

# ***MONDAY, DECEMBER 10<sup>th</sup>***

## **DO NOW**

**Know:** A student wants to answer the question, “Which materials cause the least friction when rubbed together?”

**Asked:** What should the student do next after writing a prediction?

**A:** Measure the friction produced when two materials are rubbed together

**B:** Design an experiment to compare friction created by materials

**C:** Draw a conclusion about the effects of friction on materials

## **TODAY’S PLAN**

1. Do and review the **DO NOW** and **Qualitative Prompt (QP)**!

▪ Today’s **QP** = DESIGN a simple experiment to TEST how many Pop-Tarts 5 different battery-powered toasters can cook before each runs out of battery power!

2. Open books, **WORK** on today’s **AO**!

3. \***HW** = Finish making your Inquiry Question!

## **TODAY’S ACADEMIC OBJECTIVE**

Today you will **INQUIRE** about something that can be tested with Science and **DESIGN** a way to test it!

## **DO NOW – Frictive Contact**

- **Know/Given:** A student wants to answer the question, “Which materials cause the least friction when rubbed together?”
- **Asked:** What should the student do next after writing a prediction?

# **What is KA<sup>2</sup> format? This is an example of a “1-pointer” on a DO NOW!**

- **Know:**
  - A student wants to answer the question, “Which materials cause the least friction when rubbed together?”
- **Asked:**
  - What should the student do next after writing a prediction?
- **Answer:**
  - **B:** Design an experiment to compare friction created by materials

# **DO NOW – Translating and Concluding Our Answer!**

- **Answer:**
  - **B:** Design an experiment to compare friction created by materials
- **Sci Fact** → In a science experiment, we always make predictions related to what we **THINK** is going to happen! Predictions are kinda like “educated guesses” aka **THIS WORD?!**

# hypothesis

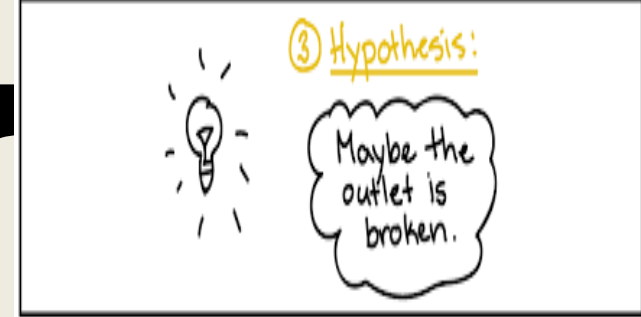
a specific, testable prediction

it describes, in concrete terms, what you expect will happen in a certain circumstance

FAQ: What are the differences between one-tailed and two-tailed tests?

<https://stats.idre.ucla.edu/.../faq-what-are-the-differences-between-one-tailed-and-two-...>

When using a two-tailed test, regardless of the direction of the relationship you hypothesize, you are testing for the possibility of the relationship in both directions. For example, we may wish to compare the mean of a sample to a given value  $x$  using a t-test. Our null hypothesis is that the mean is equal to  $x$ .



# Hypothesis

- An example of a hypothesis might be that the salamanders have curved tails due to a pollutant in the moist soil where they live.



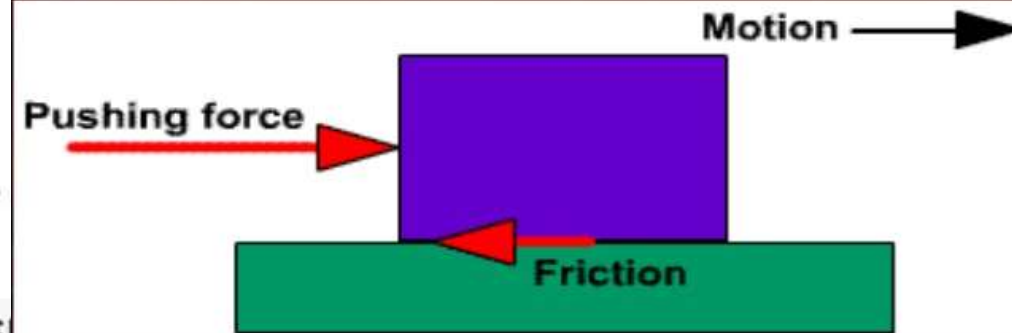
# ence experim

## Hypothesis

If we increase the amount of light during studying, then the participant's performance on test scores will decrease.

## What is Friction?

Friction is a force that opposes motion between two surfaces touching each other.



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## **TODAY’S ACADEMIC OBJECTIVE**

Today you will **INQUIRE** about something that can be tested with Science and **DESIGN** a way to test it!



# Today's Qualitative Prompt

DESIGN a simple experiment to TEST how many Pop-Tarts 5 different battery-powered toasters can cook before each runs out of battery power!

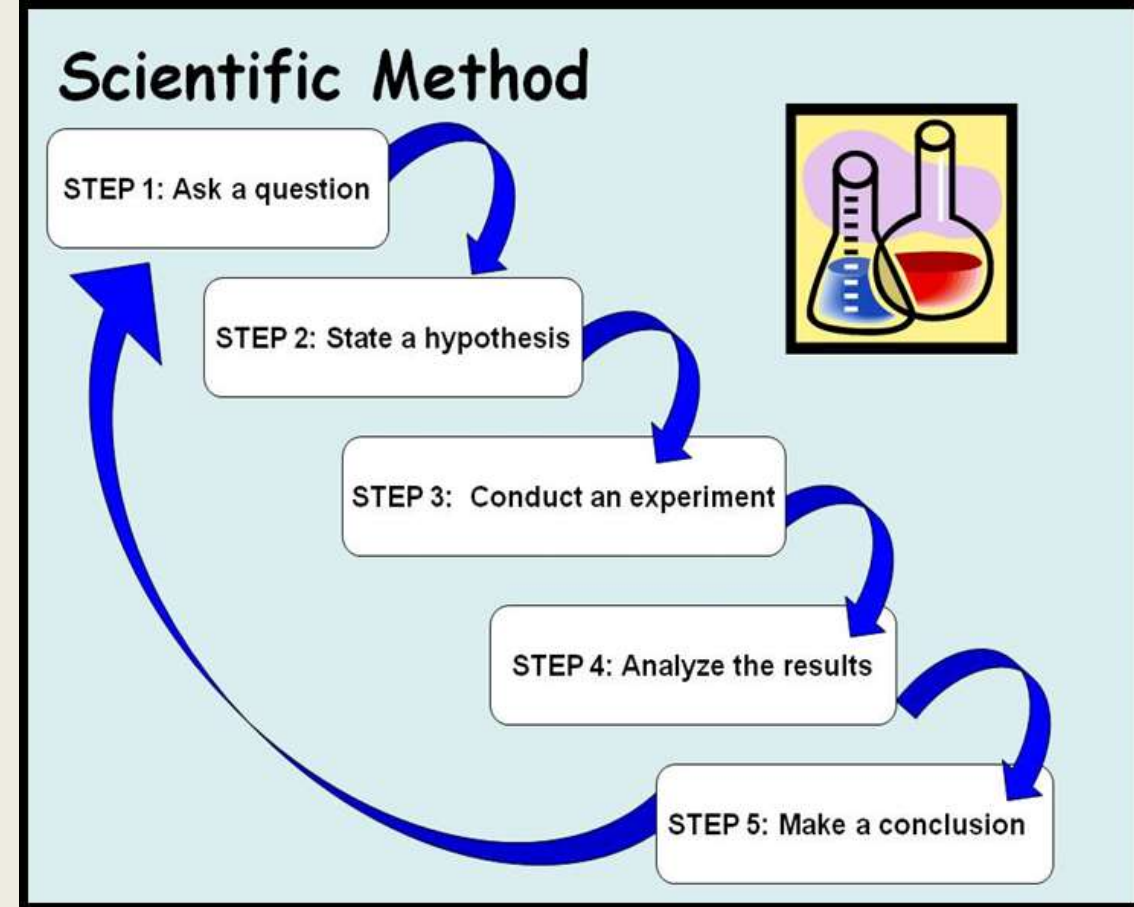
- Students, to do GOOD Science, when designing an experiment we must ALWAYS start by clearly identifying the question we want to answer!



# Today's Qualitative Prompt

DESIGN a simple experiment to TEST how many Pop-Tarts 5 different battery-powered toasters can cook before each runs out of battery power!

- Next, we must PREDICT what the answer to our question will be and then PLAN out what steps we will take to test our question!
  - (Don't forget to think about the MATERIALS you will need AND the variables you must CONTROL as well)!



### 3. Procedure

- Steps to be taken to test the hypothesis
- Includes the control





# Today's Qualitative Prompt

DESIGN a simple experiment to TEST how many Pop-Tarts 5 different battery-powered toasters can cook before each runs out of battery power!

- Next, we must PREDICT what the answer to our question will be and then PLAN out what steps we will take to test our question!
  - (Oh...and you will need to DEFINE your “experimental parameters” as well, just as “What is cooked?”)!

## control variable

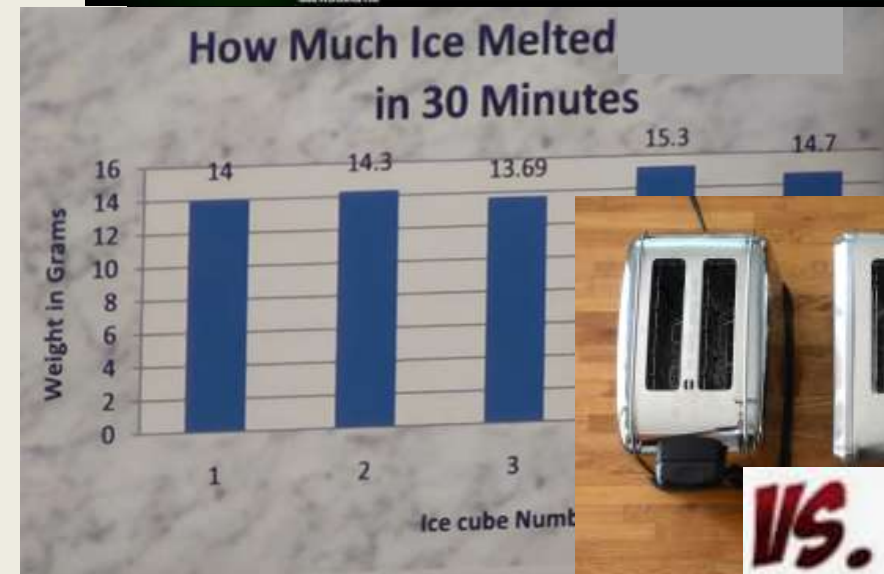
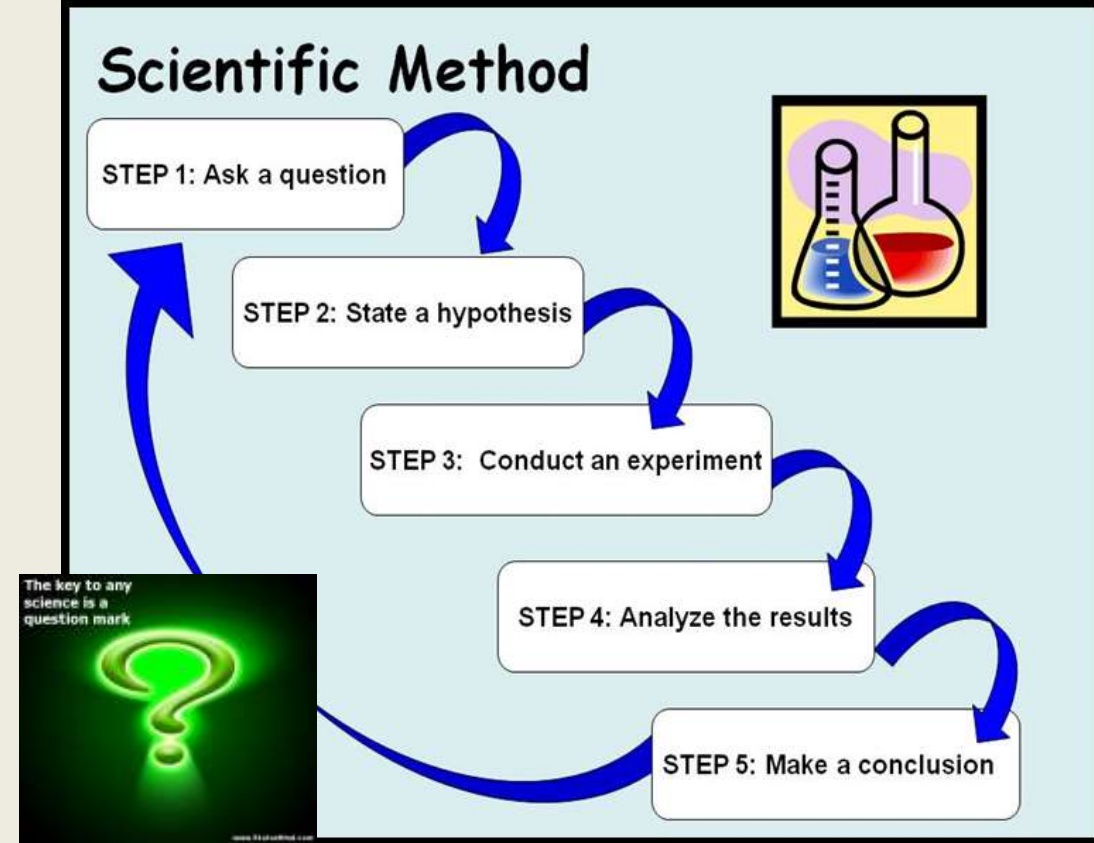
A variable that is held constant in order to assess or clarify the relationship between two other variables.



