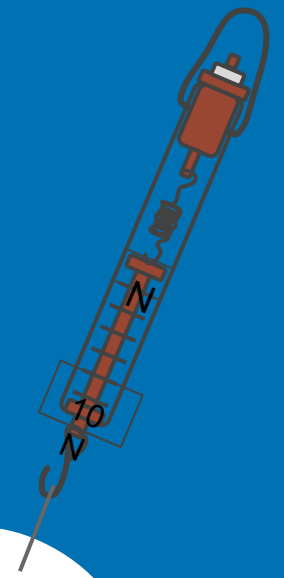
Force of the Earth Lab



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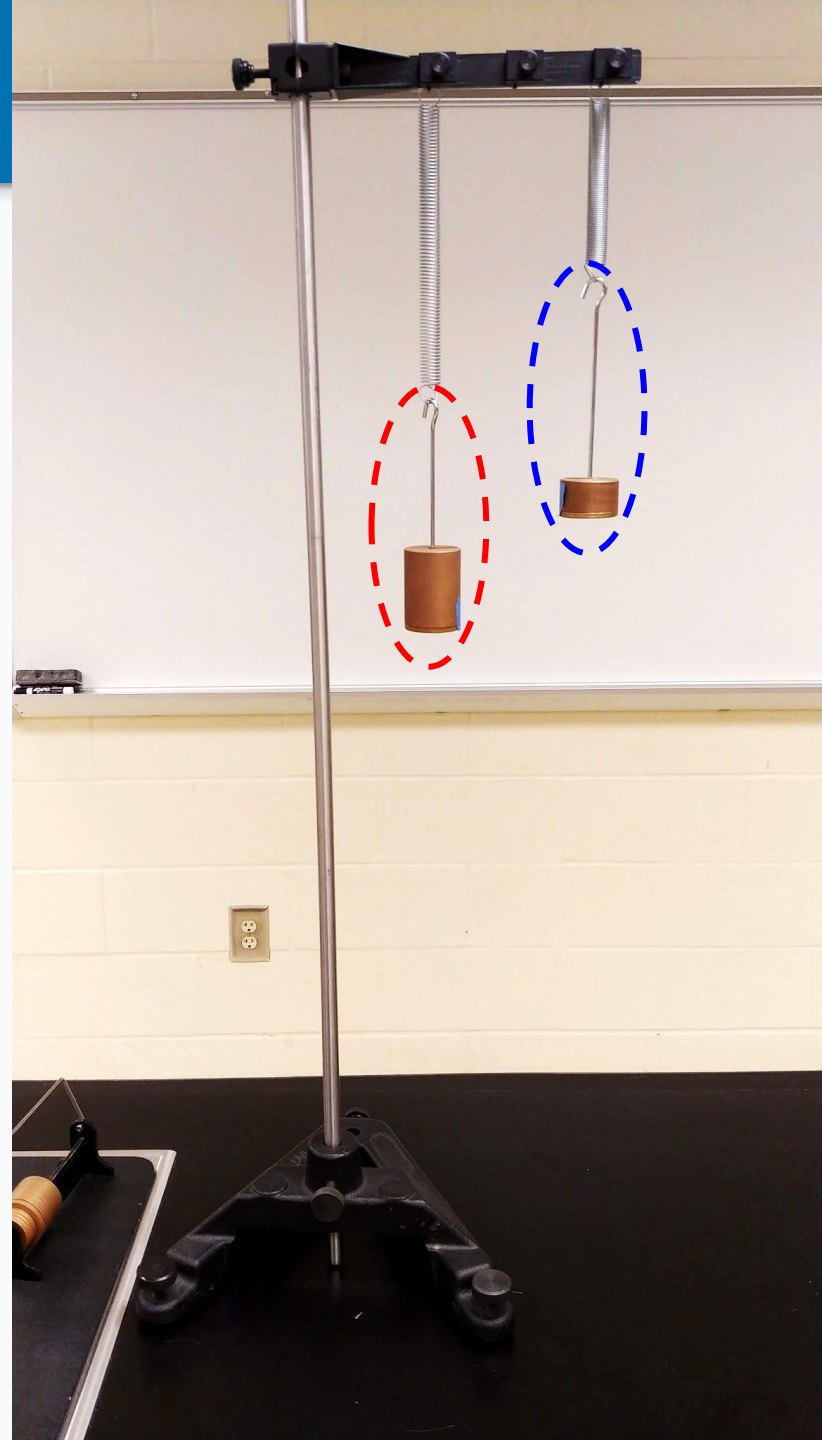
Warm-up Question:

In your notes, draw a force diagram for each of the hanging objects.



