Unit 5 Physics Energy & Momentum Physics

Physics Daily Agenda- 4/12 & 4/16

<u>Schedule</u>	Warm Up	Upcoming
 Opening Phenomenon Energy Basics Practice Exit Ticket Lab Report Check In 	How would you describe energy? How do we use this word in our everyday life?	Testing Tuesday, Wednesday and Thursday No Async Work Wednesday Gold Day Friday

View the still from the video...

- What do you notice about the 4 ramps?
- How are they similar and different?
- Which will hit the end first?



Hour 6 Class Questions/Observations

#1 ball hit first, going really fast and furious, because of the steep decline

Since #1 was going the fastest, it hit the block the hardest

#4 was the slowest, probably because of the not so steep decline

#1 had a curve going inwards for its ramp and had a sort of sideways L shape

How do the shape and slope of the ramps relate to their speed?

Deep slope at the beginning of the ramp helped the ball go faster

The Basics of Energy

What is energy?

Where have you heard of energy before?

The Basics of Energy

What is energy? The ability to do work Where have you heard of energy before?





Energy from movement

Anything with a velocity has kinetic energy



Gravitational Potential Energy

Energy from anything that has height off the ground (vertical)

PE = mgh

Example Problems

A 1.3 kg ball is thrown up in the air reaches a height of 1.2 m. What is the is potential energy of the ball?

The same ball is thrown at an initial velocity of 6 m/s. What is the kinetic energy of the ball?

Conservation of Energy

Energy cannot be created or destroyed.

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Energy Before = Energy After
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Max PE?

Max KE?

Both PE and KE?

A 0.001 kg penny falls from the top of a building that is 50 m tall.

- What is the initial PE?
- What is the total energy?
- What is the KE when it hits the ground?
- What is the velocity when it hits the ground?

Energy at Each Point (Cart = 1000kg)



Next Class: Energy Bar Graphs, Choice Based Project

Project Choices

- Energy of a Pendulum (PhET) (Pre-AP)
- Roller Coaster Project
- Energy Lost

Exit Ticket

- 1) A 100 kg roller coaster starts at the top of the hill at 60 m. What is the initial PE?
- 2) What is the total energy of the system?
- 3) The coaster reaches the lowest point. What is the KE now? Velocity?
- 4) The coaster goes back up to 10 m. What is the PE now? KE?

Physics Daily Agenda- 4/19 & 4/20

Schedule

- 1. Energy Review
- 2. Review of Schedule
- 3. Choice Project

Warm Up

- 1. Take your your notes on energy from Monday.
- 2. Open up Google Classroom.
- 3. Write in the chat to me:
 - a. How are you doing?
 - b. Rate yourself 1-4 in your

understanding of energy.

Upcoming

! Async Wednesday: ! Energy Review

! Energy Choice
! Project Due May
! 2nd: Last
! Assessment for
! Seniors!

Energy Review

A 75 kg person is at the top of a 40 m high roller coaster.

- 1. What is their potential energy?
- 2. What is the total energy of the system?
- 3. What is the kinetic energy at the bottom?
- 4. What is the velocity at the bottom?

Monday's Goals

Roller Coaster

- Step 1 and Step 2 Questions
- Basic Research on Roller Coaster Designs

Energy Lost

• Equipment, Procedure, Variables, Data Table

Pendulum

• Procedure, Variables, Data Table, maybe start taking data

Physics Daily Agenda- 4/22 & 4/23

Schedule

- Groups to Review Projects
- 2. Work Time

3. Share Out with what you completed today

	Warm Up	Upcoming	
1.	Which project are your working on?	! ! Project should be ! have done by the	
2.	What have you accomplished so far?	next block (teacher will give details)	
3.	Did you do the problems from yesterday?	Project due May 2- 2 more class blocks	
4.	Rate yourself on conservation of energy 1-4 and why.	to work!!!!!	

SENIORS

- Last assignment is the energy choice project
- Last Day to turn in missing assignments and get your grade before your final: Thursday, May 6
- 70%+ you do not have to take the final, but if you do it cannot hurt your grade
- Finals are the week of May 10-13 (not sure of schedule)
- Finals are a reassessment of ALL STANDARDS- you choose!

Roller Coaster

- Review Answers to Wednesday Asynchronous
- Review Examples

Goal by end of class

• Complete rough draft including calculations

(See drive for examples)

Energy Lost

- Review Answers to Wednesday Asynchronous
- Review Lab Report Requirements

End of Class Goal

- Data Collection
- First half of lab

Pendulum

- Review Answers to Wednesday Asynchronous
- Review how to take data and get your results

Goal by the end of class:

- Complete data and graphs and the first half of the lab
- Ask any questions!

Physics Daily Agenda- 4/26 & 4/27

Schedule

- Groups to Review Projects
- 2. Work Time

Warm Up

- 1. What you have completed so far on your project? Be specific
- 2. What questions do you
 - have? Are you confused about anything?

