Unit Plan - Integrated Learning Segment
Two-Week Thematic Unit for Second Grade

TITLE: Exploring pushes and pulls and building a catapult

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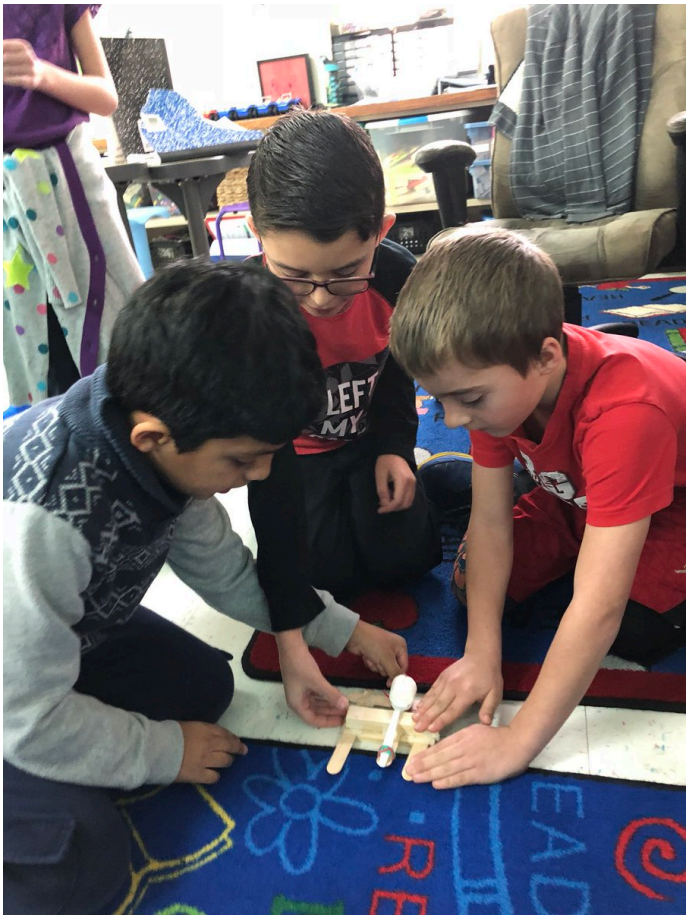
ECED 4450 Spring 2019

Focal Science Standard(s): PS.2.2- Evaluate the effects of different strengths and directions of a push or pull on the motion of an object.



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Introduction and Rationale (a)

This unit plan is on forces and motion. The unit will be addressed over a two-week period. By the end of the unit, students should be able to identify the effects of a push or pull on an object. Students will gain an understanding of various forces (pushes and pulls) on objects through hands-on learning experiences and exploration. These activities will promote inquiry and interest amongst the students as they complete each one. This unit will allow for integration across multiple domains to help students make cross-cutting connections to real-life and practical situations. For example, students will be tasked with rearranging the room at the very beginning and will discuss how they chose to move certain objects back to their original location. By doing this, the unit will be more meaningful.

Motion is a very broad subject for children to understand. Because of this, it is imperative that the unit be expanded over the two weeks so that the students can have ample time to gain an understanding. Since the topic can be somewhat difficult to grasp, the activities are made to be adaptable and flexible to meet each child where he/she is in learning. Children who need more support throughout the experiences will be given assistance by the teacher or a learning partner to help foster the ideas being addressed in the unit. For students who need more challenge, the teacher will ask them in-depth questions regarding forces and motion in other situations they may see in everyday life and ask the students how these can be related to the activities in the classroom.

The unit on motion will focus on the Tennessee State Standard PS.2.2- Evaluate the effects of different strengths and directions of a push or pull on the motion of an object (Tennessee State Board of Education, 2016). This is a second-grade standard, so it is appropriate for the age of the children in the classroom. Upon discussion with the class, it is evident that the students have the basic knowledge needed in order to complete the unit's activities. The students show an interest in working more with forces and motion and are ready for in-depth thinking. It is important to incorporate children's interests into classroom work if at all possible (Chaillé & Davis). The children are very intrigued by the ideas of forces right now, so this unit will be great for them to explore those interests. The activities planned in the unit are appropriate for the grade and ability level for the children of the class.

Throughout the unit, students will be involved in an inquiry-based learning approach. Children will be encouraged to wonder, explore, and question as they move through the two-week period. By allowing inquiry, the students will be able to make deeper connections with the content and develop a more meaningful learning experience. Students will be more actively involved in the processes that take place during the unit and will be better able to carry the information learned into new situations. The 5E's framework will be used to ensure inquiry in every step. The students will **Engage** in the first activity which will be a complete room arrangement when they come into the classroom. This will get the students excited about the new unit. As the students move the objects in the room back to their homes, they will begin thinking about the types of pushes and pulls. After that, the students will **Explore** various kinds of pushes and pulls through multiple activities such as the scooter races and tug-of-war. As the students move through the activities, they will be required to **Explain** the effects of push and pull they are seeing. For example, there will be a discussion about the motion of the pom-poms given a certain push and direction after the students play pom-pom bowling. The students will then **Extend** their knowledge on the effects of different strengths and directions of a push or pull to design and compete in a target game using catapults. The children will **Evaluate** themselves on their understanding of forces and motion as well as their ability to carry that knowledge into the designing and use of their catapults. The teacher will also evaluate throughout the unit using formative assessments such as anecdotal notes, work samples,

and documentation (i.e. pictures). The teacher will use these to progress through the activities and determine modifications that need to be made. Evaluations will also be done during whole-group and small-group discussion allowing children to express ideas and questions they may have periodically. The teacher will determine what areas should be covered more extensively and what concepts the students have mastered through these evaluations.

