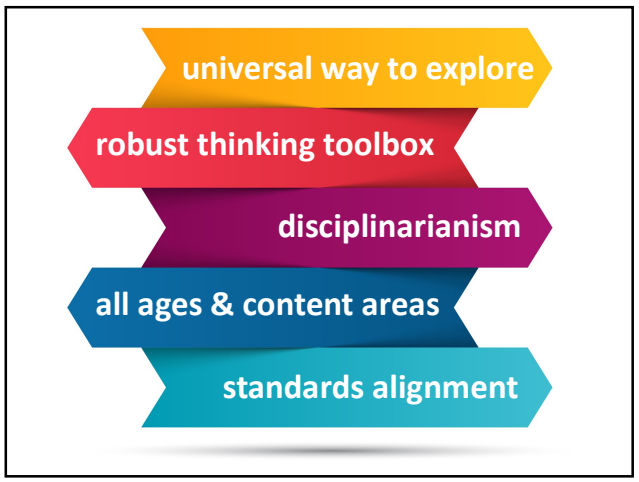
a FRAMEWORK for academic exploration to help raise thinking skills

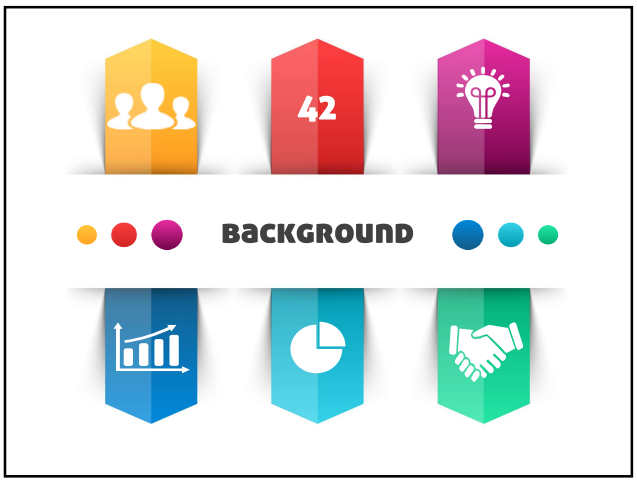
DEPTH & COMPLEXITY

that uses common LANGUAGE and a set of universally agreed-upon ICONS

DEPTH & COMPLEXITY

to guide scholarly endeavor ACROSS content areas, grade levels, and standards.





We are looking through a lens that pivots .

DEPTH & COMPLEXITY

the icons are a path to understanding the thinking lens we're using for that experience

DEPTH & COMPLEXITY

The eleven elements are not in any particular order.

What We'll Do Today:

- Understand the eleven elements of the framework
- Apply them to our content
- Know how to introduce them to students

FILL ME IN

The questions that p_____ face as they raise ch_____ from in_____ to adult life are not easy to answer. Both fa_____ and m_____ can become concerned when health problems such as co_____ arise any time after the e_____ stage to later life. Experts recommend that young ch_____ should have plenty of s_____ and nutritious food for healthy growth. B_____ and g_____ should not share the same b_____ or even sleep in the same r_____.

The questions that poultrymen face as they raise chickens from incubation to adult life are not easy to answer. Both farmers and merchants can become concerned when health problems such as cough arise any time after the egg stage to later life. Experts recommend that young chicks should have plenty of sunshine and nutritious food for healthy growth. Banties and geese should not share the same barnyard or even sleep in the same roost.

In school: 3,000 per year

Pre-school: 840 per year

LANGUAGE OF THE DISCIPLINE

"BUT ALWAYS HE LACKED THE ESSENTIAL TOOL WITHOUT WHICH THE WORKMAN CAN NEVER ATTAIN TRUE MASTERY:

HE DID NOT KNOW THE NAMES OF ANY OF THE PARTS HE WAS BUILDING, AND WITHOUT THE NAME HE WAS ARTISTICALLY INCOMPLETE.

IT WAS NOT BY ACCIDENT THAT DOCTORS AND LAWYERS AND BUTCHERS INVENTED SPECIFIC BUT SECRET NAMES FOR THE THINGS THEY DID;

TO POSSESS THE NAME WAS TO KNOW THE SECRET.

WITH CORRECT NAMES ONE ENTERED INTO A NEW WORLD OF PROFICIENCY, BECAME THE MEMBER OF AN ARCANE BROTHERHOOD,

A SHARER OF MYSTERIES, AND IN THE END A PERFORMER OF MERIT.

WITHOUT THE NAMES ONE REMAINED A BUMBLER OR, IN THE CASE OF BOATBUILDING, A MERE CARPENTER."

JAMES MICHENER, *CHESAPEAKE*

Who am I?

Think of a field, domain, or content area.

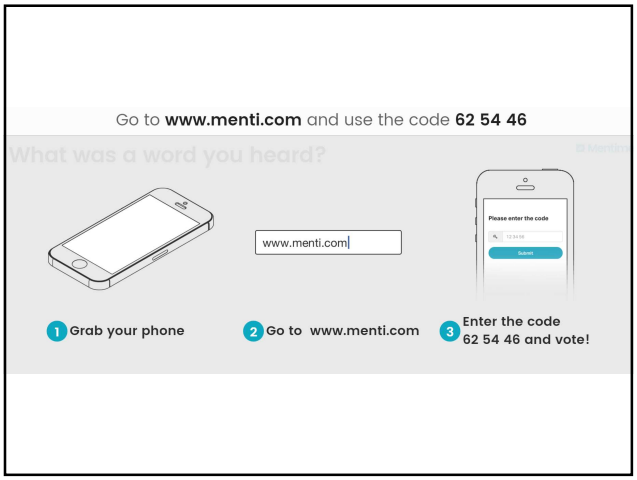
Next, think of 5 words that are the LotD of that field & write them on your Experience Sheet.

Do not share.

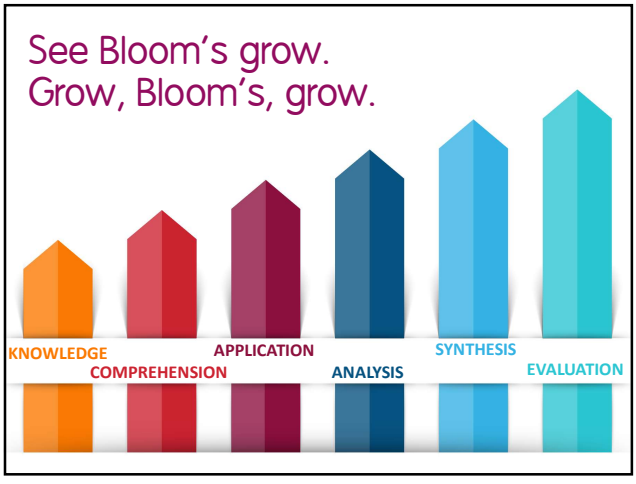
Find someone from another table in your same card suit.

Share your words with each other and guess your respective fields.

If you finish before time is up, think of more words for the other person's list.



iMPLEMENT



iMPLEMENT: Elementary Science

What do these words have in common?

- cirrus
- stratus
- cumulonimbus
- stratocumulus

1. What are two words that are missing that should be on the list?
2. Draw a picture of one you think would not be good if you were at a picnic.

iMPLEMENT: SecondaryMath

1. Why is this funny?
2. Draw the shape that best reflects this comic.
3. Think of another number that would work in the comic.

iMPLEMENT: Middle School ELA

Word Interview: Word conflict

What words mean the same as you?

What makes you happy?

Who or what is your best friend?

What do you dislike most?

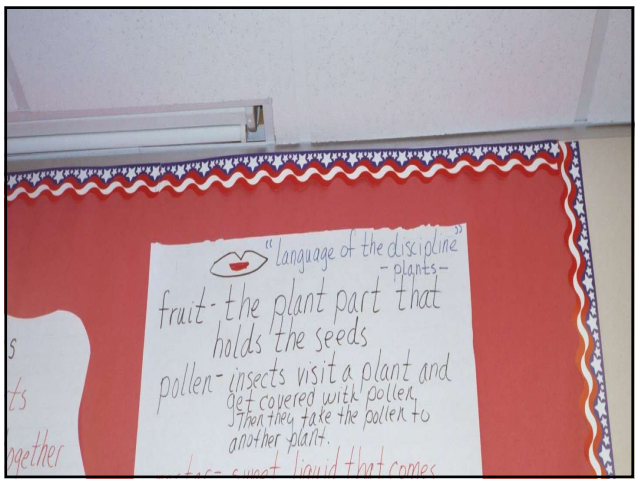
If you could give anyone advice, who would you give it to and what would you say?

iMPLEMENT: World Languages

Change "tengo" to first person plural.

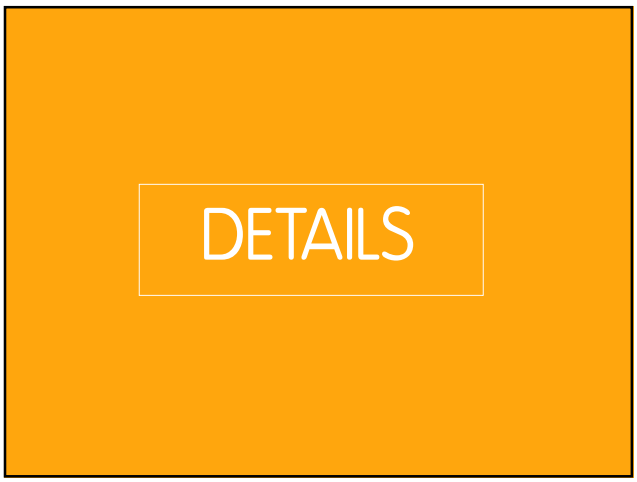
Write three nouns that begin with the third letter of the new conjugation.

Write an acrostic poem with one of the nouns using at least one verb, one noun, and one adjective.

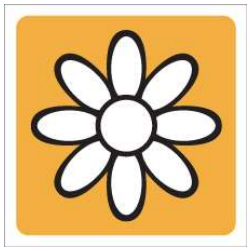

"language of the discipline"
- plants -
fruit- the plant part that holds the seeds
pollen- insects visit a plant and get covered with pollen. Then they take the pollen to another plant.


rough
smooth
opaque
Solids keep their shape.
Solids
soft
pointed
flexible
transparent
flat
rigid/hard
has color
Liquids take the shape of the container they are in.
Liquids
foamy
viscous
Can pour.
translucent
bubbly
transparent
Oobleck!
Is it a solid or a liquid?
Think Like A Scientist
Use your sense of sight, touch, smell, and hearing to learn about Oobleck!
Solid
Liquid
Gas
Sight
Touch
Smell
Hearing
Bartholomew and the Oobleck
PETRILLI'S primary post

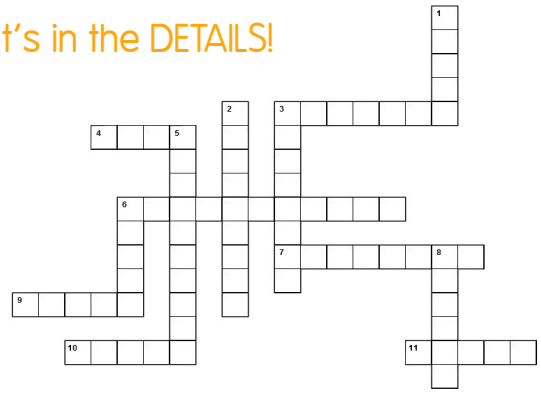

2


DETAILS

DETAILS



It's in the DETAILS!



iMPLEMENT: Social Studies

List at least 8 details about Abraham Lincoln.

Which details are most important? How can you support that opinion?

What ideas do we most associate with him?

iMPLEMENT: Middle School Science

Detail or Main Idea?

- There are eight planets in our solar system.
- Our universe is constantly expanding.
- Black holes emit negative energy.
- Multiple moons affect tidal patterns.

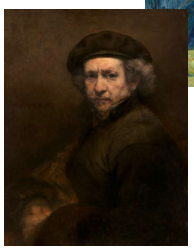
iMPLEMENT: Middle School Science

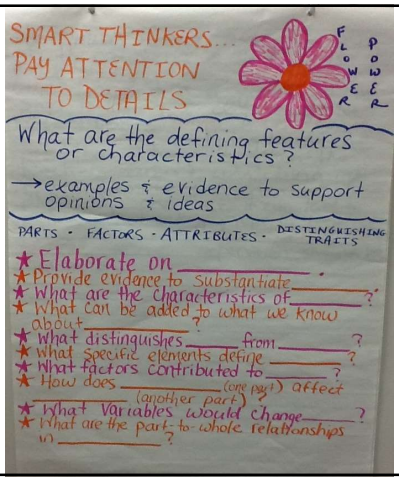
Differentiate:

Infer the big idea associated with each detail, and support the big ideas with at least three details.

iMPLEMENT: MS Art

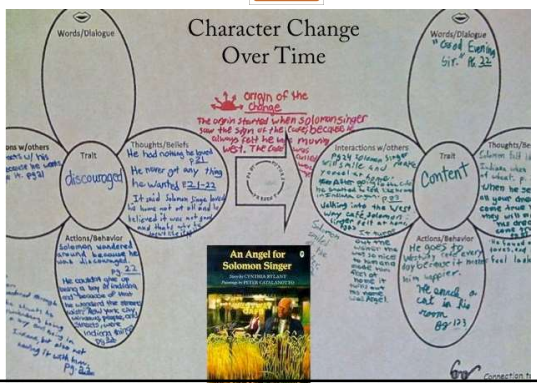
Compare the attributes of the self-portraits of Rembrandt & Van Gogh. Include line, shape, form, texture, color, value, and space.

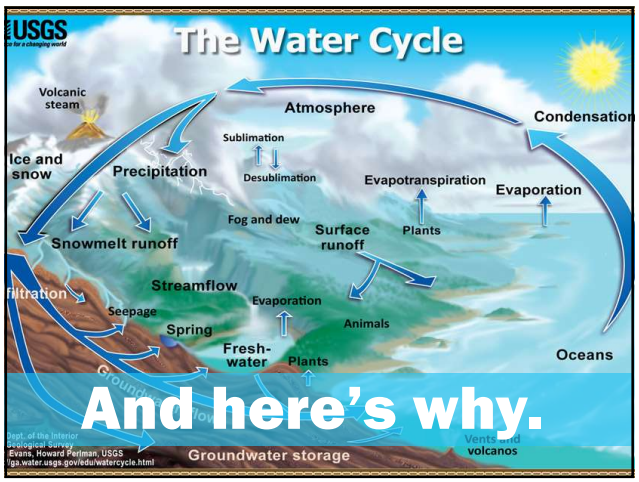




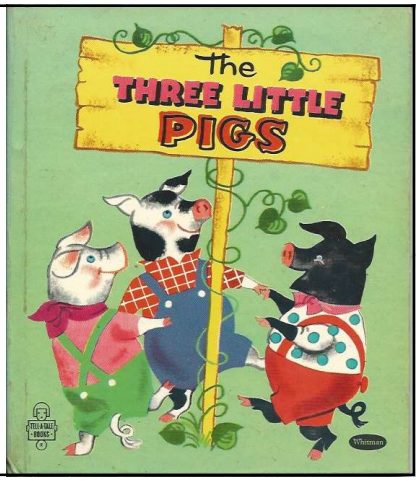
Combine with 

for analysis

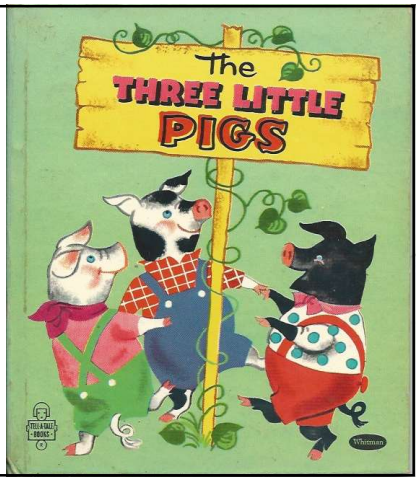




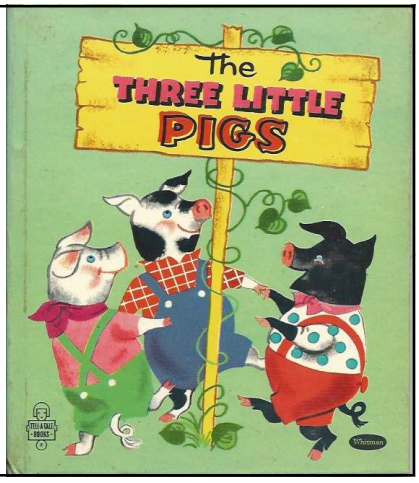
Little pig, little pig, Let __ __!



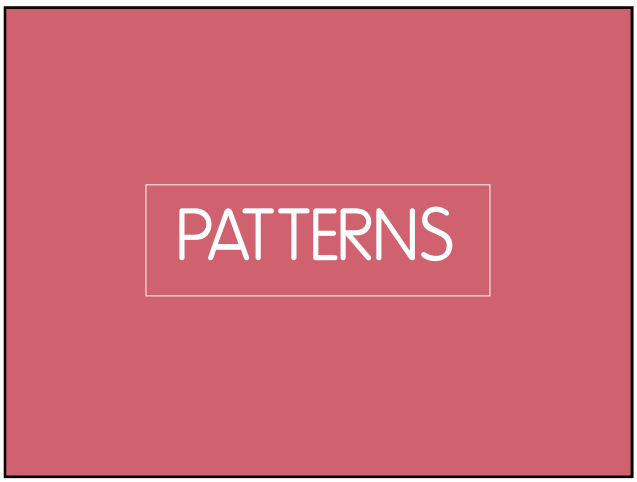
Not by the __ __ __ __ __!

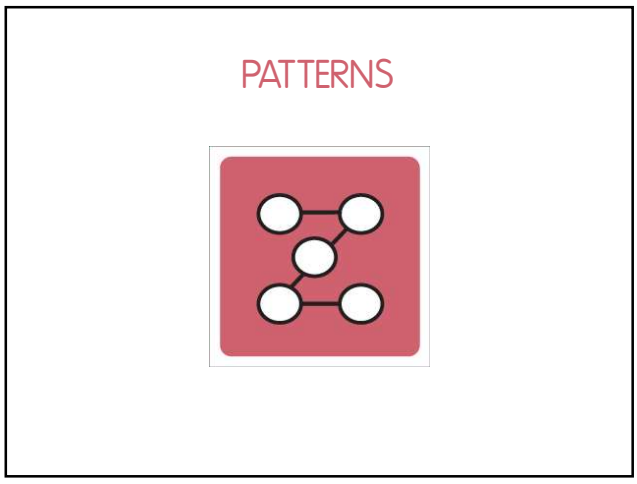


Then I'll [insert threat].




The Three Little Pigs
@threelittlepigs
Follow
We're building houses, but can't decide on building materials. Straw, sticks, or bricks? Any advice? Want it to be wolf-proof!
Reply Retweet Favorite More
3:41 PM - 20 Jan 13 · Embed this Tweet


PATTERNS


PATTERNS


AGREE/DISAGREE ACTIVITY
Agree or Disagree

AGREE/DISAGREE:

When there is a pattern, you can predict what comes next.

AGREE/DISAGREE:

Patterns can be replicated.

AGREE/DISAGREE:

A cycle is not a pattern.

AGREE/DISAGREE:

If you see repetition, look for a pattern.

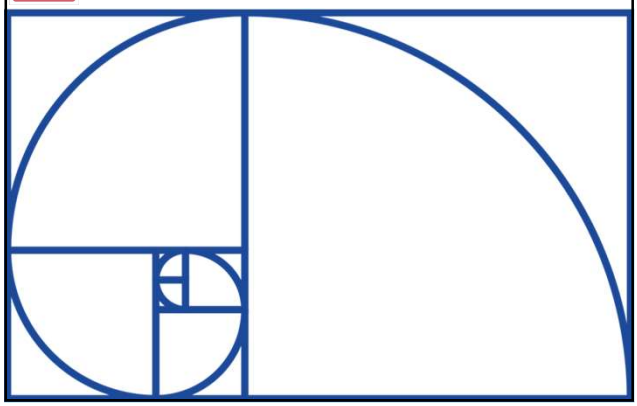
AGREE/DISAGREE:

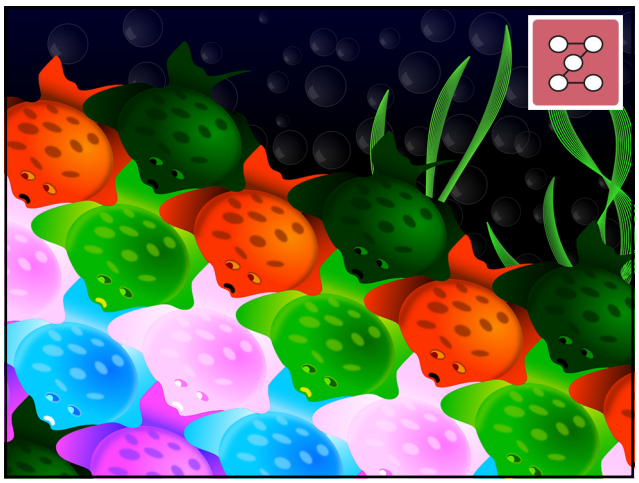
Patterns cannot be man-made. They can only be natural.

AGREE/DISAGREE:

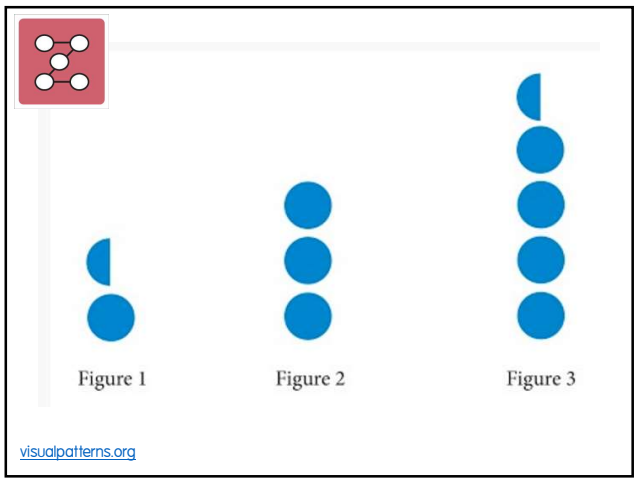
A recurring element could be considered a pattern.

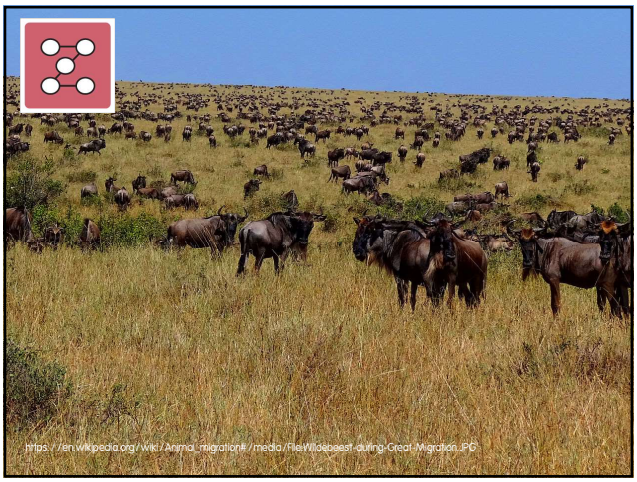
Patterns occur in all domains.