# Today's Qualitative Prompt

DESIGN a simple experiment to TEST how many Pop-Tarts 5 different battery-powered toasters can cook before each runs out of battery power!

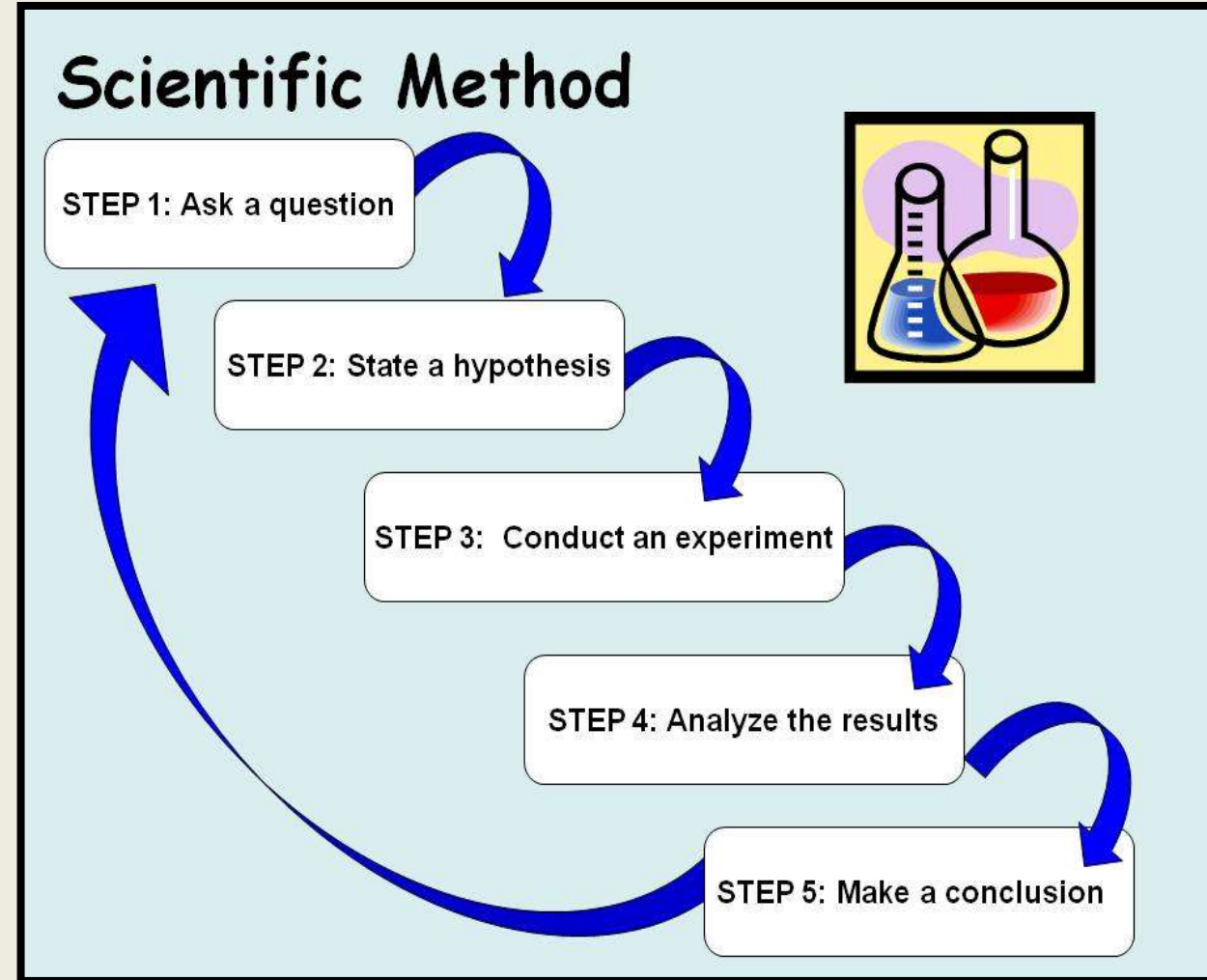
- However, after our experiment is done we are still NOT finished, since we must follow the SCIENTIFIC METHOD until the very end by ANALYZING our collected data and CONCLUDING what it means!





# Scientific Method – Jot This Down!

- The “Scientific Method” is simply a sequence of steps that scientists follow to perform **GOOD** science experiments!
  - GOOD Science = No opinions, false information, or assumptions!
- It is a way to ask and answer scientific questions by conducting **EXPERIMENTS** and collecting **DATA**!
  - Note! A “hypothesis” is just an educated guess or prediction that you make to answer the question!



• Hypothesis: An educated guess

# Scientific Method – Jot This Down!

- The “Scientific Method” is simply a sequence of steps that scientists follow to perform **GOOD** science experiments!
  - **GOOD** Science = No opinions, false information, or assumptions!
- It is a way to ask and answer scientific questions by conducting **EXPERIMENTS** and collecting **DATA**!
  - Note! A “hypothesis” is just an educated guess or prediction that you make to answer the question!



**“I’ve narrowed it to two hypotheses:  
it grew or we shrunk.”**



# What is a Control? – Jot This Down!

- Why could only ONE person blow the bubble in the previous example?
  - To do GOOD Science, you must CONTROL aka not change anything but the one VARIABLE you are testing!
- In this experiment we are testing which BRAND of bubble gum makes the biggest bubbles, so the person making the bubbles must remain CONSTANT (since people can vary in their bubble-blowing abilities)!

A variable is anything that could be changed that may affect the results or output of an investigation.



**CONTROLLED VARIABLE**

*What I KEEP THE SAME*

# Types of Variables – Jot This Down!

- Variables are ANYTHING that can be changed in a Science EXPERIMENT!
- There are 3 main types!
  - Independent Variable = This is the thing you CHANGE to cause a result!
  - Dependent Variable = This is what CHANGES; it DEPENDS on what you do to the Independent Variable!
  - Controlled Variable = Every other variable that could be changed to affect the experiment must be held CONSTANT and is thus a CONTROL VARIABLE!

3 types of variables

**INDEPENDENT VARIABLE**



**DEPENDENT VARIABLE**

What I OBSERVE

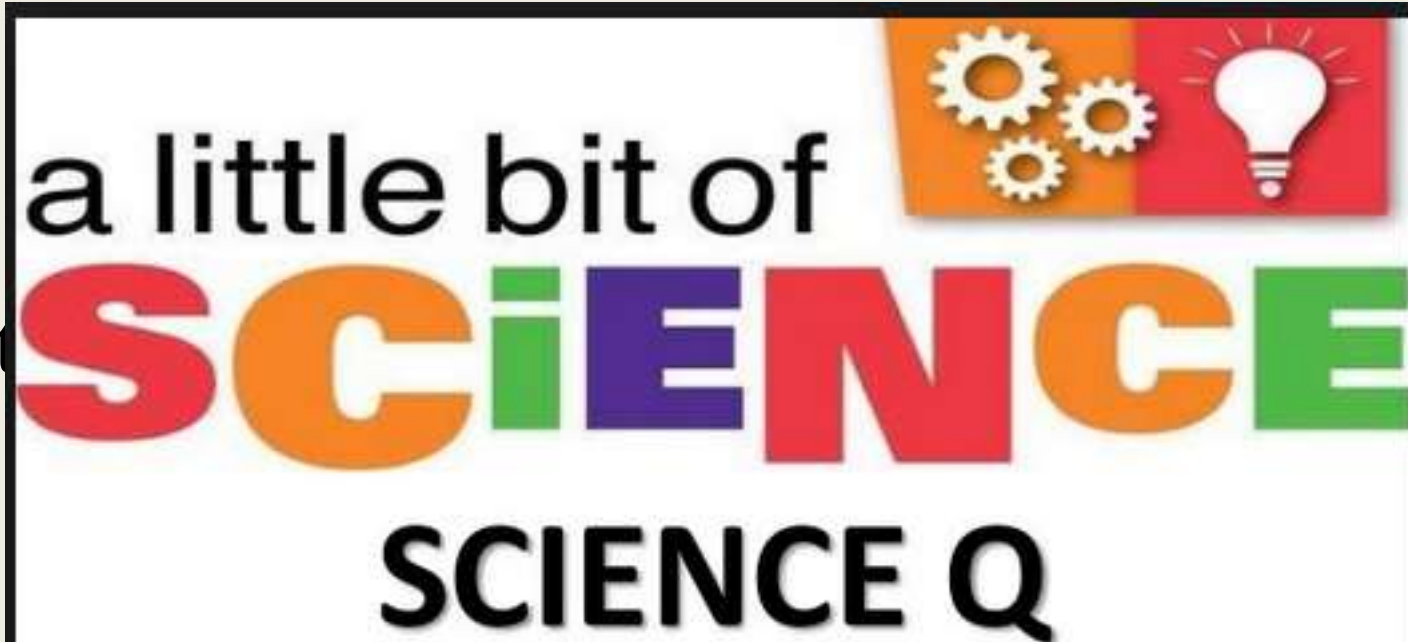


**CONTROLLED VARIABLE**

What I KEEP THE SAME

# Bell 2 Bell

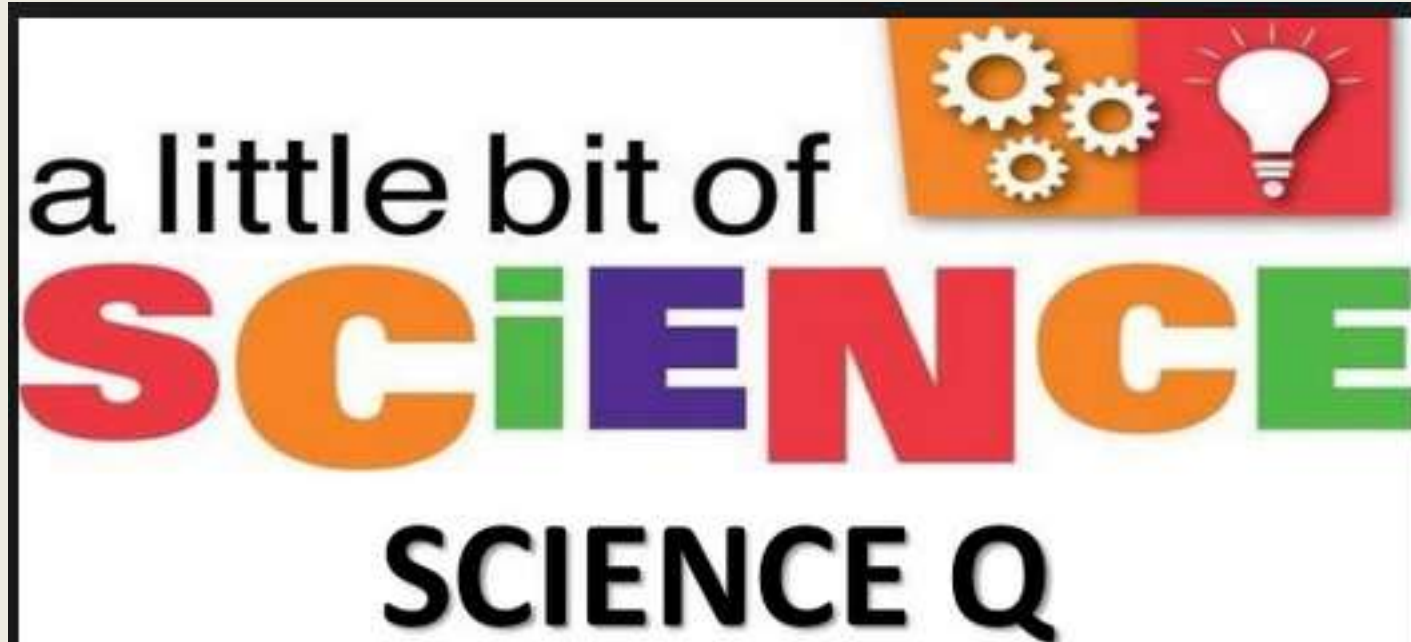
- We work what in this class?!?!?!
  - **BELL 2 BELL**
- Every single precious **SECOND** of academic instructional time is thus utilized in this classroom!
- You students will thus be vocally quizzed **EVERY DAY** until I **DISMISS** you at the end of class (with a positive greeting and a thank-you of course!).