! ! FINISH PROJECT ! IN CLASS TIME

Upcoming

Project due Sunday, May 2

Physics Daily Agenda- 4/29 & 4/30

Schedule

Warm Up

Upcoming

FINISH PROJECT

IN CLASS TIME

Sunday, May 2

Project due

- 1. Project Check in 2. Mode Times if finish of
- 2. Work Time
- 1. What do you need to finish on your project? Be specific
- 2. What questions do you
 - have? Are you confused about anything?

SENIOR FINAL SCHEDULE

Thursday, May 6th (Purple): Attend 1st, 2nd, 3rd, start 7th hour Final for seniors

• All late work/assessments turned in- must tell me if you are not taking the final (through asynchronous question on Wednesday)

Friday, May 7th: No School for All Students

Monday, May 10th (Purple): Attend 1st and 2nd. Finals-3rd Hour and 7th Hour for seniors

Tuesday, May 11th (Gold): 4th, 5th and 6th Senior Finals, No 7th hour for seniors

Wednesday, May 12th: Asynchronous (Seniors can take a 4/5/6 final if needed, no async for seniors

Thursday, May 13th (Purple): 1st and 2nd Senior Finals, Seniors are DONE after that :)

Friday May, 14th (Gold): No Seniors

Physics Daily Agenda- 5/3 & 5/4

Schedule	<u>Warm Up</u>	Upcoming
1. Collisions Phenomenon	What is a collision?	Make sure you've turned in your
2. Collisions	Describe it in your own	l project!
Lesson	words/draw it out.	Last day for late
3. Senior		May 6
Meeting		: 1
4. Finish Energy		!
Project		!

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Friday May, 14th (Gold): No Seniors (if you are failing a class at this point, you will still need to work)

Do I need to take the final?

If you have a 70%+ as of **Friday** (when I have fully updated late work), you do not have to the take the final.

I will have an asynchronous question on Wednesday, where you will indicate whether you are taking the final. It can be changed up to Friday!

The final is a reassessment of standards that you choose.

Juniors and sophomores will have a different question about end of year interests.

Unit 6 Phenomenon

- 1. What dangers can collisions cause to our bodies and brain?
- 2. Should certain types of collisions and contact be banned in the NFL and other sports?
- 3. How can we make collisions safer if they are inevitable?

Banned Hits? What was wrong with this hit?



Video

Play whole video

Focus on- 1:05-1:47

DO NOT PLAY WITH SOUND



https://www.youtube.com/watch?v= xGOC9iSf4D4


Brain Video



To Do

- Seniors: Meet with me if needed
- Momentum Phenomenon (should be finished)
- Finish your Energy Choice Project
- Collisions Flipped Lesson

You must stay on if you Energy Choice Project is not turned in!

Collisions Flipped Lesson

Questions:

- 1. Describe the three different types of collisions in your own words.
- 2. In an elastic collision, is the final velocity the same or different for the two objects?
- 3. In an inelastic collision, is the final velocity the same or different for the two objects?
- 4. Is an explosion more similar to an elastic or inelastic collision? Why?

https://www.youtube.com/watch?v=TXJTjtvL7PA&t=420s

Physics Daily Agenda- 5/6

Schedule

- 1. Review Flipped Lesson
- 2. Momentum Simulation with a Partner

3. Class Conclusions Warm Up Take out your flipped

i lesson notes.

- What are the three
 - types of collisions?
- In our phenomenon,
 - what type of collision did you see?

Upcoming

Last day for late work (Seniors)!

Teacher Appreciation Week

One of the best ways to thank a teacher is to write an email of appreciation to them! Choose a teacher you've had any time in your life and send them an email of appreciation. You can even send multiple emails :) Trust me- it will brighten up a teacher's day!

Let me know in the chat you who are sending this email to!

To Do

- Complete Momentum Collisions Simulation
 Inquiry
- Complete Wednesday Asynchronous Question (Seniors have until Friday to complete/change)
- Complete Energy Choice Project
- Complete Momentum Flipped Lesson

Physics Daily Agenda- 5/10

Schedule	 i! i!	Warm Up	Upcoming
 Class Conclusions from Momentum Simulation Collisions Equations Exit Ticket Independent Practice Time 		Open up your Momentum Simulation from Thursday. What are some things you noticed the elastic collisions had in common?	Hour 1 & 2 Senior Fina Thursday

Class Conclusions

Momentum Equation

Inelastic Collisions

Definition:

Equation:

A 5 kg ball rolling at 1 m/s collides with a 10 kg ball that is at rest. The two balls stick together and move as one. What is the final velocity of the balls?

A 5 kg ball rolling at 1 m/s collides with a 10 kg ball moving towards it at 1 m/s. The two balls stick together and move as one. What is the final velocity of the balls?

Elastic Collisions

Definition?

Equation

A 200 kg bumper car collides with a 150 kg bumper car. The 200 kg car is moving at 5 m/s and the 150 kg bumper car is at rest. After the collision the 200 kg car is at rest. What is the final velocity of the 150 kg bumper car? A 200 kg bumper car collides with a 150 kg bumper car. The 200 kg car is moving at 5 m/s and the 150 kg bumper car is moving towards it at 3 m/s. After the collision the 200 kg car bounces back at 1 m/s. What is the final velocity of the 150 kg bumper car?