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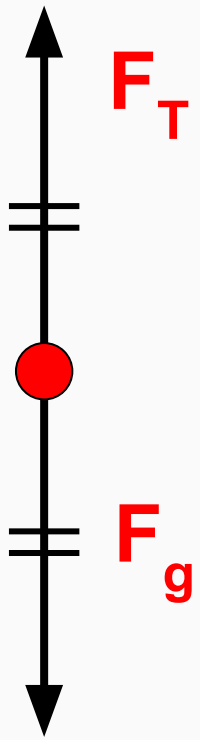
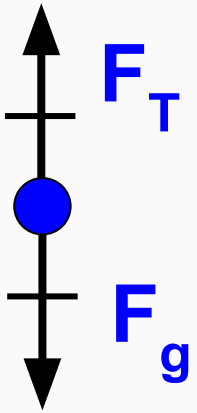
Warm-up Question: *Responses*

In your notes, draw a force diagram for each of the hanging objects.





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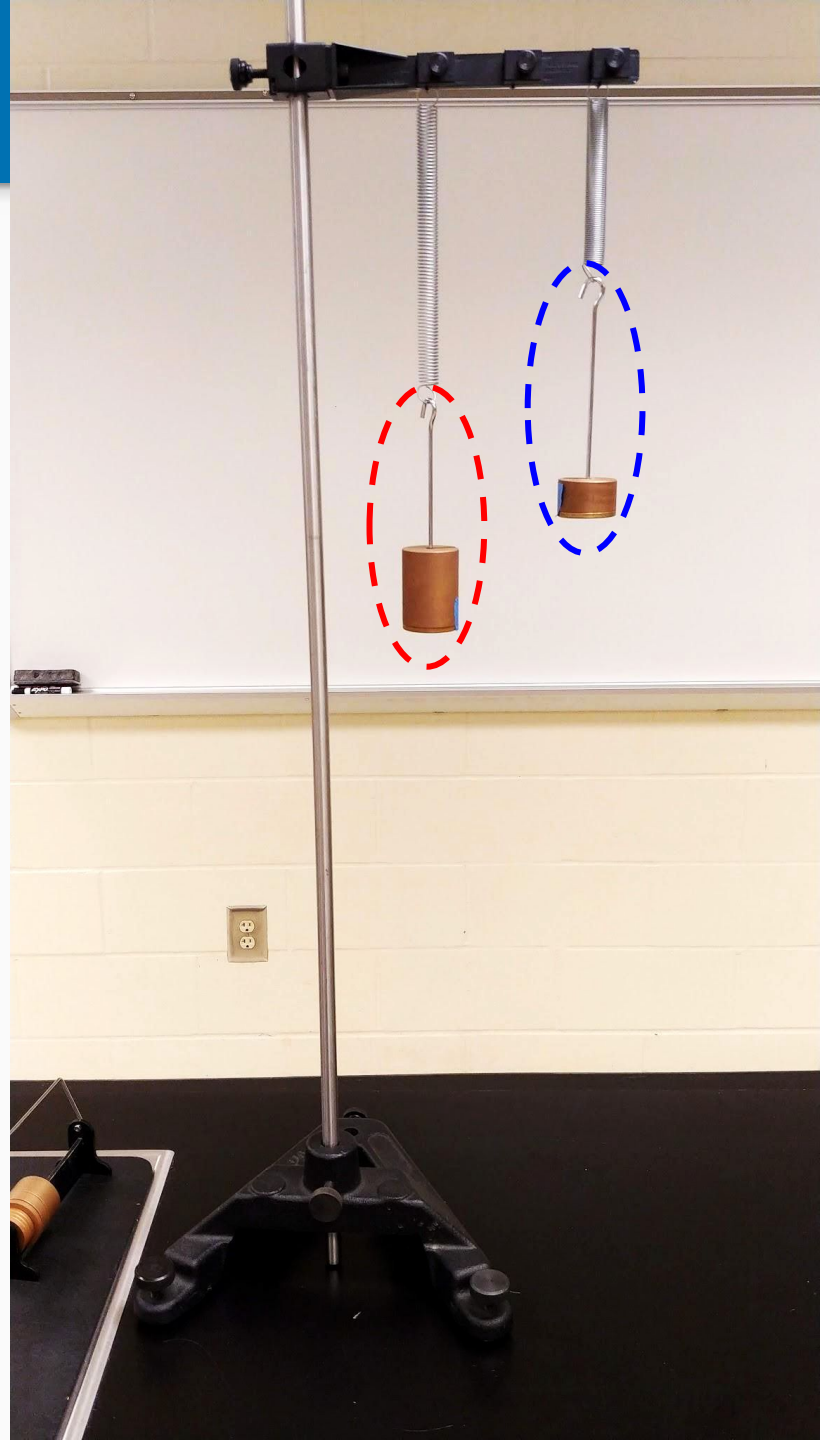