A furled chameleon tail obviously takes its shape from the rolling of a tube, but its pattern is distinct from that created by rolling an even tube, such as that of a garden hose. The gentle taper of the tail produces a logarithmic spiral—one that gets smaller, yet the small parts look like the large parts. (Michal Filip Gmerek/Shutterstock.com)

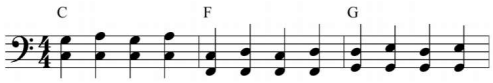




LH PATTERNS FOR THE 12-BAR BLUES

WHOLE NOTES

BLOCKED 5THS & 6THS



http: / /colorinmypiano.com

CONJUGAISON DES VERBES RÉGULIERS AU PRÉSENT

ER PARLER	IR FINIR	RE ATTENDRE
JE PARLE	JE FINIS	J'ATTENDS
TU PARLES	TU FINIS	TU ATTENDS
IL/ELLE PARLE	IL/ELLE FINIT	IL/ELLE ATTEND
NOUS PARLONS	NOUS FINISSONS	NOUS ATTENDONS
VOUS PARLEZ	VOUS FINISSEZ	VOUS ATTENDEZ
ILS PARLENT	ILS FINISSENT	ILS ATTENDENT

frenchinnormandy.com

What is a pattern in your discipline?

[stand when you can think of one]

Could you ask them to

DESCRIBE THE PATTERN?

Could you ask them to

EVALUATE THE PATTERN'S IMPORTANCE?

Could you ask them to

COMPARE THE PATTERN TO ANOTHER PATTERN?

Could you ask them to

IDENTIFY PRIMARY AND SECONDARY PATTERNS?

Could you ask them to

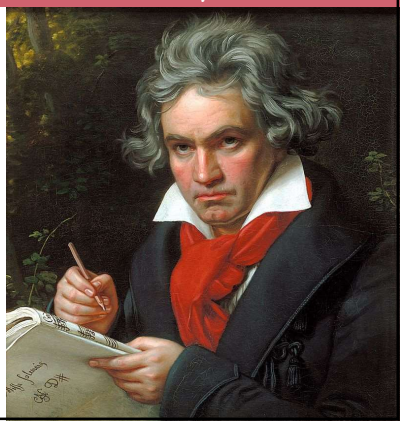
RECOGNIZE WHEN/WHERE A PATTERN BREAKS?

Could you ask them to

SEE THE PATTERN OUT OF SEQUENCE AND FIX IT?

iMPLEMENT: Secondary Music

Identify patterns of opposites in Beethoven's 5th Symphony.



iMPLEMENT: Secondary Music

Differentiate it:

Create a chart comparing the patterns of opposites in Beethoven's 5th Symphony to those in *Fur Elise*.

iMPLEMENT: Elementary Science

ped using the following elements from the NRC document *A Framework for K-12 Science Education*.

Disciplinary Core Ideas	Crosscutting Concepts
LS1.B: Growth and Development of Organisms ▪ Reproduction is essential to the continued existence of every kind of organism. Plants and animals have unique and diverse life cycles. (3-LS1-1)	**Patterns** ▪ Patterns of change can be used to make predictions. (3-LS1-1)

3-LS1-1. DEVELOP MODELS TO DESCRIBE THAT ORGANISMS HAVE UNIQUE AND DIVERSE LIFE CYCLES BUT ALL HAVE IN COMMON BIRTH, GROWTH, REPRODUCTION, AND DEATH

Create a diagram of the life cycle of the butterfly.

During which phase do you think the butterfly is most vulnerable?

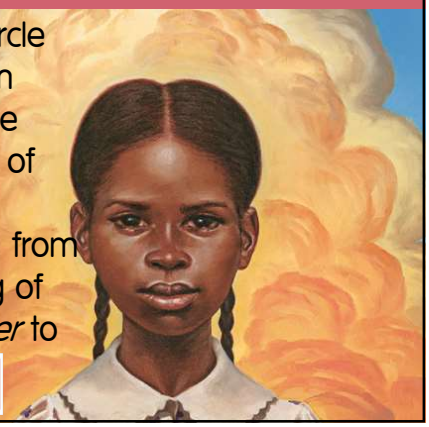
During which phase is it most free?

Differentiate it…

Redesign the life cycle of the butterfly to make the developing butterfly less vulnerable.

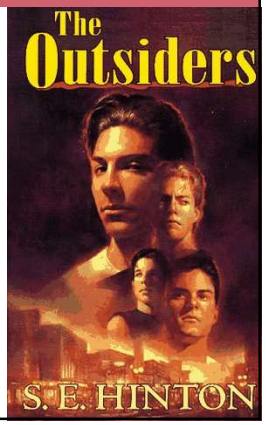
iMPLEMENT: Middle School ELA

Create a 3-circle Venn Diagram comparing the development of the character Cassie Logan from the beginning of *Roll of Thunder* to the end.



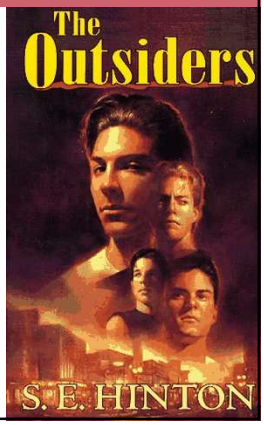
iMPLEMENT: Middle School ELA

Create an image essay illustrating the archetypes found in *The Outsiders*.



iMPLEMENT: Middle School ELA

Differentiate it: Create an image essay contrasting the archetypes found in *The Outsiders* to those found in *A Wrinkle in Time*.



4

WHAT AM I?

Always wear your seatbelt.

Obey the speed limit.

You must have a license.

Signal 100 feet before a turn.

Yield to pedestrians.

WHAT AM I?

"I" before "e" except after "c"

{& a bunch of other exceptions}.

Use the possessive in front of a gerund.

Sentences begin with a capital letter.

Sentences begin with a capital letter.

WHAT AM I?

Waft, don't inhale.

Do not return unused chemicals to their original container.

Tie long hair back.

Never look into a container that is being heated.

I have to have three sides.

I have to have three angles.

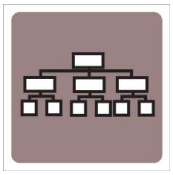
If one of my angles is 90°, I'm right.

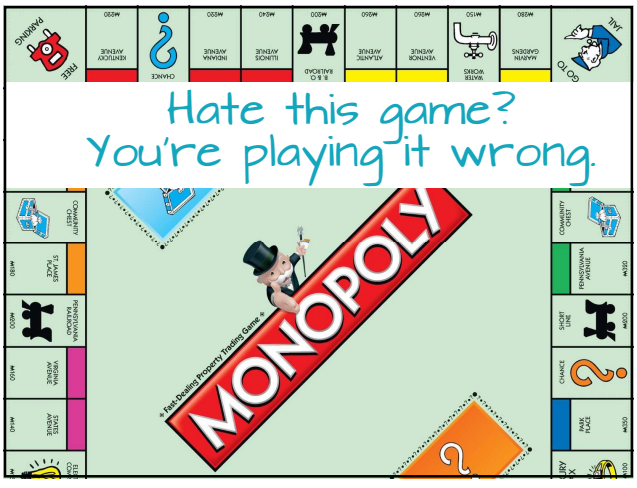
The sum of my interior angles is 180°.

YOUR TURN

RULES

RULES





RULES INCLUDE:

- standards
- directions
- methods
- organization
- usual behavior

What is a rule in your discipline?

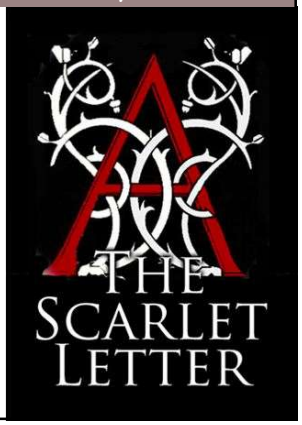
[write it down]

iMPLEMENT: Secondary ELA

In *The Scarlet Letter,* are the rules society imposes on women fair?

How does it punish the breaking of those rules?

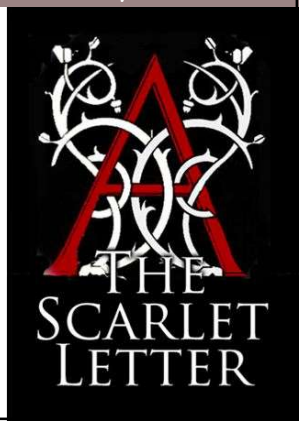
Who else is punished besides the rulebreaker and how?



iMPLEMENT: Secondary ELA

Differentiate it:

Compare the rules society imposes on women in *The Scarlet Letter* to contemporary mores. Argue either that a) the rules have changed or b) the punishments are more subtle.



iMPLEMENT: Middle School PE

What constitutes a legal underhand serve for net & wall games such as badminton, volleyball or pickleball? Demonstrate three legal serves & one illegal serve.

https://commons.wikimedia.org/wiki/File%3APickleballs_on_Court.jpg

iMPLEMENT: Kinder Math

845

Say: What does the 8 stand for in this number? It's 8 what?

iMPLEMENT: Kinder Math

6__

Say: How could we make this say 600? What would have to add?

iMPLEMENT: Kinder Math

Differentiate (dep. upon ability):

Create 6-digit numbers, following these rules:

1) At least one number must be odd.
2) At least one number must be able to be skip-counted by 3.
3) The number must end in with a digit that was not used in the number before.

iMPLEMENT: Kinder Math

Differentiate (dep. upon ability):

What rule of Roman numerals are these numbers breaking? Fix them.

19 = XIIII
100 = VV

iMPLEMENT: Kinder Math

Differentiate (dep. upon ability):

What rule about Roman numerals do you see in both of these statements?

XL = 40
IX = 9

iMPLEMENT: Kinder Math

Differentiate (dep. upon ability):

Research how to write "36" in both Mayan and Babylonian numerals.

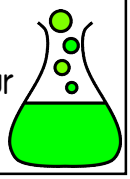
iMPLEMENT: Secondary Science

Correct the names of these common chemical compounds.

NaClO is sodium hyperchloride

$C_{12}H_{22}O_{11}$ is fructose

$MgSO_4 \cdot 7\ H_2O$ is magnesium sulfur quadrahydrate

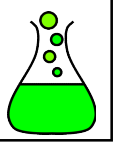


Differentiate it:

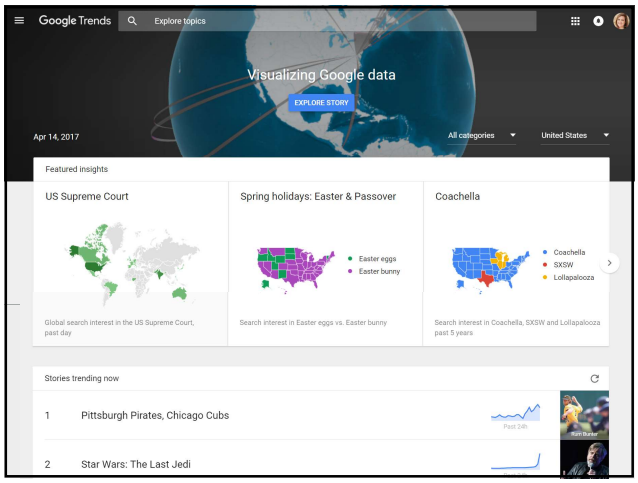
Create a chemical compound (using symbols only ☺) that has at least 6 elements, two of which must be carbon & hydrogen (bonus: Why would I ask that?).

Write it using Hill System Order & name the compound, following all naming rules.

Invent a reasonable use for it.



53 minutes ago	1 hour ago	2 hours ago
#GoodFriday	#GoodFriday	#GoodFriday
#TheLastJedi	36 ISIS	36 ISIS
36 ISIS	#TheLastJedi	#IdGiveUpThisForThat
#LiteraryTypos	Dean Blandino	Dean Blandino
#FlashbackFriday	Joseph Jakubowski	Joseph Jakubowski
Dean Blandino	#ViernesSanto	#FlashbackFriday
#EasterWeekend	#LiteraryTypos	#ViernesSanto
Morehouse	#EasterWeekend	36 Islamic State
Joseph Jakubowski	Chad Carr	#FineWomenFriday
Brett Brown	U.S.-North Korea	U.S.-North Korea

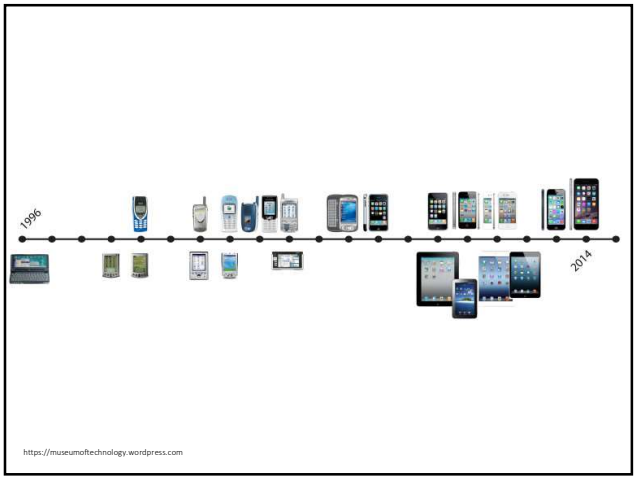


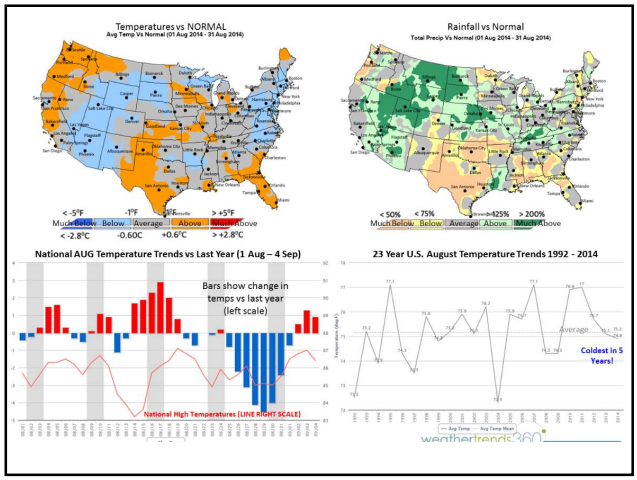
What's the difference between a fad & a trend?

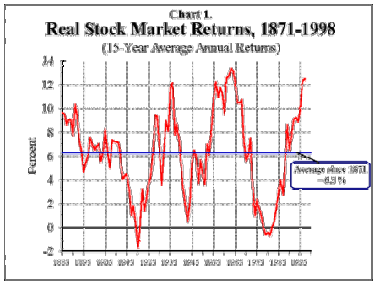
TRENDS

a general direction in which something is developing or changing

TRENDS



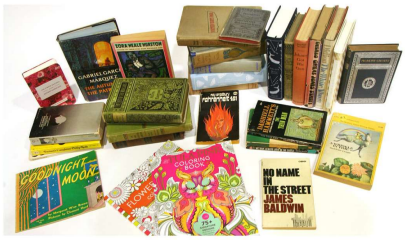




brookingsinstitute.edu

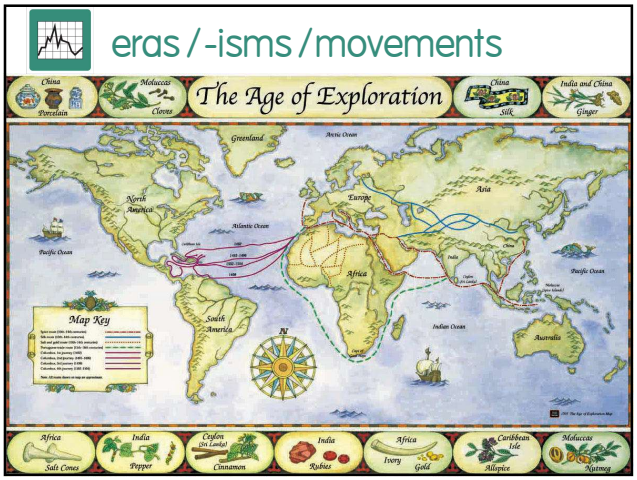
Trends exist in every industry and content domain.

6 book trends for 2016: Look into the future



571 million more print books were sold in 2015 than the year before, Nielsen bookscan reported in December. (Kirk McKoy / Los Angeles Times)

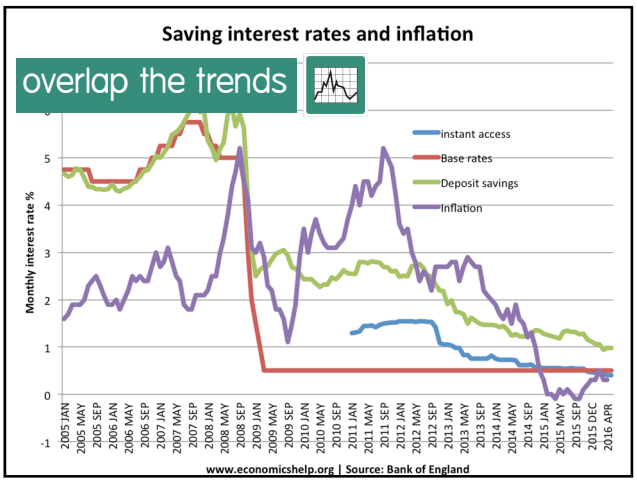
Some disciplines are a natural fit.



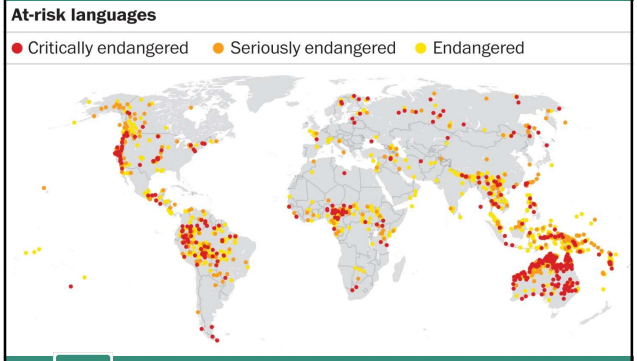

Look for gaps & relationships. Do elements or groups move closer or away from each other?


Trends are always complex.


Look for relationships among trends.


Saving interest rates and inflation
overlap the trends
instant access
Base rates
Deposit savings
Inflation
Monthly interest rate %
www.economicshelp.org | Source: Bank of England

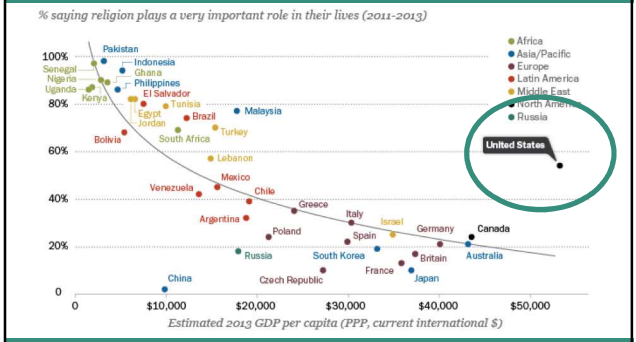
iMPLEMENT: World Languages



More or fewer languages?

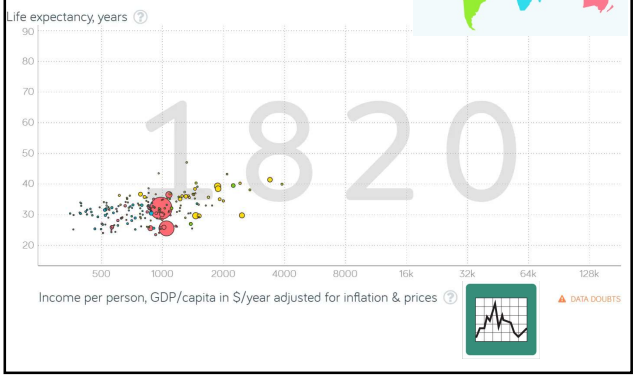
More or less likely to break to branch off?

iMPLEMENT: Secondary SS

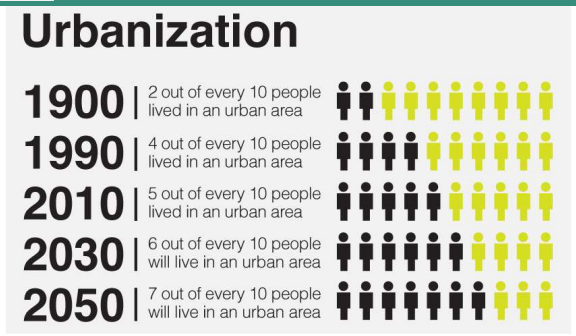


Why do you think people who are wealthy appear to be less likely to be religious?

Questions you could ask? Related Activities?

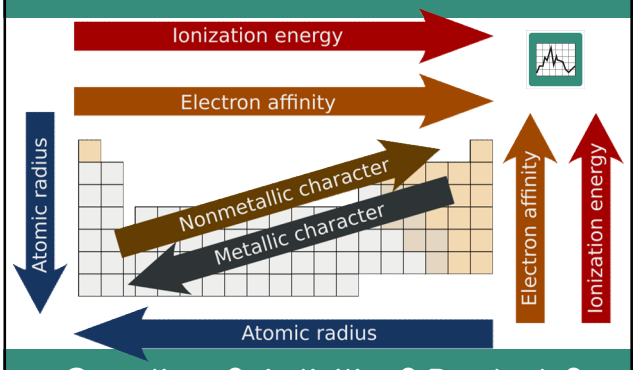


iMPLEMENT: Secondary SS

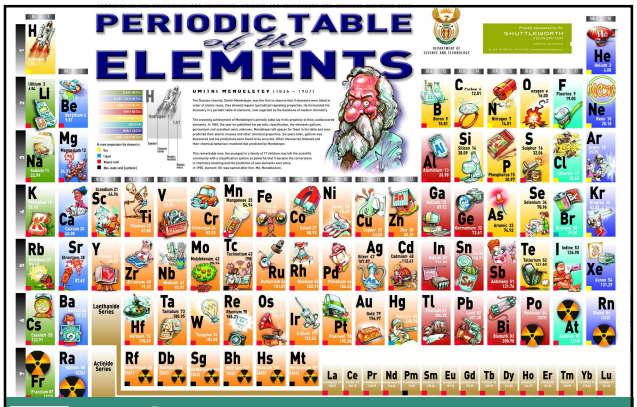


Questions? Activities? Products?

iMPLEMENT: Middle School Science



Questions? Activities? Products?



Can you find a correlation between those trends and uses?

6

Titanic WAS NOT sunk by Iceberg – new evidence suggests shock theory to disaster

THE Titanic was NOT sunk after striking an Iceberg, it has sensationally been claimed more than a century since the ship disaster.

By SEAN MARTIN
PUBLISHED: 04:12, Wed, Jan 4, 2017 | UPDATED: 07:40, Wed, Jan 4, 2017

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Millennium Problems

Yang–Mills and Mass Gap

Experiment and computer simulations suggest the existence of a "mass gap" in the solution to the quantum versions of the Yang-Mills equations. But no proof of this property is known.

Riemann Hypothesis

The prime number theorem determines the average distribution of the primes. The Riemann hypothesis tells us about the deviation from the average. Formulated in Riemann's 1859 paper, it asserts that all the 'non-obvious' zeros of the zeta function are complex numbers with real part 1/2.

P vs NP Problem

If it is easy to check that a solution to a problem is correct, is it also easy to solve the problem? This is the essence of the P vs NP question. Typical of the NP problems is that of the Hamiltonian Path Problem: given N cities to visit, how can one do this without visiting a city twice? If you give me a solution, I can easily check that it is correct. But I cannot so easily find a solution.

