Lesson Plan Template
Date: 10/7/21

Grade: 4	**Subject: Physical Science**
Materials: Sticky notes, Painter's tape, 4 small balls, data sheets	**Technology Needed: n/a**
Instructional Strategies: X Direct instruction X Guided practice ☐ Socratic Seminar ☐ Learning Centers ☐ Lecture ☐ Technology integration ☐ Other (list) X Peer teaching/collaboration/ cooperative learning X Visuals/Graphic organizers ☐ PBL X Discussion/Debate ☐ Modeling	**Guided Practices and Concrete Application:** X Large group activity Independent activity X Pairing/collaboration ☐ Simulations/Scenarios ☐ Other (list) Explain: X Hands-on ☐ Technology integration ☐ Imitation/Repeat/Mimic
Standard(s) Physical Science: 4-PS3-1 Use evidence to construct an explanation relating the speed of an object to the energy of that object. **Objective(s)** By the end of the lesson, students will relate the speed of an object to the amount of energy it releases by conducting a hands-on experiment of putting force on a ball and trying to land it in a designated area. **Bloom's Taxonomy Cognitive Level:** Understand	**Differentiation** **Below Proficiency:** Students will be encouraged to think of an action word to write on a sticky note with prompting to think of a specific game. Students are expected to take their three turns, their drawing and marking will be encouraged. **Above Proficiency:** Students can write multiple force words on their sticky note. Students are encouraged to write and explain what they did differently for each of their tries during the activity. **Approaching/Emerging Proficiency:** Majority of students will be expected to write one force word on a sticky note. Students will take their three turns during the activity, marking the spots where their balls land on their drawing. **Modalities/Learning Preferences:** • Visual: Words written on the board, sticky notes placed on the board where everyone can see, students will draw and mark their activity • Auditory: Class discussion and verbal instruction • Kinesthetic: Students will be getting up and moving around during the activity • Tactile: Students will be doing a hands-on activity; pushing, hitting, flicking, etc. a ball
Classroom Management- (grouping(s), movement/transitions, etc.) • Split up by table group • Do not hand out the balls until explaining the instructions and giving them a couple minutes to write their questions • Walk around, check with students on how many tries they have each had. Consistently remind them that they should only have 3 tries, and then they should be sitting down and talking about their findings • When activity is done, tell students to leave their balls, but bring their drawings back to where they were in the beginning to wrap up	**Behavior Expectations- (systems, strategies, procedures specific to the lesson, rules and expectations, etc.)** • Active participation and focus during the opening discussion • Quiet and focused during the explanation of the activity • Participation and movement during the hands-on activity • Active discussion within groups

Minutes	**Procedures**
5	**Set-up/Prep:** Set up the pattern of tape as shown below on tables or the floor. Have 4 spots around the classroom. Collect 4 balls and sticky notes
9	**Engage: (opening activity/ anticipatory Set – access prior learning / stimulate interest /generate questions, etc.)** As a whole group, gather students to be sitting in a circle in an open space. Have a small ball such as a tennis ball and tell the students to be ready with their eyes, hands, and minds, because the ball could be coming their way. Toss the ball to a few students and have them toss it back. Once students seem focused, initiate a discussion to generate a word wall and some questions. Say "I know that when you go outside during recess or at home, sometimes you play games involving objects like this. Can you tell me about some of those games?" As students discuss games, write them on the whiteboard. After a list is going, ask "how do you make the ball move during these games?" "Yesterday we talked about force. Who can tell me what force is?" Add on to the list by having students write words on sticky notes and placing them next to the games "I want you each to write a word that would describe the force you are putting on the ball" "I'll give you about a minute and if you have one, come and put it next to the games". These words should include things like kick, hit, push, pull, etc. Now that students have a familiar connection, move past games and ask if these ways of making balls move could also apply to other objects. "Will pushing this chair cause it to move forward? Will pulling on this magnet cause it to move towards me?"

