




# 8th Science: Amplify

## Unit 1 Lesson 2.1

Mr. Sumner  
Sept 6, 2019



# Do Now

- Expectations, **ALL SILENT (VL = 0)**
  - Grab packet from green bin
  - Go to assigned seat
  - Put backpack on desk hook
  - Work on **Do Now** at the top of your note taker



## ***Do Now***

If you apply more force to an object what happens to its velocity? Give an example.

**Describe in 2+ complete sentences**


What is mass? Give an example.

**Describe in 2+ complete sentences**


# Do Now: Turn and Talk



- Topic:

If you apply more force to an object what happens to its velocity? Give an example.

Describe in 2+ complete sentences

What is mass? Give an example.

Describe in 2+ complete sentences

- Expectations

- ***Turn your shoulders to partner***
- Make eye contact
- Stay on topic!
- Smaller shoe size goes first!

**\*\*\*Cold calling 2+ for share out after\*\*\***

# Today's Objective

- I can write a CER with evidence from our labs proving that exerting the same force to objects with different masses causes different changes in velocity.

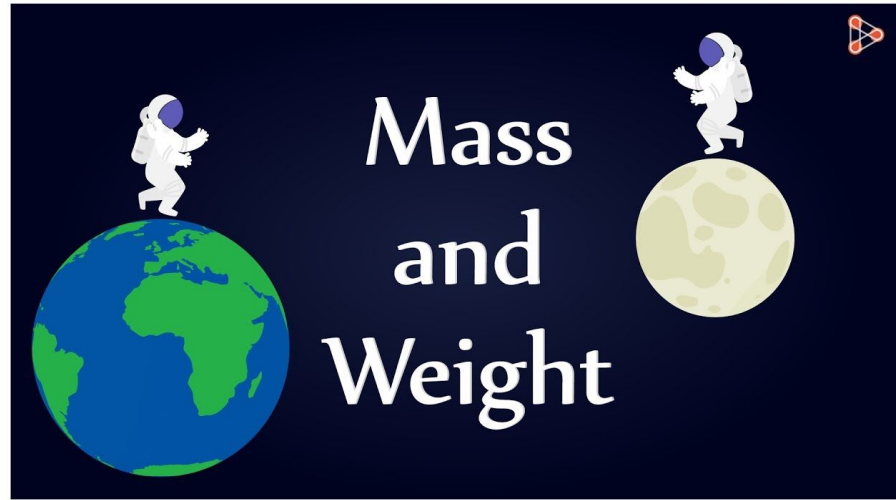
# Today's Schedule

1. Vocab
2. Analyze New Info
3. How to Calculate Velocity
4. Experiment
5. Simulation

# Vocabulary

## Mass

- How much matter (stuff) is inside an object
- Mass never changes but weight can (like on the moon)

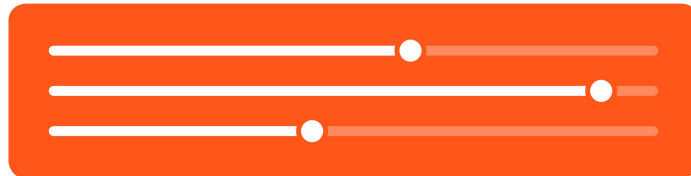


# Vocabulary

## Variable

- Any factor, trait, or condition that can be part of a phenomena or experiment

variable



# Vocabulary

## Independent Variable

- The variable that is chosen by the scientist

### Independent

The one thing you change.  
Limit to only one in an experiment.

Example:  
The liquid used to water each plant.

Independent Variable





# Vocabulary

## Dependent Variable

- The variable that has an observable effect that is caused by the independent variable

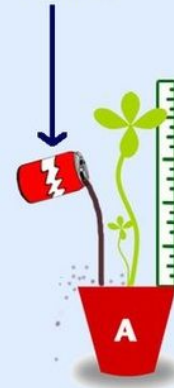
## Types of Variables

### Independent

The one thing you change.  
Limit to only one in an experiment.

Example:  
The liquid used to water each plant.

Independent Variable



### Dependent

The change that happens because of the independent variable.

Example:  
The height or health of the plant.

Dependent Variable



# Vocabulary

## Control Variable

- The variable that stays the same throughout the experiment

## Types of Variables

### Independent

The one thing you change.  
Limit to only one in an experiment.

Example:  
The liquid used to water each plant.

Independent Variable



### Dependent

The change that happens because of the independent variable.