References

Bybee, R. W. (2014). The BSCS 5E instructional model: Personal reflections and contemporary implications. *Science and Children*, 51(8), 10-13

Chaillé, C. & Davis, S. M. (2016). *Integrating math and science in early childhood classrooms through big ideas: A constructivist approach.* New York, NY: Pearson.

Tennessee State Board of Education. (2016). *Tennessee Academic Standards for Science*. Nashville, TN. Retrieved on 4/3/2019 from https://www.tn.gov/content/dam/tn/stateboardofeducation/documents/massivemeetingsfolder/meetingfiles4/10-20-17_III_J_Non-Substantive_Changes_to_Math_ELA__Science_Standards_Attachment_3_-_Science.pdf

Standard/s Addressed, Goals, and Objectives for the Unit (b)

Standards addressed. The primary focal standard comes from the Tennessee State Board of Education Standards for second grade. The standard is under the physical science domain. It is PS.2.2- Evaluate the effects of different strengths and directions of a push or pull on the motion of an object. This will be the standard that the students will be working towards throughout the unit. This unit plan will focus primarily on strengths of pushes and pulls and less on direction although it will present itself in some of the activities. Another standard being addressed in the unit is 2.W.TTP.2 Write informative/explanatory texts. There will be multiple opportunities for students to write informative texts about what they have learned or experienced throughout the two weeks. Designing and building catapults will address standard 2.ETS1.2 Develop a simple sketch, drawing, or physical model that communicates solutions to others. Students will be drawing out and building model catapults to be used at the end of the unit. The students will also be engaging in math practices during the catapult competition. This standard is 2.MD.D.9 Generate measurement data by measuring lengths of several objects to the nearest whole unit. The students will be measuring their launches each time and recording the results for each launch. There are many other sub-standards that will be touched on throughout the unit, but these are the focused standards being addressed.

Goals. The goals of this unit are for children to learn key vocabulary (force, motion, push, pull, effects) and be able to describe these vocabulary terms in context. The Students will be observing different scenarios of push and pull in everyday life. One goal is for children to be able to recognize and explain what is happening in these instances. The students will also be working with the scientific and engineering processes. The end goal is for them to create a functioning catapult and explain the forces being exerted to make it work. They will also have a math goal of measuring and collecting data from their launches accurately. Throughout this unit, I also want the students to gain more collaboration and inquiry skills. These goals will be assessed throughout the unit and during the summative assessment.

Objectives. There are a few objectives for this unit. The students will identify and explain the effects a push or pull has on an object. The students will also be participating in writing activities where the students will use vocabulary terms learned to explain their thinking and provide information. Students will engineer a working catapult and explain its function in terms of push and pull on the object. By the end of the unit, students will be able to formulate arguments regarding the effects on objects when certain forces are applied and defend the argument using key vocabulary and understandings of how force works.

References

Tennessee State Board of Education. (2016). *Tennessee Academic Standards for Science*. Nashville, TN. Retrieved on 4/3/2019 from https://www.tn.gov/content/dam/tn/stateboardofeducation/documents/massivemeetingsfolder/meetingfiles4/10-20-17_III_J_Non-Substantive_Changes_to_Math_ELA__Science_Standards_Attachment_3_-_Science.pdf

A Curriculum Web (c)

Math

1. Measuring the distances that their scooters travel, how far they can blow pom-poms, and measuring how far their catapults can send pom-poms across the room.

Literacy/Language

1. Reading books during the unit about forces and catapults.
2. Group discussions throughout the unit.
3. Science journal entries, reflection pieces, and exit tickets.
4. Writing about catapults.

Social Studies

1. Discussion of the history of catapults and how people used them for protection.

Focal Science Standard:

PS. 2.2- Evaluate the effects of different strengths and directions of a push or pull on the motion of an object.

Movement

1. Scooter activity outside.
2. Tug-of-War in the gym.
3. Rearranging the room to how it was before.
4. Shuffle Board outside.

Music

1. Push or Pull song on YouTube that the kids will sing along and do the movements too.

Technology

1. The teacher will use technology to show the videos and play the song.
2. Students can use technology to research catapults before designing.

Art

1. Marble painting activity using motion of a marble to make marks.

Science/Engineering

1. Students will be engineering catapults to test and use in a competition using what they have learned about push and pull.
2. Video about motion and how it occurs.