Title: Force of the Earth

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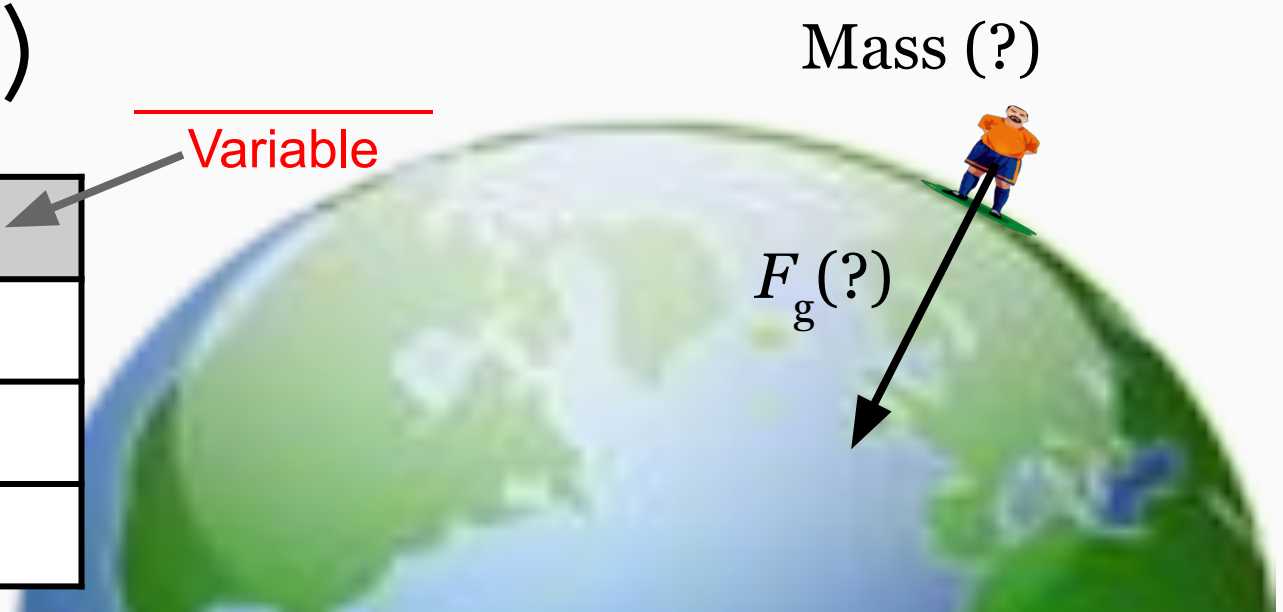
Purpose: To determine the relationship between

Data: (on 2nd page!)

Variable

Variable

...	...



Title: Force of the Earth

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F_g = "weight"

Purpose: To determine the relationship between the force of gravity on an object and the object's mass.

"mass" = the amount of *matter* in an object.