Navier–Stokes Equation

This is the equation which governs the flow of fluids such as water and air. However, there is no proof for the most basic questions one can ask: do solutions exist, and are they unique? Why ask for a proof? Because a proof gives not only certitude, but also understanding.

Hodge Conjecture

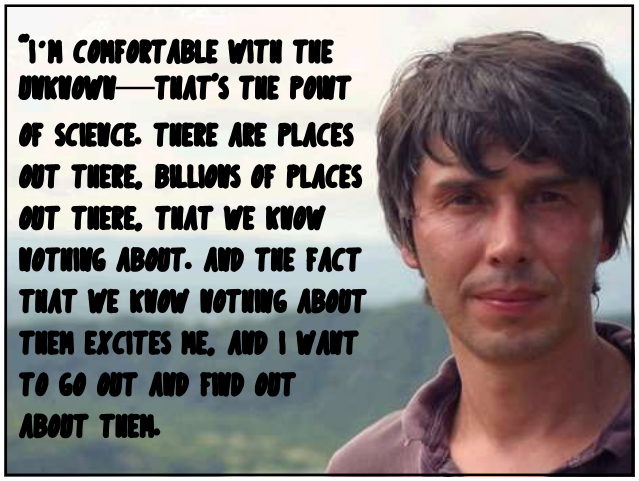
The answer to this conjecture determines how much of the topology of the solution set of a system of algebraic equations can be defined in terms of further algebraic equations. The Hodge conjecture is known in certain special cases, e.g., when the solution set has dimension less than four. But in dimension four it is unknown.

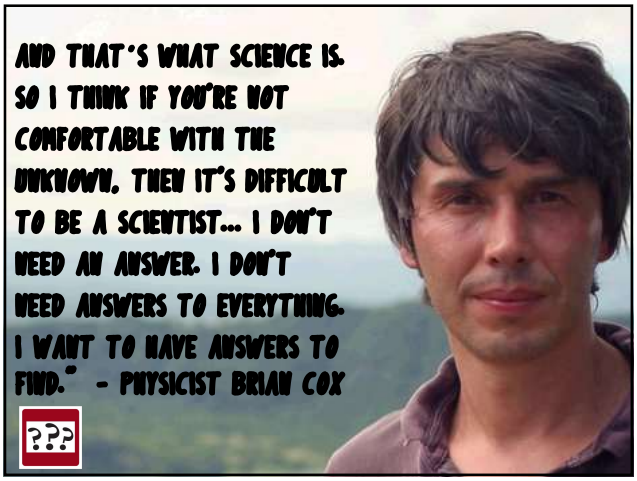
Poincaré Conjecture

In 1904 the French mathematician Henri Poincaré asked if the three dimensional sphere is characterized as the unique simply connected three manifold. This question, the Poincaré conjecture, was a special case of Thurston's geometrization conjecture. Perelman's proof tells us that every three manifold is built from a set of standard pieces, each with one of eight well-understood geometries.

Birch and Swinnerton-Dyer Conjecture

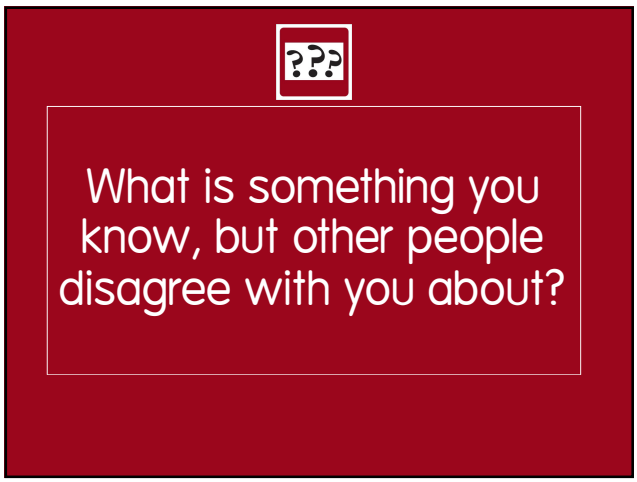
Supported by much experimental evidence, this conjecture relates the number of points on an elliptic curve mod p to the rank of the group of





What do you not know the answer to because that answer is not available?

What is something you do not know the answer to but you could find with currently available knowledge?



Dice Game

- Share your unanswerable question.
- What is your go-to answer source?
- What kinds of ?s cause disagreement?
- What do you think happened to Amelia?
- What is something your SS often think that is wrong?
- What something parents often think that is wrong?

Unanswered Questions

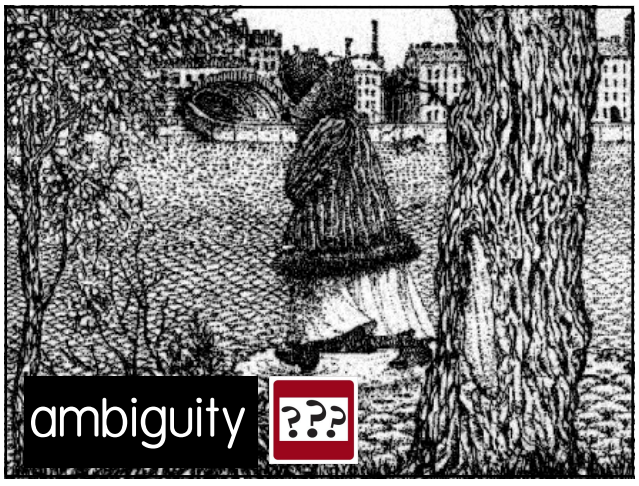

puzzles

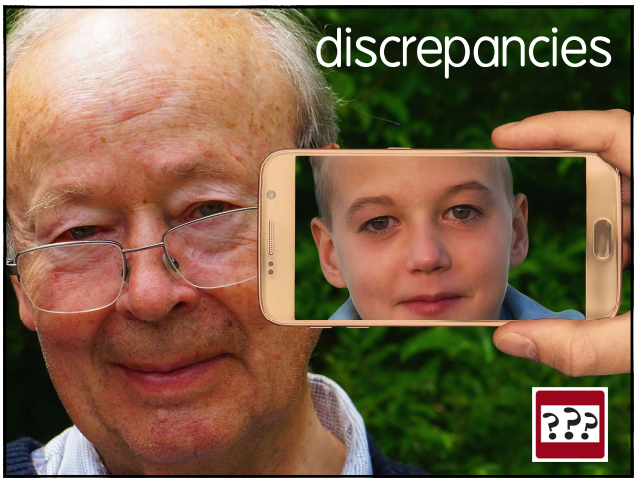

conundrums


dilemmas


lacking certainty


DOUBT KILLS
MORE DREAMS
THAN FAILURE
EVER WILL
SUZY KASSEM
doubtful

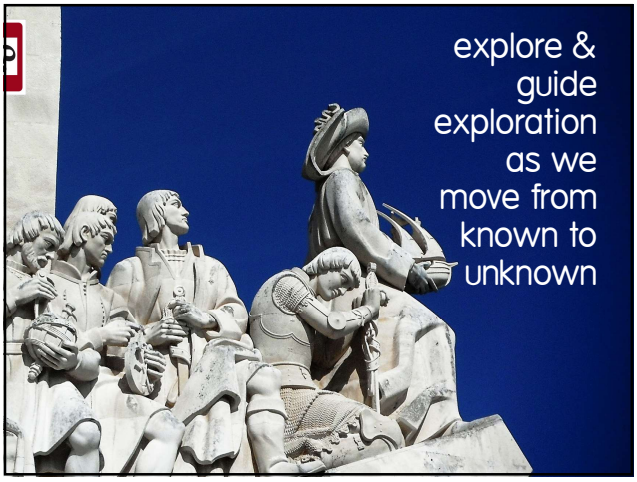

ambiguity

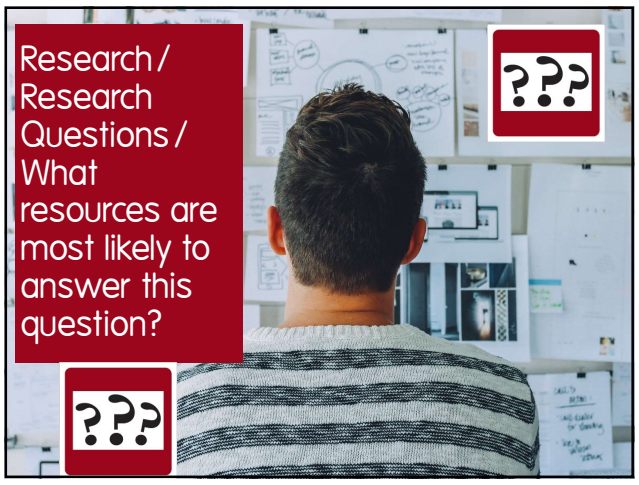

discrepancies

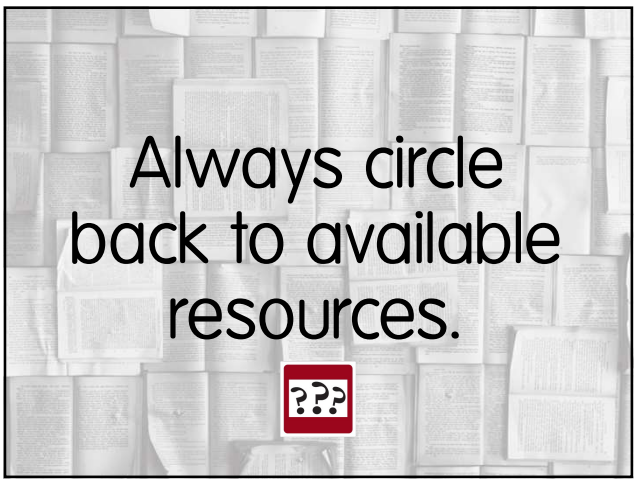
Sometimes know answer for one situation, but not another.

comfort with ambiguity and a sense of wonder

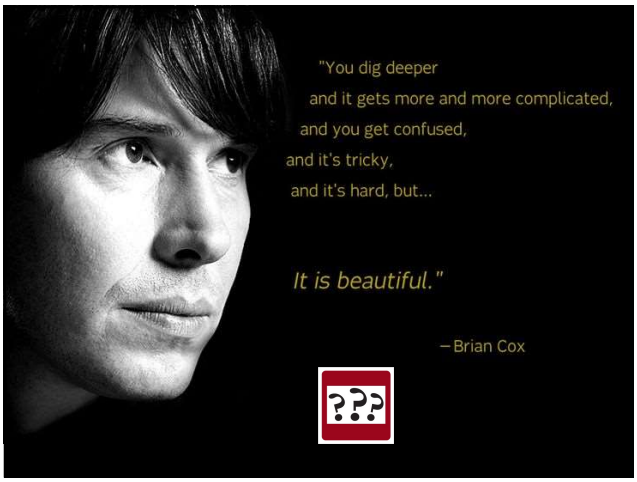
key factor in being a disciplinarian




Research / Research Questions / What resources are most likely to answer this question?


Always circle back to available resources.


Students interview each other: What questions do you still have?


"You dig deeper
and it gets more and more complicated,
and you get confused,
and it's tricky,
and it's hard, but...
It is beautiful."
—Brian Cox

iMPLEMENT: Elementary SS

Low Level :

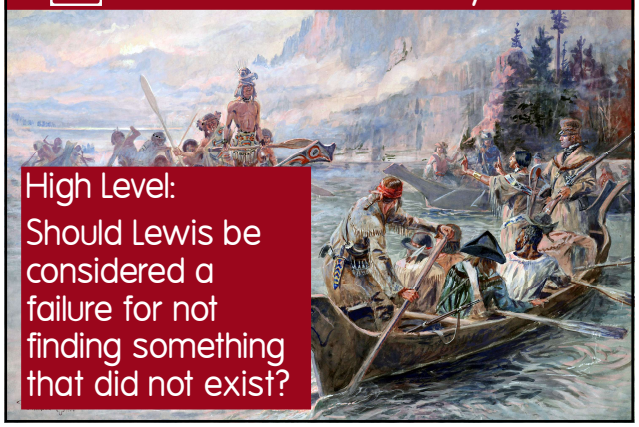
What unanswered questions guided the Corps of Discovery?

iMPLEMENT: Elementary SS

Mid Level:

Compare the unanswered questions that guided L&C with those that guided another explorer.

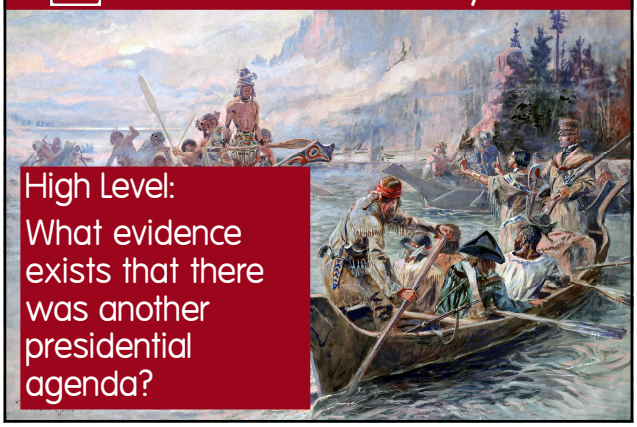
iMPLEMENT: Elementary SS



High Level:

Should Lewis be considered a failure for not finding something that did not exist?

iMPLEMENT: Elementary SS

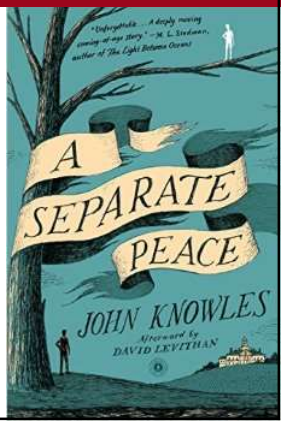


High Level:

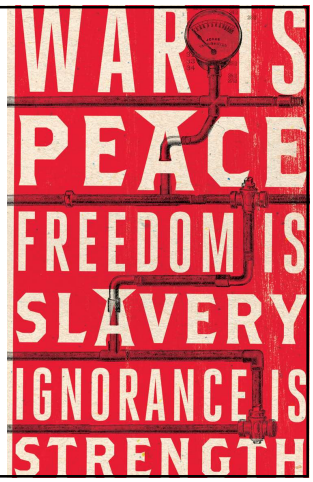
What evidence exists that there was another presidential agenda?

iMPLEMENT: HS ELA

Mock Trial: Did Gene shake the branch on purpose?



Create an illustration of what was in Julia's room 101.



Make a reasonable, supported argument that Kitty marries in a 3-minute video.

iMPLEMENT: HS AP Chem

Create a sophisticated, persuasive scientific poster evaluating the validity of the following unanswered questions in chemistry. Which of them is the most important to be answered?

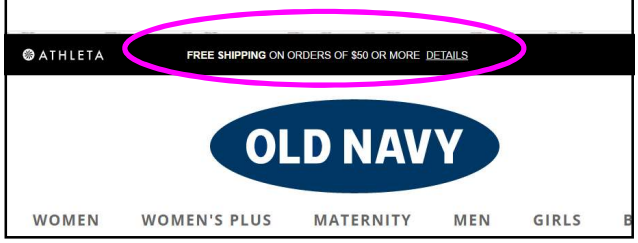
Why can't we design chemical systems more efficient than photosynthesis? We know how it works but we do not know how to build one! Despite the efforts of several decades, artificial photosynthesis has failed to replicate the chemistry of reaction center of photosynthesis. Prashant Kamat, Editor-in-Chief of ACS Energy Letters

Biochemistry on earth is based on abundant water being available, hydrocarbon-based biochemistry, and temperatures in the vicinity of 300 K, plus or minus 50 degrees. Could there be life forms in the universe that are based on radically different chemistry than the biochemistry of earth and that might thrive under conditions far more "extreme" than even the most extreme conditions supporting life on earth?" – Charles Sanders, Interim Editor of Biochemistry

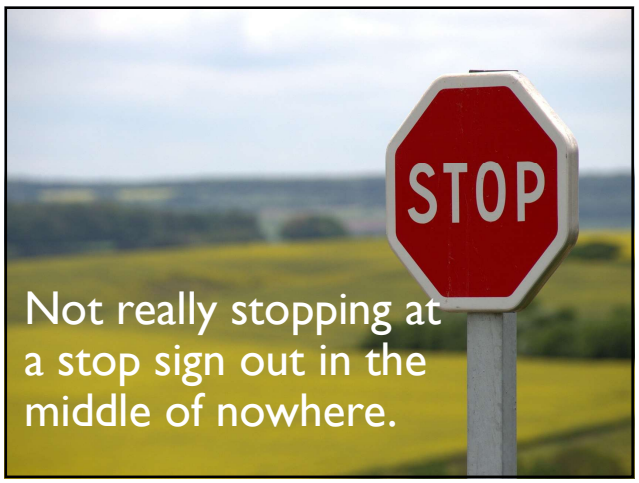
Let's Play a Game

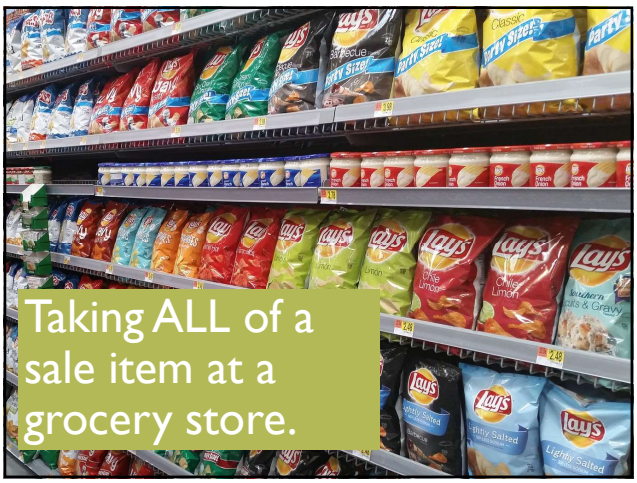
Okay / Not Okay

Ordering something you don't really want to get your order to qualify for free shipping, knowing you're going to send it back.

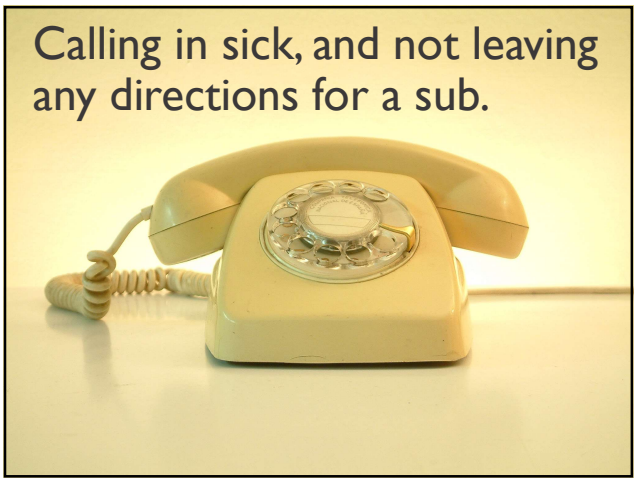


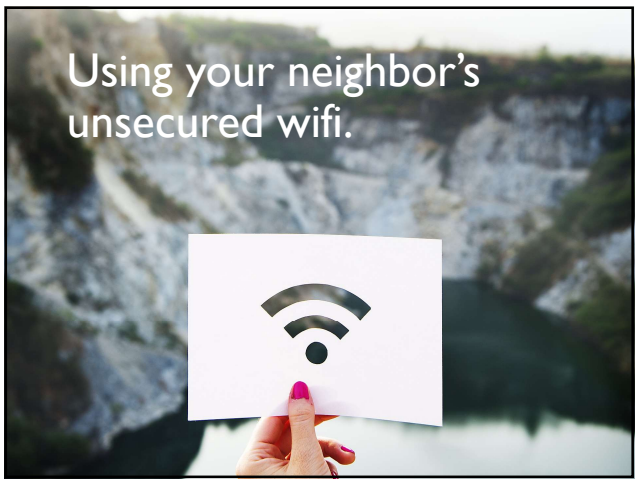
Taking shampoo/ conditioner/ soap from hotel rooms, even if you didn't use it while you were there.

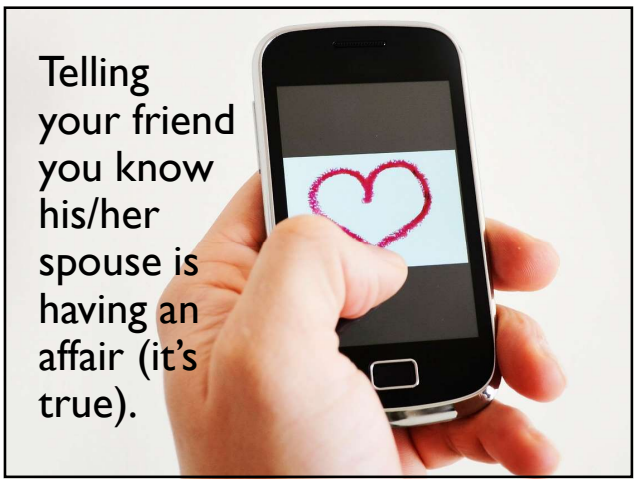

STOP
Not really stopping at a stop sign out in the middle of nowhere.


Taking ALL of a sale item at a grocery store.


22-year-old son says, "That's just capitalism."


Calling in sick, and not leaving any directions for a sub.

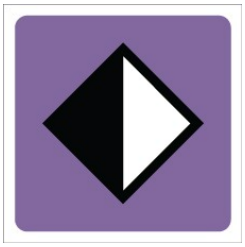

Using your neighbor's unsecured wifi.


Telling your friend you know his/her spouse is having an affair (it's true).

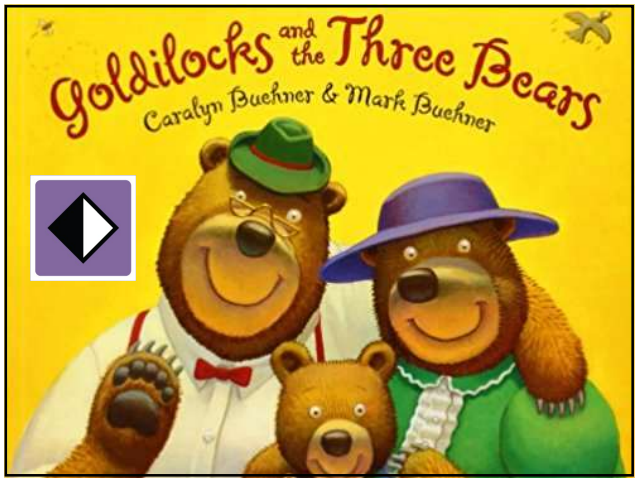

Buy an item of clothing to wear for a special occasion, and leaving the tag on so you can return it after the event.