Exit Ticket: Upload on Google Classroom

- A 1 kg ball moving at 1 m/s collides with a 2 kg ball at rest. They move together when they collide. What type of collision is this? What is the final velocity of the balls?
- 2. A 1 kg ball moving at 1 m/s collides with a 2 kg ball at rest. The 1 kg ball is now at rest after the collision and the 2 kg moves alone. What type of collision is this? What is the new velocity of the 2kg ball?

Practice Packet

Part 1 and 2

Draw it out and show all work! Check out the notes from Monday if you need help.

- 1. A bumper car with a mass of 300 kg is moving at 6 m/s and crashes into a 250 kg bumper car at is at rest. The two cars move together. What is the final velocity of the two cars after they collide?
- 2. A bumper car with a mass of 300 kg is moving at 6 m/s and crashes into a 250 kg bumper car which is moving towards the 300 kg car at 6 m/s. The two cars collide and move together. What are the final velocities of the two cars after they collide?
- 3. A bumper car with a mass of 300 kg is moving at 6 m/s and crashes into a 250 kg bumper car which is moving towards the car at 4 m/s. The two cars bounce off each other. The 250 kg car bounces backward from its original direction with a velocity of 2 m/s. What is the final velocity of the 300 kg car?

Physics Daily Agenda- 5/13 Upcoming Schedule Warm Up 1. Senior Finals **Describe an explosion** Next Block: 2. Review Async in real life and as a Wednesday Performance type of collision. 3. Explosions Task for 4. Impulse Take out your Momentum 5. Performance Wednesday Async Task Review Assignment 6. Independent Practice

Draw it out and show all work! Check out the notes from Monday if you need help.

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Draw it out and show all work! Check out the notes from Monday if you need help.

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Explosions

Definition:

Equation:

Momentum of the Astronaut?



Final velocity of the 6 kg piece?



The other momentum... impulse

When there is a change in momentum there must be a force and time interval.

$F\Delta t = m\Delta v = \Delta p$

A 0.15 kg baseball is thrown at 60 m/s towards a bat and changes speed to 50 m/s. The force on the baseball is 1000 N. How much time will it take to switch directions?

A stunt woman jumps out of 10 m building onto a net. The woman has a mass of 65 kg. She lands on a net which stops her in 0.22 seconds. What is the velocity when she hits the net (use kinematics)? What is the force exerted by the net?

What we learned in this unit

- Momentum Equation
- Elastic Collisions
- Inelastic Collisions
- Explosions
- Impulse and Momentum

Unit 5 Performance Task

- Part 1
 - Problem for each type of collision (elastic, inelastic and explosions)
 - Can use notes and resources
- Part 2
 - Phenomenon to use impulse, momentum and collisions to predict and explain the outcome of a collision

Exit Ticket

- 1. A person stands on a canoe and jumps off. The person has a mass of 50kg and and the canoe has a mass of 200 kg. The canoe moves backwards with a velocity of 0.5 m/s. What is the velocity of the person?
- 2. A 0.43 kg soccer ball is rolling towards the person at -3 m/s. A person is in contact with the ball for 0.1 seconds and the new velocity is 25 m/s. How much force did it take to hit the ball in the opposite direction?

Parts 1-4 Practice Packet

I will post the answers!

Physics Daily Agenda- 5/17 & 5/18

Schedule

- Review from Practice Packet
- 2. Momentum Performance Task

Warm Up

- Describe the
 difference between
 our three types of
 collisions.
- What is our equation for impulse?

Upcoming

Async Assignment Wednesday

Monday 5/24- No Zoom Class Hour

In the chat rate yourself 1-4... Inelastic Collisions - Elastic/Explosions
Wentzloff Hour 1: End of Year

Thursday, May 20: Normal Class

Monday, May 24: No Zoom Class

Thursday, May 27: Normal Class

Monday, May 31: No School Memorial Day

Thursday, June 3: Normal Class

Friday, June 4: All late work due, Final decision due

Monday, June 7: Optional Final

Lee Hour : End of Year

Thursday, May 20: Normal Class

Monday, May 24: Normal Class

Thursday, May 27: Normal Class

Monday, May 31: No School Memorial Day

Thursday, June 3: Normal Class

Friday, June 4: All late work due, Final decision due

Monday, June 7: Optional Final

Physics Daily Agenda- 5/20 & 5/21



- Review from Practice Packet
- 2. Momentum Performance Task

Warm Up

Upcoming

• Questions on the practice packet?

Lee Hour 2, 4, 6: End of Year

Monday/Tuesday, May 25/26: Normal Class

Thursday/Friday, May 27/28: Normal Class

Monday, May 31: No School Memorial Day

Tuesday, June 1: Normal Class

Thursday/Friday, June 3/4: Normal Class

Friday, June 4: All late work due, Final decision due

June 7-11: Optional Final