# Unit 5 In Class PPT

# Physics Daily Agenda- Wednesday 3/27

## Schedule

1. Opening Phenomenon
2. Modeling
3. Consensus Circle
4. Need to Knows?
5. Flipped Lesson

## Reminders

Flipped Lesson Energy due TOMORROW.

## Do Now.

Find somewhere comfortable to sit.

## Standards

**S.2 Modeling**

# Unit 5 Phenomenon

What dangers can collisions cause to our bodies and brain?

Should certain types of collisions/contact be banned in the NFL and other sports?

How can we make the things around us safer that could be in collisions?

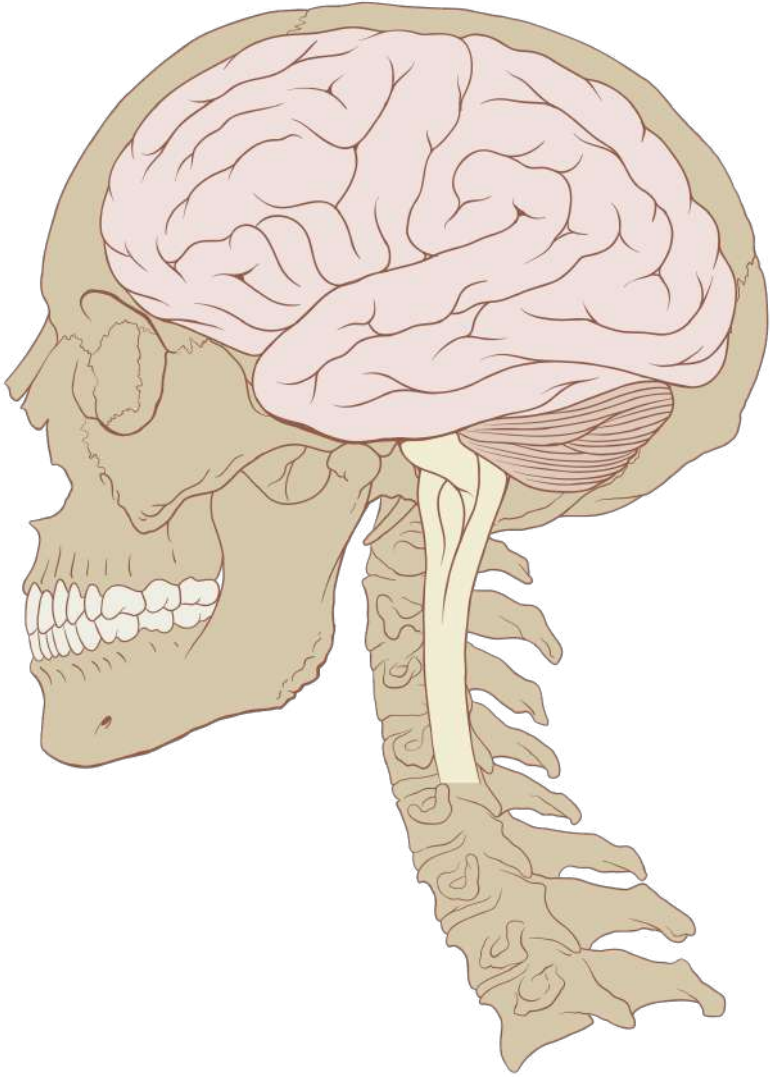
# Video

1:05-1:47

DO NOT PLAY WITH SOUND

# Model Independently

What do you see?



# Model Independently

What do you see from the outside (observable)?

What is happening inside the brain (unobservable)?

# Phenomenon Consensus Circle

**Questions to Answer:**

- What was your initial reactions to this video?
- What did you notice happen during this phenomenon?
- What other sports and situations could this apply to?
- What physics concepts does this already relate to from previous units?
- What physics concepts should we know about to explain this?
- What else are you curious about?

**Sentence Stems:**

- I agree/disagree because…
- What do you mean by that?
- Does anyone want to respond to this idea?
- What is your evidence?
- Can you give me an example?
- Why do you think that?
- Do you have anything to add?
- The next question to discuss is…

# Energy Flipped Lesson- Due Tomorrow! With Notes!

# Physics Daily Agenda- Thursday 3/28

## Schedule

1. Flipped Lesson Check
2. Conservation of Energy Demo
3. Review Energy and Conservation of Energy
4. Practice Packet Time

