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Lesson Plan

Learning Segment Focus: 8th Grade Science

Lesson 2 of 2 Topic: Kinetic Energy **Date:** 3/29/2021 **Grade:** 8th grade

Student Outcomes

Specific learning **objectives** for this lesson.	The students will be able to construct and interpret graphs after experimenting with different size toy cars. They will be able to describe the relationship between kinetic energy to mass and speed.
Justify how learning tasks are appropriate using examples of **students' prior academic learning**.	Students will have been taught already what kinetic energy is and how to find it. They have the knowledge of the formula to find kinetic energy, mass, and speed. The students know the basics of using Excel, so they are given a template to fill out as they go through the experiment.
Justify how learning tasks are appropriate using examples of **students' personal, cultural, linguistic, or community assets**.	This learning task is appropriate because most students are confused about kinetic energy, and they can get confused on how mass and speed of an object are affected when they do not have a representation to look at. This allows the students to make their own ramp, they will work together as three different groups, and this experiment will create problem-solving skills.

State Academic Content Standards

List the **state academic content standards** with which this lesson is aligned. Include abbreviation, number & text of the standard(s).	8-PS3-1: Construct and interpret graphical displays of data to describe the relationships of kinetic energy to the mass of an object and to the speed of an object.

Key Vocabulary

What **vocabulary terms/content specific terminology** must be addressed for students to master the content?	**Kinetic Energy, mass, velocity, speed, acceleration, proportional, nonproportional, and the formula for kinetic energy (with units).**

Academic Language Support

What are the **Academic Language Function(s)** (the content and language focus of the learning task represented by the active verbs within the learning objectives/outcomes) and explain how they are utilized in the lesson plan? What planned **Academic Language Supports** will you use to assist students in their understanding of key academic language to express and develop their content learning and to provide varying supports for students at different levels of Academic Language development? How do these supports address all three **Academic Language Demands (vocabulary, syntax, and discourse)?**	To begin this lesson, I will review with the students what the kinetic energy formula is, and what information needs to be gathered to plug into that formula. I have made an excel sheet of my own where the students can plug in their data without the fuss of making the excel themselves. They will be able to use their notes during this experiment just in case they are not completely comfortable with kinetic energy. I will have also made a video regarding the notes, so students who need to hear the language used in this chapter multiple times can go back to the video. This activity allows the students to communicate with one another, as well as being a hands-on experiment. This will give the students a visual as to what we have been reading about in the class, but there are auditory instructions as well. Having multiple ways to go through the instructions, the students should be able to complete this activity.

Materials

Materials needed by the teacher for this lesson. (such as books, writing materials, computers, models, colored paper, etc.)	- Plywood - Cardboard - Tape - Glue - Toy cars - Handout (instructions) - Handout (just in case there are not enough computers) - Composite Books
Materials needed by **students** for this lesson. (computers, journals, textbook, etc.)	- Composite books - Handout for instruction and to fill out information - Tape - Cardboard - Glue - Toy cars - Pencil - Computer - textbook

Lesson Timeline with Instructional Strategies & Learning Tasks

Amount of Time	**Teaching & Learning Activities (This should be a BULLETED LIST)**	**Describe what YOU (teacher) will be doing and/or what STUDENTS will be doing during this part of the lesson. (This should be VERY DETAILED)**
5 minutes	**Introduction**: - Explaining the activity - Showing the Handouts - Showing them the example, I did	To begin, I will first get my students engaged with the lesson for the day. I will start to go over the different definitions we have learned about kinetic energy. They should answer the questions correctly. I want to make sure they understand the formula and what the data should look like when completing this experiment. This will give them more details in to how kinetic energy changes due to the difference in mass and speed. I will give them the handout with instructions on how to assemble the ramp that is being used and they will also be given a handout with the template on it. They will plug this information in later into the excel file. Students should be engaged and asking questions while reading the instructions if they are confused about what they are to do.
50 minutes	**Instruction:** - Make the ramps - Test the three different toy cars - Write down data	"Okay let us get started on those ramps! You only need to take 5 – 10 minutes on this because we still must take our data. I have given you precise instructions on how to assemble this ramp." Student asks, "What happens if our ramp isn't great, and our results don't come out correctly?" "Perfect question! You continue with the experiment. In your results you will need to mention the human error involved in this process. Science is not 100% and we all make errors from time to time.

		Just do your best and make sure the data is consistent with the ramp if it is not perfect." After about 10 minutes they should be working on the experiment themselves. They are given 50 minutes for this entire part which is good for three different cars. I have instructed them to take time as soon as the car leaves the ramp, and the length is how far the car is from the end of the ramp. There is a section called observations on the handout, so someone should be filling that out during the experiment. One person should be rolling the cars, one to take the measurement, one to take the time, and one person to write down the data and observations. Some students will have great data while others will not be due to human error, and most likely due to the assemble of their ramp. "Okay class you have about 10 minutes left to complete this part. You should be on the third toy car by now." "It is time to start cleaning up now. If you were not able to finish, then you will need to come in tomorrow finish it during the class. Write down the rest of your observations, if you have any, and come back to sit down in your desks.
5 minutes	**Closure:** - Talk about what they observed - Discuss human error	"Who would like to give an example of what their data showed today?" A group will offer to explain how they had data show that the heavier the object is the fast will get to a length. However, a heavier the object is the shorter the distance becomes. Another group might speak up and say they did not see that in their data, and we will discuss what human error is. "Every experiment has a human error, which means the assembling of the ramp was most likely not done correctly." The group will go back to see where their error was and make that observation.