New Term:

"**N**ewton" → metric unit for force

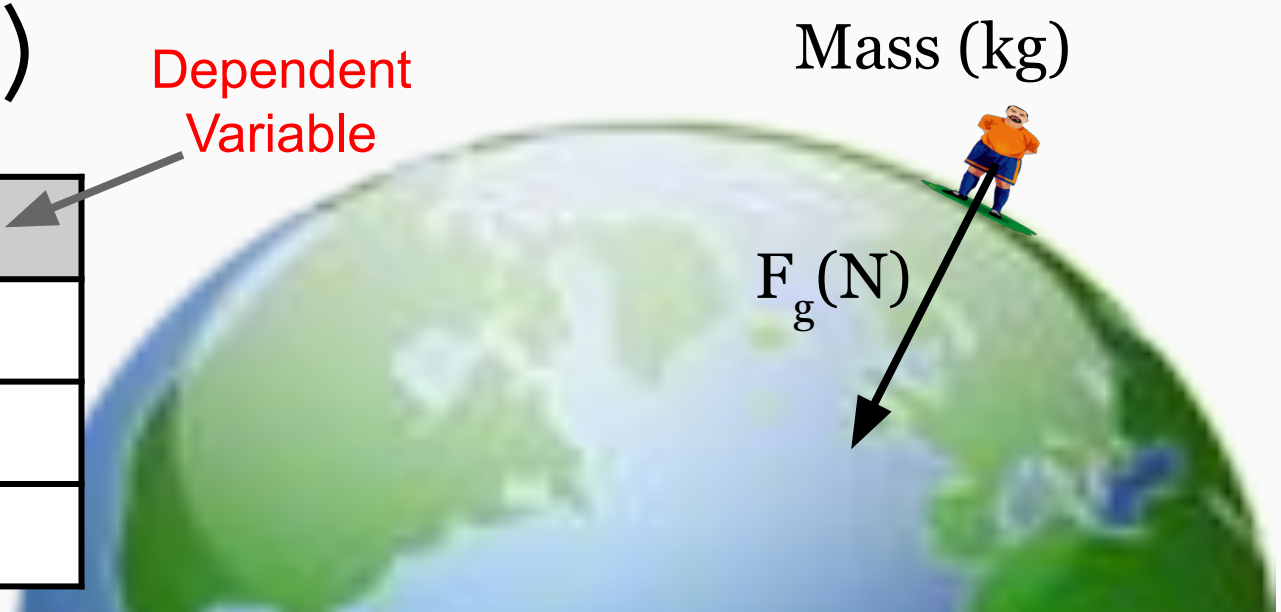
1lb = 4.45N

Data: (on 2nd page!)

Dependent Variable

Independent Variable

Mass (kg)	F_g (N)
0.550	?
0.050	?
...	...