Ethics

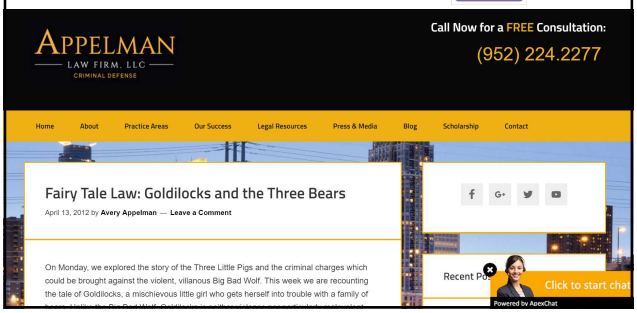
Ethics

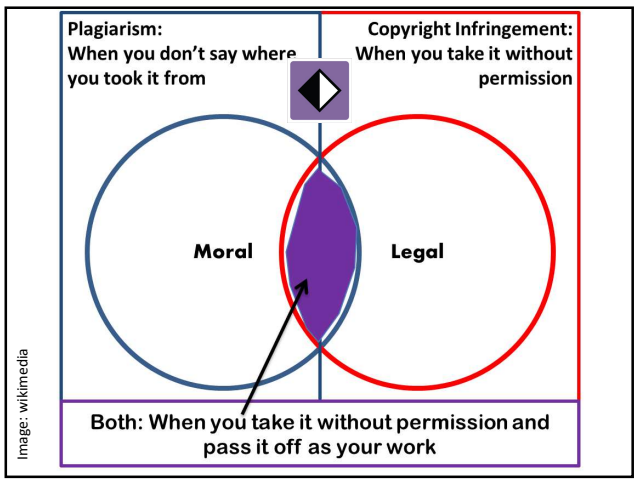


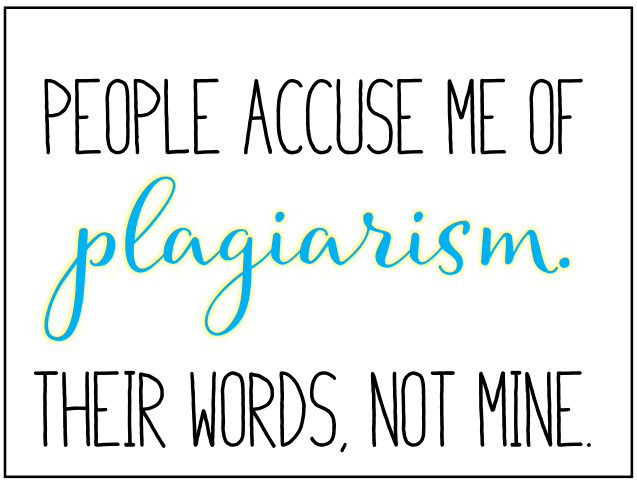
values WHAT IS RIGHT?
FAIRNESS | PHILOSOPHIES
controversy
STANDARDS JUSTICE
morals



APPARENTLY, I'M NOT THE ONLY ONE WHO'S WORRIED ABOUT THIS.




Plagiarism:
When you don't say where you took it from
Copyright Infringement:
When you take it without permission
Moral
Legal
Both: When you take it without permission and pass it off as your work
Image: wikimedia


PEOPLE ACCUSE ME OF
plagiarism.
THEIR WORDS, NOT MINE.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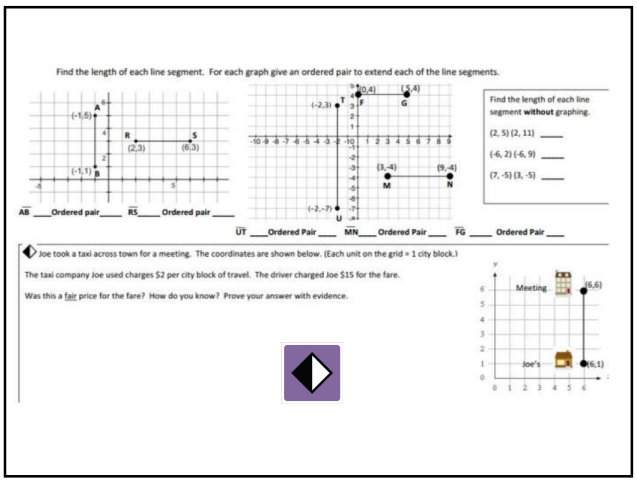
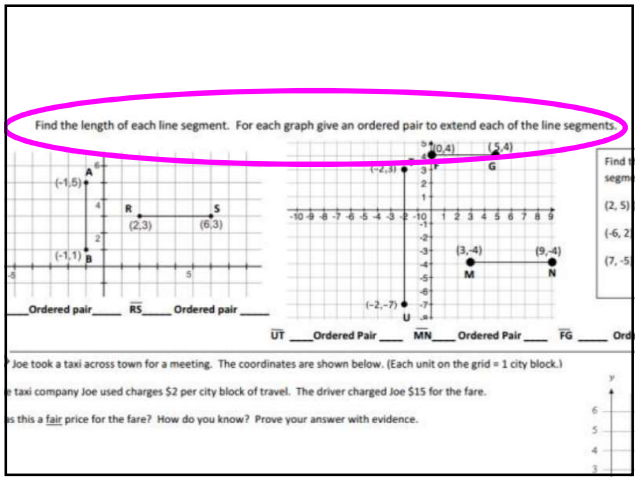
Features
FAQ
Resources
Statistics
Blog
For teachers
Multilingual Plagiarism Checker
Accurate, professional, online


Find the length of each line segment. For each graph give an ordered pair to extend each of the line segments.
Find the length of each line segment without graphing.
(2, 5) (2, 11) ____
(-6, 2) (-6, 9) ____
(7, -5) (3, -5) ____
Joe took a taxi across town for a meeting. The coordinates are shown below. (Each unit on the grid = 1 city block.)
The taxi company Joe used charges $2 per city block of travel. The driver charged Joe $15 for the fare.
Was this a fair price for the fare? How do you know? Prove your answer with evidence.
Meeting
Joe's


Find the length of each line segment. For each graph give an ordered pair to extend each of the line segments.
Ordered pair
RS
Ordered pair
UT
Ordered Pair
MN
Ordered Pair
FG
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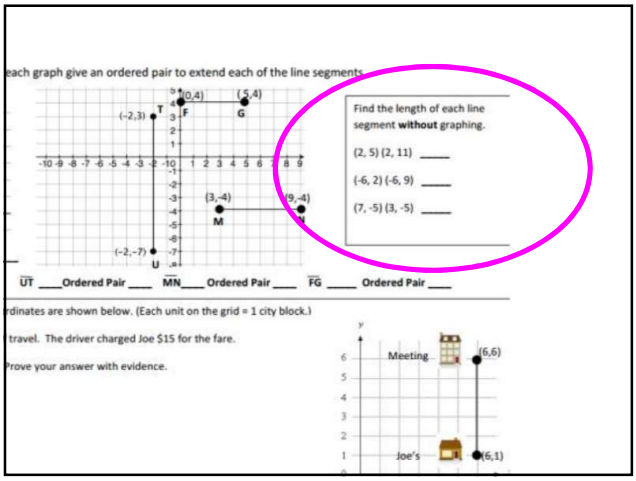
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(2, 5) (2, 11)
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UT
Ordered Pair
MN
Ordered Pair
FG
Ordered Pair
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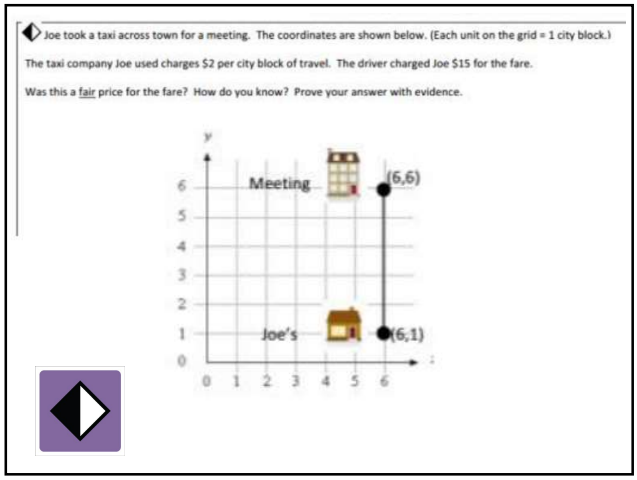
Meeting
Joe's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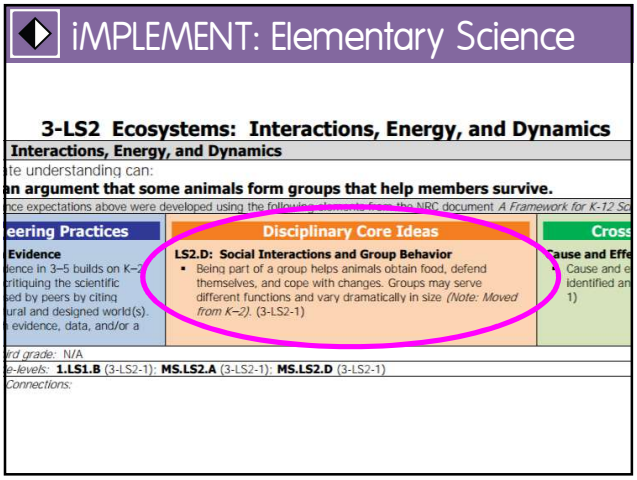
The taxi company Joe used charges $2 per city block of travel. The driver charged Joe $15 for the fare.
Was this a fair price for the fare? How do you know? Prove your answer with evidence.
Meeting
(6,6)
Joe's
(6,1)


iMPLEMENT: Elementary Science
3-LS2 Ecosystems: Interactions, Energy, and Dynamics
Interactions, Energy, and Dynamics
te understanding can:
an argument that some animals form groups that help members survive.
eering Practices
Evidence
Disciplinary Core Ideas
LS2.D: Social Interactions and Group Behavior
Being part of a group helps animals obtain food, defend themselves, and cope with changes. Groups may serve different functions and vary dramatically in size (Note: Moved from K–2). (3-LS2-1)
Cross
Cause and Effe
identified an
1)
rd grade: N/A
e-levels: 1.LS1.B (3-LS2-1); MS.LS2.A (3-LS2-1); MS.LS2.D (3-LS2-1)
Connections:

First, intro content in your fave way.

{Here's an example}

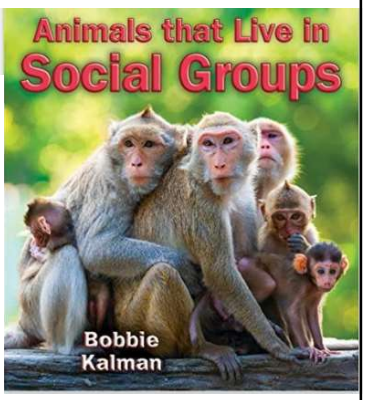
99 strange collective animal names

Whether it's a shrewdness of apes or a zeal of zebras, lots of animals have bizarre names when they cluster into crowds.

1st, we'll have a little fun with crazy names for groups of animals.

I'll flip the classroom & have them watch this video at home.

Next, they'll come back to class & we'll read this book, looking for connections between it and the video.



Why Live in Groups

There are several major disadvantages to living in gr

1. Greater competition for food, mates, sleeping site

2. Increase parasite and disease load.

There is an incidental reason why some animals live
individuals. E.g., birds don't nest on cliffs because th
because they are attracted by a scarce resource: cliff

How do individuals benefit by living in groups?

1. **Cooperative food collection**. Wolves hunt together. By doing so each can more easily track an
large game. Although the individual has to share meat, each still benefits from group hunting.
hunting is less important in primates. Chimps hunt some but meat is not a major part of their d
hunting is important in many human societies, however.

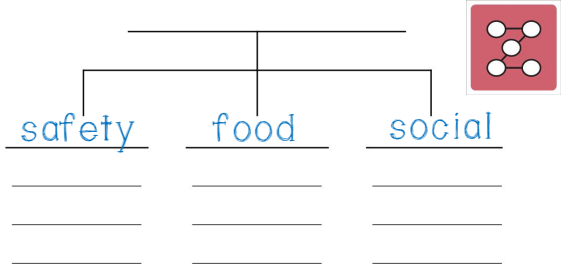
2. **Sleeping together to conserve warmth**. This explains why individuals form groups at night bu
explain why groups are maintained during the day.

3. **Shared information.** By forming groups, individuals car
example, frugivores let each other know where fruit trees

4. **Protection from predators**. There are three reasons wh
predation.

My advanced learners will read a scholarly article instead.

Next, the students will create a tree map classifying animals by the reasons they group.



My advanced students will create a persuasive piece (brochure or commercial) encouraging the polar bear to begin living in groups.

And then….enter ETHICS.

Students will debate:

Resolved: It is fair for packs of animals to hunt in order to kill a solitary animal.

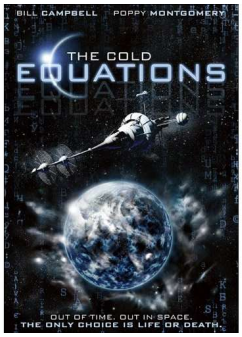
iMPLEMENT: Secondary Science

Ethics of… cloning … nomenclature … climate change … animal dissection …

iMPLEMENT: ELA

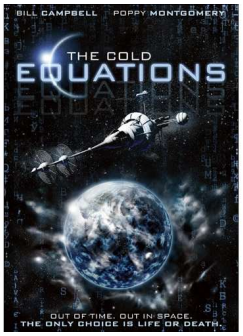
What is the ethical dilemma faced by Barton in *Cold Equations*?

So shallow; go deeper.



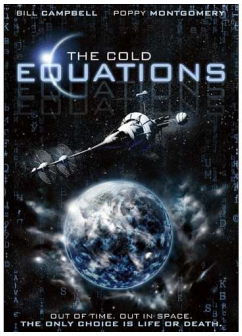
iMPLEMENT: ELA

Find a solution to Barton's ethical dilemma in *Cold Equations.*



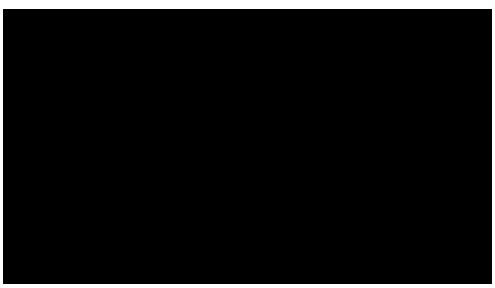
iMPLEMENT: ELA

Hold a mock trial for Barton.



8

The Three Stooges Meet Depth & Complexity



BIG IDEA

BIG IDEA

CAPTURE EVERYTHING YOU KNOW ABOUT SOMETHING IN ONE SENTENCE.

- ❑ LAB SAFETY
- ❑ MULTIPLICATION
- ❑ DEMOCRACY
- ❑ POETRY
- ❑ THE TREBLE CLEF
- ❑ IRREGULAR VERBS

CAN BE COMPLICATED, EVEN FOR THINGS THAT SEEM SIMPLE…AND THE REVERSE IS ALSO TRUE.

Mandelbrot set

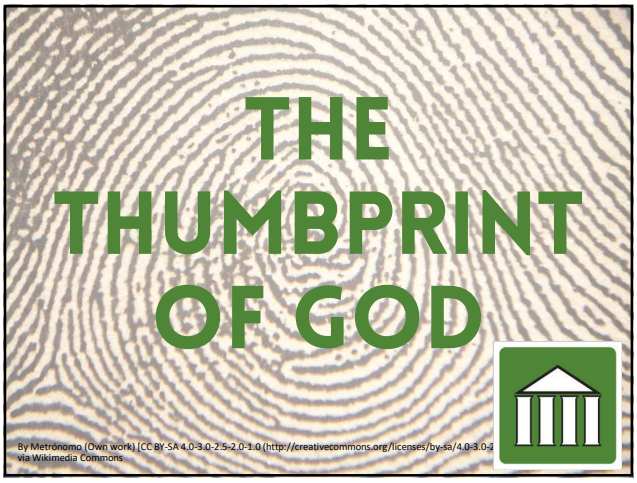
From Wikipedia, the free encyclopedia

The **Mandelbrot set** is the set of complex numbers c for which the function $f_c(z) = z^2 + c$ does not diverge when iterated from $z = 0$, i.e., for which the sequence $f_c(0)$, $f_c(f_c(0))$, etc., remains bounded in absolute value.

THIS IS JUST A DEFINITION

The Mandelbrot set is an example of a complex structure arising from the application of simple rules.

It is one of the best-known examples of mathematical visualization.



It can get you into trouble.

GOD IS LOVE.
LOVE IS BLIND.
STEVIE WONDER IS BLIND.
STEVIE WONDER IS GOD.

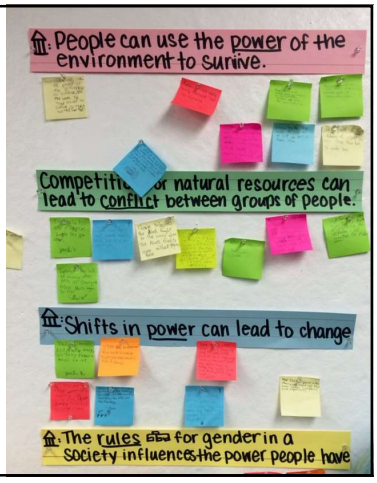
iMPLEMENT

ALWAYS SUPPORT BIG IDEA WITH DETAILS

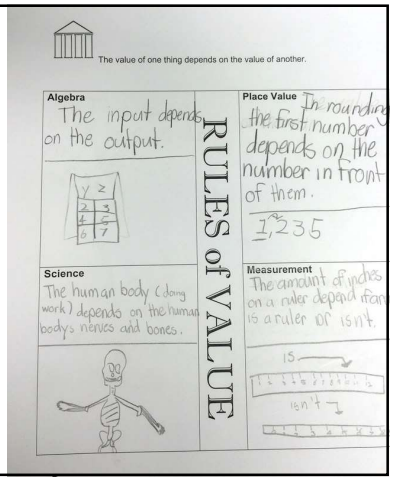
Ian's idea...

It can be used as a group or whole class activity.

http://wiseschool.weebly.com/grade-four1/relating-the-big-idea

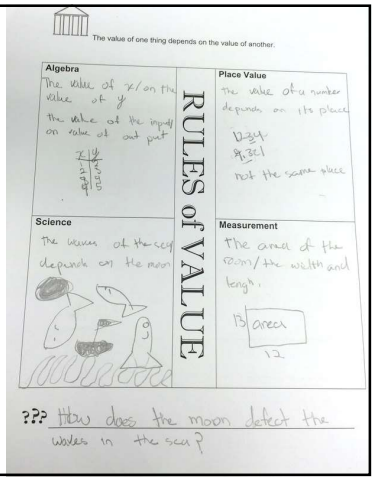


Lead students to or through Big Idea by integrating with Across Disciplines.

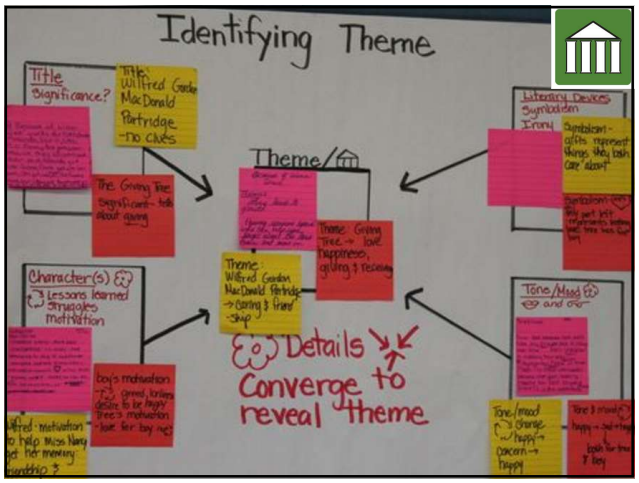


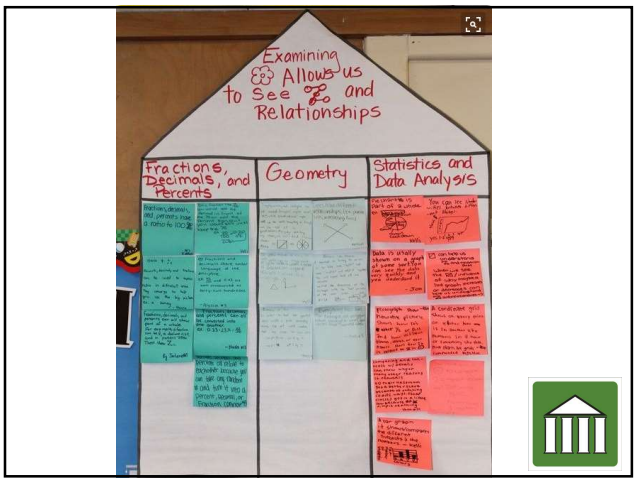
http://wiseschool.weebly.com/grade-four1/relating-the-big-idea

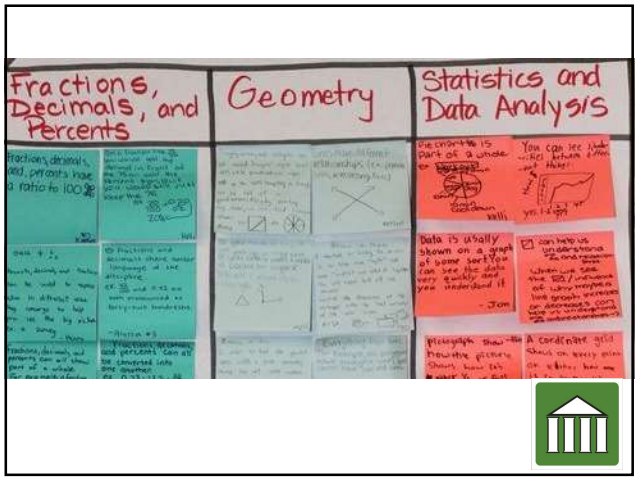
Lead students to or through Big Idea by integrating with Across Disciplines.



http://wiseschool.weebly.com/grade-four1/relating-the-big-idea







iMPLEMENT: Elementary Math

Ian's example...

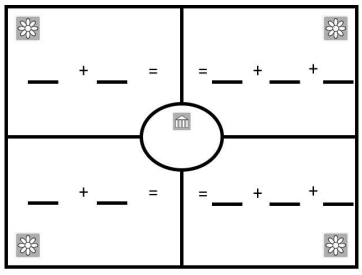
Ask students to group up (or work solo). Give them these examples:

- $5^2 = 25$
- $4^2 = 16$
- $3^2 = 9$

Ask them to determine the job of that *incredible flying two*.

iMPLEMENT: Elementary Math

Lisa's example...



iMPLEMENT: Middle Math (8th)

Why can't these systems of linear equations be solved? (eyes & brains only)

$3x + 2y = 5$ and $3x + 2y = 6$

$2x + 6y = 12$ and $2x + 6y = 10$

iMPLEMENT: Middle Math (8th)

Can these be solved?

$3x + 2y = 5$ and $3x + 2y = 6$

$2x + 6y = 12$ and $2x + 6y = 10$

Differentiate it (need support):

Big Idea: Some _____ can be _____ through _____ and don't need to be calculated.

Word Bank: solved inspection problems

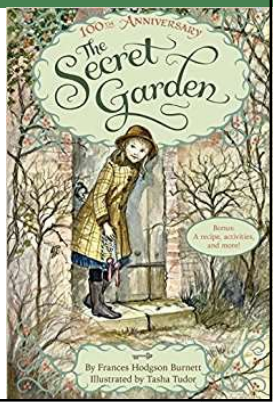
Differentiate it (advanced):

Which of the two Big Ideas below have the most application to other math problems as well?

- Some problems can be solved by inspection and don't need calculation.
- Variables must have unique values in a system of equations.

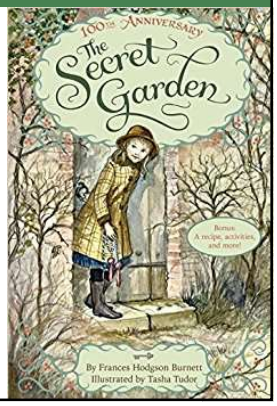
iMPLEMENT: Elementary ELA (5th)

What can you say about the importance of outdoor spaces based on this book alone?