# Bell 2 Bell

- We work **BELL 2 BELL** in Mr. Floyd's class!
- I will thus quiz you about the science we learned today until the very end!
- Let us begin!





# Tomorrow's Academic Objective and Plan

- Tomorrow you will **INQUIRE** about something that can be tested with Science and **DESIGN** a way to test it!
- \*HW = Finish making your Inquiry Question!



# ***TUESDAY, DECEMBER 11<sup>th</sup>***

## **DO NOW**

- In your notebooks, to be checked, solve this problem...

There are 1000 grams in 1 kilogram. These are units of mass!

**Know:**

$$1000g = 1kg$$

**Asked:** How many kilograms are in 2160 grams?

## **TODAY'S PLAN**

1. Do and review the **DO NOW** and **Qualitative Prompt (QP)**!

- Today's **QP** = At its simplest, a "Variable" is something that can change. LIST and SKETCH 14 things that can be variables and then WRITE all the variables in your Inquiry Project Experiments!

2. Open books, **WORK** on today's **AO**!

3. \***HW** = Work on Inquiry Projects!

## **TODAY'S ACADEMIC OBJECTIVE**

Today you will **INQUIRE** about something that can be tested with Science and **DESIGN** a way to test it!

## **DO NOW – Units of Mass**

There are 1000 grams in 1 kilogram. These are units of mass!

- **Know/Given:**

$$1000g = 1kg$$

- **Asked:** How many kilograms are in 2160 grams?

# What is KA<sup>2</sup> format? This is an example of a “1-pointer” on a DO NOW!

- **Know:**

$$\frac{1000g}{1kg} = \frac{1kg}{1000g}$$

- **Asked:** How many kilograms are in 2160 grams?

- **Answer:**  $2160g * \frac{1kg}{1000g} = 2.160kg$



# DO NOW – Never Forget to Listen to Akila!

- To solve these problems, just multiply by the fraction with the units you want on top and “*Let the Units Guide You*”!

– Example:  $84\cancel{\text{in}} * \frac{1\text{ft}}{12\cancel{\text{in}}} = 7\text{ft}$



# DO NOW – Translating Our Answer

- **Answer:**

$$2160\cancel{g} * \frac{1kg}{1000\cancel{g}} = 2.160kg$$

- **Sci Fact** → Mass is a unit of “how much matter” something has! Remember that Mass  $\neq$  Weight students!!!

# Matter

## 1. What is matter?

-anything that has mass and takes up space

## 2. What is mass?

- the total amount of matter in an object; the mass of an object equals the total mass of its parts



### Commonly-used metric units of mass

Unit	abbr.	in grams	in 1 g
1 picogram	pg	$10^{-12}$ g	$10^{12}$
1 nanogram	ng	$10^{-9}$ g	$10^9$
1 microgram	µg	$10^{-6}$ g	$10^6$
1 milligram	mg	$10^{-3}$ g	$10^3$
1 gram	g	1 g	
1 kilogram	Kg	$10^3$ g	$10^{-3}$
1 metric ton	t	$10^6$ g	$10^{-6}$



µ

## Weight

- Weight – The force of gravity on an object
- Weight is measured on a scale
- **The units for weight are Newtons or Pounds**
- Weight changes based on location as each location has a different amount of gravity



Mass = 120kg  
Weight = 200N



Moon



Earth

Mass = 120kg  
Weight = 120x10  
1200N

un

≠

# ***TUESDAY, DECEMBER 11<sup>th</sup>***

## **DO NOW**

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**Know:**

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## **TODAY'S ACADEMIC OBJECTIVE**

Today you will **INQUIRE** about something that can be tested with Science and **DESIGN** a way to test it!



# Today's Qualitative Prompt

At its simplest, a “Variable” is something that can change. LIST and SKETCH 14 things that can be variables and then WRITE all the variables in your Inquiry Project Experiments!

- Students, EVERY scientific experiment has 3 main TYPES of variables; Dependent, Independent, and Controlled!

Aim: What are variables in science experiments?

## Variables

- A variable is something that is changed
- A constant, or control, is something that does not change

**INDEPENDENT VARIABLE**



*What I CHANGE*



**DEPENDENT VARIABLE**

*What I OBSERVE*



**CONTROLLED VARIABLE**

*What I KEEP THE SAME*

# Today's Qualitative Prompt

At its simplest, a “Variable” is something that can change. LIST and SKETCH 14 things that can be variables and then WRITE all the variables in your Inquiry Project Experiments!

- The DEPENDENT variable is what we are studying, to see IF it changes, and whether or not it changes DEPENDS on the INDEPENDENT variable (the thing we DO change in our experiment to produce a result!)

## A birdy example...

Imagine you want to see what color of bird feeders your local birds preferred.



Red?



Blue?



Green?

## Our Constants and Variables

- **Independent Variable:** color of the feeders
- **Dependent Variable:** amount of seed eaten
- **Constants:** everything else that is kept the same, for example:
  - the location of the feeders
  - the kind of feeder used
  - putting the feeders out at the same time

# Today's Qualitative Prompt

At its simplest, a “Variable” is something that can change. LIST and SKETCH 14 things that can be variables and then WRITE all the variables in your Inquiry Project Experiments!

- However, we cannot forget about the many CONTROLLED Variables; all of the things we want to remain constant and unchanged to make sure they do not AFFECT the results of our experiment!

## Why is it important to only change the independent variable?

If everything except the independent variable is held constant, we can say:

The experiment is FAIR.

(ONLY the independent variable can change!)

## If you don't...

If you measure a change in the dependent variable, you won't know whether it is the independent variable that is causing the change.



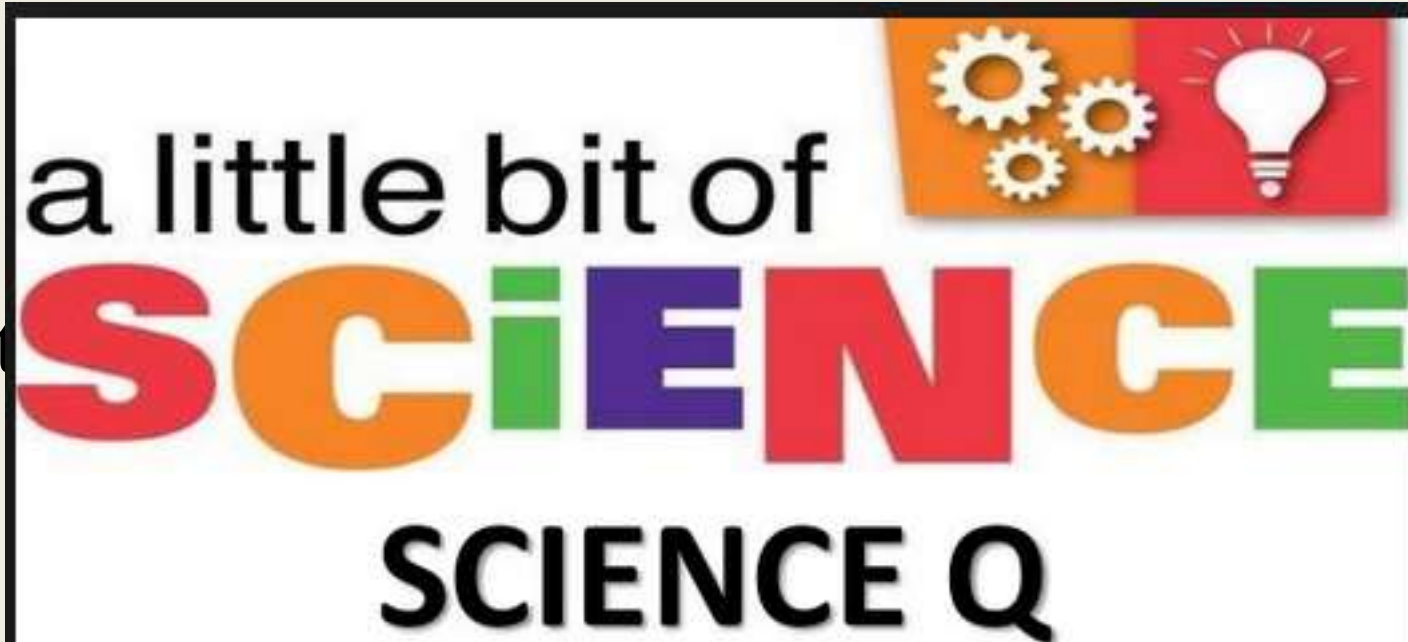
Independent Variable





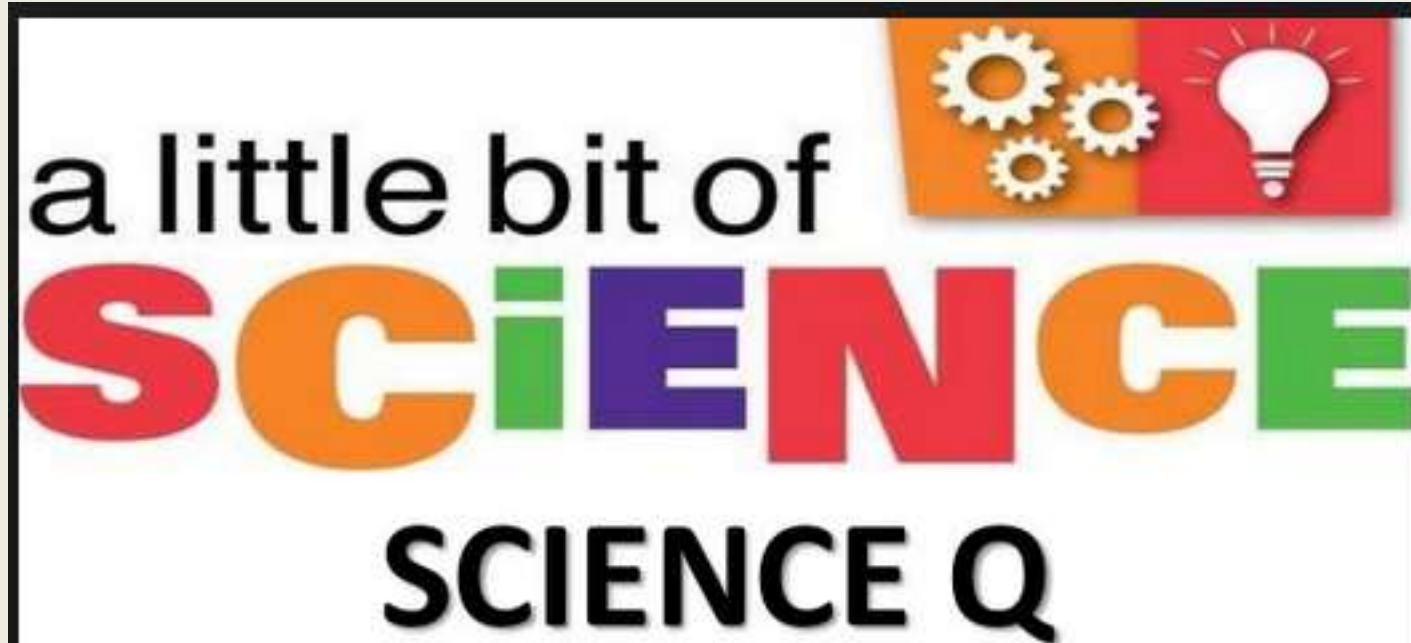
# Bell 2 Bell

- We work what in this class?!?!?!
  - **BELL 2 BELL**
- Every single precious **SECOND** of academic instructional time is thus utilized in this classroom!
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# Bell 2 Bell

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# Tomorrow's Academic Objective and Plan

- Tomorrow you will **INQUIRE** about something that can be tested with Science and **DESIGN** a way to test it!
- \*HW = Work on your Inquiry Projects!