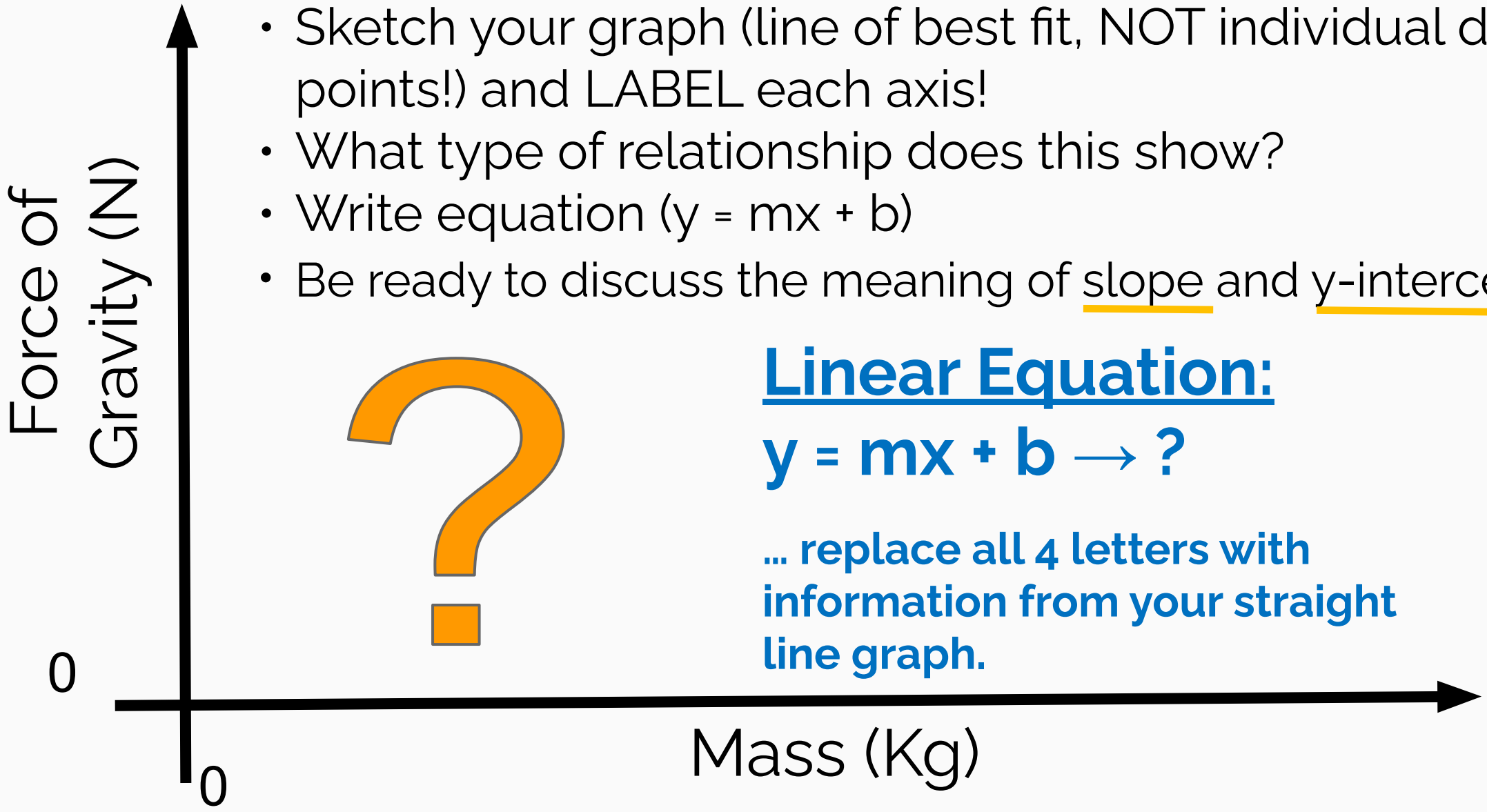
OPTIONAL: VIDEO Data Collection

Each student should use a **different** data set to collect and analyze data. Talk to your lab groups members to make sure you are not using the same data collection video.

** If you have 4 lab group members, 2 will have to use the same video**

Force of the Earth Lab (Data Set #1) Force of the Earth Lab (Data Set #2) Force of the Earth Lab (Data Set #3)

Whiteboard Results



- Sketch your graph (line of best fit, NOT individual data points!) and LABEL each axis!
- What type of relationship does this show?
- Write equation (y = mx + b)
- Be ready to discuss the meaning of slope and y-intercept.

?

Linear Equation:

y = mx + b → ?

… replace all 4 letters with information from your straight line graph.

Y-Intercept Rules:

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5% Rule: If the y-intercept is less than 5% of the maximum y-value, then you can say that it is insignificant or zero.

Logic: If you can reason that the y-intercept should be zero. You can say its is zero.

$$F_g = (10N/kg)m \ldots$$

New Terms:
"weight", "Newtons", "mass" and "gravitational field strength"

$$F_g = (10N/kg)m \ \ldots$$

↓ (slope)

Units: $\frac{N}{kg}$

Variable: g

"Earth's Gravitational Field Strength":
↳ the force of gravity for each unit of mass