Title and Description of Learning Experiences (d)

Overview

This two-week unit plan will have a focus on forces and motion, particularly push and pull. Students will engage in a variety of activities that cover many different content areas. The experiences will integrate science, math, technology, engineering, literacy, art, gross motor movement, social studies, and music. Students will be engaging in inquiry-rich activities throughout the unit that will promote critical thinking and deep understanding. This unit is designed to make cross-connections to various concepts and real-world experiences.

Students will be completing a variety of activities that address various modalities of learning. The experiences range from very hands-on such as the catapult building, to kinesthetic learning like the scooter races and tug-of-war, to more traditional learning styles of read-alouds and group discussion with a multitude of activities in between. Students will be encouraged to collaborate with classmates throughout the unit. This will enhance the learning process and overall take-away about force and motion. Students will have multiple opportunities to share ideas, questions, and thoughts they have about the concepts we cover and experiences we will be doing. This environment will promote the inquiry that is required for children to deeply engage in and soak up the information being discovered and presented.

The unit also includes a field trip to a local taffy making store. The students will have the opportunity to watch taffy making take place and relate it to the concepts being discussed in the classroom. Students will reflect on this experience as well as other experiences in the classroom. After they have seen a professional make it, they will have the chance to try taffy making themselves. There are many activities planned that have real-world connections. The goal of this is to have children become more aware of the forces that surround their everyday lives and be able to attach key vocabulary to these happenings.

At the end of the unit, the students will be designing, building, testing, revising, and competing with catapults. This activity has children engaging in the scientific process and stretching their understanding of force and motion to something unconventional but fun. The summative assessment for the unit will be the final catapult challenge in which the students will be firing pom-poms into targets at different ranges. The students will complete both a group and individual evaluation form about the experience and what science concepts they used throughout the process. This will show that they not only know about forces, motion, push, and pull, but that they can apply this knowledge to different situations.

Calendar

Week 1 of 2

Schedule	Monday	Tuesday	Wednesday	Thursday	Friday
Arrival	Rearrange the room and reset				
Welcome/Whole Group books	Motion video on BrainPOP Jr.	*Book read-aloud *Motion: Push and Pull, Fast and Slow*		Push or Pull song on YouTube	Field Trip to taffy making store!
Small Group		Pom-pom blowing game	Marble Painting		
Independent		*Science journal entry	Reflection piece of marble painting		Science journal entry on taffy experience
Snack					
Outdoor Learning/Gross Motor	Scooter races			Tug-of-War in gym	
Departure	Group discussion of similarities/differences with the scooters and room rearrangement			Recap of tug-of-war game and forces in action	

** Complete lesson plan*

Week 2 of 2

Schedule	Monday	Tuesday	Wednesday	Thursday	Friday
Arrival					Everyone get in groups and take one last test run of catapults
Welcome/Whole Group books	*Book read-aloud *The Art of the Catapult* *K-W-L chart activity	Group discussion and review of catapult features/functions		Video of catapults on YouTube	Catapult competition – part 4
Small Group		Catapult designing – part 1	Catapult building and testing – part 2	Last minute changes to catapults if needed – part 3	Evaluation of catapult group/individual
Independent	Reflection piece: What are three things you learned about catapults?			Science journal entry	
Snack	DIY taffy making		Marshmallow launchers		
Outdoor Learning/Gross Motor				Shuffle Board	
Departure		Exit ticket: What materials do you need to build your catapult?		Exit ticket: Is your catapult ready for the big competition?	

** Complete lesson plan*

Titles and Descriptions

Week 1

Day 1

The day will begin before the children come into the room. I will be rearranging the furniture and supplies in the room to different locations, making sure that the change is visible and apparent. I will greet students at the door and have them sit on the carpet. I will **engage** the children in motion by challenging them to figure out how each thing should be returned to its home (push or pull). I will ask students to think about which items were easier/harder to move and why they think this is true. I will have the students reflect on the experience and prepare to learn more about force and motion. Once finished, the students will watch a video on motion via BrainPOP Jr.

Later that day, the students will be given scooters to use outside during free time. I will encourage them to think about how the scooter pushes relate to the activity they completed earlier that morning. I will ask the students to **explore** scooter movement and try to find different ways in which they can move their partner across the sidewalk and determine which way was most effective and why.

Day 2

On the second day, the students will read a book during whole-group time about force and motion. The book is called *Motion: Push and Pull, Fast and Slow* by Darlene Stille. The students will participate in a class discussion about the different kinds of pushes and pulls that were present in the book. The teacher will ask the students to **extend** their knowledge of forces and write a reflection piece in their science journals.

Later that day, the students will participate in a pom-pom blowing game. In this game, the students will be given a straw, two pom-poms, and a target. The students will **explore** moving the pom-poms in different ways using their breath. I will ask them to think about how they can move the pom-pom faster or slower like the book discussed and what force they used to make the pom-pom reach the target.

Day 3

The students will do a marble painting activity by pushing various marbles across large paper. I will give the students limited free range as to how the marbles may move across the paper. The students may choose to bounce, roll, push, or scoot the marbles across, but I will ensure that they know the marbles may not fly across the room and may not hit others. Students will write about the experience and what happened using language of the standard and lesson.