**Scientific Method**

1. Ask a Question
2. Make a Hypothesis
3. Experiment
4. Collect Data
5. Reach a Conclusion

**INQUIRY**

The image shows a poster for the scientific method with a cartoon scientist and a list of five steps. Below it is a graphic with the word 'INQUIRY' in large, colorful letters and a photo of three people on a stage.

**Science Inquiry**

Minds-on Hands-on

92 - 100 = A Excellent work  
83 - 91 = B Above average work

The poster features a photo of students in a lab, the title 'Science Inquiry' in large letters, and the phrases 'Minds-on' and 'Hands-on'. It also includes a grade scale for 'A' and 'B'.

**"Googleable"**  
A "Googleable" question is a question which can be answered by a simple Google or library search.

**"Non-Googleable"**  
A "Non-Googleable" question is a question which cannot be easily answered by a Google or library search, but they may help you find the answer.

**The Display Board**

Group Name

**Title**  
Question

Hypothesis

Procedure

**Data**

**Results**  
Conclusions, and Future Steps

The display board template is divided into several sections: Group Name, Title (with a question), Hypothesis, Procedure, Data (with a bar graph and a line graph), and Results (with conclusions and future steps).

# ***WEDNESDAY, DECEMBER 12<sup>th</sup>***

## **DO NOW**

**Know:** A student designs an experiment to determine the spectrum of color produced by different light sources.

**Asked:** Which variable should be held constant in the student's experiment?

**A:** The light source used

**B:** The prism through which the light passes

**C:** The colors produced by each light source

## **TODAY'S PLAN**

1. Do and review the **DO NOW** and **Qualitative Prompt (QP)**!

- Today's **QP** = LIST all of the variables that you'd need to CONTROL in an experiment to measure the effect of TECHNOLOGY (phones, video games, etc.) on social skills!

2. Open books, **WORK** on today's **AO**!

3. \***HW** = Work on Inquiry Projects!

## **TODAY'S ACADEMIC OBJECTIVE**

Today you will **INQUIRE** about something that can be tested with Science and **DESIGN** a way to test it!

## **DO NOW – Brite Lite**

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# What is KA<sup>2</sup> format? This is an example of a “1-pointer” on a DO NOW!

- **Know:** A student designs an experiment to determine the spectrum of color produced by different light sources.
- **Asked:** Which variable should be held constant in the student’s experiment?
- **Answer:**
  - **B:** The prism through which the light passes

# **DO NOW – Translating and Concluding Our Answer!**

- **Answer:**
  - **B:**The prism through which the light passes
- **Sci Fact** → In a science experiment, it is **CRUCIAL** to first lay-out **EVERYTHING** that we must control! When it comes to light though, does anyone know what a **PRISM** even is?!



# control variable

A variable that is held constant in order to assess or clarify the relationship between two other variables. Control ...



## Identify Variables #3



Manipulated Variable

- How does the size of a parachute affect the time it takes a hippo to fall 10 feet?



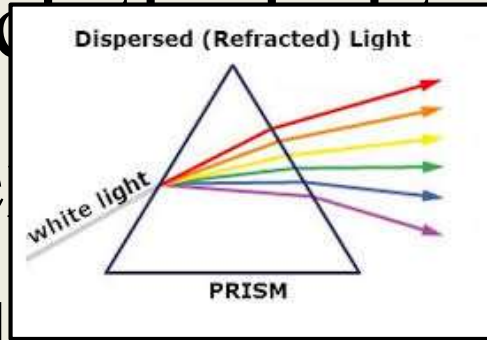
Responding Variable

## Identify Variables #3



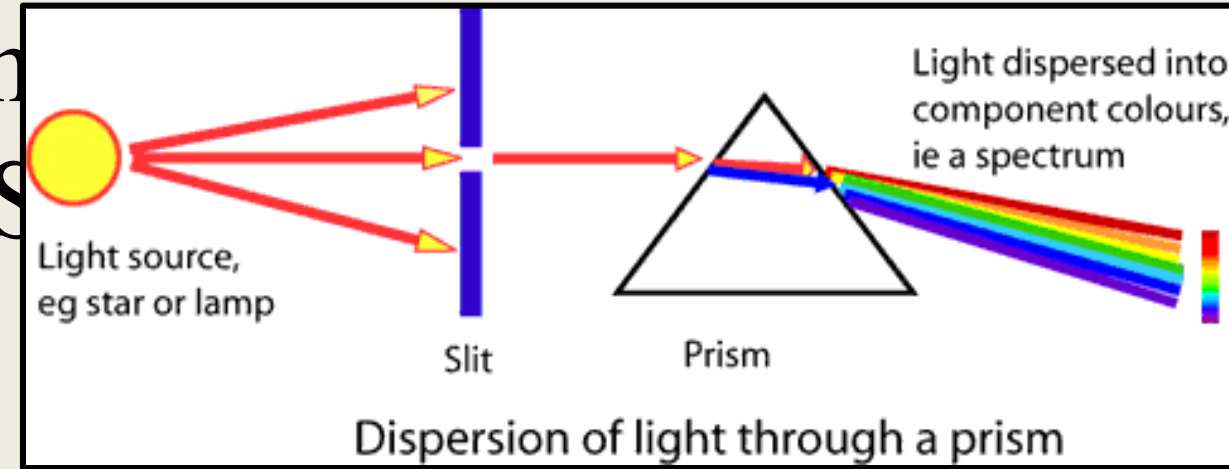
- **Controlled Variables:**
  - \* Same hippo
  - \* Dropped from the same height
  - \* Same parachute fabric
  - \* Same length of strings on the parachute
  - \* etc...

- **Sci Fact** → CRUCIAL



Prism ?

what a PRISM



passes it is THING that we

# ***WEDNESDAY, DECEMBER 12<sup>th</sup>***

## **DO NOW**

**Know:** A student designs an experiment to determine the spectrum of color produced by different light sources.

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# Today's Qualitative Prompt

LIST all of the variables that you'd need to CONTROL in an experiment to measure the effect of TECHNOLOGY (phones, video games, etc.) on social skills!

- Students, recall that a VARIABLE is anything that can be CHANGED, especially in a Science Experiment!



## DEFINITION

➤ Variable – Any factor that can change in a scientific investigation or experiment

A variable is anything that could be changed that may affect the results or output of an investigation.



**INDEPENDENT VARIABLE**

*What I CHANGE*

**DEPENDENT VARIABLE**

*What I OBSERVE*

**CONTROLLED VARIABLE**

*What I KEEP THE SAME*



# Today's Qualitative Prompt

LIST all of the variables that you'd need to CONTROL in an experiment to measure the effect of TECHNOLOGY (phones, video games, etc.) on social skills!

- Students, recall that a VARIABLE is anything that can be CHANGED, especially in a Science Experiment!

**Aim:** What are variables in science experiments?

A birdy example...

Imagine you want to see what color of bird feeders your local birds preferred.



Red?






Blue?



Green?

BirdSleuth K-12

## Our Experimental Design

<b>CONSTANTS</b>	Location of feeders Kind of seed Type of feeder		
<b>INDEPENDENT VARIABLE</b>	Red 	Blue 	Green 
<b>DEPENDENT VARIABLE</b>	Amount of Seed Eaten	Amount of Seed Eaten	Amount of Seed Eaten



# Today's Qualitative Prompt

LIST all of the variables that you'd need to CONTROL in an experiment to measure the effect of TECHNOLOGY (phones, video games, etc.) on social skills!

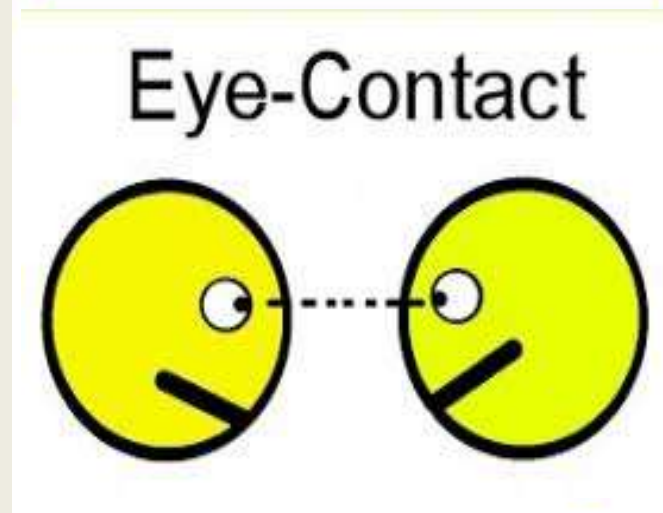
- To do “good science” we always follow the SCIENTIFIC METHOD so we thus have THREE variables in this experiment; our INDEPENDENT variable is the usage of technology, while the DEPENDENT variable is social skills!



# Today's Qualitative Prompt

LIST all of the variables that you'd need to CONTROL in an experiment to measure the effect of TECHNOLOGY (phones, video games, etc.) on social skills!

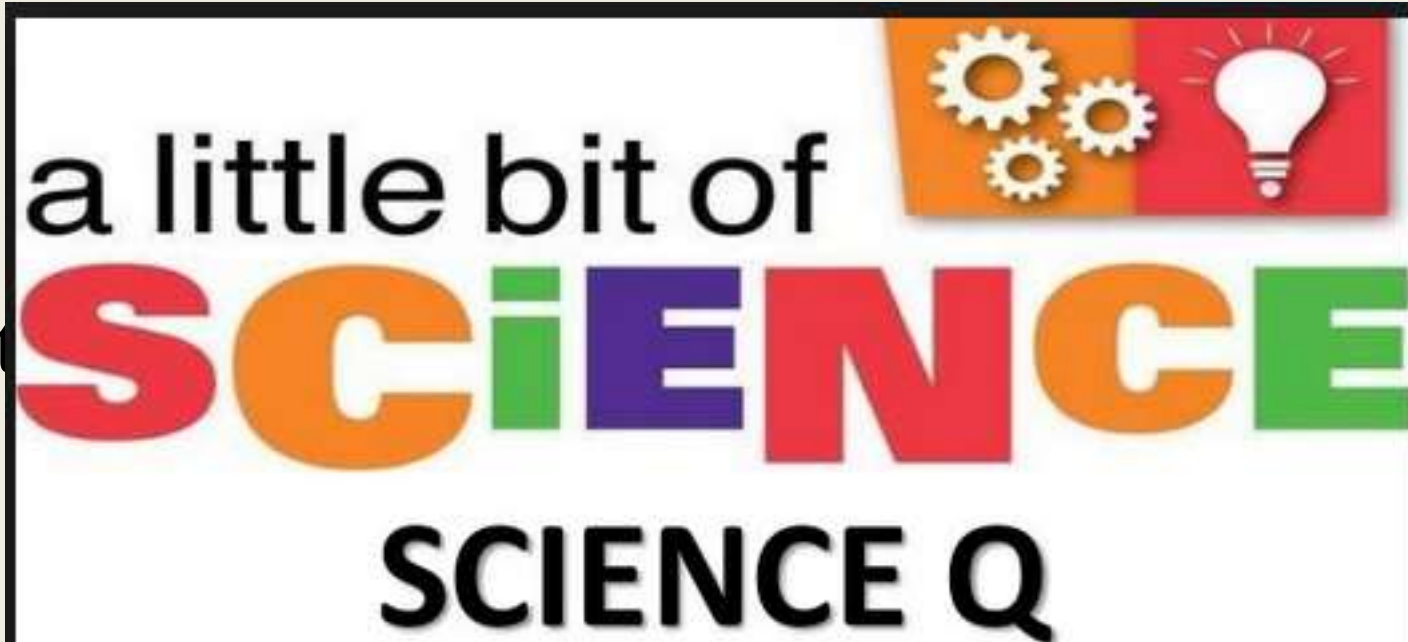
- However, to truly TEST what the effect of all of your tech is on social skills we'd have to first DEFINE what "social skills" are and then CONTROL everything else that could affect them!