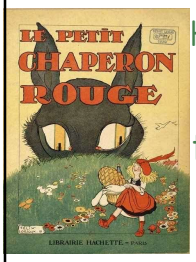


iMPLEMENT: Elementary ELA (5th)

What other texts have we read this year that have the same or similar Big Idea?



iMPLEMENT: World Languages



How is a Big Idea in *Les Trois Petits Cochons* similar to a Big Idea in *Le Petit Chaperon Rouge?*

Il était une fois une maman cochon qui avait trois petits cochons. Elle les aimait beaucoup, mais comme il n'y avait pas assez de nourriture pour qu'ils puissent tous manger à leur faim, elle les a envoyé tenter leur chance dans le vaste monde.

IS THIS GOOD, BAD, OR NEUTRAL?

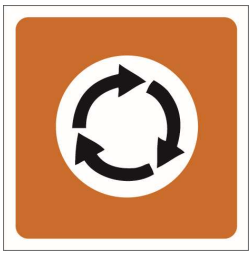
IS THIS GOOD, BAD, OR NEUTRAL?

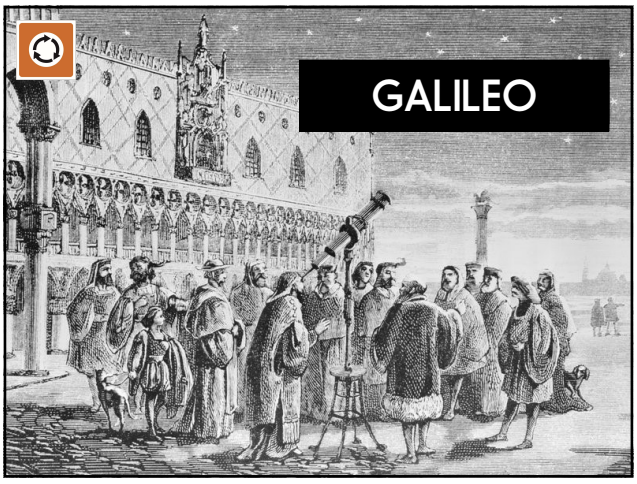
OVER TIME

THINK OF AN OBSOLETE PROBLEM.

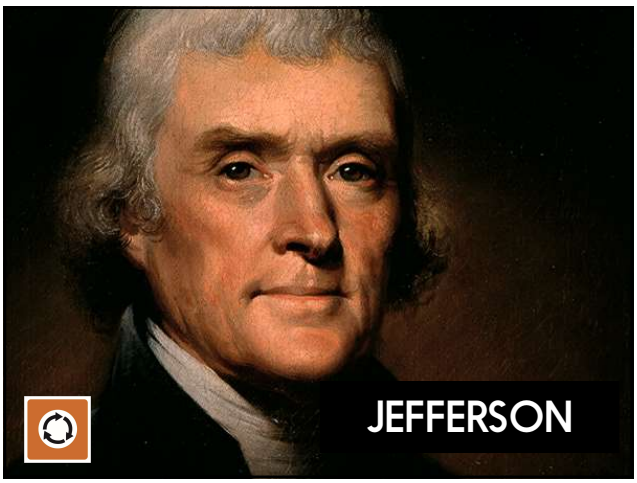
THINK OF A NEW PROBLEM.

OVER TIME

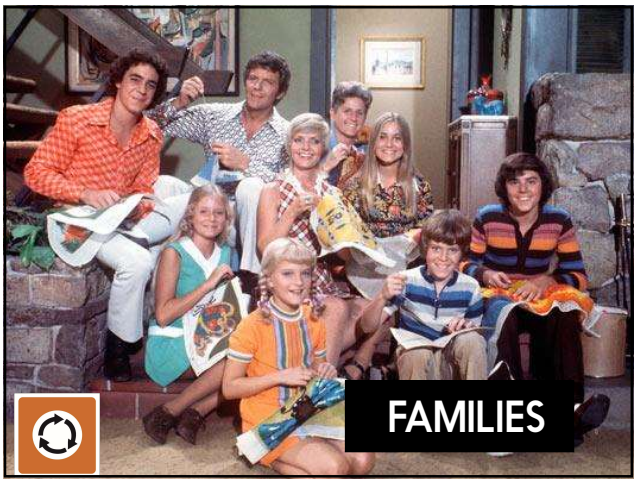


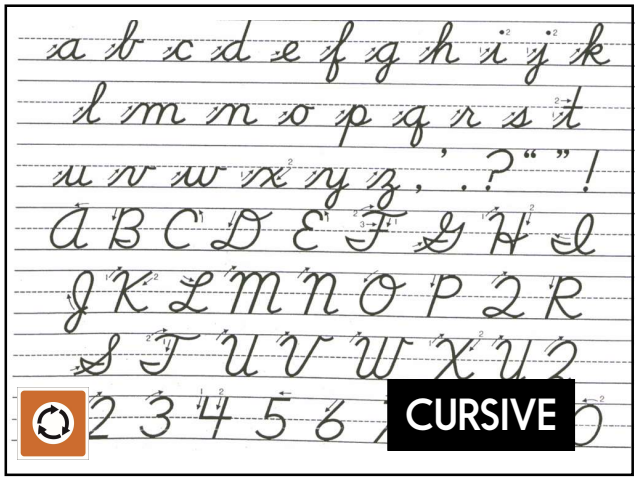


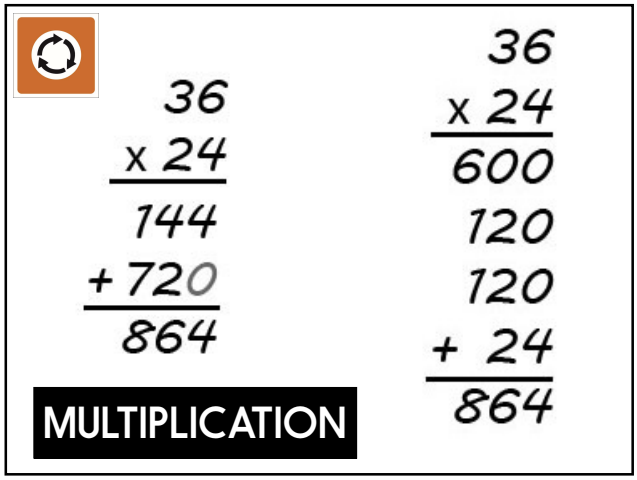

SHAKESPEARE


JEFFERSON


Viceroys
FILTER
the Smoke!
As your Dentist,
I would recommend
SMOKING

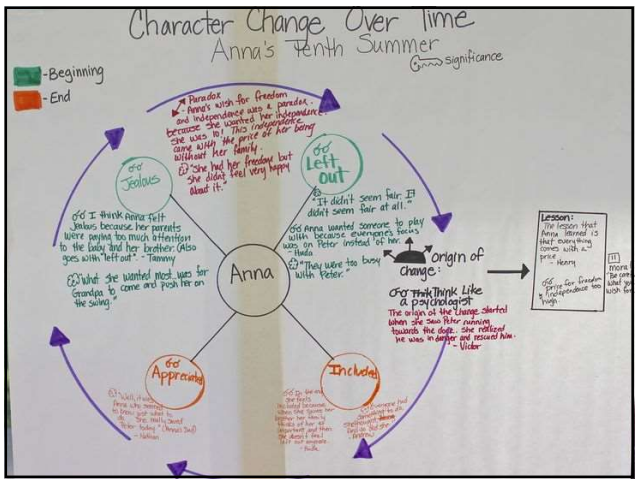

FAMILIES





How has something changed over time in your discipline?

[write it down]



iMPLEMENT: Secondary Math

Set up a uniform rate table for the challenge below:

A 555-mile, 5-hour plane trip was flown at two speeds. For the first part of the trip, the average speed was 105 mph. Then the tailwind picked up, and the remainder of the trip was flown at an average speed of 115 mph. For how long did the plane fly at each speed?

$D = RT$

	DISTANCE	RATE	TIME
1st PART	d	105 mph	t
2nd PART	$555 - d$	115 mph	$5 - t$
TOTAL	555 miles	----------	5 hours

Remember: D = RT

	DISTANCE	RATE	TIME	
1st PART	d	105 mph	t	$d = 105t$
2nd PART	$555 - d$	115 mph	$5 - t$	$555 - d = 115(5 - t)$
TOTAL	555 miles	----------	5 hours	

Ya with me, humanities peeps?

What happens over time to the plane?

Would it be fair to charge passengers more for planes that fly faster?

Differentiate it:

What would your hourly pay rate have to be to justify paying an extra $150 for the faster rate of speed?

(trickstier than it looks)

iMPLEMENT: Kinder Math

Which of these could be a bedtime?
A dinner time?
Sleeping time?

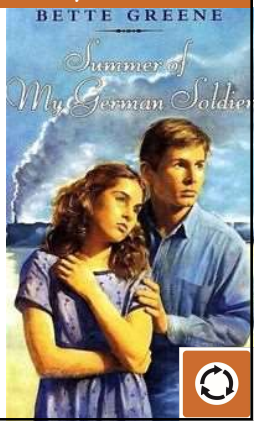
Differentiate it:

Think of something you would not be likely to do at these times.

When it's these times for you, what time is for people in Sydney, AU?

iMPLEMENT: Secondary ELA

Use the Thinking Map of your choice to compare and contrast a character as he/she changes from the beginning of the novel to the end.

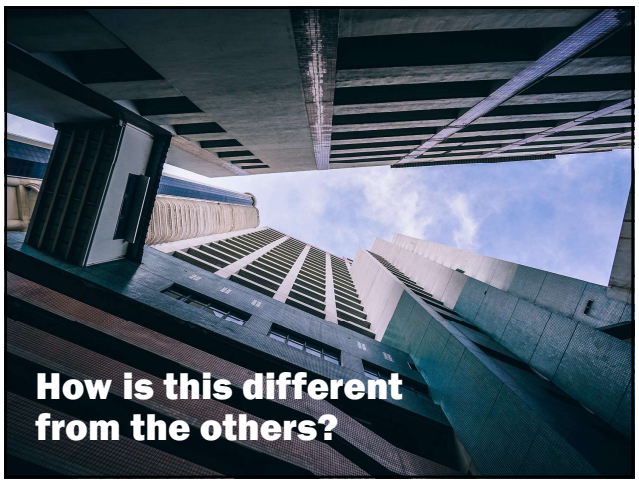


iMPLEMENT: Secondary ELA

Imagine that there were a sequel written. What conflict might exist at the beginning of the sequel? Design a movie poster that uses a one-line slogan highlighting that conflict.

10

Let's Look

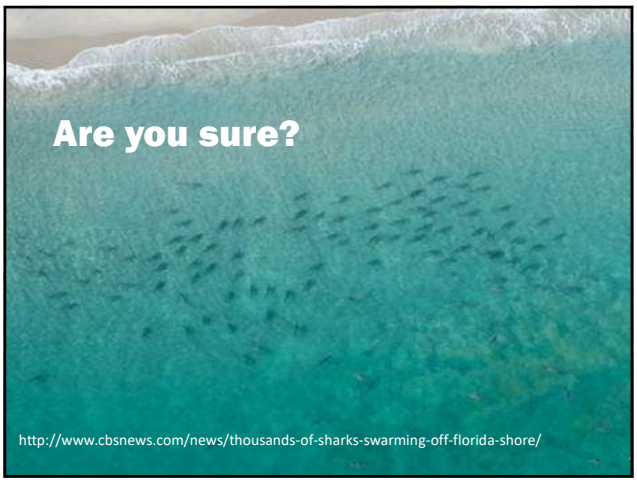

How is this different from the others?


Who would want to see from this angle?


How would someone be sitting who had this perspective?

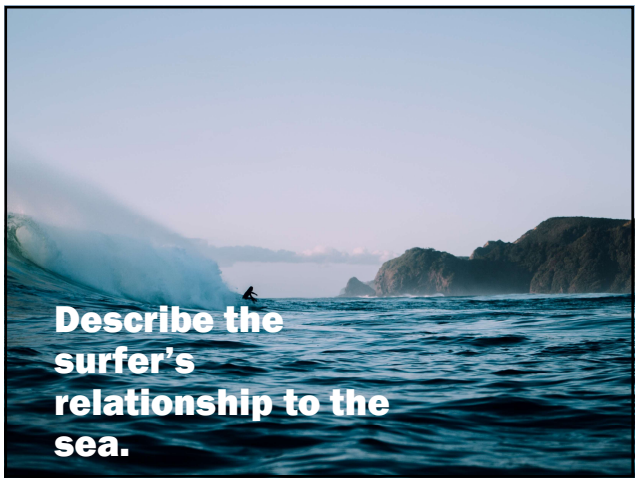

Would this be a better apartment building or office building?

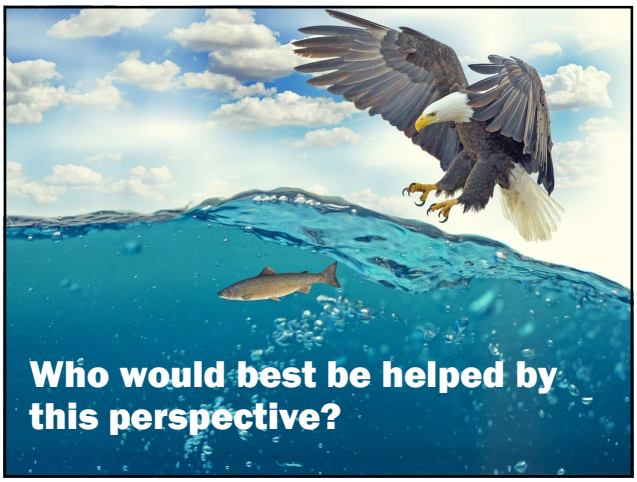
Let's Look Some More



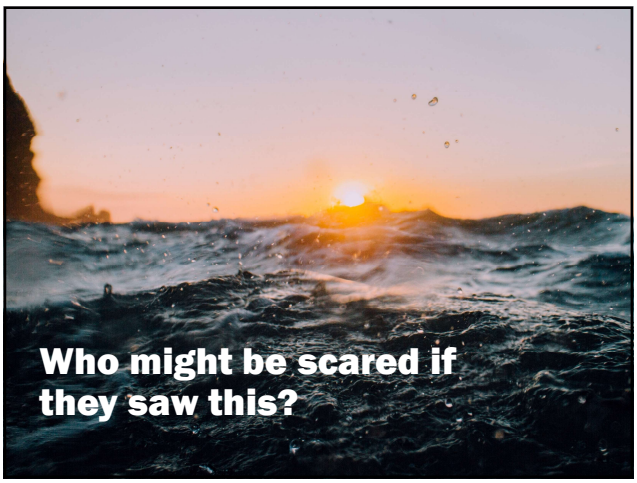

What are some contrasts you see?


What animals have this perspective?

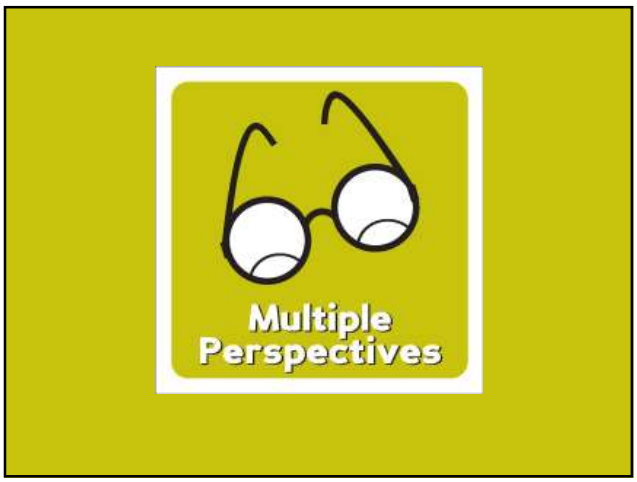

Describe the surfer's relationship to the sea.


Who would best be helped by this perspective?


How would a marine biologist feel about the boats? Same or different from the boaters?


Who might be scared if they saw this?

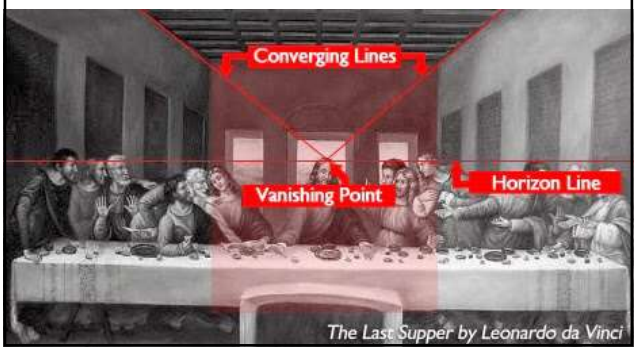

Who is most worried about this?
http://latimesblogs.latimes.com/lanow/2012/06/great-pacific-garbage-patch-tsunami-debris.html

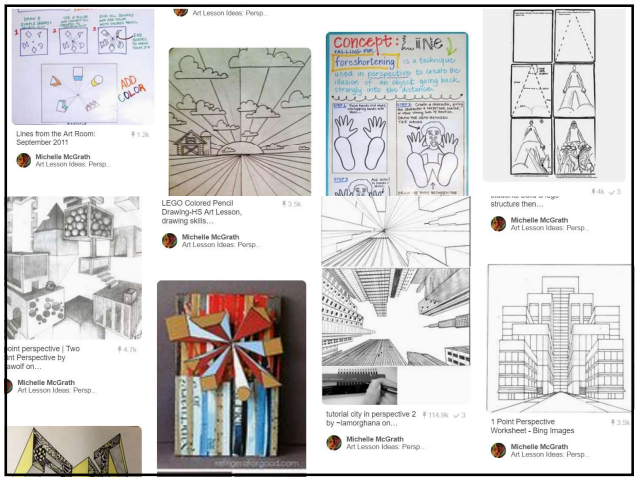

Multiple Perspectives

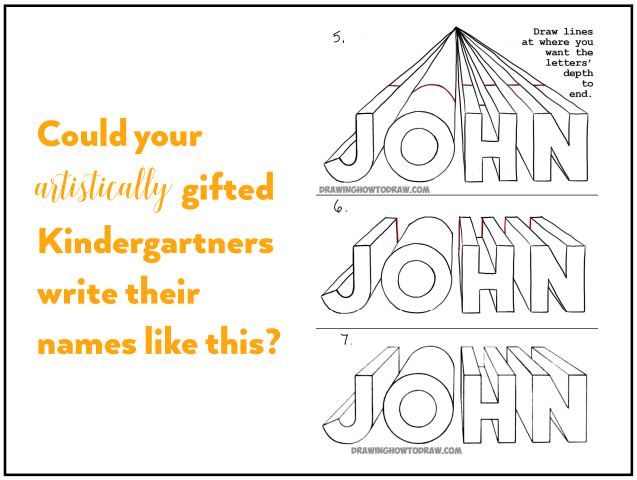
Perspective is an art technique for creating an illusion of three dimensions (depth and space) on a two-dimensional (flat) surface.

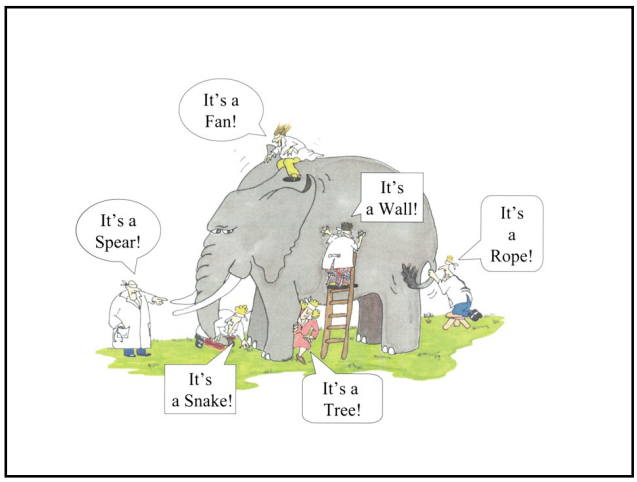
Perspective is what makes a painting seem to have form, distance, and look "real".

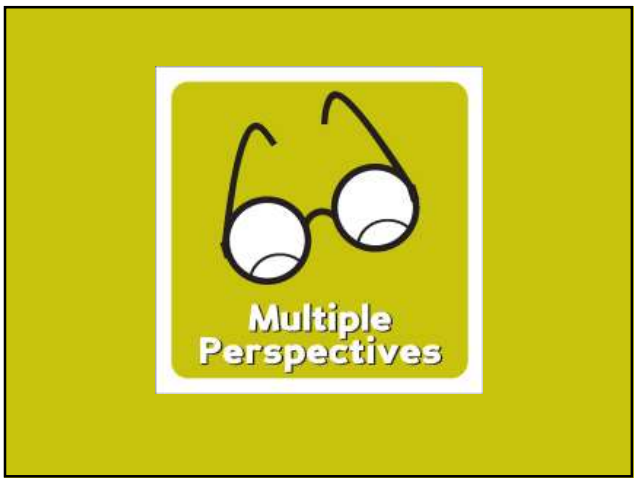
There are techniques for this.



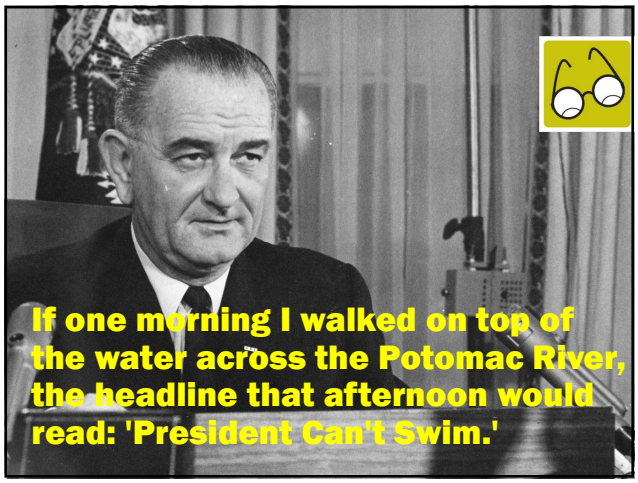

Lines from the Art Room: September 2011
Michelle McGrath
Art Lesson Ideas: Persp...
LEGO Colored Pencil Drawing-HS Art Lesson, drawing skills...
Michelle McGrath
Art Lesson Ideas: Persp...
tutorial city in perspective 2 by ~lamorghana on...
Michelle McGrath
Art Lesson Ideas: Persp...
1 Point Perspective Worksheet - Bing Images
Michelle McGrath
Art Lesson Ideas: Persp...


Could your artistically gifted Kindergartners write their names like this?
5.
Draw lines at where you want the letters' depth to end.
JOHN
DRAWINGHOWTODRAW.COM
6.
JOHN
7.
JOHN
DRAWINGHOWTODRAW.COM


It's a Fan!
It's a Spear!
It's a Wall!
It's a Rope!
It's a Snake!
It's a Tree!