Day 4

On day four, the students will meet in whole-group during the morning hours. I will play them a push or pull song from YouTube (A Push or A Pull by Peter Weatherall). I will play it through once and have the children listen to the song and watch the motions. Then, the song will be played once more, but this time the students will sing/dance along with it. This activity will get out all the wiggles the children may have from the morning and get them ready to participate.

When the students move to specials, they will go to gym. The gym teacher knows that we are covering push and pull for this unit, so the students will be playing tug-of-war. The class will have multiple chances to play and the winners will receive something special from the gym teacher. When the students come back to class, we will talk about how their pulling affected the rope and the other team. I

will encourage the students to participate in the discussion and reflect on how the tug-of-war game was similar or different to other activities we have done so far.

Day 5

It's Friday! On day five of the unit, the second-grade class will go on a field trip to a taffy making store. This will serve as an **extension** activity about the idea of forces on objects that affect it. Before the students leave for the trip, we will read an informational text about taffy making and how the process works. The students will be watching the taffy being made and will get to have a taste test with the candy maker. Once we return, the students will write in their science journals what they noticed on the field trip and also include the steps for making taffy. I will ask the students to include how the taffy making ties into our science unit.

Week 2

Day 6

Day six begins our series of catapult building. The students will be making a K-W-L chart as a class. I will start by having a classroom meeting where the children will use chart paper to discuss everything they know about catapults. The students will write their ideas as they brainstorm the function, uses, and building of catapults. After discussing the different ideas the students have about catapults and writing down questions they have, we will read *The Art of the Catapult* by William Gurstelle. The class will add any information to our chart paper that we discovered from the book. I will explain to the students that they will be designing, testing, and using their catapults for a competition at the end of the week. I will tell the children to begin thinking about how they will want to design their catapults. We will start the designing process tomorrow. This will **engage** students in designing and engineering practices.

Day 7

Today is the day students start designing their catapults. They will be asked to get into groups of three. The small groups will be given both plain and graph paper on which to draw out their designs. There will be books to use that have model catapults in them to use as reference and they will be able to use the iPads to research catapults, but the students will be designing their very own with their groups. The group will **explore** various kinds of catapults and ways in which to build them, but the group must come up with one design to use. Students will make a list of the required materials they need for their catapults. If they do not finish designing during small group time, they may work on their design during free time.

Day 8

I will have each of the materials requested by the groups (within reason) that they need to build their catapults. The groups will meet and begin building if they are happy with their design. Students will build their catapults and test out their prototypes. They will have the chance to make adjustments as needed after testing. I will allow two groups to test at a time in the hallway and as they finish testing, I will ask them to **explain** why/why not their catapult worked and what they may need to change to make it the best it can be. The students will have a large chunk of time to work on their catapults before we conclude for the day.

Once they have had time to complete their catapults, the class will meet and discuss the challenges they faced and how they overcame those challenges. Each group will have an opportunity to speak. I will then pose a prompt for the students to think about: Does a catapult have a push or pull?

Both? Neither? The students will determine what they think and will **elaborate** on the reason they chose their answer. The students may do a writing piece for this or simply explain to the group.

Day 10

It's catapult testing day! Teams will assemble and prepare to test their catapults. I will set up targets in the hallway and give each team a set of ammo. The students will record the data they collect after each launch making sure to include if they launched it harder/softer than the last, how far the pom-pom went, and if they hit the target. The students will do an **evaluation** of how successful their catapult was, what they did to hit the targets, and make a final decision of how the catapult had a push, pull, or both to make it work. This will serve as the summative assessment as well as my observations of the battles.

Two Complete Lesson Plans (e)

Lesson Title: Motion **Grade/Level:** 2nd **Date/Learning Experience #: 4/13/19**

Curriculum Standards	Essential Question(s)/I Can Statement(s)
State Curriculum Standards – Underline your language/vocabulary words PS.2.2- Evaluate the effects of different strengths ~~and directions~~ of a push or pull on the motion of an object. 2.W.TTP.2 Write informative/explanatory texts.	*What question(s) or I Can statement(s) drive your instruction?* What is a push and pull? I can identify effects of forces on objects.

Lesson Objective(s) – Student Learning Outcome(s) for this learning experience

Objectives use active verbs, are measureable (if applicable), and link to standards. Consider using Bloom's Taxonomy or Webb's Depth of Knowledge.

TSW complete a journal entry about forces and motion using vocabulary terms learned throughout the unit.

Knowing Your Learners

Describe pre-requisite skills students already know that will help them meet the lesson objective(s). What is your evidence that students need this/these skills(s)? This may include pre-assessment data; student personal, cultural or community assets you have gathered and observations you have made concerning your students.

Students have been discussing force and motion, specifically push and pull, in previous lessons. The students have developed a curiosity in how forces work on objects. They have discussed vocabulary in previous lessons such as forces, effects, push, pull, and motion. Each of these vocabulary words will provide a basis for which the students will be writing about the science topic. It has been noted that approximately 75% of the class needs more support with explaining their thoughts and using academic language to demonstrate understanding.