**If you won't be here tomorrow, you need to get the work!**

## Do Now

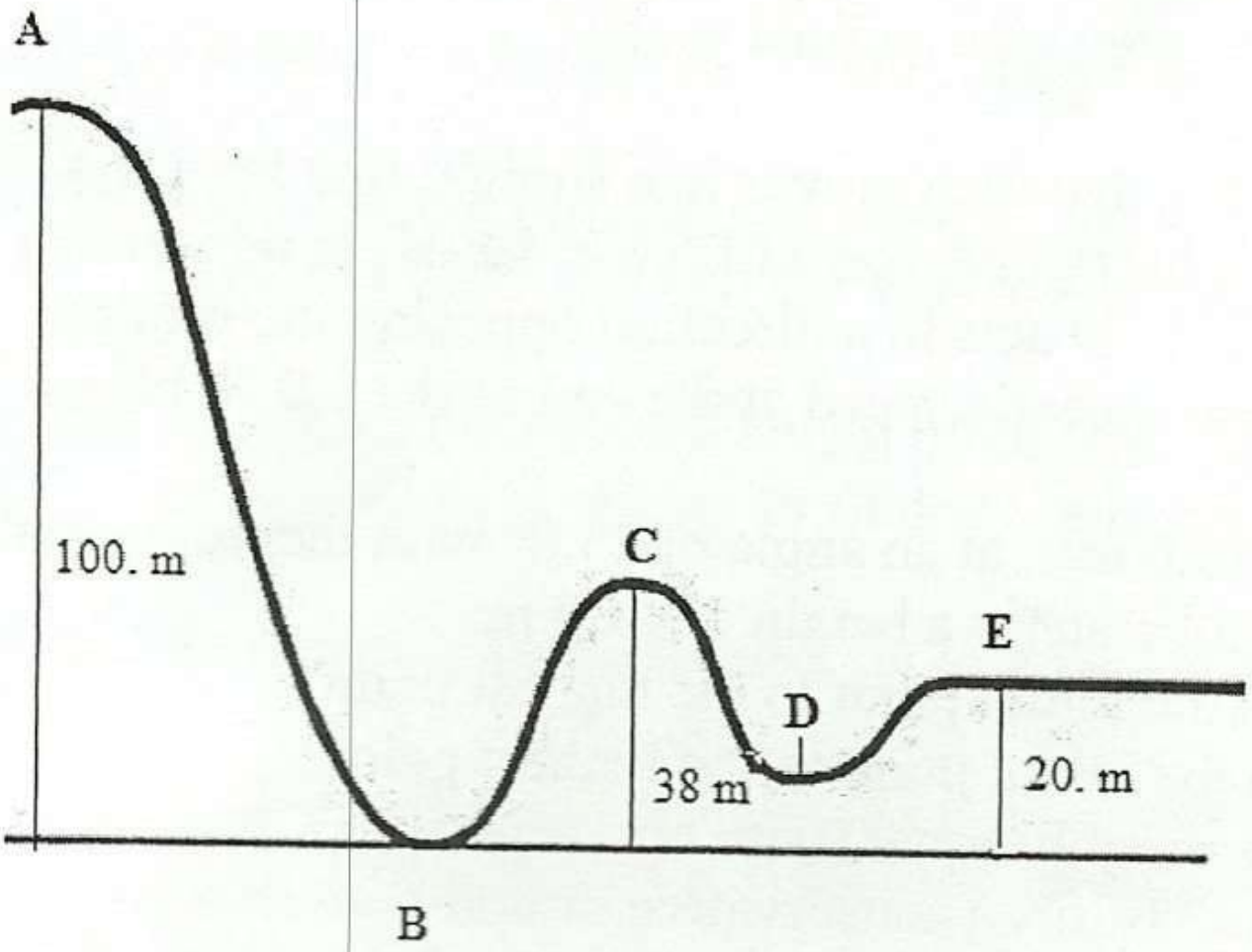
Take out your flipped lesson notes

## Standards

**5.1 Energy Conservation**
I can calculate potential and kinetic energy using the conservation of energy

# Conservation of Energy

https://dptv.pbslearningmedia.org/resource/hew06.sci.phys.maf.rollercoaster/energy-in-a-roller-coaster-ride/


A
100. m
C
E
D
38 m
20. m
B

Practice Problems

# Flipped Lesson

# Pages 1 and 2

# Physics Daily Agenda- Friday 3/29

## Schedule

1. Bouncing Balls Mini Lab
2. Roller Coaster Project Introduction
3. Work Time

## Do Now

Take out a notebook.

## Standards

**5.1 Energy Conservation**

I can calculate potential and kinetic energy using the conservation of energy

# Bouncing Balls Mini Lab

How much energy is “lost” when a ball bounces? How can we figure this out?

# Bouncing Balls Mini Lab

## How much energy is “lost” when a ball bounces? How can we figure this out?

Choose 3 different balls and record the initial height and new bounce height.

Determine the PE at the top, KE at the bottom and velocity at the bottom.

Determine the new PE when it bounces up. How much energy was lost?

# Roller Coaster Project Introduction

# Physics Daily Agenda- Monday 4/8

## Schedule

1. Roller Coaster Project Work Time
2. Roller Coaster Project **Due 4/16**

## Do Now

Take out your theme park rubric.

## Standards

**5.1 Energy Conservation**
I can calculate potential and kinetic energy using the conservation of energy

# Physics Daily Agenda- Thursday 4/11

## Schedule

1. Conservation of Energy Review
2. Roller Coaster Project Work Time

## Reminders

- Work and Power FL Due Monday
- Roller Coaster Project **Due Thursday 4/18 End of Class**