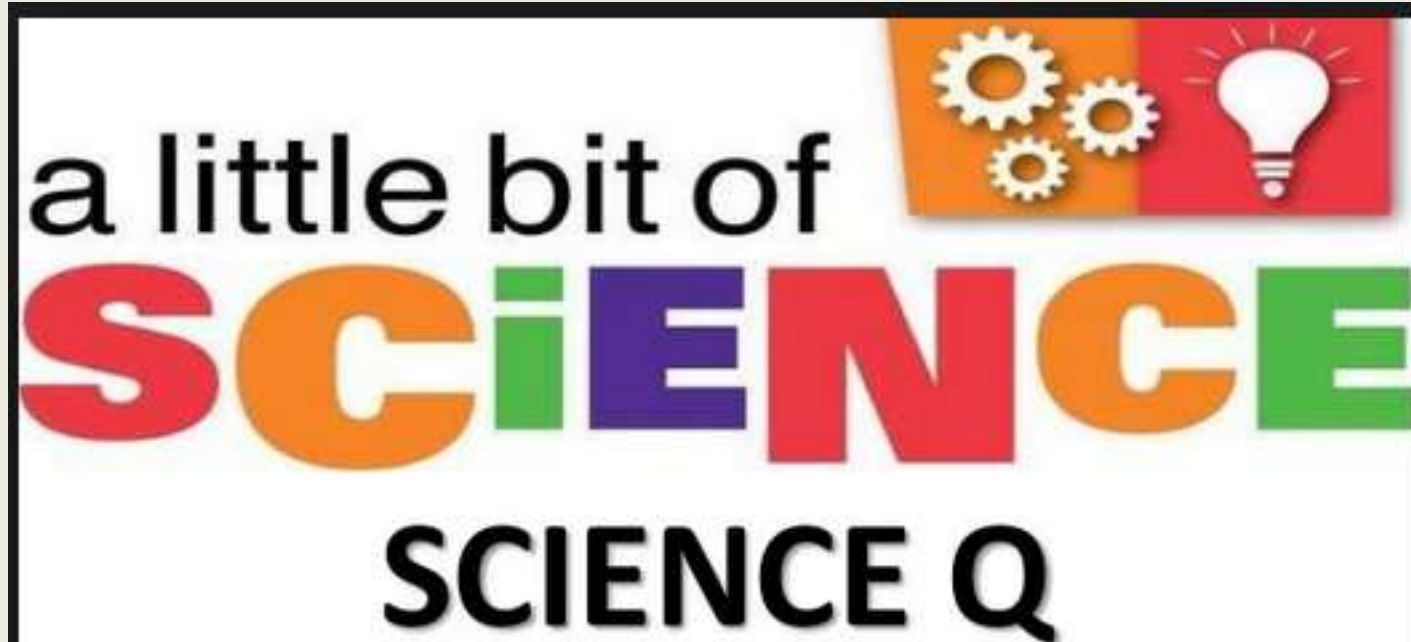
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# Bell 2 Bell

- We work **BELL 2 BELL** in Mr. Floyd's class!
- I will thus quiz you about the science we learned today until the very end!
- Let us begin!





# Tomorrow's Academic Objective and Plan

- Tomorrow you will DESIGN a scientific display board in order to STAND OUT and showcase your Inquiry Project!
- \*HW = Work on your Inquiry Projects!

**Inquiring for an A**

**Scientific Method**

1. Ask a Question
2. Make a Hypothesis
3. Experiment
4. Collect Data
5. Reach a Conclusion

**INQUIRY**

Scientific Method (1) as

1. Ask a question

2. Formulate a hypothesis

3. Hypothesis

4. Procedure

5. Results

6. Conclusions and Future Steps

**Science Inquiry**

Minds-on Hands-on

92 - 100 = A Excellent work

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Science Inquiry

**"Googleable"**

A "Googleable" question is a question which can be answered by a single Google or library search.

**"Non-Googleable"**

A "Non-Googleable" question is a question which cannot be easily answered by a Google or library search, but they may help you find the answer.

**The Display Board**

**Title**

Group Name

Hypothesis

Procedure

**Question**

**Data**

**Results**

Conclusions, and Future Steps

# THURSDAY, DECEMBER 13<sup>th</sup>

## DO NOW

- In your notebooks, to be checked, solve this problem...

There are 20 years in 1 score.  
These are units of time!

**Know:**

*20 years = 1 score*

**Asked:** How many score are in  
220 years?

## TODAY'S PLAN

1. Do and review the **DO NOW** and **Qualitative Prompt (QP)**!
  - Today's **QP** = LIST as many CONTROL VARIABLES that you can think of from your Inquiry Experiments and then SKETCH a simple diagram showing how your experiment is done!
2. Open books, **WORK** on today's **AO!**
3. \***HW** = Finish Inquiry Projects!

## TODAY'S ACADEMIC OBJECTIVE

Today you will **DESIGN** a scientific display board in order to **STAND OUT** and showcase your Inquiry Project!

## **DO NOW – Units of Time**

There are 20 years in 1 score. These are units of time!

- **Know/Given:**

$$20\text{years} = 1\text{score}$$

- **Asked:** How many score are in 220 years?

# What is KA<sup>2</sup> format? This is an example of a “1-pointer” on a DO NOW!

- **Know:**

$$\frac{20years}{1score} = \frac{1score}{20years}$$

- **Asked:** How many score are in 220 years?

- **Answer:**  $220years * \frac{1score}{20years} = 11score$



# DO NOW – Never Forget to Listen to Akila!

- To solve these problems, just multiply by the fraction with the units you want on top and “*Let the Units Guide You*”!

– Example:  $84\cancel{\text{in}} * \frac{1\text{ft}}{12\cancel{\text{in}}} = 7\text{ft}$



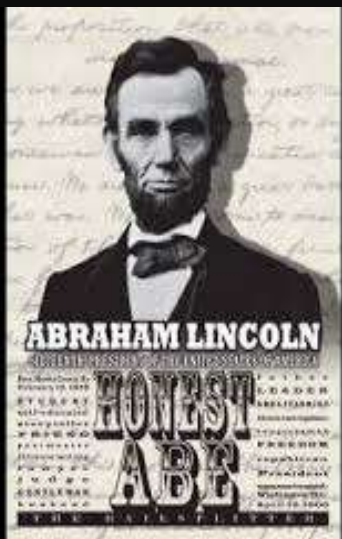
# DO NOW – Translating Our Answer

- **Answer:**

$$220\cancel{years} * \frac{1score}{20\cancel{years}} = 11score$$



- **Sci Fact** → Students, keeping track of TIME is oftentimes CRUCIAL in a Science Experiment, almost as crucial as knowing that the CHEF was not born yesterday 😊
- Does anyone know who is FAMOUS for using the “score” unit though!



Four score and seven years ago our fathers brought forth on this continent, a new nation, conceived in Liberty, and dedicated to the proposition that all men are created equal.

Honest Abe



et → Students, I



DOur Answer

NOW



STUDENT accountability

The obligation of an individual or organization to account for its activities, accept responsibility for them, and to ...



DO THE WORK



THE GETTYSBURG ADDRESS

November 19, 1863  
At the Dedication of the Soldiers' National Cemetery in Gettysburg, Pennsylvania:  
Four score and seven years ago our fathers brought forth on this continent, a new nation, conceived in Liberty, and dedicated to the proposition that all men are created equal.  
Now we are engaged in a great civil war, testing whether that nation, so conceived and so dedicated, can long endure. We are now in a great battle-field of that war, we have come to dedicate a portion of that field, as a final resting place for those who here gave their lives that that nation might live. It is altogether fitting and proper that we should do this.  
But, in a larger sense, we can not dedicate -- we can not consecrate -- we can not hallow -- this ground. The brave men, living and dead, who struggled here, have consecrated it, far above our poor power to add or deduct. The world will little note, nor long remember what we say here, but it can never forget what they did here. It is for us the living, rather, to be dedicated here to the unfinished work which they who fought here have thus far so nobly advanced. It is rather for us to be here dedicated to the great task remaining before us -- that from these honored dead we take increased devotion to that cause for which they gave the last full measure of devotion -- that we here highly resolve that these dead shall not have died in vain -- that this nation, under God, shall have a new birth of freedom -- and that government of the people, by the people, for the people, shall not perish from the earth.

Abraham Lincoln



# THURSDAY, DECEMBER 13<sup>th</sup>

## DO NOW

- In your notebooks, to be checked, solve this problem...

There are 20 years in 1 score.  
These are units of time!

**Know:**

*20 years = 1 score*

**Asked:** How many score are in  
220 years?

## TODAY'S PLAN

1. Do and review the **DO NOW** and **Qualitative Prompt (QP)**!
  - Today's **QP** = LIST as many CONTROL VARIABLES that you can think of from your Inquiry Experiments and then SKETCH a simple diagram showing how your experiment is done!
2. Open books, **WORK** on today's **AO!**
3. \***HW** = Finish Inquiry Projects!

## TODAY'S ACADEMIC OBJECTIVE

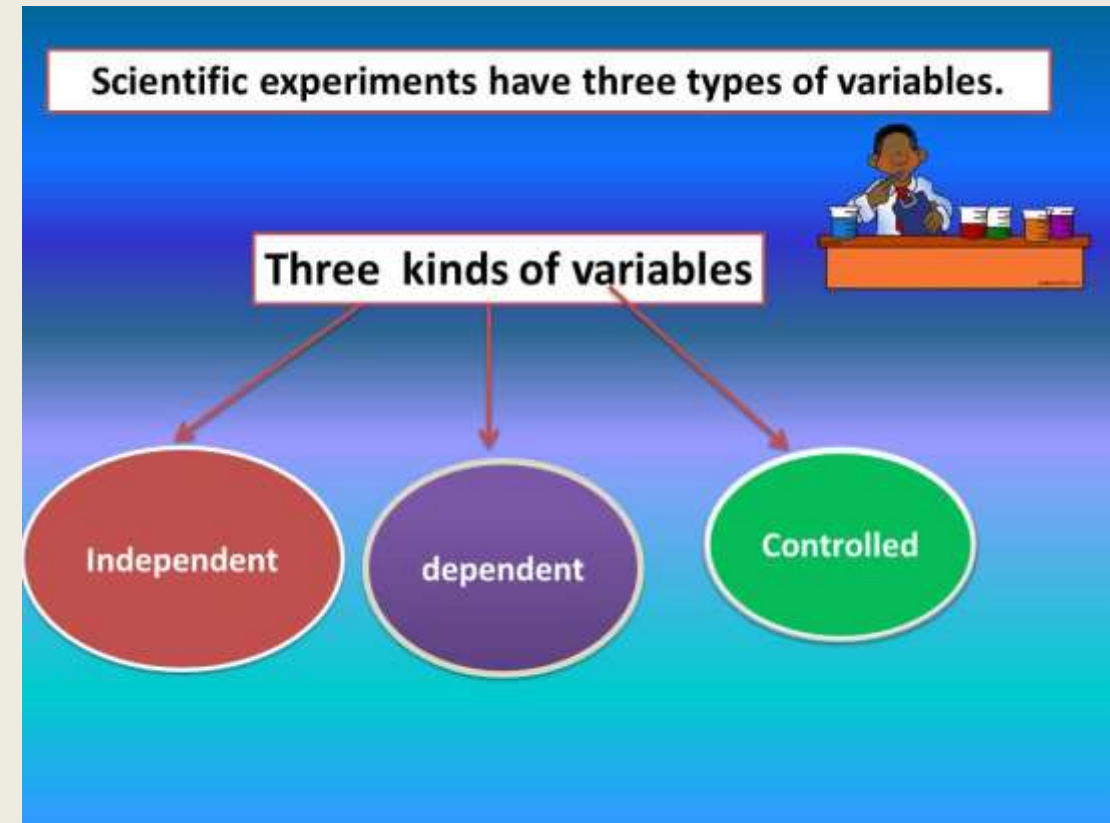
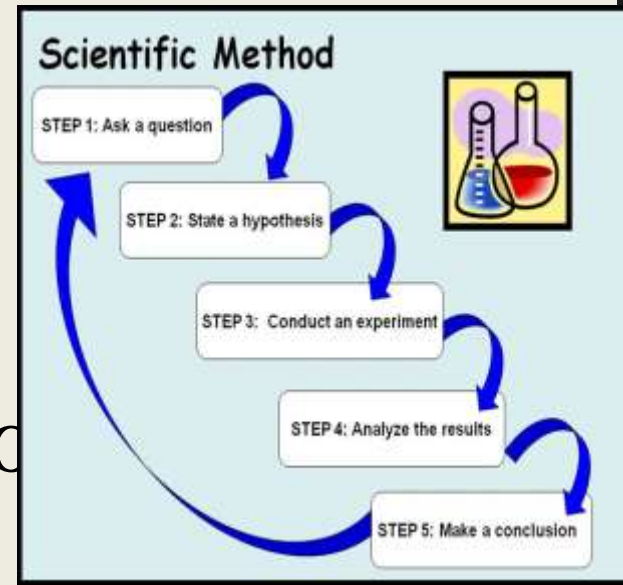
Today you will **DESIGN** a scientific display board in order to **STAND OUT** and showcase your Inquiry Project!