Multiple Perspectives

Perspective affects interpretation of *events, actions,* **and even** *facts.*



iMPLEMENT

iMPLEMENT: Elementary Science

5-PS2 Motion and Stability: Forces and Interactions

5-PS2 Motion and Stability: Forces and Interactions		
Students who demonstrate understanding can:		
5-PS2-1. Support an argument that the gravitational force exerted by Earth on objects is directed down. [Clarification Statement: "Down" is a local description of the direction that points toward the center of the spherical Earth.] [Assessment Boundary: Assessment does not include mathematical representation of gravitational force.]		
The performance expectations above were developed using the following elements from the NRC document *A Framework for K-12 Science Education*:		
Science and Engineering Practices	**Disciplinary Core Ideas**	**Crosscutting Concepts**
Engaging in Argument from Evidence Engaging in argument from evidence in 3–5 builds on K–2 experiences and progresses to critiquing the scientific explanations or solutions proposed by peers by citing relevant evidence about the natural and designed world(s). • Support an argument with evidence, data, or a model. (5-PS2-1)	**PS2.B: Types of Interactions** • The gravitational force of Earth acting on an object near Earth's surface pulls that object toward the planet's center. (5-PS2-1)	**Cause and Effect** • Cause and effect relationships are routinely identified and used to explain change. (5-PS2-1)
Connections to other DCIs in fifth grade: N/A		
Articulation of DCIs across grade-levels: **3.PS2.A** (5-PS2-1); **3.PS2.B** (5-PS2-1); **MS.PS2.B** (5-PS2-1); **MS.ESS1.B** (5-PS2-1); **MS.ESS2.C** (5-PS2-1)		
Common Core State Standards Connections: *ELA/Literacy –* **RI.5.1** Quote accurately from a text when explaining what the text says explicitly and when drawing inferences from the text. *(5-PS2-1)* **RI.5.9** Integrate information from several texts on the same topic in order to write or speak about the subject knowledgeably. (5-PS2-1) **W.5.1** Write opinion pieces on topics or texts, supporting a point of view with reasons and information. (5-PS2-1)		

iMPLEMENT: Elementary Science

5-PS2 Motion and Stability: Forces and Interactions

Disciplinary Core Ideas

PS2.B: Types of Interactions

- The gravitational force of Earth acting on an object near Earth's surface pulls that object toward the planet's center. (5-PS2-1)

Which is more affected by gravity, the moon or Earth?

Debate: Because of gravity, planets with large masses are bossier than planets with a smaller mass.

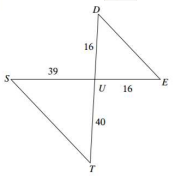
iMPLEMENT: Secondary Math

The concepts of congruence, similarity, and symmetry can be understood from the perspective of geometric transformation. Fundamental are the rigid motions: translations, rotations, reflections, and combinations of these, all of which are here assumed to preserve distance and angles (and therefore shapes generally). Reflections and rotations each explain a particular type of symmetry, and the symmetries of an object offer insight into its attributes—as when the reflective symmetry of an isosceles triangle assures that its base angles are congruent.

Perspective is a central tenet of geometry.

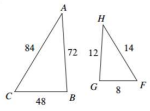
State if the triangles in each pair are similar. If so, state how you know they are similar and complete the similarity statement.

1)



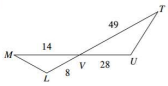
$\Delta UTS \sim$ _____

2)



$\Delta CBA \sim$ _____

3)



4)

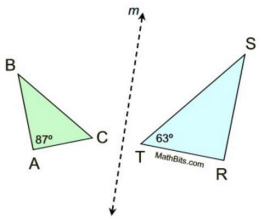
You can be very simplistic, but please don't stop there.

7. ΔRST was dilated and then reflected over line m to create image ΔABC.

a) Which angle in the image is 63°?

Choose:

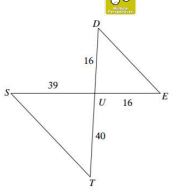
- $\angle C$
- $\angle S$
- $\angle B$
- $\angle R$



You can be very simplistic, but please don't stop there.

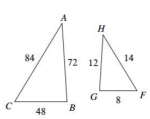
State if the triangles in each pair are similar. If so, state how you know they are similar and complete the similarity statement.

1)



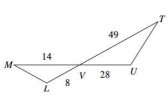
$\Delta UTS \sim$ _____

2)



$\Delta CBA \sim$ _____

3)



4)

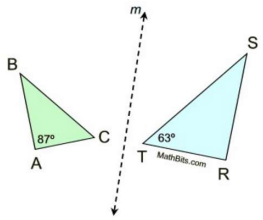
How would a landscape architect use this?

7. ΔRST was dilated and then reflected over line m to create image ΔABC.

a) Which angle in the image is 63°?

Choose:

- ∠C
- ∠S
- ∠B
- ∠R



What words would a landscape artist use to describe this?

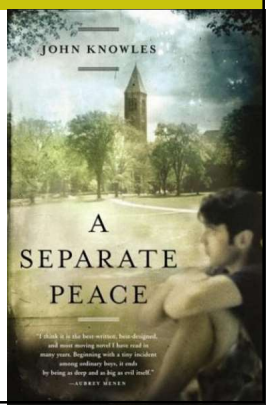
Things can be very different from each other, and yet be similar in very important ways.

Multiple Perspectives + Big Idea

iMPLEMENT: Secondary ELA

Multiple Perspectives

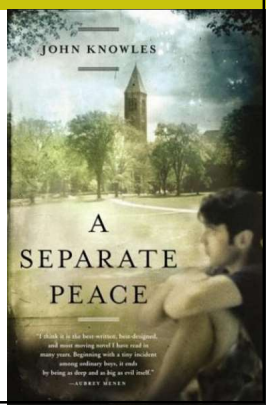
Analyze two conflicts in the story from the perspectives of Finny and Gene.



Don't forget the product piece:

Multiple Perspectives

Create a cause and effect chain that explores the origins of the conflicts.



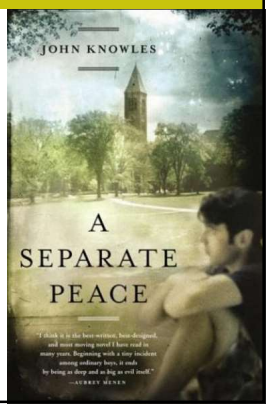
Differentiate it:

Choose one the following artists

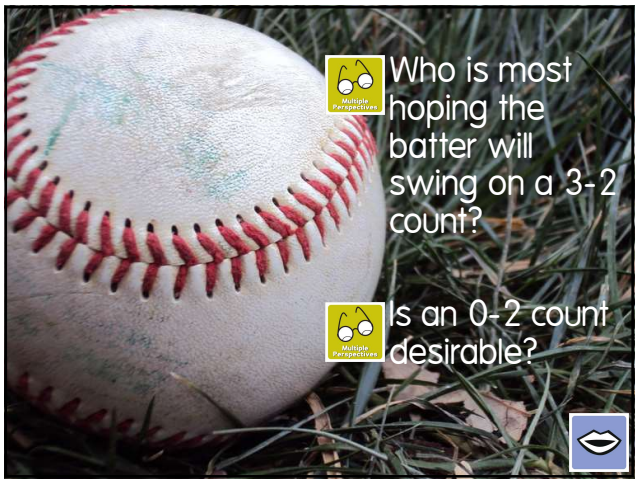
+

and select three of their works that best represent the narrative style of Gene. [poster]

- M.C. Escher
- Van Gogh



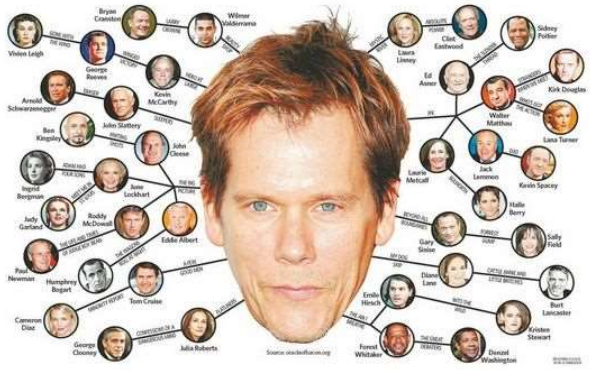
iMPLEMENT: Physical Education

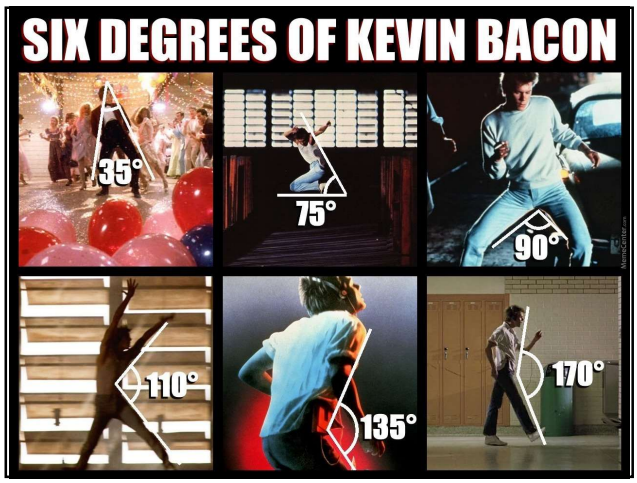


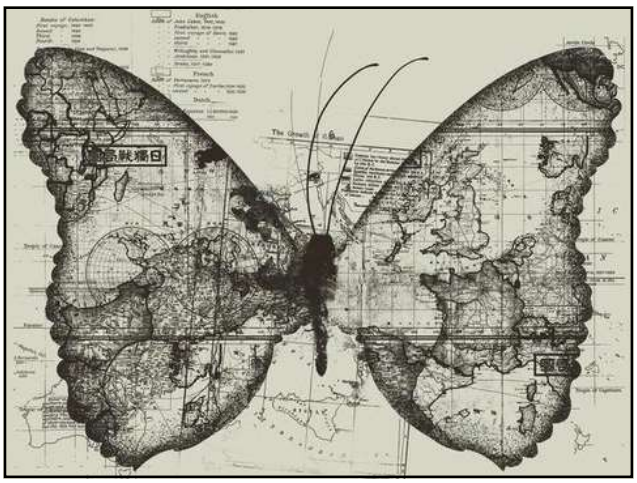
What was your undergraduate major?

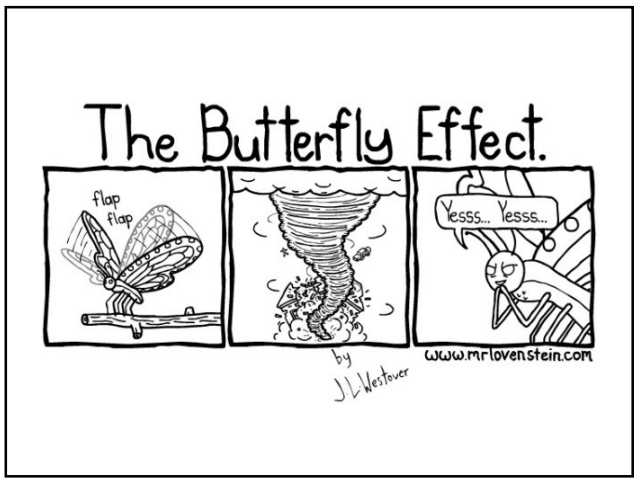
HOW POPULAR IS YOUR MAJOR?

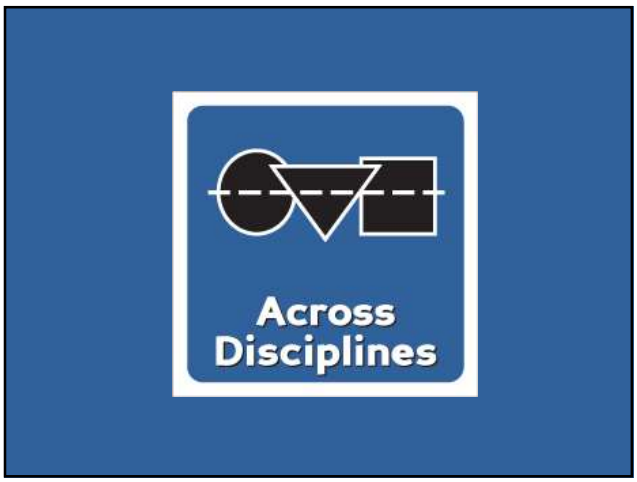
Business
Health Professions & Related Fields
Social Sciences & History
Psychology
Biology & Biological Sciences
Engineering
Visual & Performing Arts
Education
Communication & Journalism
Homeland Security/Law Enf./Firefight.




SIX DEGREES OF KEVIN BACON
35°
75°
90°
110°
135°
170°



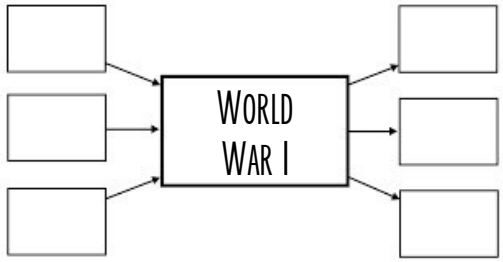

The Butterfly Effect.
flap flap
Yesss... Yesss...
by J.L. Westover
www.mrlovenstein.com


Across Disciplines

This is more than just language arts + history.

Across Disciplines

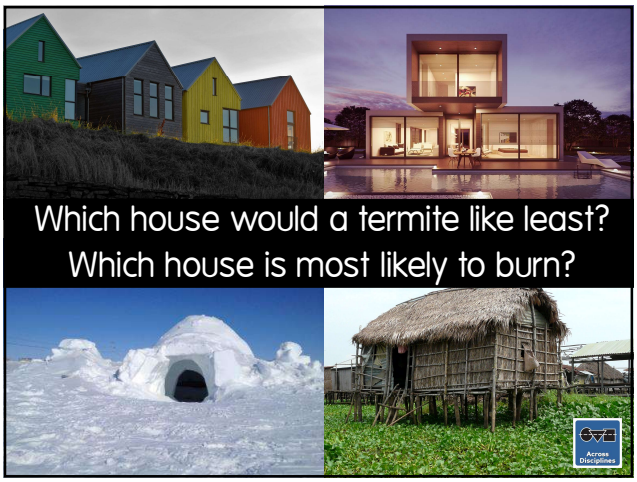
Create a multi-flow map, showing the way that World War 1 connects with science, math, and poetry.

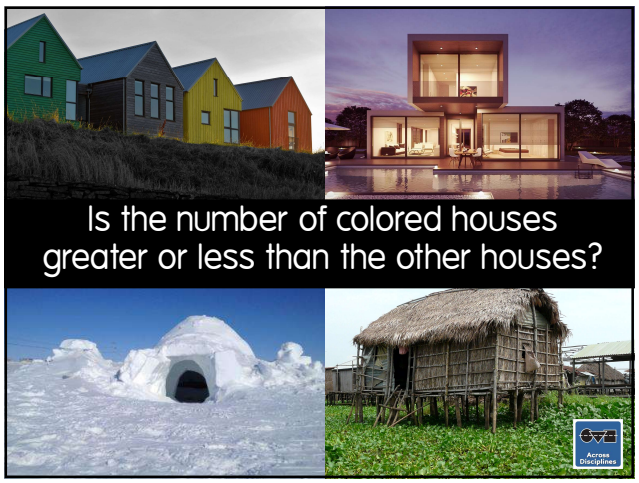


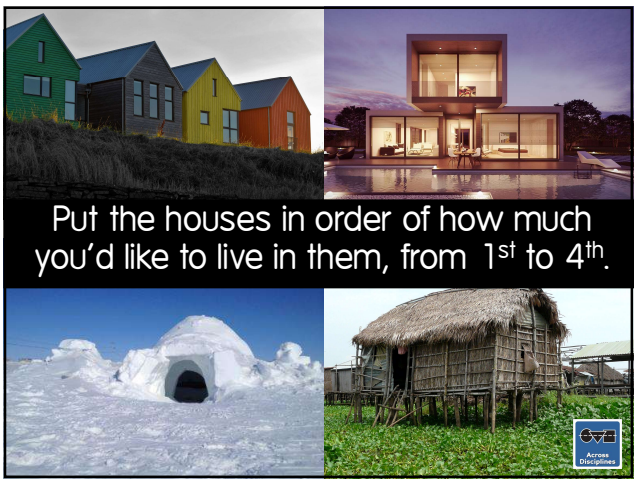

iMPLEMENT: Kinder Social Studies
Would a sailor rather have a map or a globe?

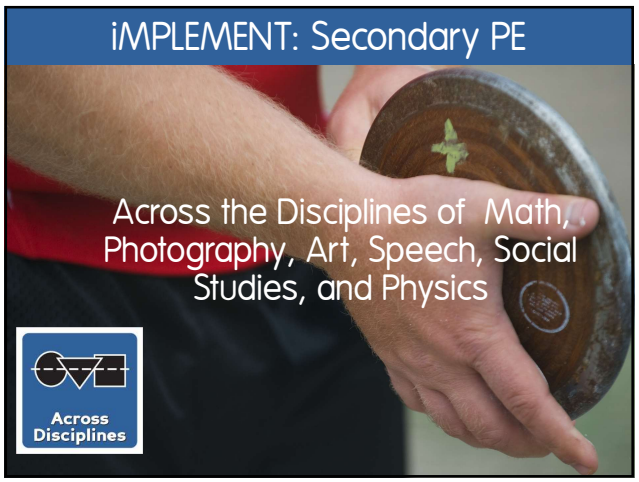

How about an astronaut?

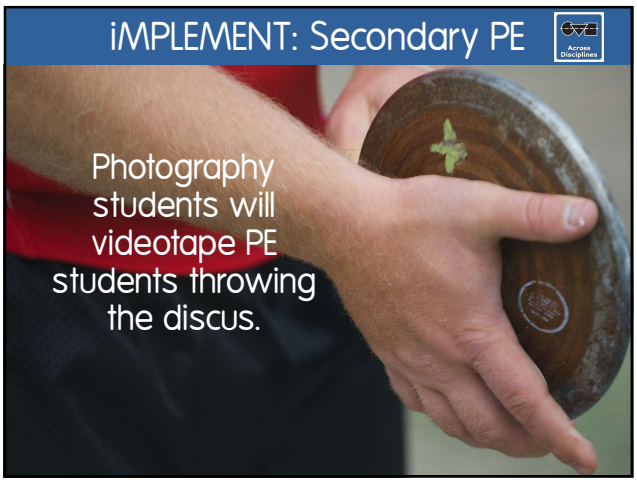

iMPLEMENT: Kinder Social Studies
What can we tell about who lives in these houses?

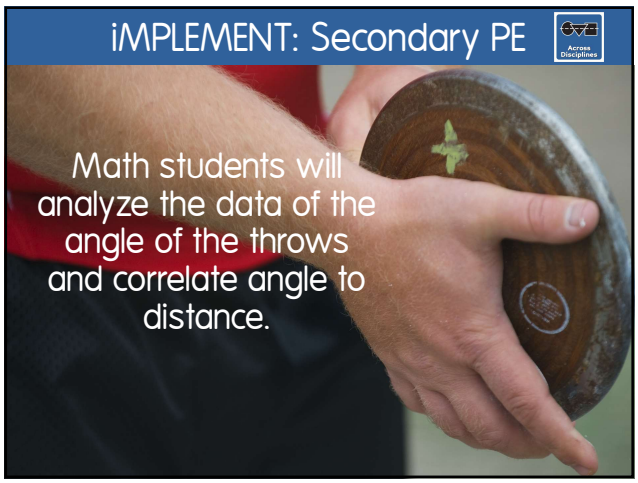

Which house would a termite like least?
Which house is most likely to burn?

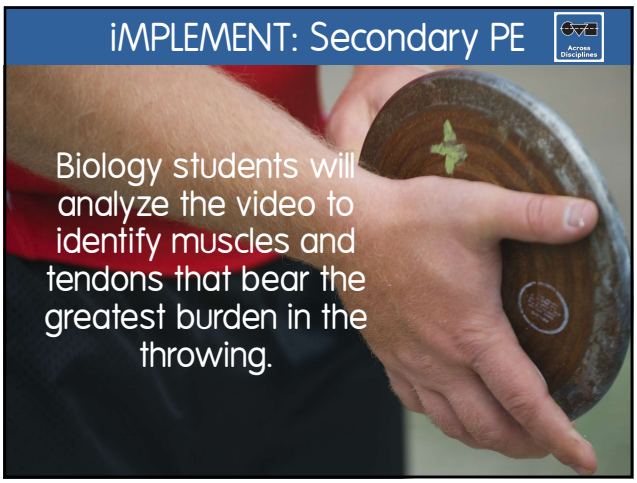

Is the number of colored houses greater or less than the other houses?

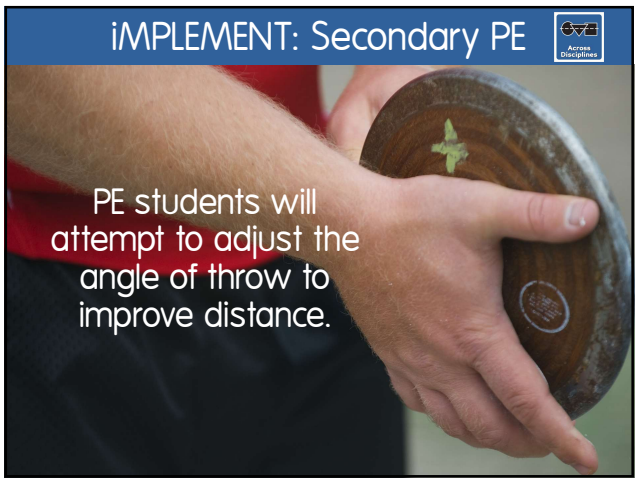

Put the houses in order of how much you'd like to live in them, from 1st to 4th.

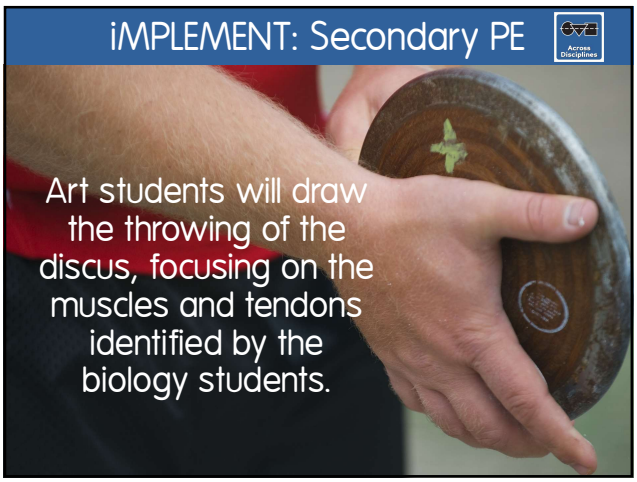

iMPLEMENT: Secondary PE
Across the Disciplines of Math, Photography, Art, Speech, Social Studies, and Physics
Across Disciplines


iMPLEMENT: Secondary PE
Photography students will videotape PE students throwing the discus.