Technology Integration

Provide your **rationale** for your technology choices that accurately reflects those choices within your teaching context. **Identify** what technology(s) you are using as part of your lesson plan. **Describe** how the use of technology aligns to your learning objectives, content standards, and central focus. **Explain** how technology-based instructional strategies are essential to students accomplishing the learning objectives (beyond what could be accomplished without using the technology). **Specify** how the technology	An excel template is easy to use especially if the information has already been given to you. This will help show the data and the difference between the three toy cars. I am using excel and graphs to integrate into my lesson plan. Part of the standards is for them to show graphical evidence regarding kinetic energy, so having them input their own data which has them make their own graphs. They can then interpret the data even

selections meet or exceed the needs/strengths of all students**. Justify the "fit"** of chosen technologies, showing how the content, instructional strategies, and technology "fit" together.	more by looking at the graphs and giving me more of an accurate result. I think we should integrate technology because it does allow us to view, for example, data in science experiments. We can compare different topics easier than just reading a table. Technology can allow a student to have more of a creative hand in class, assignments, and projects. A lot of students do not like to do projects by hand, and this seems to come easier than anything. Even if a student does struggle with technology, you can give them a How-To worksheet to help them through technology. This has them using the technology as well as learning new topics.

Accommodations/Modifications

How might I **modify** instruction for: *Remediation?* *Intervention?* *IEP/504?* *LEP/ESL?* (All students who have plans mandated by federal and state law.)	For the students who need remediation, I can give them an extra handout that goes over the notes, but in more depth. I can have examples about kinetic energy. For intervention, I could have the students answer questions about kinetic energy and see where they are at before starting the project. The worksheets/handouts given out have many details for anyone with IEP's or 504's. I will assign those students with others who do not have 504's. For ESL students I will make sure that the handouts have a lot of visuals and include them within a group.

Differentiation

How might you provide a variety of techniques (enhanced scaffolding, explicit instruction, contextualized materials, highlighters/color coding, etc.) **to ensure all student needs are met?** (All students who are not on specific plans mandated by federal and state law.)	I will make sure to provide multiple real-life examples when going through this lesson, which is why we are using toy cars. We can use this information to talk about how cars are when going through hills and how they accelerate. I like to use small group instruction because it allows the students to collaborate with each other, but if a student is struggling then they can be helped by others. Using project-based learning can help for a multitude of students. It provides visuals, reading, and collaboration.

Assessments: Formative and/or Summative

Describe the **tools/procedures** that will be used in this lesson to monitor students' learning of the lesson objective(s) (include type of assessment & what is assessed).	☐ **Formative** /☐ ~~Summative~~	As a formative assessment, I will be using what is called interview assessment at the beginning of this less. This will allow me to engage with the students and see where they are at in understanding the material before continuing with the project. This is a casual talk, so it is more of an observation than a formal assessment.
	☐ **Formative** /☐ ~~Summative~~	Another formative assessment is having the students fill out the handout discussing the observations that they made during the experiment. I can see where they went wrong in the experiment, or what calculation they did not get right.
	☐ ~~Formative~~ /☐ **Summative**	For a summative assessment, I will have the students turn in the printed versions of their excel file along with the graphs. I will have them put this in their composite book, so they

		can discuss the results in the lab notebook. Each student will have a different lab report, but they will have the same results. I will be checking those lab reports for understanding of why they received the results that they did.

Research/Theory

Explain **connections to theories and/or researc**h (as well as experts in the field or national organization positions) that support the approach you chose and justify your choices using **principles of the connected theories and/or research.**	**Piaget:** This theorist uses the developmental approach. Humans are to develop in various stages, so it was easy to use this model. We introduced the concept of kinetic energy in the classroom when taking notes. We have also done other handouts before this project (classwork) to solidify that they do know the material. Once they have mastered the material, they can use this knowledge and apply it to the experiment.

Lesson Reflection/Evaluation

What went **well**? What **changes** should be made? How will I **use assessment data** for next steps?	*TO BE FILLED IN AFTER TEACHING* (I am not sure if I need to write this out)

Include supporting material such as slides, pictures, copy of textbook, and handouts for any activities students will be using as part of your lesson.

*adapted from: http://webcache.googleusercontent.com/search?q=cache:EsQcNWuG1ZoJ:web.mnstate.edu/harms/StudentTeachers/edTPA-LessonPlan.doc+&cd=2&hl=en&ct=clnk&gl=us; http://www.moreheadstate.edu/getmedia/cd3fd026-939f-4a47-a938-29c06d74ca01/Lesson-Plan-and-Reflections.aspx; http://www.mcneese.edu/f/c/9cb690d2/Lesson%20Plan%20Rubric%20Aligned%20with%20InTASC.docx;https://www.uwsp.edu/education/Documents/edTPA/Resource12.pdf; https://www.uwsp.edu/education/Documents/edTPA/Resource11.pdf; https://www.uwsp.edu/education/Documents/edTPA/Resource11a.pdf; https://www.uwsp.edu/education/Documents/edTPA/LessonPlanTemplateSOE.docx; https://www.uwsp.edu/education/Documents/edTPA/SpecEdLessonPlanGuide.docx; https://www.uwsp.edu/education/Documents/edTPA/SpecEdLessonPlanTemplate.docx