Assessment/Evaluation

How will students demonstrate understanding of lesson objective(s)? **Formative**: *How will you monitor student progress towards lesson objectives as you are teaching?* TTW ask questions as the book is being read about the various forces in the book. The teacher will be looking for use of vocabulary in students' explanations of what is happening in that section of the book. If an assistant is present, TTW have the assistant take anecdotal notes of the students' responses. TTW use a 1,2 check system while asking questions also as a quick assessment of student understanding. As the students begin writing in their journals, TTW walk around a take note of questions the students have and misunderstandings that need to be discussed in the next meeting. **Summative:** *What evidence (formative and/or summative) will you collect and how will you document student learning/mastery of lesson objective(s)? A summative assessment is not needed for every lesson, however, it is* ***required for every lesson submitted for CAEP data collection points I, II, and III.*** Students will be assessed on their science journal entries. TTW be looking for use of academic language discussed in class and accuracy of information. The students will be given a prompt in which to answer, and mastery will be determined by completion and accuracy of the prompt answer. Students may also draw pictures to accompany their writing which the teacher will use also to determine mastery.	**Assessment/Evaluation Modifications** *What modifications will you make on assessments/evaluations for students with diverse and/or special needs (i.e. students with IEP or 504, struggling learners, advanced learners) and will these modifications be within/for small groups or individuals?* Support: Students who need more support will be given extra time to complete the tasks. Wait time will be given during class discussion so that everyone can gather their thoughts and have a response ready.

Academic Feedback: *How will you give academic feedback? How will your academic feedback promote student understanding of the learning objective(s) or state standard(s)?*

Feedback will be given in both their science journals and during whole-group discussion. TTW write in each science journal about what the child did accurately and what needs to be improved for the next task. The students will also conference with the teacher during whole-group asking questions they may have and clearing up misunderstandings they may have.

More challenge: Those who need more challenge will be asked higher order questions during class discussion. Students will also be encouraged to extend their science journals to include examples or supporting information they may know.

Academic Language Demands

Function and Product of the Lesson *The function is the verb, usually a Blooms verb (e.g., analyze, interpret, recount), that guides the language objective of the lesson. This includes a product that students will either write, say, present, or do that involves Academic Language (e.g. essay, present, recount).*

TSW write an entry in their journals about forces and motion using vocabulary they have been learning.

Academic Vocabulary *What specialized terms and phrases do students need to understand what they are expected to do? How does this vocabulary connect to the objectives, state standards and function of the language demand?*

Students need to know what explain, discuss, and effects mean. They have been using most of these words throughout the year, so they should be aware of how they are used. They must know these in order to reach the objective and master the standards.

Content Vocabulary *What are the key vocabulary words, symbols, or sounds in this lesson? How does this vocabulary connect to the objectives, state standards and function of the language demand?*

Students will need to know the words forces, push, pull, and motion to complete the task of the lesson. These words are relatively new to the students, but will be discussed in the lesson. Students must know how to apply and use these words in their explanations to meet the objective.

Syntax and/or Discourse, Mathematical Precision (math only). This section is not required for Early Childhood or Special Education.

Syntax *What are the specific ways or conventions for organizing symbols (e.g., linear, horizontal), words (grammar), phrases, or graphics that students need to know to be able to do what you are asking?*

Discourse *What are the specific ways in which members of a discipline (e.g., scientist, historian, etc.) talk, write, and communicate knowledge that students need to know to be able to do what you are asking (e.g., essays, presentations, performance, journal, debate, historical account, signal)?*

Language Supports *What general instruction will you provide to help students in the whole class (e.g., word walls, learning partners, guided notes) learn the discourse/syntax? What focused instruction (e.g., Venn diagrams, graphic organizers, outlines, student examples, sentence stems) will you provide to help students learn the discourse/syntax (can be completed in small groups)? What individual instruction that targets the needs of an individual student(s) will you provide to help that student(s) learn the discourse/syntax? What opportunities will you provide for students to practice language/vocabulary and develop fluency? What tools (e.g., EQ or vocabulary board, Venn diagram, anchor chart, vocabulary cards, graphic organizer, peer support, sentence stems, pictures, table, chart, thinking map, modeling, sort, song, body movements, games) will you use to help students meet the language demands?*

General Supports – *Strategies used to support the whole class and may be used to support more than one demand (e.g., Venn diagram, learning partners, word wall, anchor chart, vocabulary cards, graphic organizer, sentence stems, pictures, table, chart, thinking map, modeling, sort, song, body movements, games). These strategies can cross disciplines and be used in a variety of lessons.*

-books about motion in the classroom, word wall, sentence starters

These supports will be available for all students to use as reference when completing the task.

Targeted Supports – *Strategies that focus toward a specific language demand (e.g., Venn diagrams, graphic organizers, outlines, examples, sentence stems). These may be addressed during small groups. These can be general supports that are modified for specific students or groups of students.*

-printed prompt cards, word bank

These supports will be available for a few students who need more support. The students will be given a word bank of the vocabulary and a copy of the prompt at their desks.