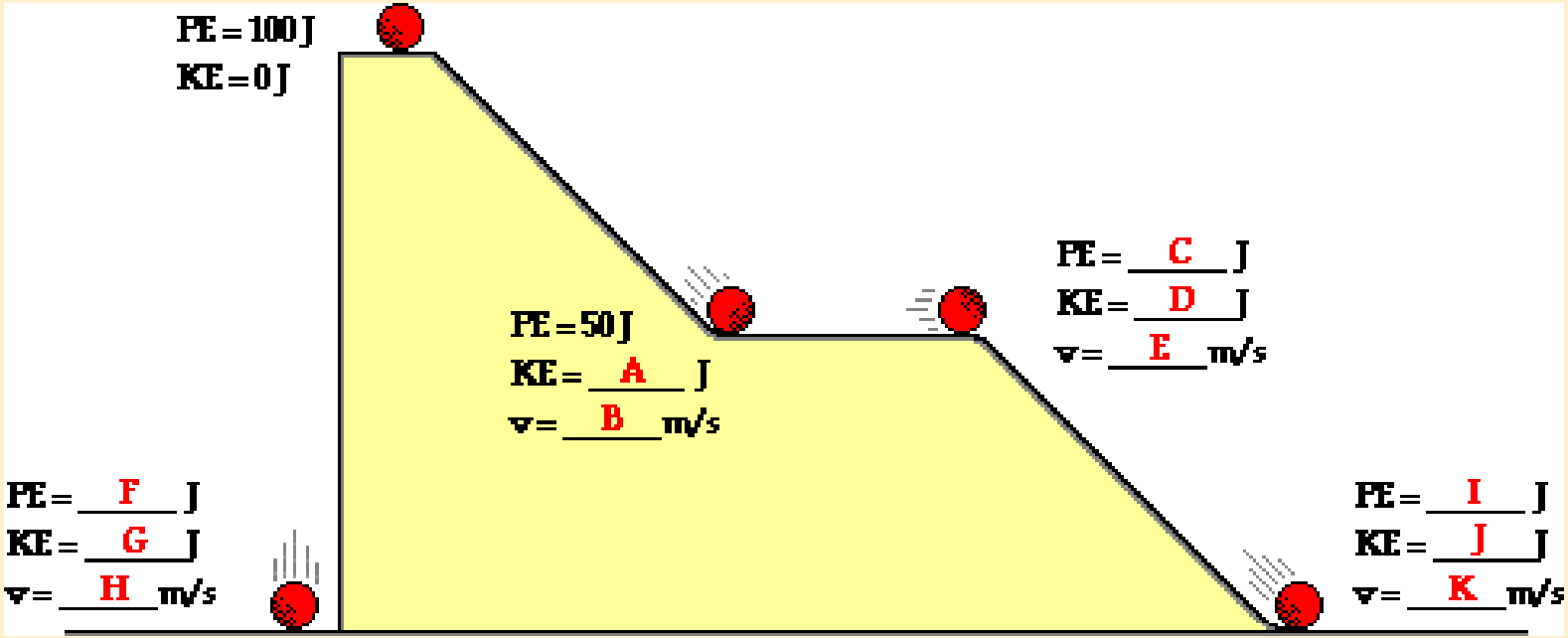
## Do Now

Take out your theme park rubric.

## Standards

**5.1 Energy Conservation**
I can calculate potential and kinetic energy using the conservation of energy

The ball is 2 kg.



# Roller Coaster Mini Project

# Physics Daily Agenda- Friday 4/12

## Schedule

1. Welcome to our Engineer Stephanie Gordon
2. Design Constraints
3. Roller Coaster Project Work Time

## Reminders

- **Work and Power FL Due Monday**
- Roller Coaster Project **Due Thursday 4/18 End of Class**

## Do Now

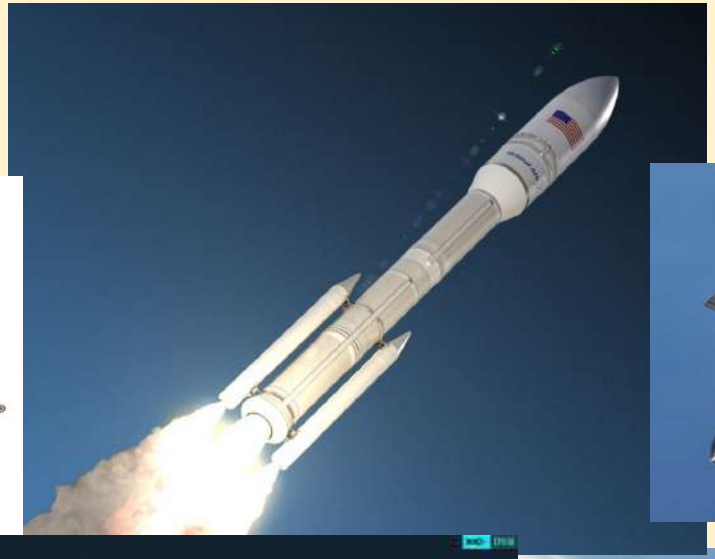
Take out your theme park rubric and notebook

## Standards

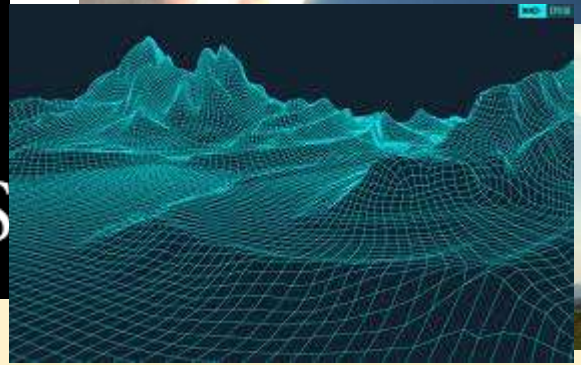
**5.1 Energy Conservation**
I can calculate potential and kinetic energy using the conservation of energy