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4	**Explain: (concepts, procedures, vocabulary, etc.)** Point to the list of action words (push, kick, hit, pull etc) and explain that these words indicate a force on an object. Above the row of action words, put FORCE. "That force then sets the object in motion. What is motion?" Add the word "away" or "toward" next to the force words, depending on whether the force would bring the object away or towards you: ie."does the ball move away from you or toward you when you kick?". Label this row as MOTION. "Today we are going to focus on the motion of moving an object away from us. You are going to use a force to make a ball go various speeds to get it to stop at a certain spot." Explain to students the procedure for the hands-on activity. Point out that the spots on the floor have an x and 2 lines. They will take turns trying to get a tennis ball in-between the 2 lines, starting from the x. Students will then mark where their tennis ball stopped moving on their diagram and explain what they did for each try. After each student has 3 turns, the group will sit down together, examine their data, and write down any observations and questions that they have. They will be encouraged to turn this into a discussion with their group, not just independent writing time. "think about all the different vocabulary words that we talked about yesterday while you're doing this. How might they play a part in getting the ball to stop" "When I say so, get up and grab a piece of paper. You will have a minute to write any of your wonders or thoughts about what we talked about. After a bit I'll give each group a ball and you can get started" Give students an opportunity (1-2 mins) to write any questions that they may be wondering about the initial discussion before passing out the balls. Write steps on the board: 1. Try to get the ball from the x to in between the lines in 3 tries each 2. Explain what you did for each try 3. Discuss observations and data with group
10	**Explore: (independent, concreate practice/application with relevant learning task -connections from content to real-life experiences, reflective questions- probing or clarifying questions)** Split up the class into 4 groups. Pass one ball to each group. Watch and make sure that students are taking turns, starting their ball on the x, and marking down where their ball lands and writing what they did for each try. After 7 minutes all groups should be wrapping up and sitting down to discuss their findings together. Walk around and check on how students are doing. Ask "is there another force you could put on that ball to make it not go quite so far/to make it go further?" "Did that force make the ball fast or slow? Do you think that ball had a lot of energy, or just a little bit?"
7	**Review (wrap up and transition to next activity):** The groups would then come back together and discuss their findings. To start off the discussion ask "what happened during the activity? Why do you think that happened?" "lets remember to use those vocabulary words to try and explain it". Students should have noticed that when they applied more force to the object, the ball had more speed. When the ball had more speed, the students should be able to connect it to their data to find that the ball went further. Explain that the more speed an object has, the more Kinetic energy it releases, and therefore in the case of a moving ball, it is going to go further. If there is extra time, students can return to their tables and try the activity again. They may have a new idea on how to get the ball between the lines now that they have more information on the relation of force, speed, and energy.

Formative Assessment: (linked to objectives, during learning)

- **Progress monitoring throughout lesson (how can you document your student's learning?)**

Students are actively participating in the discussion. They are ready to move on when they can agree that motion and force will result in various speeds. Students participate in the engage section by providing an action word related to a game on a sticky note. The words will indicate if they understand what actions will put force on an object. Students will turn in their marked diagram with descriptions of their tries, as well as any findings or questions that they wrote down during the lesson (See sheet below). This data will be what drives both their small group discussion, and the wrap-up discussion. Students will be able to recall what did and what did not work by looking at their explanations for each try. When students can show/explain that they had to use a force that would result in the ball being slower in order for the ball to not produce too much energy, they are ready to move on. By the third try, students should be using the words speed and energy in their descriptions/explanations/thoughts on why things did and didn't work.

Proficient: Student gets at least one ball in the square and accurately explains why it worked using the words speed, energy, and force in their description.

Nearing proficient: Student gets at least one ball close to the square and uses one of the following words in their description: speed and/or

Summative Assessment (linked back to standards, END of learning)

Chapter test on how forces act from my practicum teacher is attached.

Proficient: 80% or above

Nearing proficient: 65-79%

Not met: 64% or below

energy. They have some understanding of why their experiments did or didn't work. **Not met:** Students do not get any of their balls close to the square. Limited to no understanding of the words speed, energy, and force in their descriptions.	