Individual Supports – *Supports used to target the specific needs of an individual student (e.g., ELL, student with autism, struggling reader or writer, student with significant language delays). These students may or may not have been formally identified and may or may not have an IEP or 504 plan.*

-modified pencil, large print notebook

One student struggles with writing, so the student will be given a pencil with a grip on it and large-lined paper in the notebook for easier writing.

Instruction – When designing your instruction, consider when you will implement formal and informal assessments/evaluations, when you will provide feedback, and when you will teach academic language. Therefore, this section should include aspects written above.

Lesson Part	Description of Activities and Instruction (Teacher Does)	Description of Activities and Instruction (Students Do)	Meeting Individual & Group Needs /Learning Styles *Plans instruction to meet the needs of individual students. Adaptations are tied to learning objectives. Specific individual or group learning includes requirements in IEP or 504 plans.*
Set/Motivator: *Restate and address your Essential Question. How do you engage student interest in the content of the lesson? How does this relate to previous learning? Use knowledge of students' academic, social, and cultural characteristics.*	1. *Thank you all for joining me on the rug. I have a very special book that we are going to read today. This book is SO special that none of you have ever seen it before. I keep it locked up in a special place until I believe my students are ready for it. Do you think you all are ready for it?* 2. *I believe you are too. Now, who can tell me what our science focus has been?* TTW call on a student to answer. 3. *That is right! My special book is all about motion. So, I need everyone to have your thinking cap on,* (ttw make the motion), *your listening ears turned up,* (ttw make the motion), *and your eyes focused on me.*	1. TSW sit on the carpet in their spots. Students will respond to the teacher. *Yes! We're ready!* 2. TSW answer the question if called on. 3. TSW perform the motions as the teacher does and prepare to listen to the story.	TTW have students who need support with paying attention will be seated closer to the teacher for proximity.

Instructional Procedures/Learning Tasks: *Provide specific step-by-step details of lesson content aligned with objectives, utilizing a variety of teaching strategies.*	4. TTW pull the book out from behind the chair. *Motion: Push and Pull, Fast and Slow by Darlene Stille. Students, right away what does the title tell us about the story?* TTW call on a couple of students to answer. 5. *Alright, so we are reading a story about push and pull.* TTW read the story pausing occasionally to ask questions. Some questions may be: *How does this page relate to what we did earlier today?* *Which way made the object move the furthest? Faster or slower? Why do you think that?* 6. *Please do not yell out your answer, but simply show me a 1 if you believe that it would be easier to move a heavy wagon by pushing it or a 2 if you believe it would be easier to move it by pulling it.* *Hmm, it seems that there are some different opinions. What is a way we could determine which way is easier?* TTW call on a few students to share. 7. *These are some great ideas that we should experiment with during our motion unit. Now, we have talked about push and pull and how it effects objects' movements. I want you to write an entry in your science journals when I call you back to your desks. I want you to answer this prompt: What is a push and pull? What happens to objects when there is a push or pull on them?* TTW post the prompt on the SMART board. 8. TTW call the students to their desks by group. *Please take out your journals and begin working on your entry. You may draw a picture to go with your writing if you would like. Remember, I want to see you*	4. TSW raise their hands and answer the question asked if called on. 5. TSW listen as the teacher reads the story and will answer questions as they go through. 6. TSW hold up either a 1 or 2 depending on their choice. Some students will share their ideas of how to determine which way is easier. 7. TSW listen to the prompt given for their science journals and begin to think of ideas. 8-9. TSW move to their desks when called on and will take out their journals. Students may choose to look at a book before writing for ideas. Students may ask for assistance if needed.	- The teacher can call on students who need more support with paying attention to answer questions to keep them engaged in conversation. -TTW allow more time for students to think about answers before asking students to discuss. -For students who need more challenge, more in-depth questions can be asked for follow-up. -Encourage more in-depth responses for students who need more challenge. -Assistance from the teacher available for all students during the process.

	use the vocabulary words we have been discussing. If you need help, I will be walking around the room. There are some books you can use if you need some ideas. 9. TTW walk around the class and take note of questions the students have and things that need to be discussed further. 10. *Once you have finished, please come back to the rug and pick out a book out of this basket to read while you wait* (books will be about motion). TTW wait for all students to return to the carpet. 11. TTW complete the closure.	TSW write their entries and draw a picture if they wish. 10. TSW head back to the carpet once they are finished and pick out a book from the basket to read quietly. 11. TSW complete the closure.	
Questions and/or activities for higher order thinking: *These are open-ended and cannot be answered by yes or no. These can be asked at various points throughout the lesson and guide rather than direct student thinking.*	1. How does this page relate to what we did earlier today? 2. Which way made the object move the furthest? Faster or slower? Why do you think that?	Provide exemplar student responses here. 1. We had to push and pull different things to get them back where they belonged. 2. Faster! The faster makes it go more because there is more push.	Extended time will be allowed for students to think about their responses before answering if they need it. The teacher may ask supporting questions to guide their thinking to answering the HOT questions.
Closure: *Makes clear connections to real-world situations and requires students to reflect on and apply their learning through verbal or written expression.*	1. *Would anyone like to share what they wrote in their journal?* TTW select a few students to share. 2. *I am so proud of your hard work for this task. We are going to go outside and work with some scooters in just a few minutes. We are going to test some of our theories about push and pull and see how they work out for scooter races. I need everyone to grab their*	1. TSW share what they wrote about to the class if chosen. 2. TSW grab their water bottles and line up at the door.	If students do not want to share, but want their ideas told to the class, they may ask a classmate to present for them. Reminders will be given