# Today's Qualitative Prompt

LIST as many CONTROL VARIABLES that you can think of from your Inquiry Experiments and then SKETCH a simple diagram showing how you're experiment is done!

- Students, recall that every "GOOD" science experiment has THREE main types of variables!



# Today's Qualitative Prompt

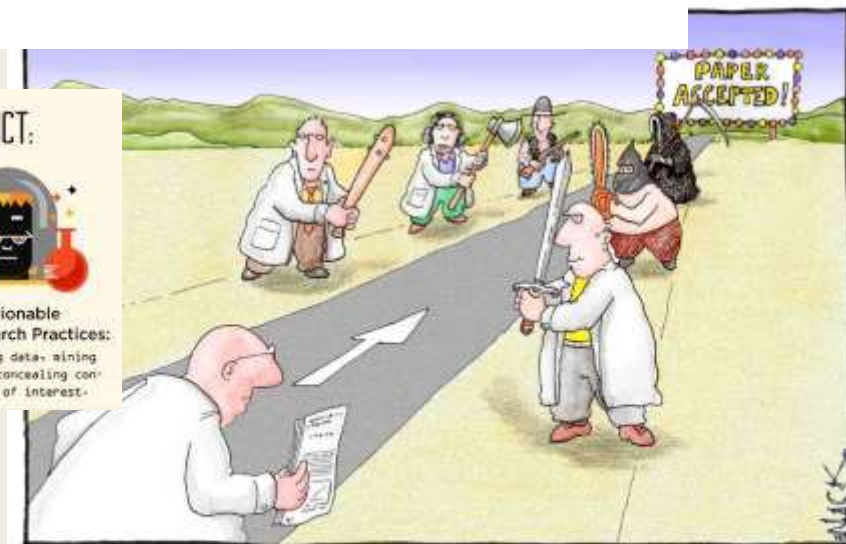
LIST as many CONTROL VARIABLES that you can think of from your Inquiry Experiments and then SKETCH a simple diagram showing how you're experiment is done!

- Students, recall that every “GOOD” science experiment has THREE main types of variables!



Science is what we do to keep us from lying to ourselves

— Richard P. Feynman —



Most scientists regarded the new streamlined peer-review process as 'quite an improvement.'

# Today's Qualitative Prompt

LIST as many CONTROL VARIABLES that you can think of from your Inquiry Experiments and then SKETCH a simple diagram showing how you're experiment is done!

- Identifying the INDEPENDENT aka “what you change” and DEPENDENT aka “what you measure” is thus pretty easy if you use GOOD Science!

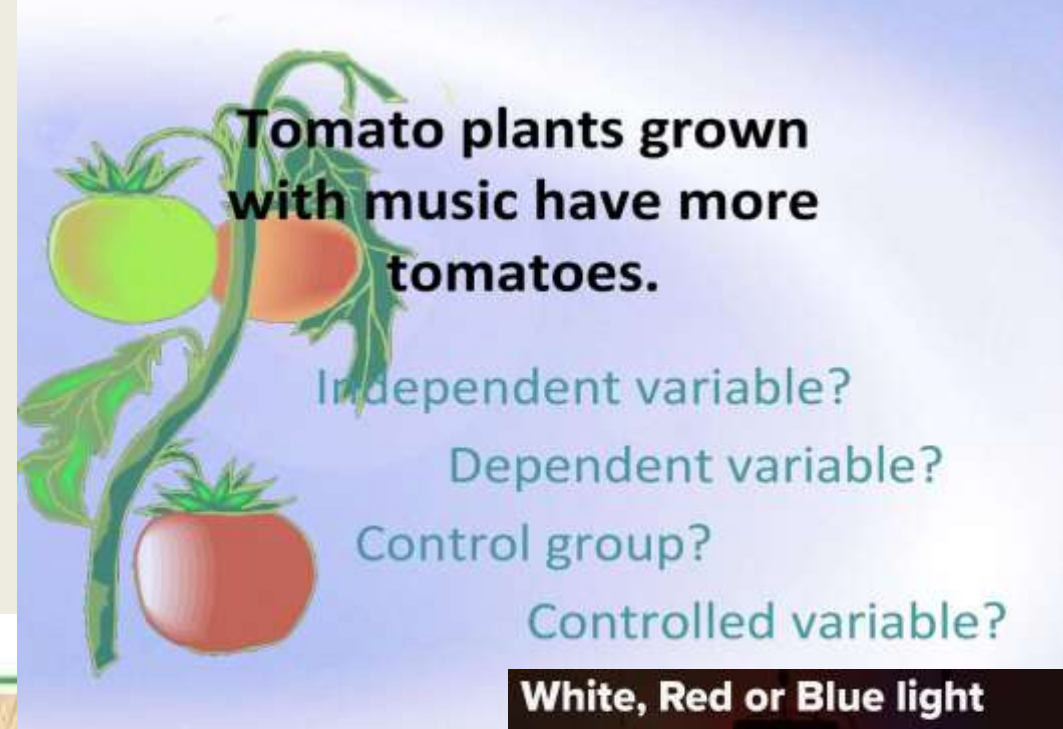




# Today's Qualitative Prompt

LIST as many CONTROL VARIABLES that you can think of from your Inquiry Experiments and then SKETCH a simple diagram showing how you're experiment is done!

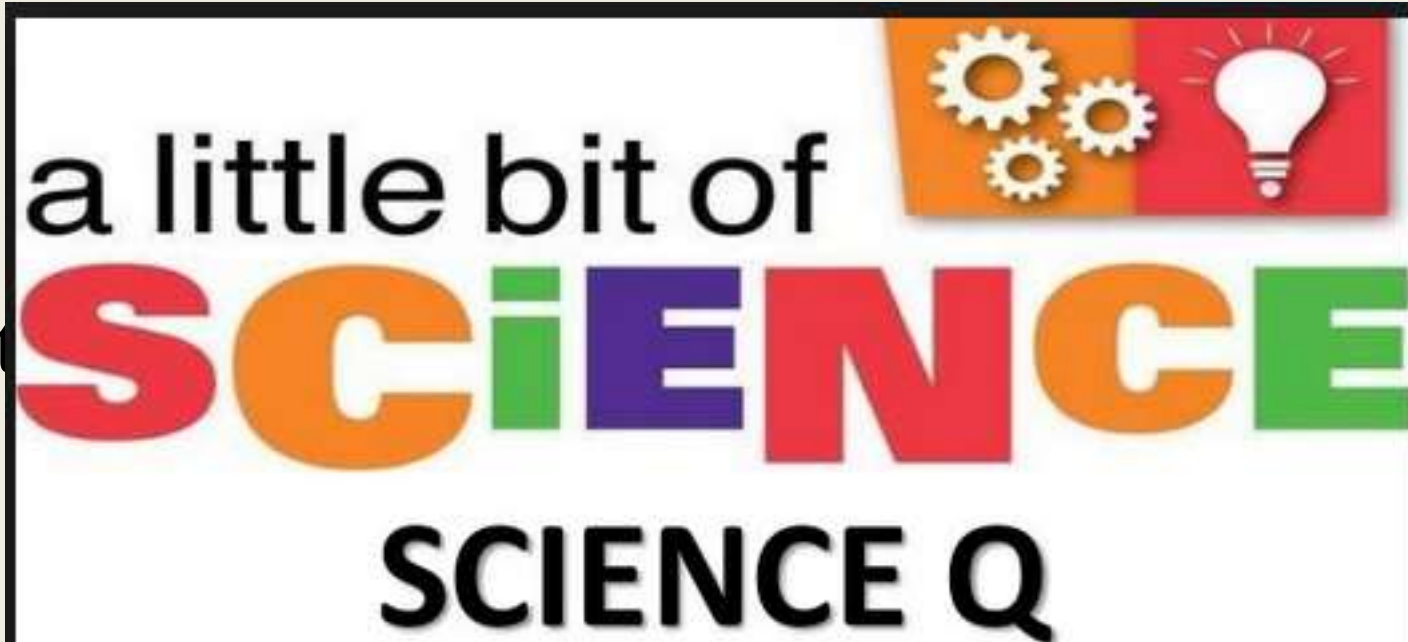
- However, listing all of the CONTROLLED variables can be tough, since often times there are A LOT of outside factors that can affect an experiment!





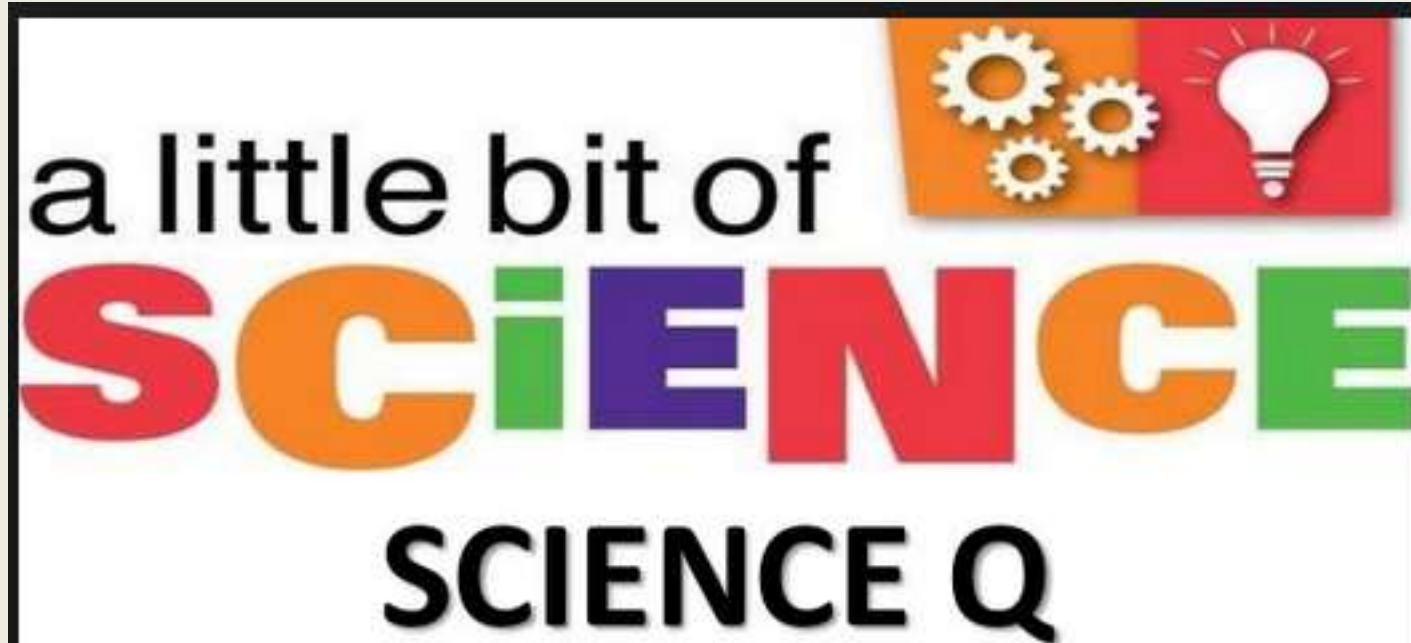
# Bell 2 Bell

- We work what in this class?!?!?!
  - **BELL 2 BELL**
- Every single precious **SECOND** of academic instructional time is thus utilized in this classroom!
- You students will thus be vocally quizzed **EVERY DAY** until I **DISMISS** you at the end of class (with a positive greeting and a thank-you of course!).