$g_{Earth} = 10 \frac{N}{kg}$

$g_{moon} = 1.67 \frac{N}{kg}$

General Equation

$F_g = gm$ or $F_g = mg$

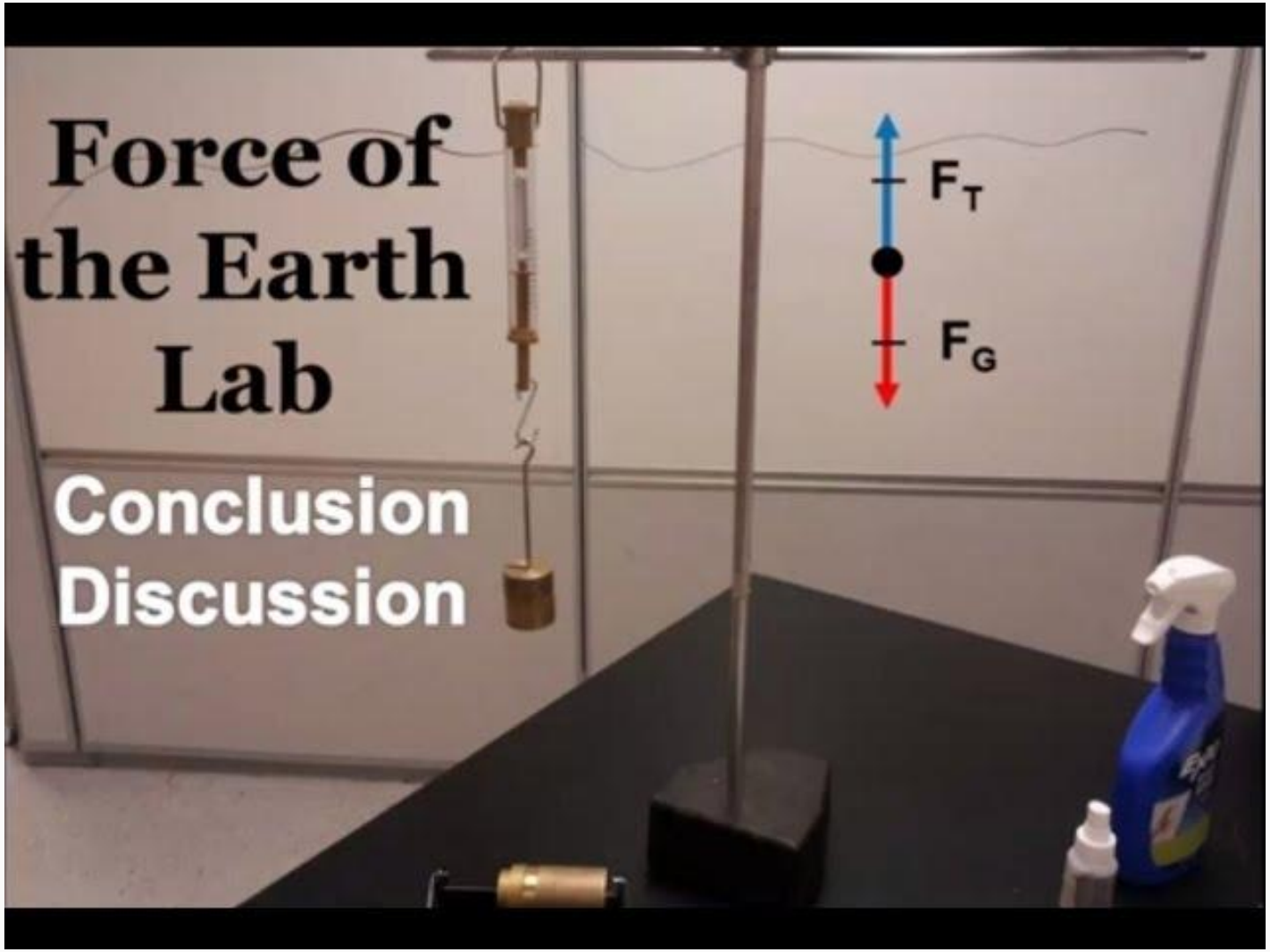
$$\vec{g} = \frac{\vec{F}_g}{m}$$

AP Equation Sheet

New Terms:

1. "weight"
2. "Newtons"
3. "mass"
4. "gravitational field strength"

Conclusion Discussion VIDEO



Click Me for Video

- This video summarizes the consensus we reached about the relationship between the force of gravity on an object and its mass. Use it as an aid to help finish writing your lab report. *This video also discusses the relationship between the force of gravity and height which you may NOT have done in the lab...*