# Stephanie Gordon

LEHIGH UNIVERSITY



JOHNS HOPKINS UNIVERSITY



Roller Coaster Design Project

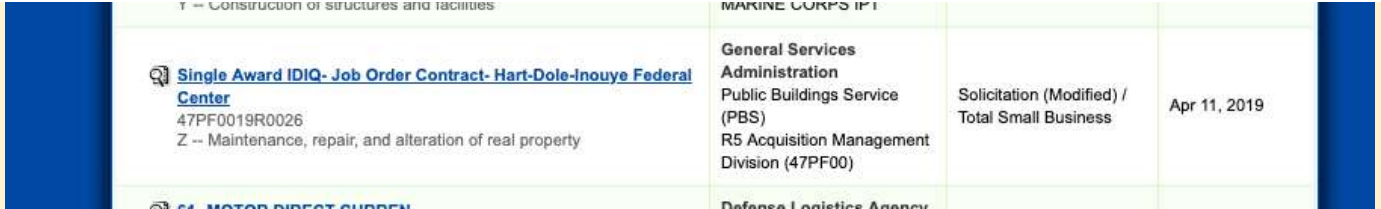
**Goal:** To create blueprints for a 2D roller coaster after interviewing a roller coaster fanatic that is your family, friend or teacher and show your knowledge of energy, work, and power.


## Technical Specifications

### Synopsis:

Added: Apr 11, 2019 8:01 pm

This is a Sources Sought Synopsis for the purpose of conducting market research and obtaining industry information only. The National Park Service will use information obtained through this synopsis to develop an acquisition strategy. Proposals are NOT being requested nor accepted at this time.

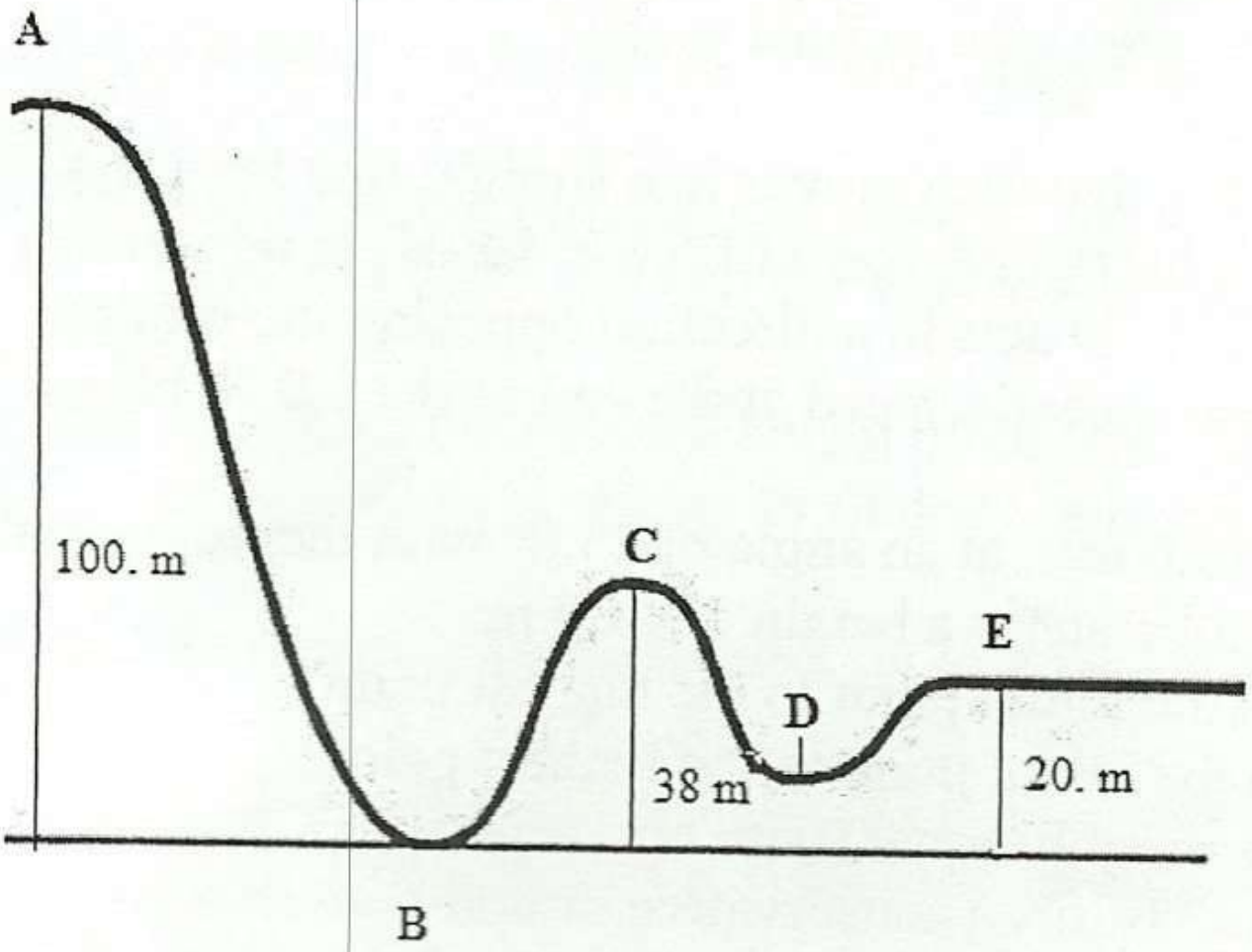


# Design Constraints in this project

- Schedule
- Max Height
- Ending Speed
- Loop
- Showing Your Work in an organized way
- Number of Energy Calculations