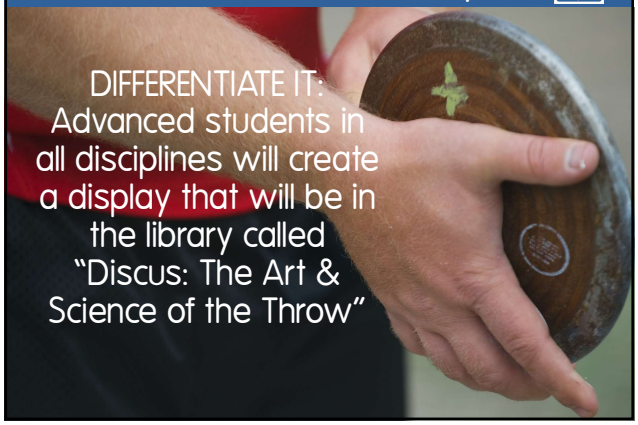

iMPLEMENT: Secondary PE
Math students will analyze the data of the angle of the throws and correlate angle to distance.


iMPLEMENT: Secondary PE
Biology students will analyze the video to identify muscles and tendons that bear the greatest burden in the throwing.


iMPLEMENT: Secondary PE
PE students will attempt to adjust the angle of throw to improve distance.


iMPLEMENT: Secondary PE
Art students will draw the throwing of the discus, focusing on the muscles and tendons identified by the biology students.

iMPLEMENT: Secondary PE

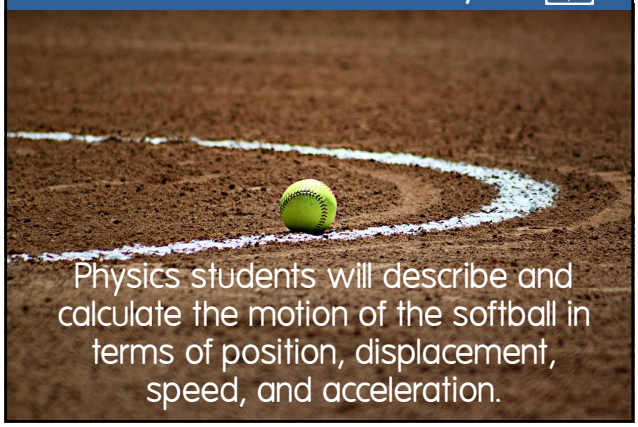


DIFFERENTIATE IT: Advanced students in all disciplines will create a display that will be in the library called "Discus: The Art & Science of the Throw"

iMPLEMENT: Secondary PE

PE students will throw and hit a series of softballs, video recorded by photography students.

iMPLEMENT: Secondary PE



Physics students will describe and calculate the motion of the softball in terms of position, displacement, speed, and acceleration.

iMPLEMENT: Secondary PE

Math students will analyze the data looking for patterns.

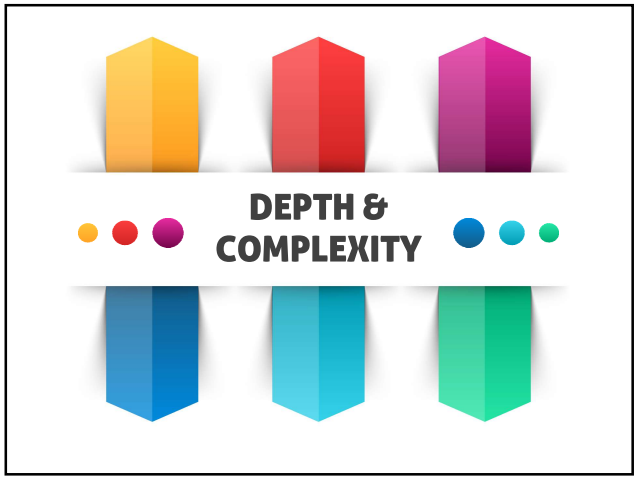
iMPLEMENT: Secondary PE

Speech students will create a presentation for the softball teams and coaches sharing the patterns.

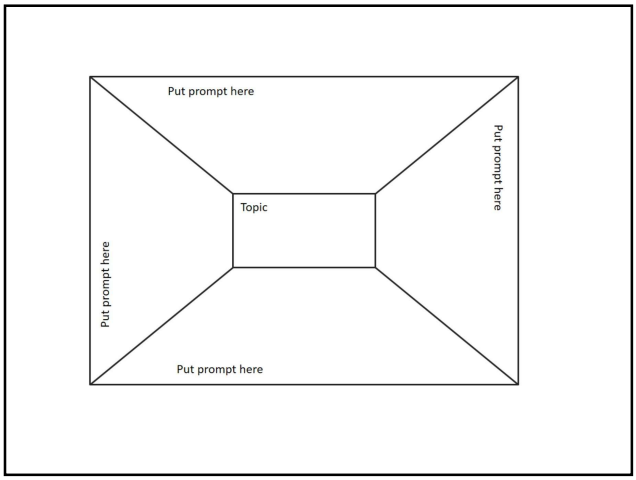
Think of three things you teach that you could implement an

Across Disciplines

approach, and select at least two disciplines for each of those.



1 FRAMES


Put prompt here
Put prompt here
Topic
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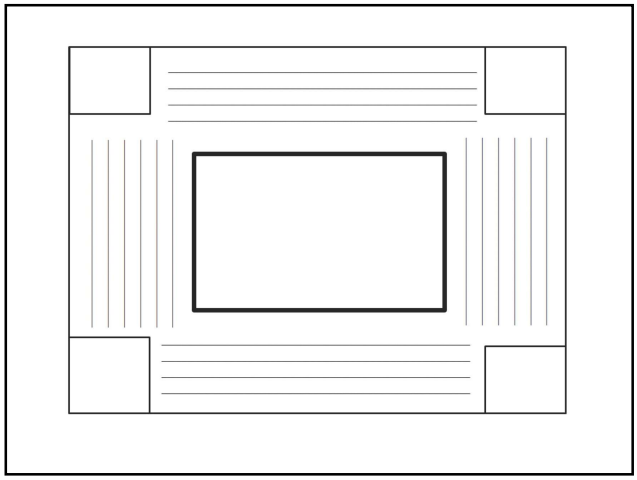
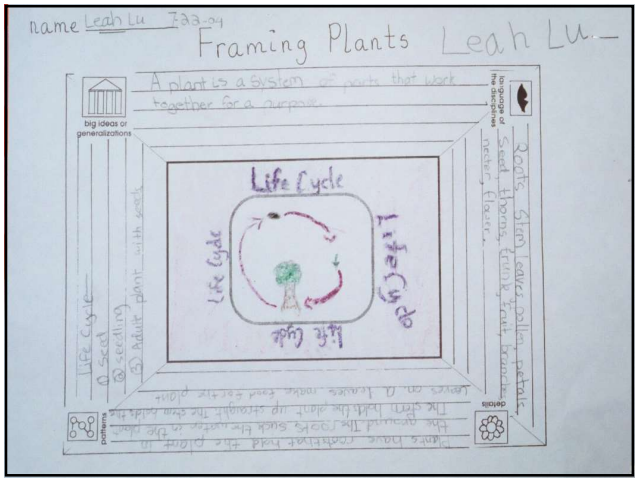
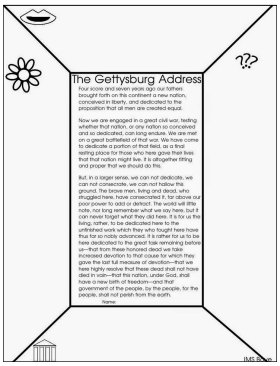
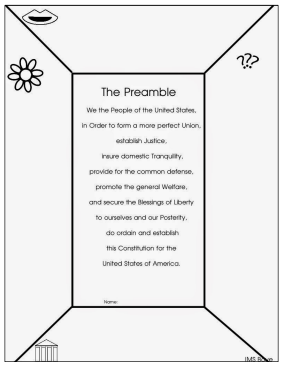
Put prompt here



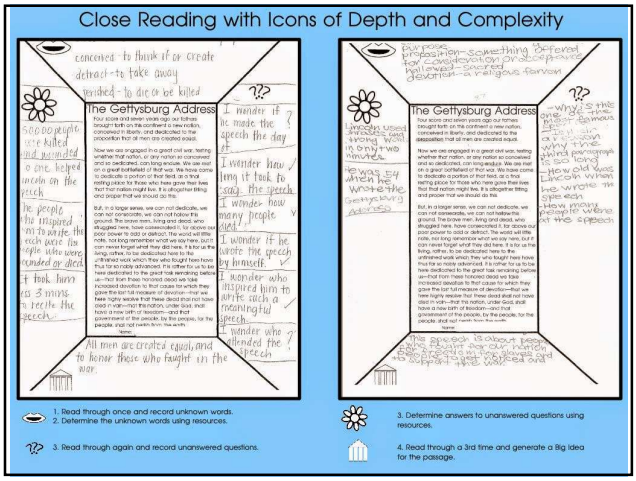

name Leah Lu
Framing Plants
Leah Lu
A plant is a system of parts that work together for a purpose.
big ideas or generalizations
Life Cycle
Life Cycle
Life Cycle
Life Cycle
Life Cycle
1) Seed
2) seedling
3) Adult plant with seeds
details
Roots, Stem, leaves, pollen, petals, seed, thorns, fruit, fruit, branches, nectar, flower

content in the center

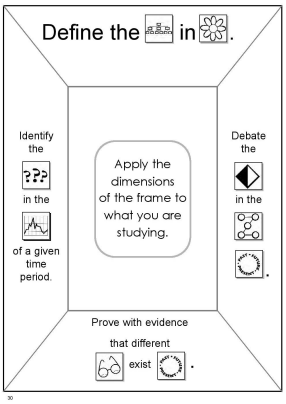




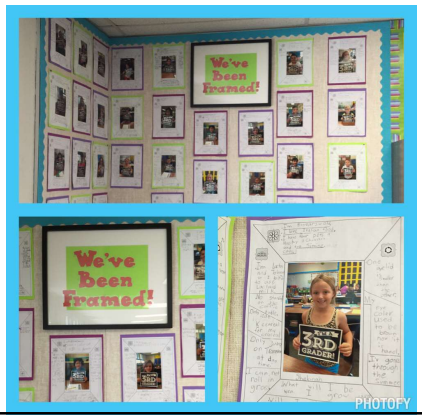
Close Reading with Icons of Depth and Complexity



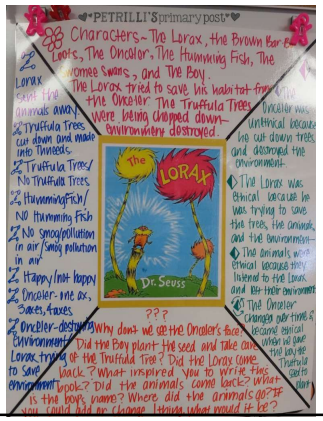
combine elements

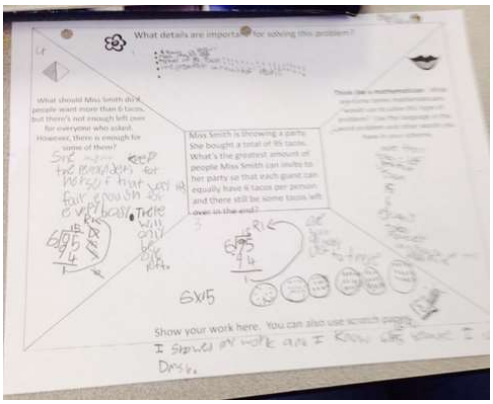


affective domain



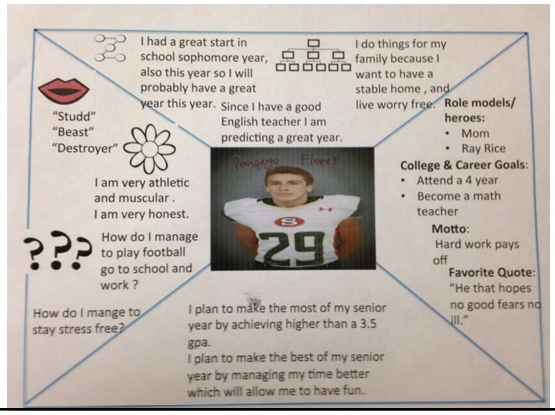
give one as an example



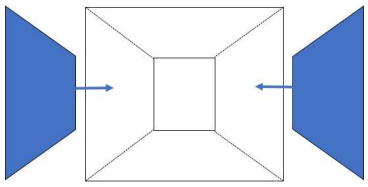


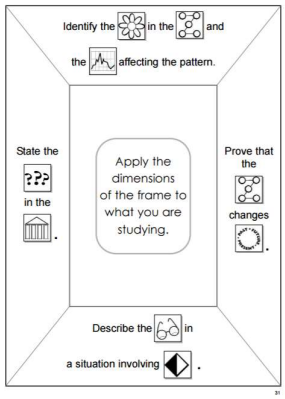
http://teach2learncoach.blogspot.com/2016/07/using-depth-and-complexity-frames-in.html

are we using elements…or not????



Break Apart Strategy- Give each group 2 copies of the frame. Have them cut one into the different sections and keep one for the final product.



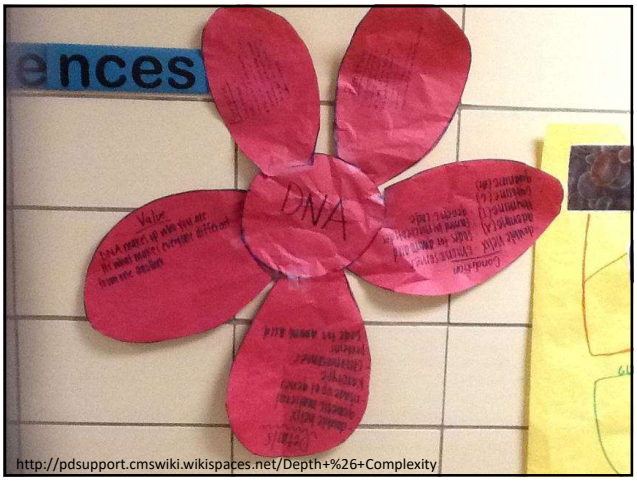


1 FRAMES

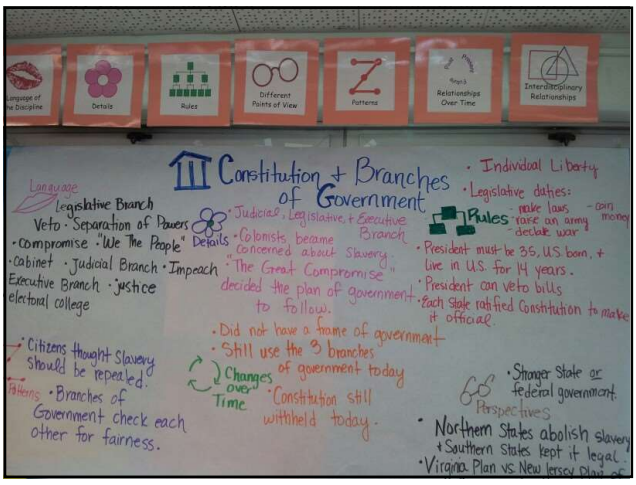
use to:

- ✓ highlight
- ✓ extend
- ✓ enhance
- ✓ focus attention

2 Differentiate

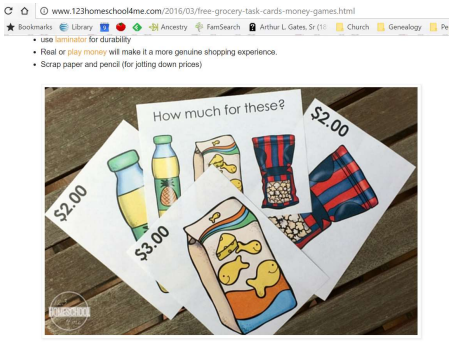


http://pdsupport.cmswiki.wikispaces.net/Depth+%26+Complexity



3 Centers/learning stations

1. Find a center activity that you want to use.



2. Incorporate the elements of Depth & Complexity.

Would it be fair to give $3.00 change back if someone paid you $10 for all of these items?

3. Differentiate by combining elements or adjusting challenge.

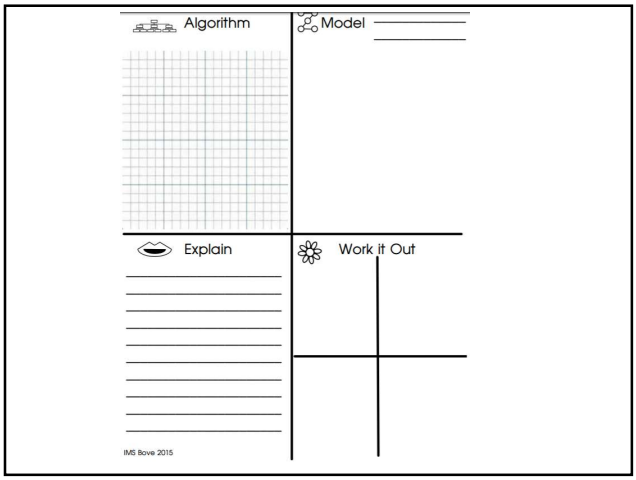
Would it be fair to give $3.17 change back if someone paid you $10 for all of these items?

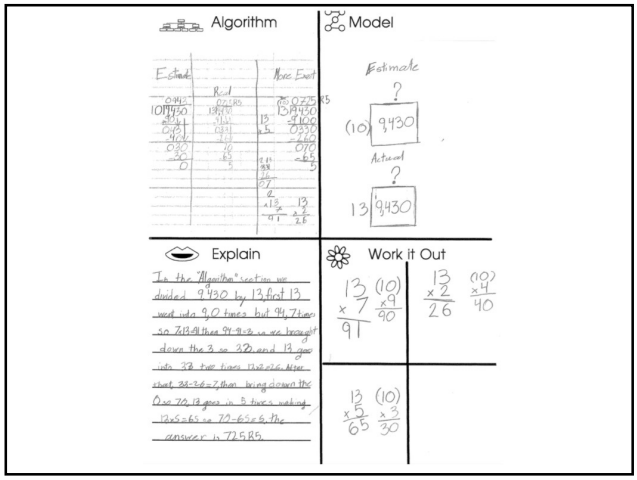
Estimate the area of each of the three containers, assuming the pitcher is 800 ml.

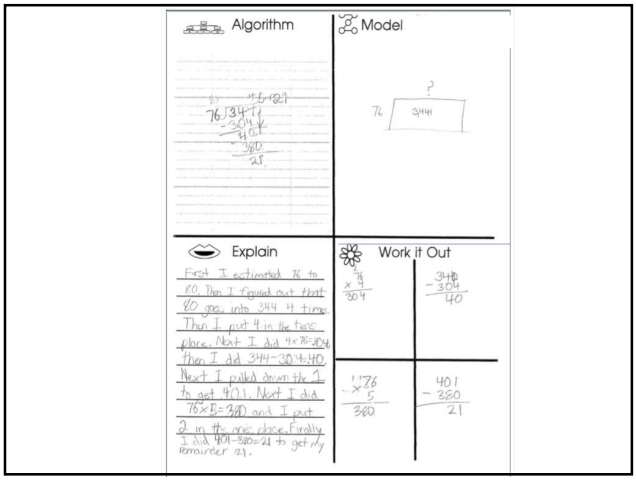
Would it be fair to charge three times as much for the pitcher as the smallest container?

Describe the perspectives of dairy farmers, grocery store owners and shoppers to a rise in milk prices.

4 Set up classwork or homework







WHICH ONE DOES NOT BELONG?

31	28
23	29

WHICH ONE DOES NOT BELONG?

31	28
23	29

WHICH ONE DOES NOT BELONG?

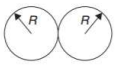
NATO	Treaty of Versailles
Truman Doctrine	Marshall Plan

What is the overarching intent of these policies?

WHICH ONE DOES NOT BELONG?

NATO	Treaty of Versailles
Truman Doctrine	Marshall Plan

What are the similarities between this and pre-WWI US policy?



Two solid spheres of radius R made of the same type of steel are placed in contact, as shown above. The magnitude of the gravitational force that they exert on each other is F_1. When two other solid spheres of radius $3R$ made of this steel are placed in contact, what is the magnitude of the gravitational force that they exert on each other?

Name the formula needed to solve this problem. Newton's Law of Gravitation	Write the formula needed to solve this problem & solve it. $F = G\frac{m_1 m_2}{r^2}$ $81F_1$
Evaluate Hooke's claims of plagiarism against Newton.	What is the Big Idea of inverse square laws?

5 Create Task Statements

Task Statements:

1. Thinking Skill [Bloom's]
2. Element of Depth & Complexity + Content
3. Resources + [Research] Skills
4. Product

A For the objective

The learner will calculate the likelihood of an earthquake on the San Andreas fault after evaluating the frequency of quakes  over the past 200 years. The learner will create one of three products to represent their findings.

Using information on the web, the learner will rank elements of the periodic table based on their potential problems and create one of three products to represent their findings.

B For the students

Calculate the likelihood of an earthquake on the San Andreas fault after evaluating the frequency of quakes over the past 200 years using data from earthquake.usgs.gov/data .

Create . . .

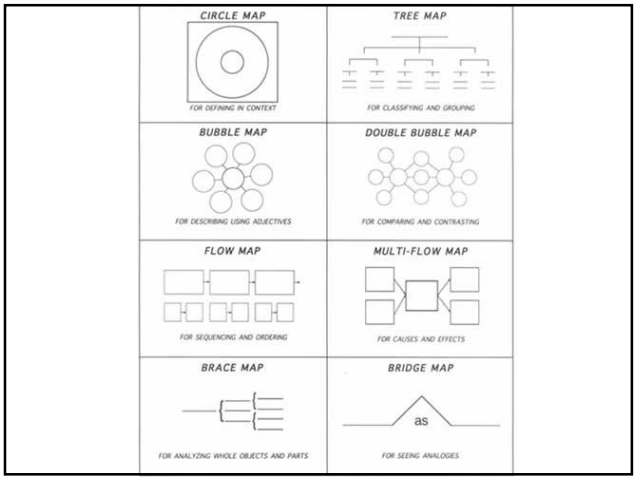
- a chart in PowerPoint
- an infographic
- an insurance company flier

Using information you find at chemicalelements.com or chem4kids.com, rank ten elements of the periodic table based on their potential problems.

Then create....