	water bottles and line up at the door quietly.		on how to line up and move outside the classroom if needed.

Material/Resources: *What do you need for this lesson? Identify, within a bulleted list, the specific materials and resources that you will use. Describe how these materials and resources add value, depth, and extend students' learning.*

- Book *Motion: Push and Pull, Faster and Slower*- the teacher will read the book aloud to help children further their understanding of motion
- Science journals- each student should have a science journal at their desk
- Writing utensil- pencil is preferred for writing
- Colored pencils (optional)- students may use these for their drawings
- Books about motion- students can use these as a reference when writing and then again while waiting for classmates to finish

Technology: *(a) Describe the technology you plan to use in your lesson, (b) How does the identified technology in your lesson improve student learning? If applicable, (c) explain how you will use this technology to support a variety of student needs within the learning environment, and (d) If you used this technology to design and implement formative and/or summative assessments, please explain. Did you use the technology to collect and/or analyze your data to inform instruction? Explain.*

- SMART board- the teacher will place the prompt on the SMART board so that each student can refer to it when writing

Co-Teaching Strategies Used: *(highlight and explain all that apply): One Teach, One Observe; One Teach, One Assist; Station Teaching; Parallel Teaching; Supplemental Teaching; Alternative (Differentiated); Team Teaching*

For this lesson, I would use the one teach, one assist co-teaching strategy. During discussion time, I would have the other teacher be laying out the targeted supports on each student's desk who would need it. As the students were writing, both of us would be walking the room to assist the students who need help.

Management

Management**:** *Explanation of processes and/or procedures, transitions from one activity to another, strategies for gaining attention, motivating students to engage in the lesson and focus on learning (e.g. work boards, posted procedures, modeling, positive feedback, redirection). If management decisions were addressed above, please bold those processes and procedures.*

There are posted procedures in how to go to and from the rug for group time. Students walk to the rug and sit in their designated spots, and then wait until called upon to leave the rug. The students have practiced and know how to line up to leave the room as well. The students will be reminded of these procedures should they need it.

Theory/Rationale

I am using science journals for a number of reasons. By allowing students to convey their ideas in their own notebooks, I can get a true picture of the understanding they have for the subject. Science journals also encompass the three interwoven components widely used in early childhood education- drawing, writing, and thinking (Chaillé & Davis, 2016). These journal entries can be used as an assessment tool for big concepts that may be covered in multiple sessions. I am also integrating content by using literature about motion to help students understand force and motion. Integration is key in helping children understand big ideas of science (Chaillé & Davis, 2016).

Chaillé, C., & Davis, S. M. (2016). *Integrating math and science in early childhood classrooms through big ideas: A constructivist approach.* Pearson.

Lesson Title: Catapults **Grade/Level:** 2nd **Date/Learning Experience #: 4/14/19**

Curriculum Standards	Essential Question(s)/I Can Statement(s)
State Curriculum Standards – Underline your language/vocabulary words PS.2.2- Evaluate the effects of different strengths ~~and directions~~ of a push or pull on the motion of an object. 2.SL.CC.2 Recount or describe key ideas or details from a text read aloud ~~or information presented orally or through other media.~~	*What question(s) or I Can statement(s) drive your instruction?* What is a push or pull? I can use informational text to gather information.

Lesson Objective(s) – Student Learning Outcome(s) for this learning experience

Objectives use active verbs, are measureable (if applicable), and link to standards. Consider using Bloom's Taxonomy or Webb's Depth of Knowledge.

TSW create a K-W-L chart of the key ideas about catapults from the book *The Art of the Catapult* with 100% accuracy.

Knowing Your Learners

Describe pre-requisite skills students already know that will help them meet the lesson objective(s). What is your evidence that students need this/these skills(s)? This may include pre-assessment data; student personal, cultural or community assets you have gathered and observations you have made concerning your students.

The students have shown an interest in catapults and how they work. The class is in their second week of a unit about push and pull forces and how they affect objects. The students have shown a basic understanding of these concepts in formative assessments throughout the previous week. The beginning of catapults will challenge their thinking to more in-depth perceptions of push and pull in which 90% of the class has shown they are prepared for.

Assessment/Evaluation

How will students demonstrate understanding of lesson objective(s)?

