FVE 5th Grade Science - Week 2 and 3

Theme: Motion and Design: Potential Energy & Transfer of Energy

By the end of the week, students will have revisited potential energy, kinetic energy, and transfer of energy. They will be able to describe a Rube Goldberg machine and will use their design and physics skills to engineer a Rube Goldberg machine at home.

Flow: Build Understanding ➔ Review of Physics *Menu* ➔ Connect and Build ➔ Final Activity

Learning enrichment activities are listed in a suggested order or a sort of pathway, but feel free to skip/extend/repeat as needed. As kids feel they are mastering the content, PLEASE feel free to skip activities in the "Review of Physics Content" section as many are designed to present similar information in different ways to prepare kids for the final activity. ***This is a potential schedule, but you may do more/less activities or move to the final activity sooner.*** *Also included are bonuses or extensions for connections, games, or additional information. Printables & answers are linked and/or available on my (Mrs. Nichol) FVE teacher webpage.*

	Mon	Tues	Wed	Thurs	Fri
Week 1	*OkGo video Article	Review of Physics choices menu	Review of Physics choices menu	Mystery Science 1	Mystery Science 1
Week 2	Mystery Science 2	Mystery Science 2	Rube Goldberg	Rube Goldberg	Rube Goldberg

Key:  Video  Article/book  Activity/building

Build Understanding/Excitement for Final Activity:

OkGo music video (*optional in the larger lesson plan*) https://okgosandbox.org/this-too-shall-pass/

- **Parent Note**: contains the word "h*ll" once; first image is a band member with red paint – which you will see later in the video, but it looks slightly shocking before you know it is paint.
- **Obj**: Students will see a larger example of a Rube Goldberg machine; this can build inspiration and excitement for their own smaller scale version in the final activity for this week.
- **Bonus**: As students watch the video, they can go on a video "scavenger hunt" using the scavenger hunt paper and mark where they observe the simple machines being used.
- **Extension**: To learn more about simple machines that you may want to build into your Rube Goldberg machine, and ways to lessen the force needed to move an object, try this game: https://www.brainpop.com/games/simplemachinesgame/

Article Rube Goldberg and quiz easier text harder text

- **Obj**: Comprehend a non-fiction text and uncover the origin of Rube Goldberg machines.

Preparation – Review of Physics Content – as needed, menu of choices:

BrainPop videos – *if needed to review/refresh what we have already seen, watched in class*

login: FabFalcons2020 password: FabFalcons2020

- Review if needed: Potential Energy (notes from this video should already be in your science notebook)
- Review if needed: Kinetic Energy (this should be the other side of your T-chart of notes in your science notebook)
- **Obj**: The ideas in these two videos form important ideas for ways we can build potential energy (which is transferred into kinetic energy), which is key to the final activity for this week. These are also here to remind students of what we have already viewed for potential/kinetic energy.

Discovery Ed video – Science Kids: All About Energy

Login using your school login.

- **Obj**: Students will see additional real-world examples and will be able to define and explain ways to build mechanical/elastic energy and gravitational energy and to transfer these into kinetic energy.
- **Activity**: While you are watching the video, take 3-2-1 notes in your science notebook. Specifically, make sure to note ways to build mechanical/elastic energy and gravitational energy (perhaps in the 3 important ideas section). As a reminder, 3-2-1 notes are: 3 important ideas, 2 questions your have, 1 picture to help you remember.
- **Time**: 19 minutes

Epic: Search for the book What's Your Potential? (also available in Spanish)

- **Obj**: Students comprehend a nonfiction text; review transformation of energy and explain several forms of energy.
- **Bonus**: Page 24 has a fun experiment with bouncing water balloons and tracking potential versus kinetic energy – perhaps do this on one of the warmer days...outside…and with parent permission.
- **Extension**: Want to go deeper into physics? Check-out "The Manga Guide to Physics" which goes deeper into the why/how of physics

Doodle Notes: Forces

Watch the video of Mrs. Nichol (linked on Google Classroom) to complete the notes for topics 1-3

- **Obj**: Students will take notes from a presentation and will review the forces: push, pull, and friction. We will also review balanced and unbalanced forces, which will both be needed in any sort of chain reaction machine.
- Make sure to complete the notes while watching the video and add color!
- Do not try this at home: balanced forces video from the first slide – balanced bottle sculptures

Phet Simulation: Newton's 2nd Law

Use the worksheet to guide set-up and data collection.

- **Obj**: Students will be able to manipulate variables (1 at a time) and collect data. After running the simulation, students can explain in their own words the relationship between force, mass, and acceleration.
- Answer Key is in the This Week's Materials section on my FVE teacher webpage and on the Google Classroom form that you will go to for the last question
- **Directions for after the simulation**: Go to the Google Classroom form (Google Classroom ➔ Classwork ➔ "PhET Simulation Newton's 2") to check your work and answer the question about your data – What do you notice happening when you increase the applied force?

Connects and Builds up to Final Activity:

Mystery Science video and activities: "Could You Knock Down a Building Using Only Dominoes?" and "Can You Build a Chain-Reaction Machine?"

- "Could You Knock Down…" **Obj**: Students construct an explanation of how energy is stored, released, and transferred in chain reactions, such as falling dominoes. If they complete the activity, students begin creating a lever and ramp simple chain machine (the start to a Rube Goldberg).
- "Can You Build a…" **Obj**: Students review storing, releasing, and transferring energy. If they complete the activity, students complete the chain-reaction machine they started in the first video activity.
- **Bonus**: Using your knowledge of how items interact in a system, see how many levels you can make it through this game. You have succeeded (Criteria) when you get the ball in the cup using only the materials available on each level (Constraint) http://www.engineering.com/GamesPuzzles/DynamicSystems.aspx

Final activity:

Engineer a Rube Goldberg machine.

- **Obj**: Students (and families if you would like to participate!) apply their knowledge of potential energy and energy transfers by engineering a Rube Goldberg machine.
- **Constraint**: You may only use materials you find in nature OR around your house (with your parent's permission). Need some more inspiration? Chain Reaction Tricks
- **Sharing your creation**: Whether it works or it is a "**F**irst **A**ttempt **I**n **L**earning, "upload a video of your machine in action to this FlipGrid: https://flipgrid.com/4c655a21 Start the video by explaining what you want your machine to do. For example:
  - The video on Flipgrid is trying to get the ball into the garbage can.
  - In their music video, OkGo is trying to spray themselves with paint.
  - In the game Mouse Trap, the players are attempting to trap the mouse.

(It shouldn't but if FlipGrid asks for a classcode, it is nccrgh)

Go to our Google Classroom and please provide me with feedback on what you thought of this week's activities! 😊 What would you like to see more of – Podcasts? Videos? Stories? Simulations? What was your favorite part of this week's activities?