# Bell 2 Bell

- We work **BELL 2 BELL** in Mr. Floyd's class!
- I will thus quiz you about the science we learned today until the very end!
- Let us begin!





# Tomorrow's Academic Objective and Plan

- Tomorrow you will **STAND OUT** and **PRESENT** your contribution to the world of **SCIENCE!**
- \*HW = Finish your Inquiry Projects!

The collage features several educational elements:

- The Display Board:** A template for a science project display board with sections for Group Name, Title, Question, Hypothesis, Procedure, and Data. The Data section includes a bar graph, a table with columns labeled A, B, C, D, E, F, G, H, I, J, K, L, M, N, O, P, Q, R, S, T, U, V, W, X, Y, Z, and a line graph.
- Science Inquiry Project:** An illustration of children in a laboratory setting.
- Grading Scale:** A scale showing 92 - 100 = A Excellent work and 83 - 91 = B Above average work.
- Science Inquiry Book:** A book cover titled "Science Inquiry" with the subtitle "Minds-on Hands-on".
- Googleable vs. Non-Googleable:** A box defining "Googleable" as a question which can be answered by a single Google or library search, and "Non-Googleable" as a question which cannot be easily answered by a Google or library search, but may help you find the answer.
- INQUIRY 4:** A colorful banner with the word "INQUIRY" in large, multi-colored letters and a large number "4".
- Cartoon Characters:** A cartoon character in a yellow suit and hat, possibly a detective or scientist, standing in a snowy or icy environment.

# FRIDAY, DECEMBER 14<sup>th</sup>

## DO NOW

- In your notebooks, to be checked, solve this problem...

There are about 3 stones in 19 kilograms. These are units of mass!

**Know:**

$$3st \approx 19kg$$

**Asked:** How many stones are in 76 kilograms?

## TODAY'S PLAN

1. Do and review the **DO NOW** and **Qualitative Prompt (QP)**!
  - Today's **QP** = PREDICT and SKETCH what the RESULT would be in an experiment designed to TEST what happens when super-small particles are FIRED into an Atom!
2. Open books, **WORK** on today's **AO**!
3. \***HW** = Finish your InquiryProjects!

## TODAY'S ACADEMIC OBJECTIVE

Today you will **STAND OUT** and **PRESENT** your contribution to the world of **SCIENCE**!



## **DO NOW – Units of Mass**

There are about 3 stones in 19 kilograms. These are units of mass!

- **Know:**

$$3st \approx 19kg$$

- **Asked:** How many stones are in 76 kilograms?

**What is KA<sup>2</sup> format? This is an example of a “1-pointer”  
on a DO NOW!**

• **Know:**

$$3st \approx 19kg$$
$$\frac{3st}{19kg} \quad \frac{19kg}{3st}$$

• **Asked:** How many stones are in 76 kilograms?

• **Answer:**  $76kg * \frac{3st}{19kg} \approx 12st$

# DO NOW – Never Forget to Listen to Akila!

- To solve these problems, just multiply by the fraction with the units you want on top and “*Let the Units Guide You*”!

– Example:  $84\cancel{in} * \frac{1ft}{12\cancel{in}} = 7ft$



# DO NOW – Translating and Concluding Our Answer!

- **Answer:**

$$76\cancel{kg} * \frac{3st}{19\cancel{kg}} \approx 12st$$

- **Sci Fact** → Students, NEVER FORGET the difference between MASS (the amount of MATTER making up an object) and WEIGHT (the force of gravity on an object)! What is that  $\approx$  though?!



# MASS

VS

# WEIGHT

## Metric Units of Mass

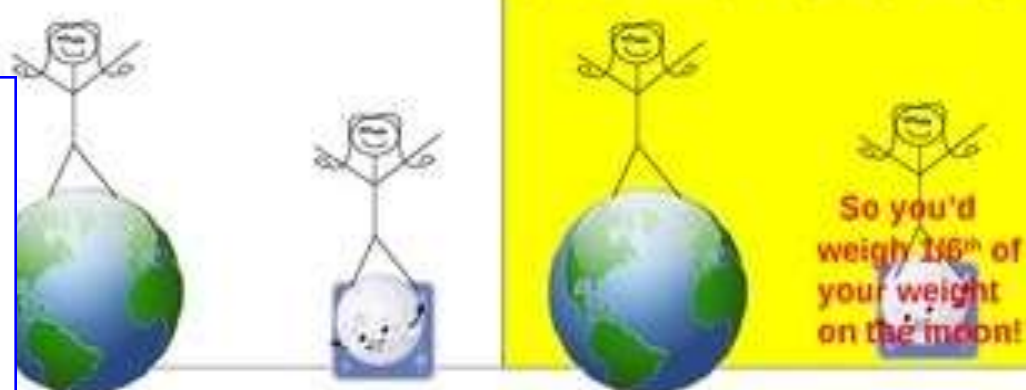
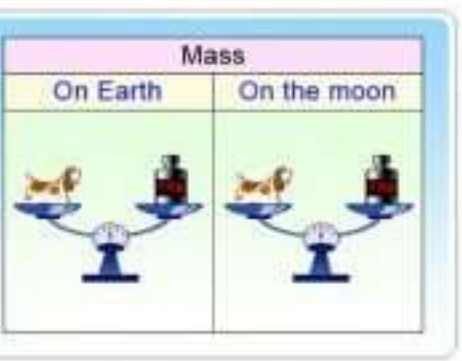
Kilograms

Grams

Milligrams



Mass	Weight
A measure of how much matter an object contains	The force of gravity on an object
Is the same for an object no matter where it is located in the universe	Changes for an object depending on where it is located in the universe.
Measure with a balance	Measure with a scale.
Earth mass same as Moon mass Mass=50kg      Mass=50kg	Earth weight more than Moon weight Weight=490N      Weight=82N (110 pounds)      (18 pounds)



## Newton's Laws

1. A body will remain at rest, or moving at a constant velocity, unless it is acted on by an unbalanced force.
2. The force experienced by an object is proportional to its mass times the acceleration it experiences:

$$\vec{F} = m\vec{a}$$

3. If two bodies exert a force on one another, the forces are equal in magnitude, but opposite in direction:

$$\vec{F}_{12} = -\vec{F}_{21}$$



Weight is another word for the force of gravity

$$F_g = mg = W$$

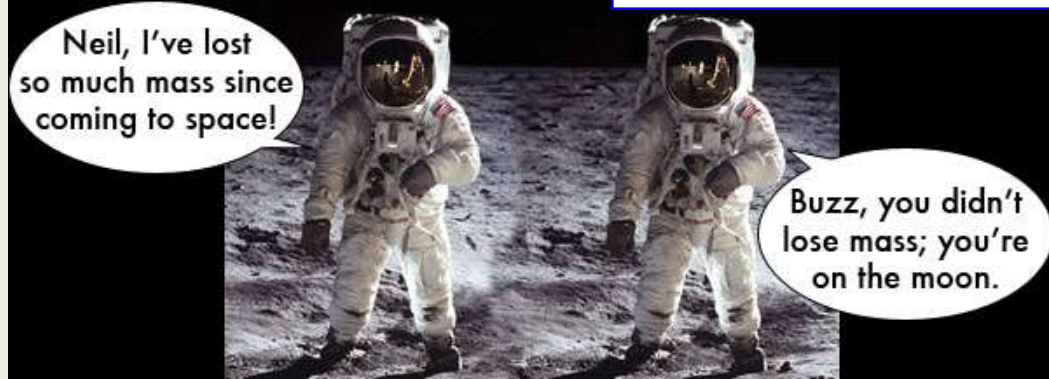
# FORGET the

Mass

Stone

Formula for an approximate result, multiply the mass value by 6.35

# difference



# What is that



Is approximately

# FRIDAY, DECEMBER 14<sup>th</sup>

## DO NOW

- In your notebooks, to be checked, solve this problem...

There are about 3 stones in 19 kilograms. These are units of mass!

**Know:**

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## TODAY'S PLAN

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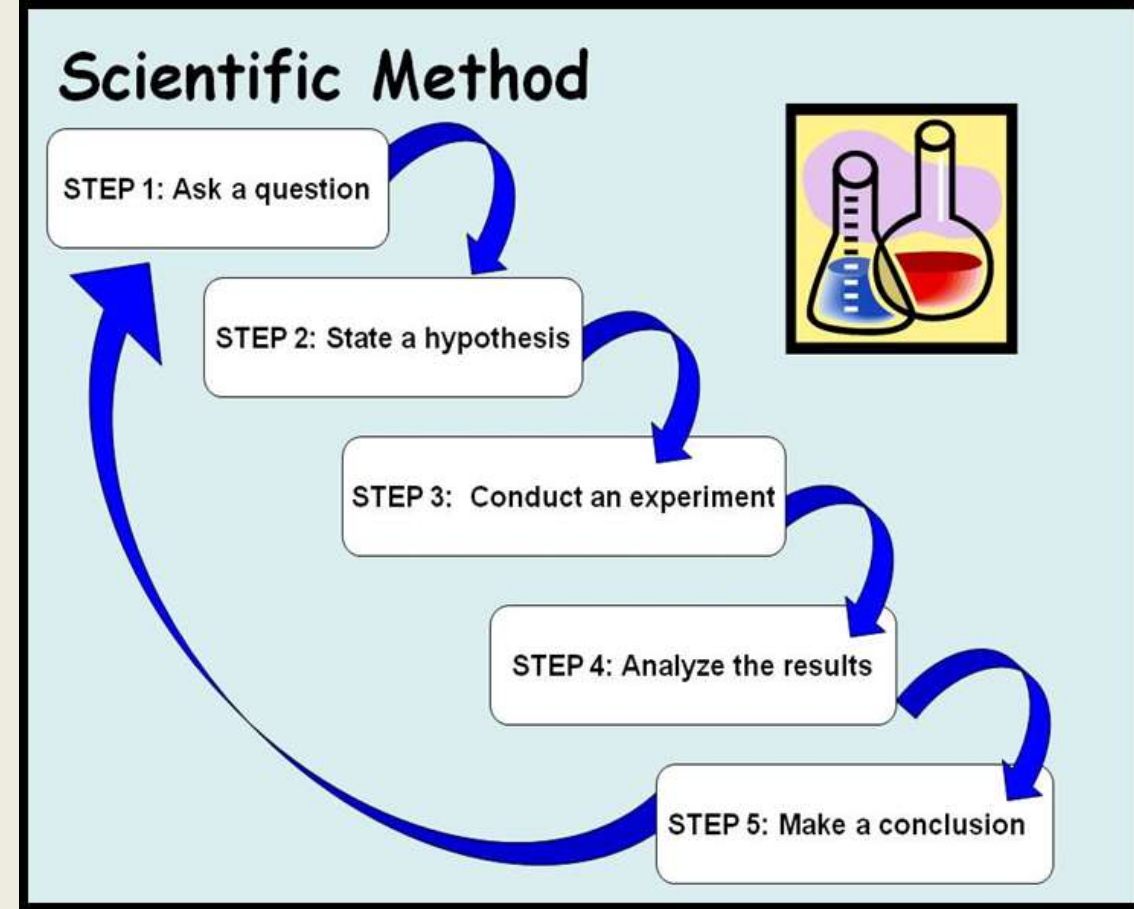
## TODAY'S ACADEMIC OBJECTIVE

Today you will **STAND OUT** and **PRESENT** your contribution to the world of **SCIENCE**!

# Today's Qualitative Prompt

PREDICT and SKETCH what the RESULT would be in an experiment designed to TEST what happens when super-small particles are FIRED into an Atom!

- Students, ANALYZING and making CONCLUSIONS related to the RESULTS of a science experiment is one of the FINAL steps of the Scientific Method!