# Steps to Start Your Project

1. Choose a starting height
2. Create an initial design with heights, radius of loop and mass of the car chosen
3. Determine your 6 points to calculate energy
4. Determine your PE at the start of ride
5. Determine your PE, KE and velocity at each point


A
100. m
C
E
D
38 m
20. m
B

# Project Goals Friday and Monday

- Create your rough draft of your coaster with design and heights
- Calculate all KE, PE, velocities for ride
- Add work and power on Monday
- Show your teacher your rough draft

# Physics Daily Agenda- Monday 4/15

## Schedule

1. Review Work and Power
2. Project- Motor, Ending Speed
3. Roller Coaster Work Time

## Reminders

- Roller Coaster Project **Due Thursday 4/18 End of Class**

## Do Now

Take out your flipped lesson notes and roller coaster project

## Standards

**5.1 Energy Conservation**
I can calculate potential and kinetic energy using the conservation of energy

**5.2 Work and Power**
I can use forces and motion concepts to determine the work and power on a system.

# Work and Power

The Dragster is 130 m tall and the average car has a mass of 13607.8 kg (15 tons!). What is the potential energy at the top?

How much **work** does the coaster have to do to get to the top?

If it takes 10 seconds to reach the top, how much power is needed?

# Motor Requirement and Ending Speed

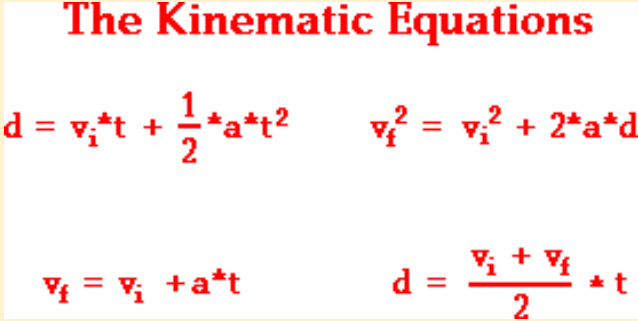
- Calculate work to reach the top
- Choose a reasonable time to reach the top and find power

Ending Speed:

- Starting Speed & Ending Speed
- Choose distance and find acceleration

  OR

- Choose acceleration and find distance



# Roller Coaster Project Steps

1. Choose a starting height
2. Create an initial design with heights, radius of loop and mass of the car chosen
3. Determine your 6 points to calculate energy
4. Determine your PE at the start of ride
5. Determine your PE, KE and velocity at each point
6. Determine the acceleration to end ride
7. Determine work and power
8. Show teacher rough draft (by Tuesday)

# Physics Daily Agenda- Tuesday 4/16

## Schedule

1. Review Project Requirements
2. Work Time- show teacher rough draft by the end of class

## Reminders

- Roller Coaster Project **Due Thursday 4/18 End of Class**

## Do Now

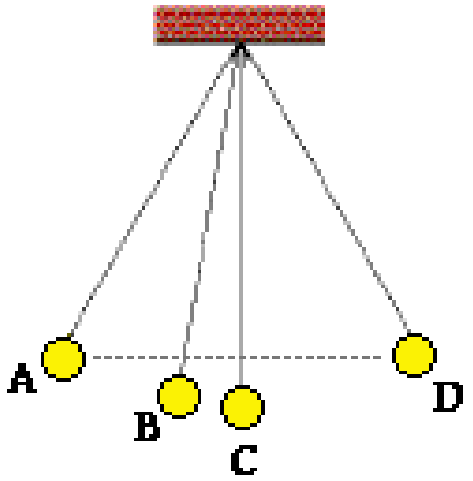
Take out your roller coaster project.

## Standards

**5.1 Energy Conservation**
I can calculate potential and kinetic energy using the conservation of energy

**5.2 Work and Power**
I can use forces and motion concepts to determine the work and power on a system.

# Pendulum Energy




A: KE = 0 J

PE = 2.4 J

B: KE = 2.0 J

PE = _____ J

C: KE = _____ J

PE = 0 J

D: KE = _____ J

PE = _____ J

# Motor Requirement and Ending Speed

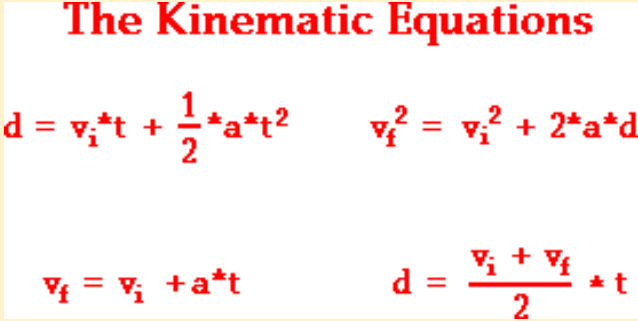
- Calculate work to reach the top
- Choose a reasonable time to reach the top and find power