Reflection (What went well? What did the students learn? How do you know? What changes would you make?):
This lesson went well considering it was the first lesson I taught and only the second day being in the classroom! The kids loved the experiment. I could tell that they enjoyed having the freedom of the project, rather than having something set that they *had* to do. Many of the students found ways to be successful in the experiment, but some of them didn't. The one's that didn't, however, were the ones who were trying more creative approaches, such as bouncing the ball and blowing on the ball. If I had allowed them to have more than three tries, I think that they would have eventually figured out something that worked. Some of the students who succeeded thought outside of the box and did things such as picking up the ball and setting it down. Although this did not necessarily reflect the objective of relating speed to energy, it did show that they understood that a force is a change of movement, which was a concept that they have been working on in science. I was very impressed by the creativity of one of the groups because they created a wall around the back of the square with their sweaters. This way, they could roll the ball towards the square and it would bounce off the wall of sweaters. This still required an understanding of speed and energy because they still had to roll the ball light enough to ensure that it didn't bounce too far back off the sweaters. Overall, it seemed chaotic from the outside, but the students were able to fully embrace their creativity in a way that would lead them to more of an understanding of speed and energy. Something I would change about this lesson is giving more time to review. The students had so many good ideas but because we were short on time, they did not all get to share them with each other. We could have also had time to let the students try their experiment again after the discussion because they probably had some new ideas. Lastly, I would give each of the students a sheet that already had the table on it, as well as some lines for them to write. I forgot to tell the students that they would be turning in their papers, so they were extremely messy, and no one wrote any questions. A couple students wrote different ideas and the different things that they tried, but overall, most of the papers were incomprehensible.

Tape example:

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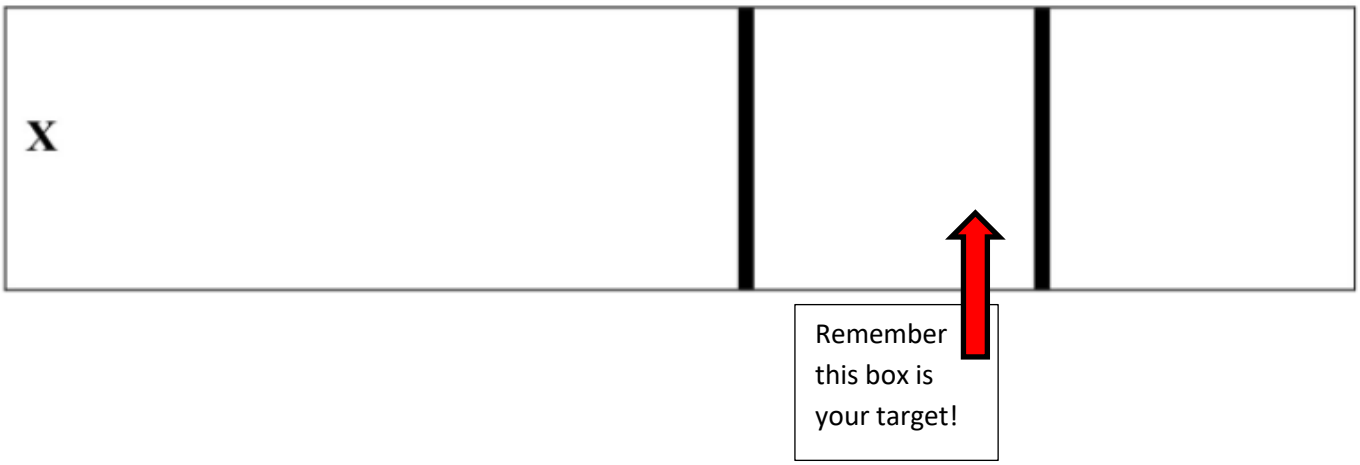
Using an “X”, mark the spot where your ball lands on this diagram:



Describe what you tested for each try:

First try: _____

_____

Did it work? Why or why not?_____

_____

Second try: _____

_____

Did it work? Why or why not?_____

_____

Third try: _____

_____

Did it work? Why or why not?_____

_____

Name _____ Date _____

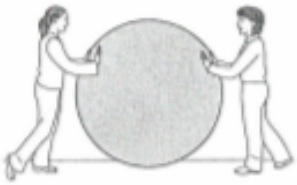
Chapter Test How Do Forces Act?