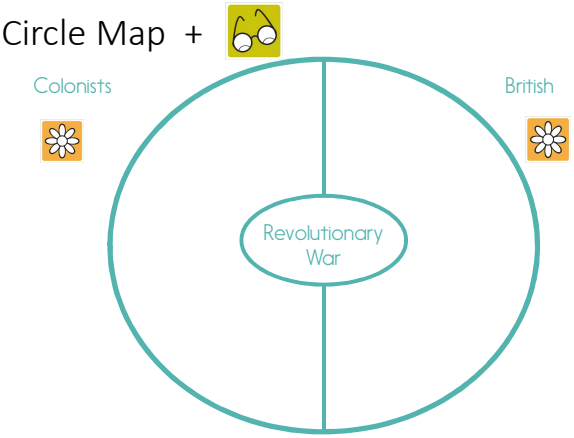
- a public service announcement
- a series of advertisements
- a story warning of these problems

6 Combine with Thinking Maps

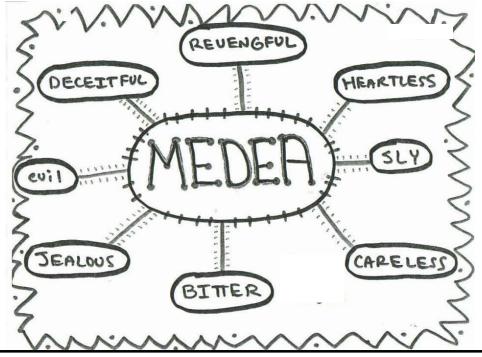


Learning Skill	Element[s]	Thinking Map
Main Idea		
Details		
Sequence		
Cause and Effect		
Compare/Contrast		

Circle Map +



Bubble Map +



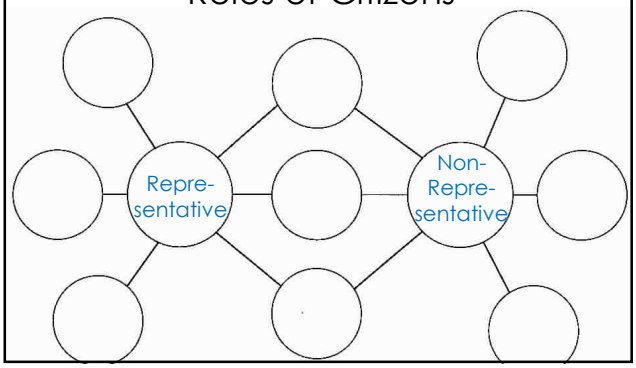
Tree Map +

Roles of Citizens

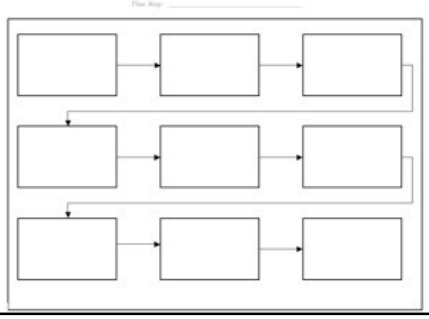
Cont. Society #1	Cont. Society #2	Cont. Society #3

Double Bubble +

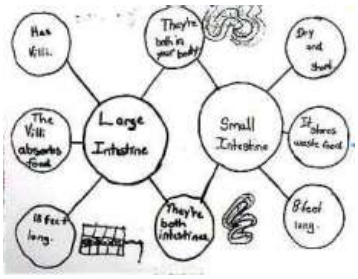
Roles of Citizens



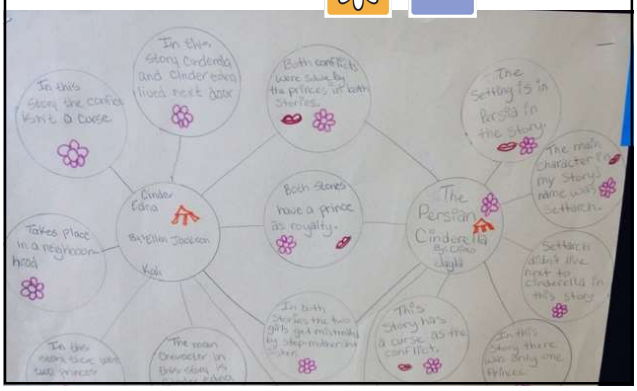
Using details from the article, trace the sequence of events that led to the conflict.



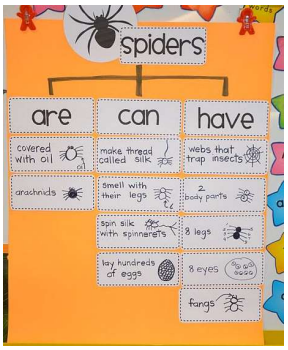
Double Bubble +



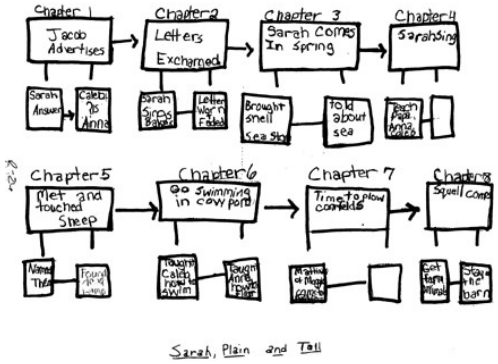
Double Bubble +



Tree Map +



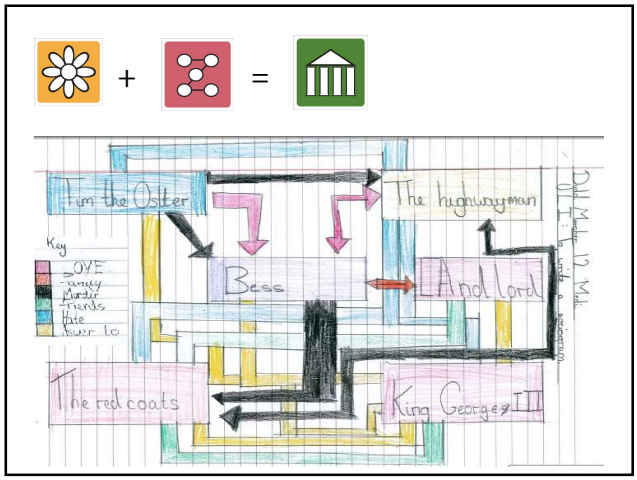
Sequence +

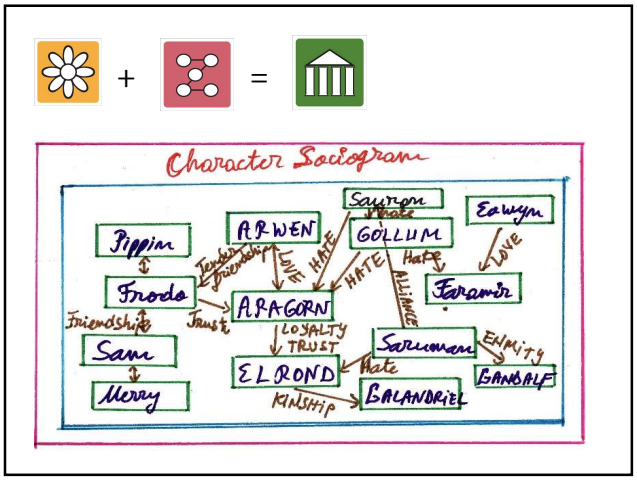


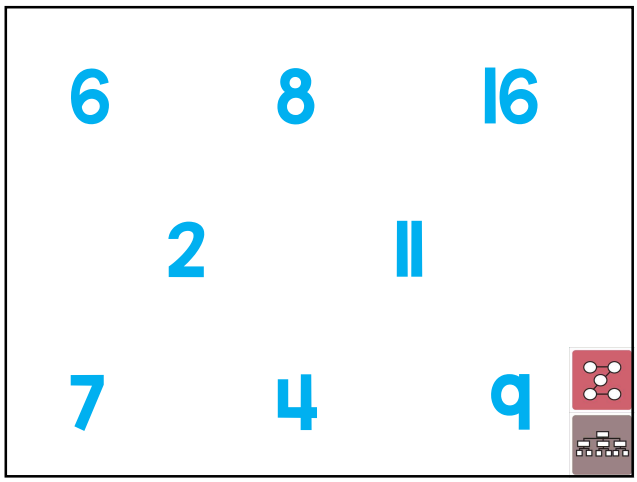
7 Sociograms [relationships between/among elements]

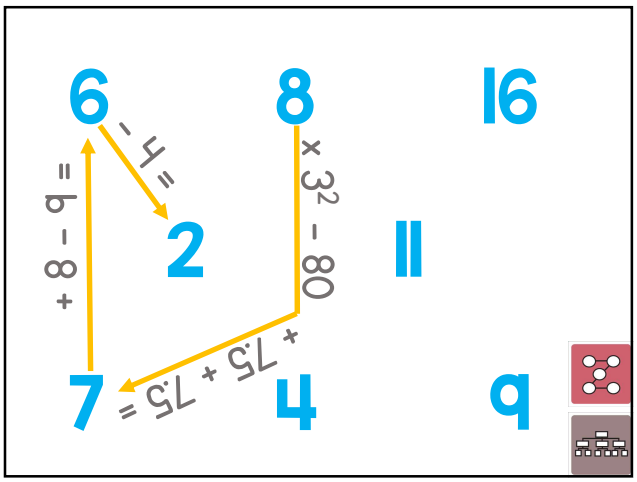
Using details from the story, show the patterns of the relationships between the characters.

Analyze those patterns to determine what they say about the difference between the bonds of friendship and family.


Tim the Ostler
The highwayman
Bess
And lord
The red coats
King George III


Character Sociogram
Sauron
Eowyn
Pippin
ARWEN
GOLLUM
Frodo
Faramir
ARAGORN
Sam
Saruman
ELROND
Merry
GALANDRIEL
GANDALF
LOVE
HATE
ALLIANCE
TRUST
LOYALTY
ENMITY
KINSHIP

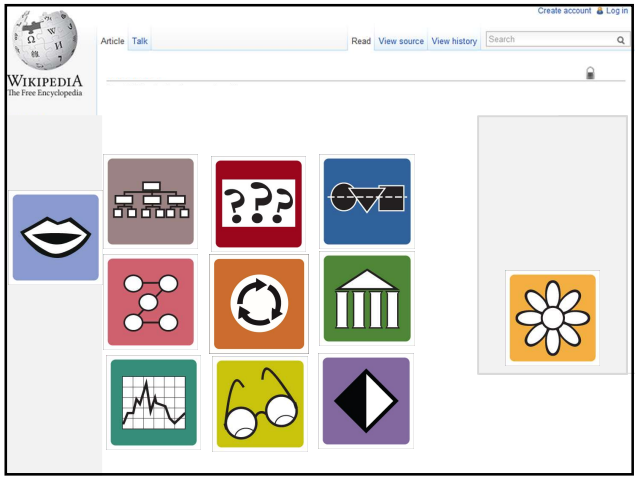

6
8
16
2
11
7
4
9


6
8
16
- 4 =
= 6 - 8 +
x 3² - 80
2
11
+ 75 + 75 =
7
4
9

Also use with:

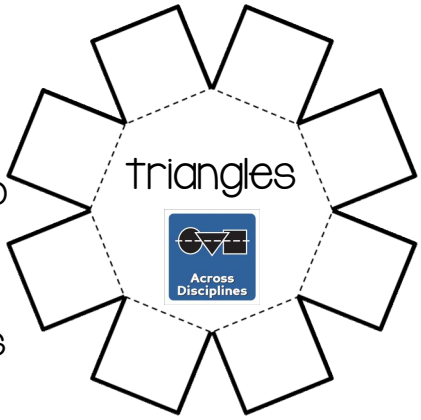
1. Math [numbers & operators, steps in problems]
2. Science [biological systems, planets, elements, etc.]
3. Social Studies [historical figures, movements, and eras]
4. Art [colors, line, form, etc.]

8. Create a Wikipedia-type page organized by elements

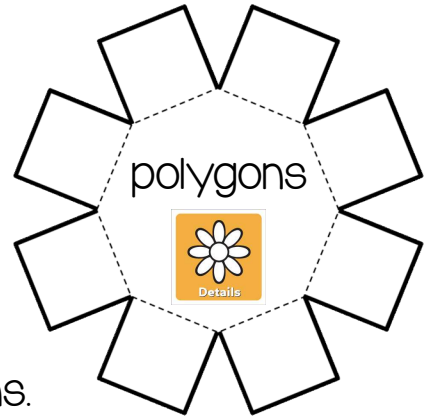


9. Folding & Interactive Notebooks

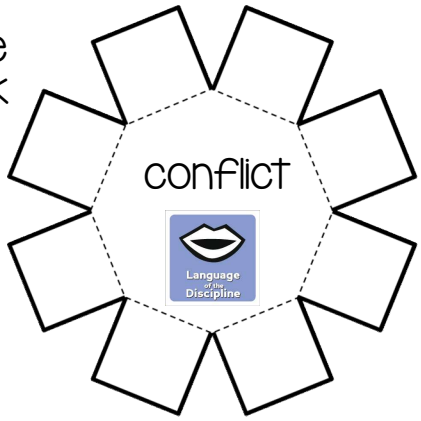
Where do you see triangles in other disciplines besides math?



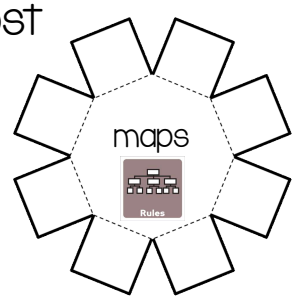
List & draw 8 details about polygons.

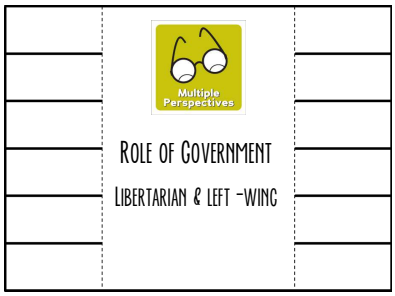


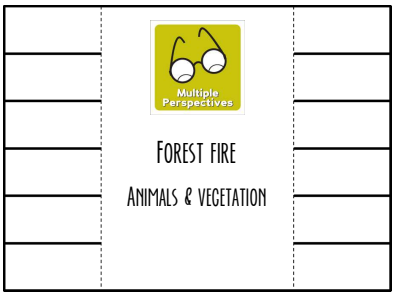
What are words we use to talk about conflict?

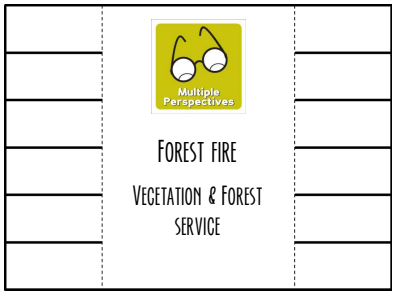


What are the rules associated with maps? Put a star next to the most important rule.



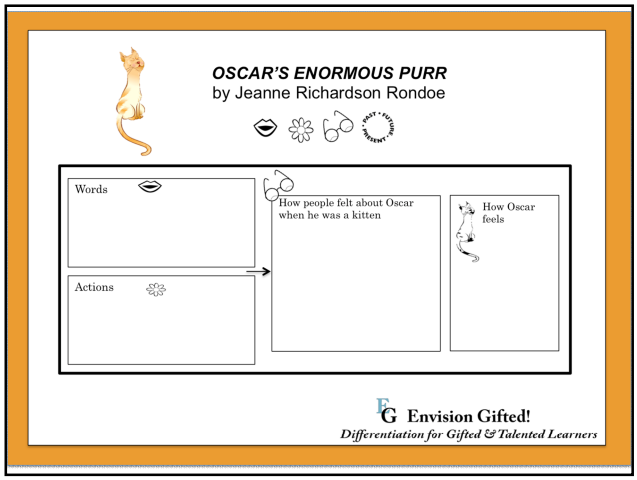






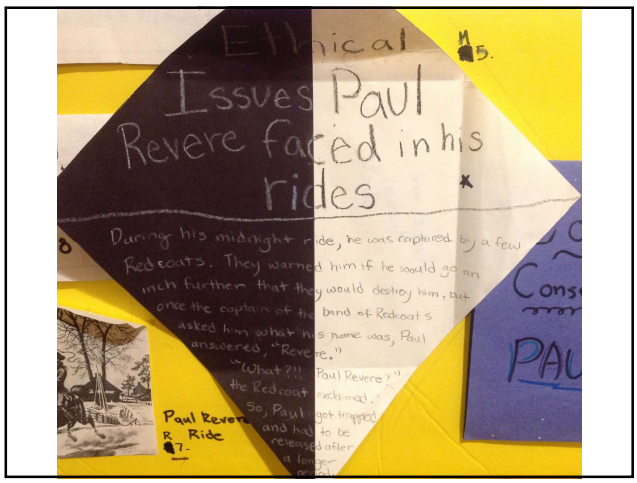
What rules have been enacted because of the Forest Service's perspective with regards to forest fires?

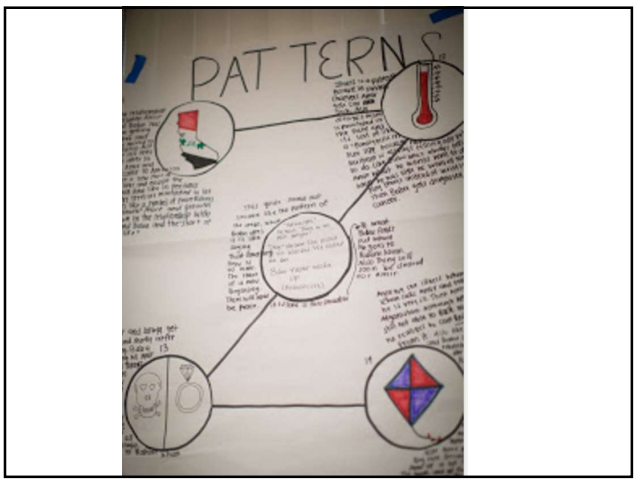
Other ideas:

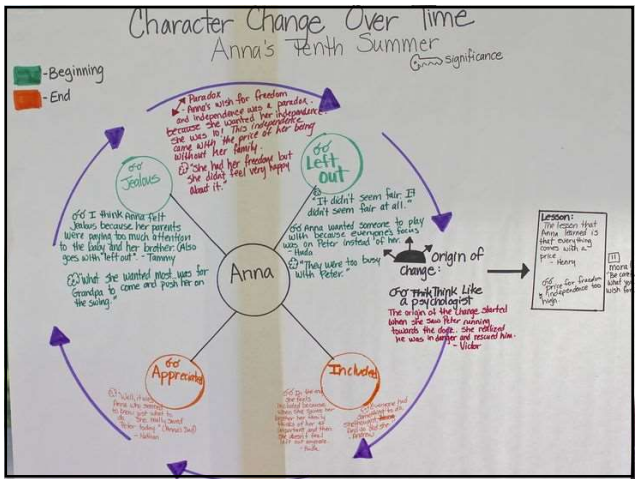

OSCAR'S ENORMOUS PURR
by Jeanne Richardson Rondoe
Words
Actions
How people felt about Oscar when he was a kitten
How Oscar feels
Envision Gifted!
Differentiation for Gifted & Talented Learners

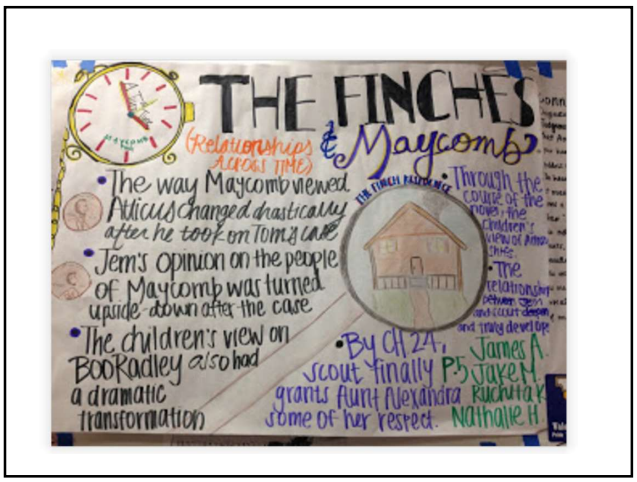

"read
ALEXIS O'NEILL
LAURA HULISKA-BEITH
THE RECESS QUEEN
Teach students to "read" the cover of a book using Depth and Complexity.

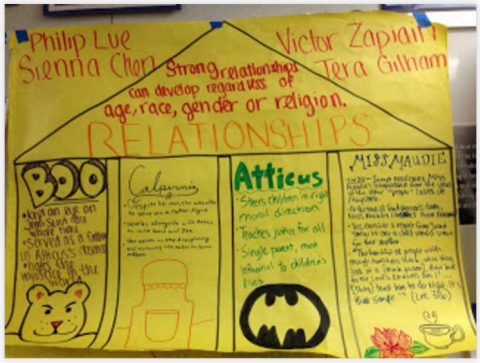

HEADQUARTERS
OPPOSED TO
WOMAN SUFFRAGE


Issues Paul Revere faced in his rides
During his midnight ride, he was captured by a few Redcoats. They warned him if he would go an inch further that they would destroy him, but once the captain of the band of Redcoats asked him what his name was, Paul answered, "Revere."
"What?!! Paul Revere?"
the Redcoat exclaimed.
So, Paul got trapped and had to be released after a long
Paul Revere's Ride


PATTERNS


Character Change Over Time
Anna's Tenth Summer
significance
-Beginning
-End
Paradox
Anna's wish for freedom and independence was a paradox because she wanted her independence but this independence came with the price of her being without her family
"She had her freedom but she didn't feel very happy about it."
Left out
"It didn't seem fair. It didn't seem fair at all."
Anna wanted someone to play with because everyone's busy with Peter instead of her.
Linda
"They were too busy with Peter."
Jealous
I think Anna felt Jealous because her parents were paying too much attention to the baby and her brother. Also goes with "left out." - Tammy
What she wanted most was for Grandpa to come and push her on the swing."
Anna
origin of change:
Think Like a psychologist
The origin of the change started when she saw Peter running towards the dock. She noticed he was in danger and rescued him. - Victor
Lesson:
The lesson that Anna learned is that everything comes with a price - Henry
Appreciate
Included


THE FINCHES
(Relationships Across Time)
& Maycomb
The way Maycomb viewed Atticus changed drastically after he took on Tom's case
Jem's opinion on the people of Maycomb was turned upside-down after the case
The children's view on Boo Radley also had a dramatic transformation
Through the course of the novel, the children's view of Anna changes
The relationship between Jem and Scout deepen and many develope
By Ch 24, Scout finally grants Aunt Alexandra some of her respect.
P.5
James A.
Jake M.
Ruchita P.
Nathalie H.



Name: _____

10 Things I've Learned This Year

Name: _____

How I've Changed this Year

At the beginning of the year, I was...

Now, at the end of the year, I am...

The Big Idea of how I'm different now than I was as the beginning of the year is...

_____

_____

_____

Name: _____

How I Will Be Next Year

Change through the Year

Beginning of this Year

End of this Year

Based on the changes I've seen in myself this year, I predict that next year, I will...

_____

_____

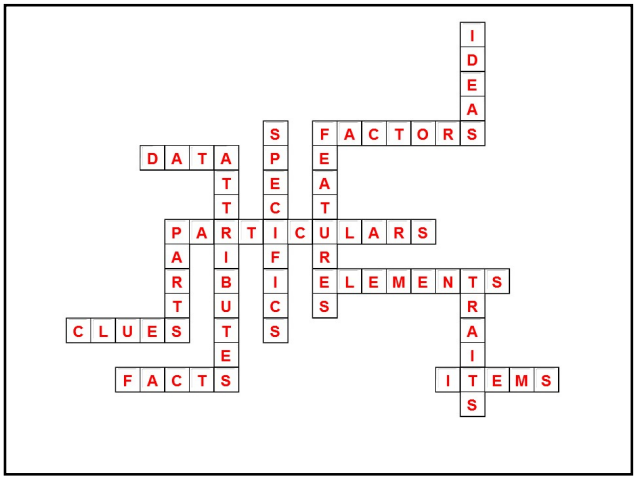
_____

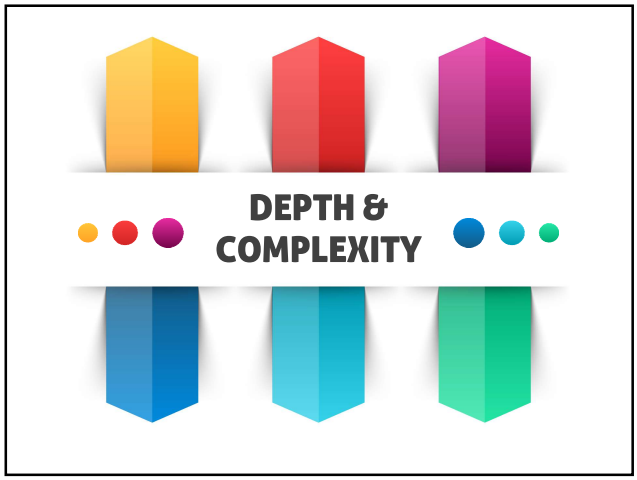
USE AS STRUCTURE

Weather

Language of the Discipline	Details	Patterns	Change over Time	Trends
100	100	100	100	100
200	200	200	200	200
300	300	300	300	300

Depth & Complexity augments and enriches **existing** projects and lessons.




DEPTH &
COMPLEXITY