Ending Speed:

- Starting Speed & Ending Speed
- Choose distance and find acceleration

  OR

- Choose acceleration and find distance



# Roller Coaster Project Steps

1. Choose a starting height
2. Create an initial design with heights, radius of loop and mass of the car chosen
3. Determine your 6 points to calculate energy
4. Determine your PE at the start of ride
5. Determine your PE, KE and velocity at each point
6. Determine the acceleration to end ride
7. Determine work and power
8. Show teacher rough draft (by Tuesday)
9. Get larger white paper (in prep room) and begin final draft. Make sure you have **all** requirements!

# Physics Daily Agenda- Wednesday 4/17

## Schedule

1. Work Time FINAL DRAFT

## Reminders

- Roller Coaster Project **Due Thursday 4/18 End of Class**

## Do Now

Take out your roller coaster project.

## Standards

**5.1 Energy Conservation**
I can calculate potential and kinetic energy using the conservation of energy

**5.2 Work and Power**
I can use forces and motion concepts to determine the work and power on a system.

# Roller Coaster Project Steps

1. Choose a starting height
2. Create an initial design with heights, radius of loop and mass of the car chosen
3. Determine your 6 points to calculate energy
4. Determine your PE at the start of ride
5. Determine your PE, KE and velocity at each point
6. Determine the acceleration to end ride
7. Determine work and power
8. Show teacher rough draft (by Tuesday)
9. Get larger white paper (in prep room) and begin final draft. Make sure you have **all** requirements!

# Physics Daily Agenda- Thursday 4/18

## Schedule

1. Work Time FINAL DRAFT **Due Today!**

## Reminders

- Roller Coaster Project **Due TODAY 4/18 End of Class**
- Flipped Lessons Collisions and Impulse due Tuesday!

## Do Now

Take out your roller coaster project.

## Standards

**5.1 Energy Conservation**
I can calculate potential and kinetic energy using the conservation of energy

**5.2 Work and Power**
I can use forces and motion concepts to determine the work and power on a system.

# Physics Daily Agenda- Monday 4/18

## Schedule

1. Teacher Appreciation
2. Collisions Mini Lab
3. Flipped Lesson Time

## Reminders

- Flipped Lesson Collisions due Tuesday!

## Do Now

Take out your notebook and something to write with.

## Standards

**5.1 Energy Conservation**
I can calculate potential and kinetic energy using the conservation of energy

**5.2 Work and Power**
I can use forces and motion concepts to determine the work and power on a system.

# Turn in Roller Coaster Project!

- Hour 1: Jeff, Emily, Christian S, Chris W, Emma
- Hour 5: Maya, Diane, Peter, Octavia, Sam
- Hour 6: Robert-Michael, George, Bayron, Ceirra, Brandon, Alize, Jaycee

# Collisions Mini Lab

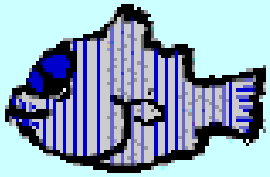
For each collisions, model and write down what is happening in the collision.

We will categorize at the end.