Example:  
The height or health of the plant.

Dependent Variable



### Controlled

Everything you want to remain constant and unchanging.

Example:  
Type of plant used, pot size, amount of liquid, soil type, etc.

Controlled Variables



# Analyzing New Information

- $VL = 0$
- Independent
- 2+ ideas for what else could've happened



**Ana Gonzales**

To: Student Physicists

Re: Thruster Data



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Thank you for sharing your models and explanations. This information is very helpful!

We analyzed the thruster data from the pod and found that the thrusters exerted the **same strength force** as in other missions. Since this pod didn't stop, we'll need to look at another cause.

### Analyzing New Information

If the force from the thrusters on the pod was the same as usual, what could be some other possible reasons the pod started going in the other direction?

- **2 ideas with reason in 2+ complete sentences**

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# Turn and Talk



- Topic:

***Analyzing New Information***

If the force from the thrusters on the pod was the same as usual, what could be some other possible reasons the pod started going in the other direction?

- **2 ideas with reason in 2+ complete sentences**


- Expectations

- ***Turn your shoulders to partner***

- Make eye contact

- Stay on topic!

- Whoever's birthday is next goes first!

**\*\*\*Cold calling 2+ for share out after\*\*\***

# Analyzing New Information

- $VL = 0$
- Independent
- 2+ ideas for effect of asteroid samples



**Ana Gonzales**

To: Student Physicists

Re: Thruster Data



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SPACE AGENCY**

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Thank you for sharing your models and explanations. This information is very helpful!

We analyzed the thruster data from the pod and found that the thrusters exerted the **same strength force** as in other missions. Since this pod didn't stop, we'll need to look at another cause.

The pod had been collecting asteroid samples, and we aren't sure how many it was carrying. Could a difference in the number of asteroid samples explain why the same thruster force caused a different change in velocity? We'd really appreciate your help with this.

If we now know there were a different number of asteroid samples on the pod, what effects could this have? **2 ideas with reason in 2+ complete sentences**

_____
_____
_____
_____

# Turn and Talk



- Topic:

If we now know there were a different number of asteroid samples on the pod, what effects could this have? **2 ideas with reason in 2+ complete sentences**


- Expectations

- ***Turn your shoulders to partner***
  - Make eye contact
  - Stay on topic!
  - Whoever's birthday is last goes first!
- \*\*\*Cold calling 2+ for share out after\*\*\***

## Calculating Velocity

- $v_L = 0$ , write along with 1st example

**Teacher Example:** If a soccer ball travels 100 meters in 2 seconds going to the right, what is the velocity of the soccer ball?

# Calculating Velocity: You Try

- $VL = 1.5$
- Try the next 3 with your table partner
- **Cold call for share out after**



**You Try #1:** If a car travels 200 miles in 4 hours going to the west, what is the velocity of the car?

**You Try #2:** If a bird travels 75 meters in 3 seconds going to the south, what is the velocity of the bird?

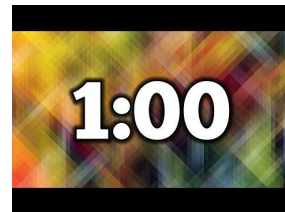
**You Try #3:** If a rollercoaster travels 1800 feet in 3 minutes going clockwise, what is the velocity of the soccer ball?



## Lab Steps: Teacher Demo

- VL = 0, following along and raising hand to ask questions
  - Will have a random table show how to do it later so pay attention!
1. Put launcher at level 1 as close as possible to object at beginning of table #1
  2. When you release, start timer at the same time
  3. When the object reaches the end of table #2 stop timer, catch object before it falls
  4. Put time you recorded into the correct data table

# Determine Variables



- $VL = 0$ , independent
- Use the **Variable Bank** to answer!

<b>Variable Bank</b>	Time (in seconds), Launcher Level, Type of Ball
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What is the independent variable (what we choose to change)?

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What is the dependent variable (the change we observe)?

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What is the control variable (what we keep the same)?

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# Turn and Talk



- Topic: 

Variable Bank	Time (in seconds), Launcher Level, Type of Ball
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What is the independent variable (what we choose to change)?

---

What is the dependent variable (the change we observe)?

---

What is the control variable (what we keep the same)?

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- Expectations
    - ***Turn your shoulders to partner***
    - Make eye contact
    - Stay on topic!
    - Short hair goes first
- \*\*\*Cold calling 2+ for share out after\*\*\***

# Determine Variables



- VL = 0, independent
- Complete sentences

We are going to measure the time it takes for each object to go across the tables 3 different times (called a trial). Why do you think it is important to do multiple trials during an experiment?