- Hypothesis: An educated guess



The  
Scientific  
Method



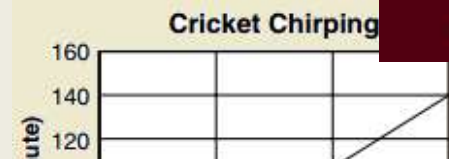
# Today's Qualitative Prompt

PREDICT what the RESULT would be in an experiment designed to TEST what happens when super-small particles are FIRED into an Atom!

- Due to this, this step is often overlooked but it is **INCREDIBLY** important!



**STEP 3**  
**Design and Conduct Your Experiment**

A dark red rectangular box with white text. Below the text, there are three stylized white birds flying to the right. The background of the box has a faint circular pattern.

Bird Feeder Visits by Color



**STEP 5**  
**Communicate Your Experiment and Results**

A dark red rectangular box with white text. Below the text, there is a small image of a science report or poster with various diagrams and text.

**Effects of Solar Warming (Temperature in °F)**

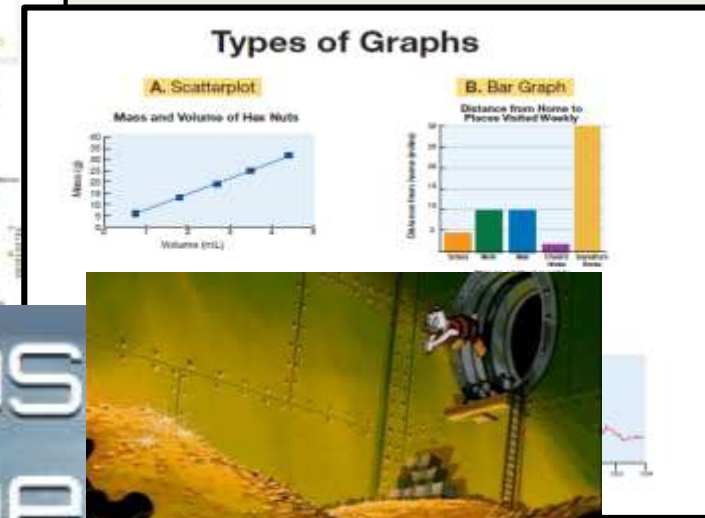
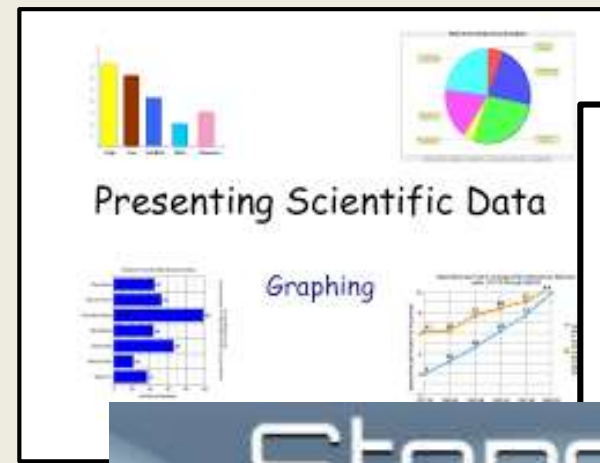
	North	South	East	West
Day 1	29	36	32	32
Day 2	29	36	32	31
Day 3	30	37	34	33
Day 4	27	34	32	30
Day 5	30	37	35	33



# Today's Qualitative Prompt

PREDICT what the RESULT would be in an experiment designed to TEST what happens when super-small particles are FIRED into an Atom!

- Due to this, this step is often overlooked but it is **INCREDIBLY** important!



Steps  
of the  
Future



3	6.4	50.8
4	6.6	53.3
5	6.8	55.8

## Experiment conclusion

### CONCLUSION

Ideally, the experiment is then repeated to determine if the results are the same every time.

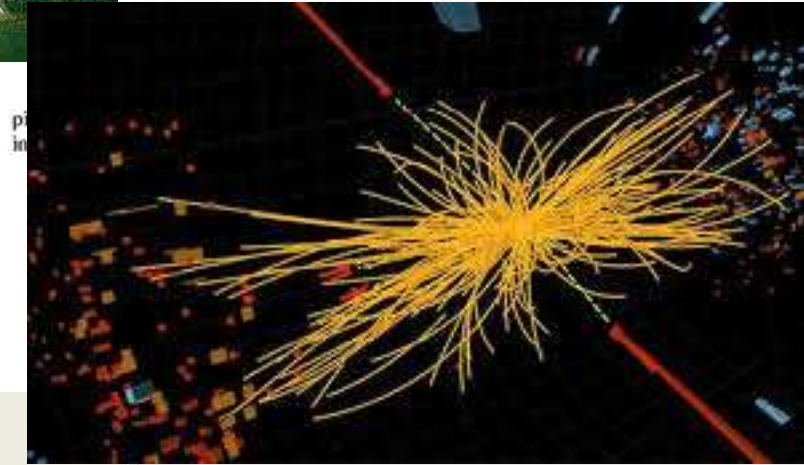
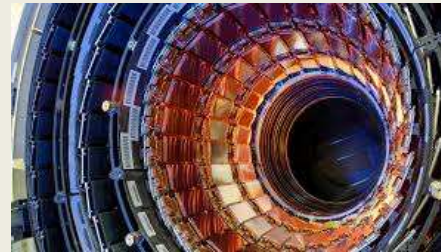
To be successful in science, the scientific method should be used for all experiments. The experimenter should observe, hypothesize, experiment, and analyze to retain accuracy. When the scientific method is employed, the results should speak for themselves.

out to test the actual boiling of water (at sea level) using water; the objective of the experiment was to confirm that it boil at 100 degrees celsius.

# Today's Qualitative Prompt

PREDICT what the RESULT would be in an experiment designed to TEST what happens when super-small particles are FIRED into an Atom!

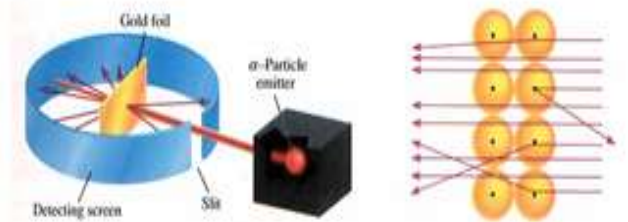
- However, we cannot forget the importance of PREDICTION as well, and when SMASHING particles together the RESULTS can be quite QUANTANOMICAL!



Rutherford gold foil experiment (1913)  
\*Colorised af\*



## Rutherford's Gold Foil Experiment

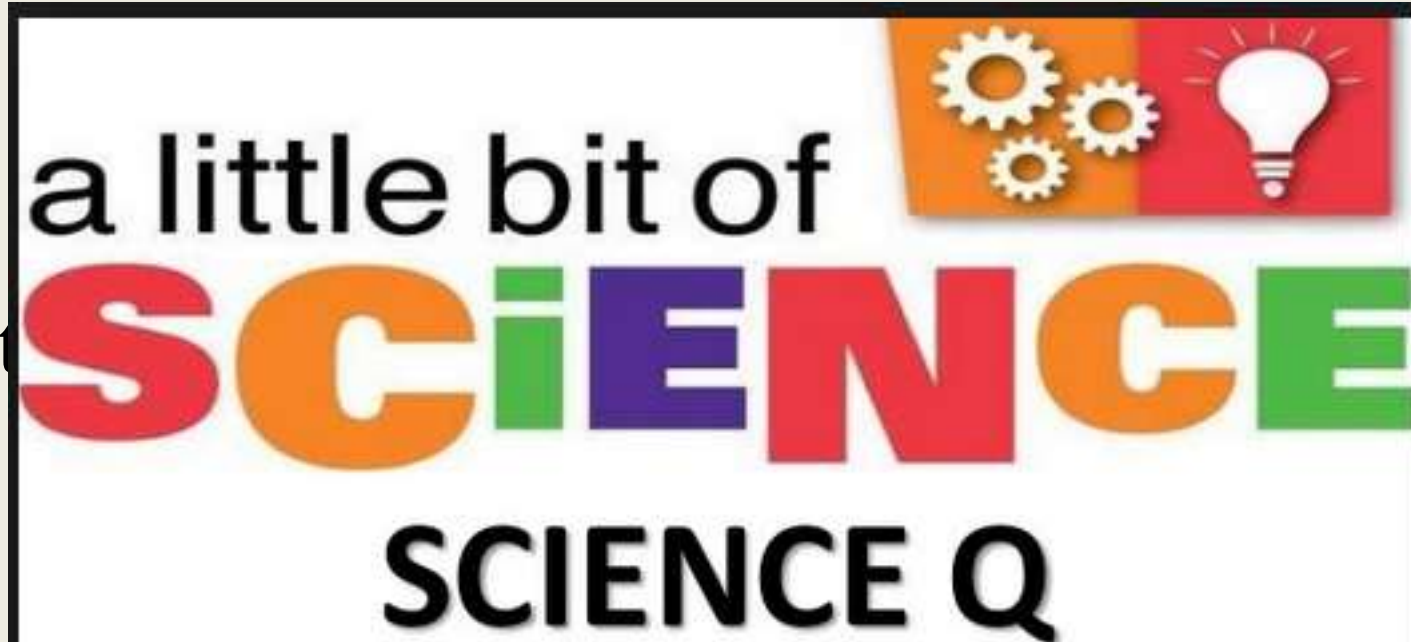


- Alpha particles are helium nuclei
- Particles were fired at a thin sheet of gold foil
- Particle hits on the detecting screen (film) are recorded



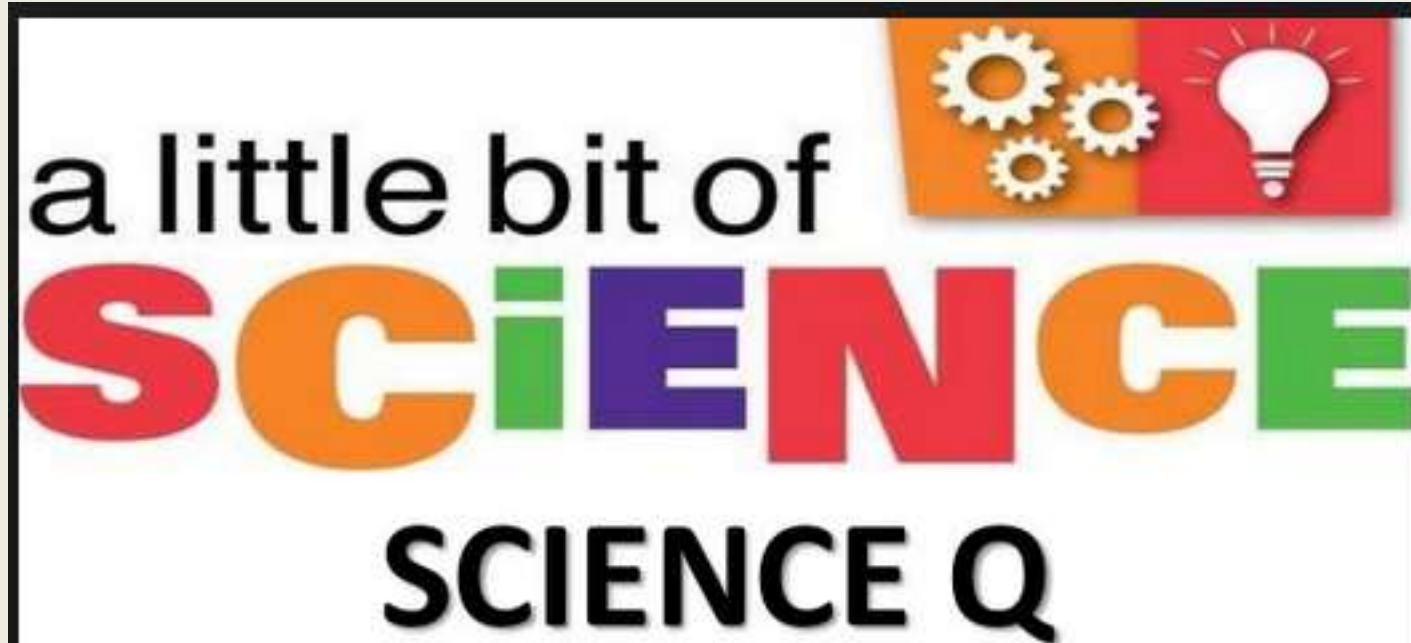
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