1

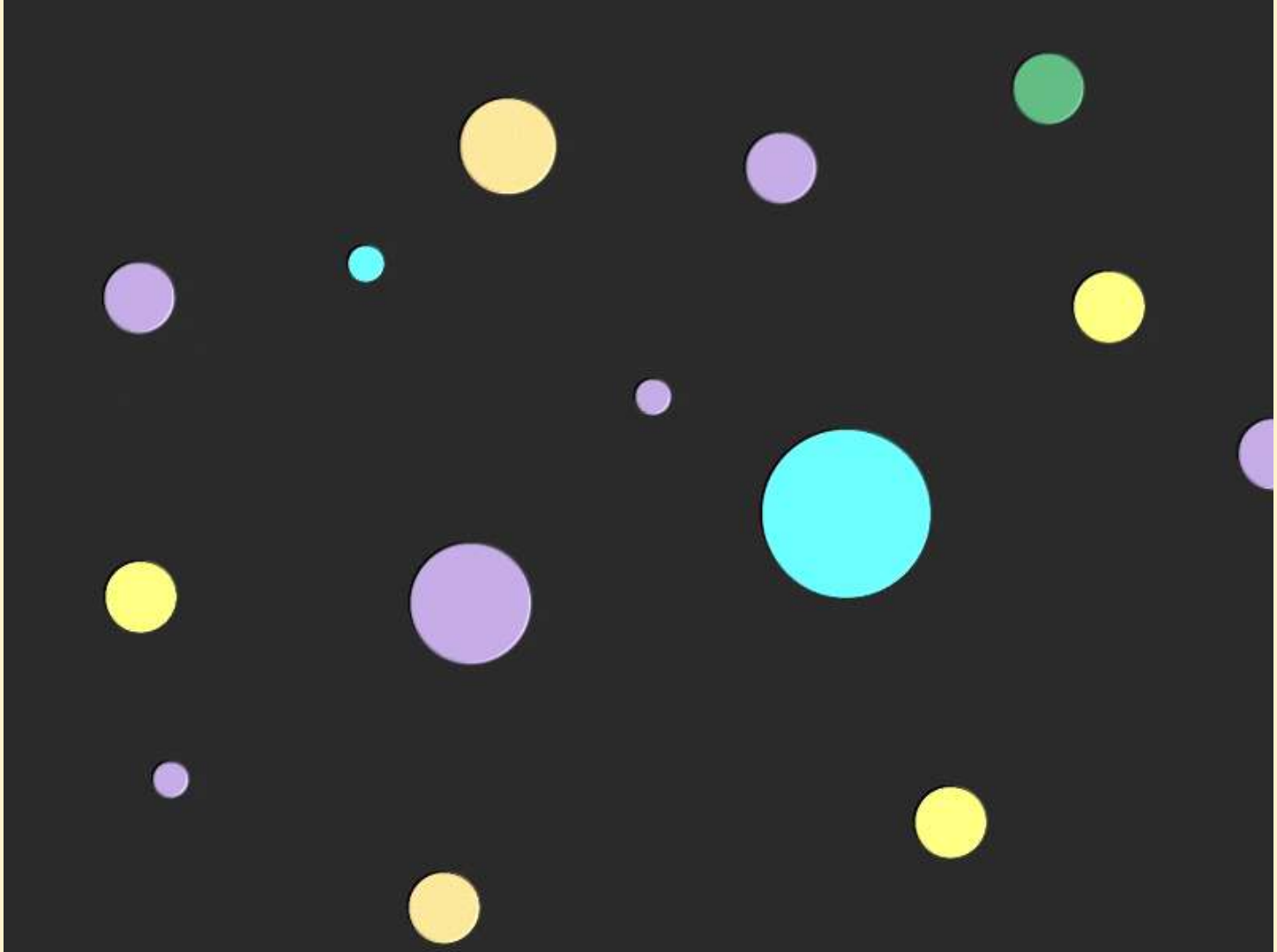
2

The mass of the big fish is 4X the mass of the little fish.
Speed of Big Fish = 5 km/hr



3

4



5

6

# Physics Daily Agenda- Tuesday 4/23

## Schedule

1. Review types of collisions
2. Review impulse
3. Practice Time

## Reminders

- Complete pages 3 and 4 in Practice Packet

## Do Now

Take out your flipped lessons notes and practice packet.
Sit with your partner from yesterday.

## Standards

**5.3 Collisions**

**5.4 Impulse**

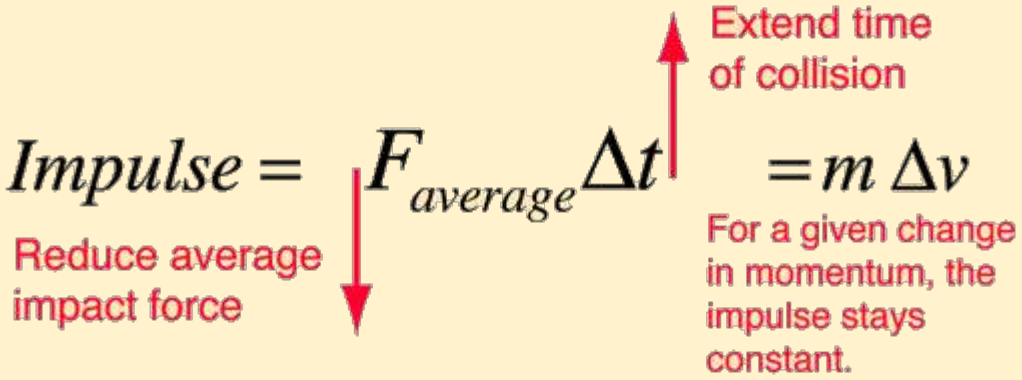
# Momentum and Impulse Equations

$$p = mv$$

$p$ = momentum
$m$ = mass
$v$ = velocity

# Inelastic (#1 Part 2) vs. Elastic (#4 Part 2)  vs. Explosions (#1 Part 3)

# Part 4 #1


Extend time
of collision
Impulse = $F_{average}\Delta t$ = $m\,\Delta v$
Reduce average
impact force
For a given change
in momentum, the
impulse stays
constant.

# Let’s look at different situations!

# Problems- how to successfully complete?

- Draw the situation- before and after
- Type of collision
- Variables for mass and velocity
- What are you looking for?
- Write down equation
- Solve!