**Explain in 2+ sentences**

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# Turn and Talk



- **Topic:** We are going to measure the time it takes for each object to go across the tables 3 different times (called a trial). Why do you think it is important to do multiple trials during an experiment?

**Explain in 2+ sentences**


- Expectations
    - ***Turn your shoulders to partner***
    - Make eye contact
    - Stay on topic!
    - Long hair goes first
- \*\*\*Cold calling 2+ for share out after\*\*\***

# Hypothesis

2:00

- $VL = 0$ , independent
- Complete sentences

**Question:** What do you think the results of the experiment will tell us about the relationship between mass and velocity?

Answer with your hypothesis (best guess). **1+ complete sentence**

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Why is it important to create a hypothesis? **1+ complete sentence**

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# Turn and Talk



## - Topic:

**Question:** What do you think the results of the experiment will tell us about the relationship between mass and velocity?

Answer with your hypothesis (best guess). **1+ complete sentence**

Why is it important to create a hypothesis? **1+ complete sentence**

## - Expectations

- ***Turn your shoulders to partner***
- Make eye contact
- Stay on topic!
- Longer first name goes first

**\*\*\*Cold calling 2+ for share out after\*\*\***

## Lab Steps: Table Demo

- VL = 0, following along and raising hand to ask questions
  - Anyone want to volunteer? Will get you ahead on your work
1. Put launcher at level 1 as close as possible to object at beginning of table #1
  2. When you release, start timer at the same time
  3. When the object reaches the end of table #2 stop timer, catch object before it falls
  4. Put time you recorded into the correct data table



# Run Experiment and Collect Data



- VL = 2
- **ALL** materials stay on desks
- Stay with table
- **ONLY 10 MIN.**
- Using **ALL** materials appropriately
  - Will be having people redo after 1st warning
- Work on Analyze Data section when done

## Ping Pong Ball

Trail #	Time (in seconds)
Trail #1	
Trail #2	
Trail #3	

## Golf Ball

Trail #	Time (in seconds)
Trail #1	
Trail #2	
Trail #3	

# Analyze Data

- VL = 1.5
- Working alone or with table partner
- MORE ON BACK
- Raise hand to have Mr. S check off your C.E.R.
- Cannot get computer until checked off



## ***Analyze Data***

Which object has more mass, the golf ball or ping pong ball? \_\_\_\_\_

Which trial had the fastest time? \_\_\_\_\_

Which trial had the slowest time? \_\_\_\_\_

What is the main difference that you notice between the golf ball and ping pong ball trials and why do you think this happened? **2+ complete sentences**

_____
_____
_____
_____
_____
_____

# Simulation

- VL = 1.5
- Working alone or with table partner
- All links on weebly and are in GREEN
- Music only if earned
- READ INSTRUCTIONS AND ASK TABLE PARTNER BEFORE ASKING ME!!!
- Exact steps on your worksheet so follow them!



## Simulation: 2.1 Motionless Objects

Instructions: 1) Click **RUN** at the top left 2) Click **PREPARE FORCE** at the top right 3) Click on Object A (green) then click right on the force button (bottom right) 4 times 4) Repeat for objects B, C, D (all objects should have a pink arrow pointing right and be the same size) 5) Push **EXERT FORCE** at the top right 6) Click **ANALYZE** button at top left and record in data table

Object	Mass (kg)	Initial velocity (cm/s)	Prepared force	Change in velocity (cm/s)
A	0.5	0	4 clicks to right	
B	1	0	4 clicks to right	
C	2	0	4 clicks to right	
D	4	0	4 clicks to right	

Which object's velocity changed the most? (circle one)

Object A   Object B   Object C   Object D

# Analyze Data

- VL = 1.5
- Working alone or with table partner
- Use evidence from your simulation data tables



## ***Analyze Data***

Which objects had the most change in velocity? \_\_\_\_\_  
What was the mass of these objects? \_\_\_\_\_

Which objects had the least change in velocity? \_\_\_\_\_  
What was the mass of these objects? \_\_\_\_\_

What is the relationship between the mass of the object and the amount of change in velocity according to the data from your simulation? **Use evidence from data tables, 2+ sentences**


## 2 +'s and 1 $\Delta$

+'s	$\Delta$