Directions: Read each question. Then choose the correct answer.

1. Which of these is an example of a pull?
   - Ⓐ A baseball player throws a ball.
   - Ⓑ One magnet repels another magnet.
   - Ⓒ An apple falls from a tree to the ground.
   - Ⓓ A soccer player kicks the ball toward the goal.

2. Juan lets a ball go at the top of a ramp. What causes the ball to start moving down the ramp?
   - Ⓐ the size of the ball
   - Ⓑ the length of the ramp
   - Ⓒ the smooth surface of the ramp
   - Ⓓ the force of gravity acting on the ball

3. Rose and Gloria are pushing a ball as shown below.



Why is the ball **not** moving?

- Ⓐ They are both pushing the ball in the same direction.
- Ⓑ They are both pushing the ball in different directions.
- Ⓒ They are both pushing the ball with unequal forces.
- Ⓓ They are both pushing the ball with equal forces.

Name _____ Date _____ Chapter 3

Chapter Test How Do Forces Act?

4 Ken and Steve pull as hard as they can on either end of a rope. What makes the rope slowly move toward Ken?

Ⓐ Ken is using more force than Steve to pull the rope.

Ⓑ Ken is moving in the opposite direction from Steve.

Ⓒ Ken's end of the rope has more mass than Steve's end.

Ⓓ Ken's end of the rope has less friction than Steve's end.

5 Martin pushes a 100g ball and a 500g ball from the same starting point with the same force. What will **most likely** happen?

Ⓐ The 500g ball will move more easily.

Ⓑ The 100g ball will move more easily

Ⓒ Both balls will travel at the same speed.

Ⓓ Both balls will travel in opposite directions.

6 Betty and Carlos are playing tennis. Betty hits the ball to Carlos. What will happen when Carlos hits the ball with his racket?

Ⓐ The force of friction pushing on the ball will increase.

Ⓑ The force of gravity pulling on the ball will increase.

Ⓒ The motion of the ball will stay the same.

Ⓓ The direction of the ball will change.

7 Julie is pushing Alan around on a merry-go-round. What can Julie do to make Alan go faster?

Ⓐ push with more force

Ⓑ pull instead of push

Ⓒ add the force of gravity to the merry-go-round

Ⓓ increase the friction of the merry-go-round

8 Two balls roll down a ramp. The first ball turns to the left, and the second ball rolls in a straight line. Which statement is true?

Ⓐ The motion of the balls is different.

Ⓑ The force of gravity on the balls is different.

Ⓒ The first ball has friction, but the second ball does not.

Ⓓ The first ball follows a pattern, but the second ball does not.

9 Susan wants to know a race car's speed. She knows the distance the car travels on the track. What else does Susan need to know to figure out the race car's speed?

Ⓐ the force of gravity on the race car

Ⓑ the mass of the race car

Ⓒ the time it takes to complete the race

Ⓓ the amount of friction on the racetrack

GO ON

Name _____ Date _____ Chapter 3

Chapter Test How Do Forces Act?

10 Dave rolls a toy car on a tile floor and on a carpet. What causes the car to roll more slowly on the carpet?

Ⓐ There is less friction on the carpet.

Ⓑ There is more friction on the carpet.

Ⓒ The force of gravity is weaker on the carpet.

Ⓓ The force of gravity is stronger on the carpet.

11 Brandon threw a ball straight up in the air. What made the ball change direction and come back down?

Ⓐ the speed of the ball

Ⓑ the force of the throw

Ⓒ push of air on the ball

Ⓓ the pull of gravity on the ball

Directions: Read the question. Then write your answer on the lines.

12 What is the scientific way to describe the weight of an object?

_____

_____

Test Score
_____ /13

DONE!