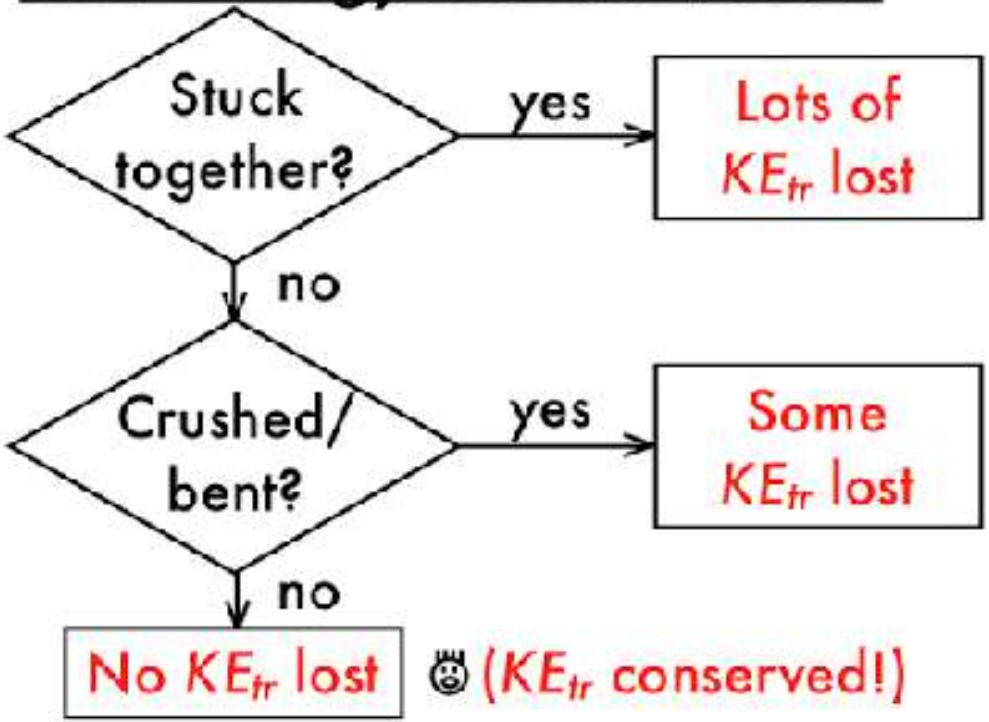
Work on Pages 3 and 4 in your Practice Packet!

# Video

1:05-1:47

DO NOT PLAY WITH SOUND

# Kin. Energy Conservation



# Welcome Katerina and Jon!

# Physics Daily Agenda- Tuesday 4/30

## Schedule

1. Turn in Concussion CER (10 min)
2. End of Unit Assessment

## Reminders

Wednesday we are introducing your unit assessment project.

## Do Now

Take out your concussion watching guide.

## Standards

**5.1 Conservation of Energy**

**5.2 Work and Power**

**5.3 Collisions**

**5.4 Impulse**

# End of Unit Assessment

Choose 1

# Phenomenon Assessment #1

- Create model with before, middle and after
- Must have labels and relevant vocabulary to unit (energy, work/power, momentum, collisions, impulse)
- Description on back to match model

# Phenomenon Assessment #2

- Create model with before, middle and after
- Must have labels and relevant vocabulary to unit (energy, work/power, momentum, collisions, impulse)
- Description on back to match model

# Phenomenon Assessment #3

- Create model with before, middle and after
- Must have labels and relevant vocabulary to unit (energy, work/power, momentum, collisions, impulse)
- Description on back to match model

# Physics Daily Agenda- Wednesday 5/1

## Schedule

1. Go over Project
2. Get partner/work by yourself
3. Brainstorm
4. Brainstorm #2
5. Absent yesterday? makeup models

## Do Now

Take out a notebook and something to write with.

## Standards

**5.1 Conservation of Energy**

**5.2 Work and Power**

**5.3 Collisions**

**5.4 Impulse**


First Prime Air Delivery
December 7, 2016
Fully Autonomous — No Human Pilot
13 Minutes — Click to Delivery
amazon

# Project Overview

# Hour 1 Groups

1. Becky, Kennedi
2. Jenna, Hannah
3. Allie
4. Emma
5. Paige, Nikita
6. Isaac, Aaron
7. Sage, Ryan
8. Abby
9. Aditya, Alex
10. August, Chris B
11. Mackenzie
12. Michael, Chris W
13. Robert, Shane
14. Jeff, Christian S
15. Emily
16. Ramiyah
17. Jon
18. Sierra

# Hour 5 Groups

1. Seth
2. Nick, Drew
3. Max, Dylan
4. Amanda, Isabelle
5. EJ, Diane
6. Miranda, Michale
7. Vlada, Maya
8. Krystal, Bella
9. Jillian
10. Sam, Maurice
11. Octavia
12. Quianna
13. Peter
14. Desiree
15. Juni

# Hour 6 Groups

1. Cierra, Cheyanne
2. Tila, Luis
3. Diana, Audrey
4. Jack, George
5. Mary, Joey
6. Nicole
7. Logan, Alize
8. Jasen, Leo
9. Njeri
10. Alan, Bayron
11. Zain, Jason
12. Donovan
13. Robert-Michael
14. Jayden
15. Brandon, Jaycee

Due Friday beginning of class- Budget sheet with design

# Physics Daily Agenda- Thursday 5/2

## Schedule

1. Continue/finish brainstorming
2. Finish proposal sheet
3. Final proposal **due tomorrow.**

## Do Now

Take out your project outline and budget sheet.

## Standards

**5.1 Conservation of Energy**

**5.2 Work and Power**

**5.3 Collisions**

**5.4 Impulse**

# Physics Daily Agenda- Friday 5/3

## Schedule

1. Get drawer
2. Buy materials
3. Begin building/planning

## Do Now

Take out your project outline and budget sheet.

## Standards

**5.1 Conservation of Energy**

**5.2 Work and Power**

**5.3 Collisions**

**5.4 Impulse**