Formative*: How will you monitor student progress towards lesson objectives as you are teaching?*

At the beginning of the lesson, the teacher will have the students collaborate to create a list of things they know about catapults on a K-W-L chart. This will serve as a pre-assessment of the students' knowledge of the topic. Then, the students will generate questions about what they want to know about catapults for the chart. Once they begin reading the book, TTW ask questions periodically to ensure the students are following along and comprehending. TTW take notes of student responses and questions they have in the form of jots. TTW also use a thumbs up, sideways, or down quick assessment during the story.

Summative: *What evidence (formative and/or summative) will you collect and how will you document student learning/mastery of lesson objective(s)? A summative assessment is not needed for every lesson, however, it is* ***required for every lesson submitted for CAEP data collection points I, II, and III.***

The summative assessment for this lesson will be both whole-group and individual. TSW revisit the K-W-L chart they made at the beginning of the lesson and add anything they did not already know about catapults and how they work. TTW ensure that all key ideas have been listed on the classroom chart. Then, the students will list three things they learned about catapults that they did not know previously on an exit ticket. Mastery will be determined by the completion of both activities.

Academic Feedback: *How will you give academic feedback? How will your academic feedback promote student understanding of the learning objective(s) or state standard(s)?*

Feedback will be given during group discussion the following day. TTW clarify any questions the students still have about catapults and will reflect with the students

Assessment/Evaluation Modifications

What modifications will you make on assessments/evaluations for students with diverse and/or special needs (i.e. students with IEP or 504, struggling learners, advanced learners) and will these modifications be within/for small groups or individuals?

Support: Students who need more support will be given extra time to complete the tasks.
Wait time will be given during class discussion so that everyone can gather their thoughts and have a response ready.
More challenge: Those who need more challenge will be asked higher order

about the key ideas they learned and how they apply to the science standard. If students chose to create their own lists, TTW provide feedback on their charts as well.	questions during class discussion. They will also be encouraged to explain how catapults connect to the science unit. Those who do not wish to participate in the whole-group list making may create their own lists independently.

Academic Language Demands

Function and Product of the Lesson *The function is the verb, usually a Blooms verb (e.g., analyze, interpret, recount), that guides the language objective of the lesson. This includes a product that students will either write, say, present, or do that involves Academic Language (e.g. essay, present, recount).*

TSW create a classroom K-W-L chart using information they already know and gained information about catapults.

Academic Vocabulary *What specialized terms and phrases do students need to understand what they are expected to do? How does this vocabulary connect to the objectives, state standards and function of the language demand?*

Students need to know the words/phrases key details, recount, and describe. The students have been exposed to these words in ELA activities, so they are a review. The students will need to be able to apply each of these words to complete the tasks.

Content Vocabulary *What are the key vocabulary words, symbols, or sounds in this lesson? How does this vocabulary connect to the objectives, state standards and function of the language demand?*

Students need to know push, pull, force, and catapult for this lesson. The students will be talking about catapults and explaining the function of them and how they relate to the science standard they are covering. They have been talking about each of these for a week at the point of this lesson and most of the children are aware of what a catapult is.

Syntax and/or Discourse, Mathematical Precision (math only). This section is not required for Early Childhood or Special Education.

Syntax *What are the specific ways or conventions for organizing symbols (e.g., linear, horizontal), words (grammar), phrases, or graphics that students need to know to be able to do what you are asking?*

Discourse *What are the specific ways in which members of a discipline (e.g., scientist, historian, etc.) talk, write, and communicate knowledge that students need to know to be able to do what you are asking (e.g., essays, presentations, performance, journal, debate, historical account, signal)?*

Language Supports *What general instruction will you provide to help students in the whole class (e.g., word walls, learning partners, guided notes) learn the discourse/syntax? What focused instruction (e.g., Venn diagrams, graphic organizers, outlines, student examples, sentence stems) will you provide to help students learn the discourse/syntax (can be completed in small groups)? What individual instruction that targets the needs of an individual student(s) will you provide to help that student(s) learn the discourse/syntax? What opportunities will you provide for students to practice language/vocabulary and develop fluency? What tools (e.g., EQ or vocabulary board, Venn diagram, anchor chart, vocabulary cards, graphic organizer, peer support, sentence stems, pictures, table, chart, thinking map, modeling, sort, song, body movements, games) will you use to help students meet the language demands?*

General Supports – *Strategies used to support the whole class and may be used to support more than one demand (e.g., Venn diagram, learning partners, word wall, anchor chart, vocabulary cards, graphic organizer, sentence stems, pictures, table, chart, thinking map, modeling, sort, song, body movements, games). These strategies can cross disciplines and be used in a variety of lessons.*

-books about catapults, word wall

These supports will be available for the class to use as they fill out the K-W-L chart together.

Targeted Supports – *Strategies that focus toward a specific language demand (e.g., Venn diagrams, graphic organizers, outlines, examples, sentence stems). These may be addressed during small groups. These can be general supports that are modified for specific students or groups of students.*

-example K-W-L chart, simplified catapult books

These supports will be given to a few students who need more support with comprehension and instruction. The K-W-L chart will give them a reference when participating in the whole-group and the simplified books will allow them to access information they can comprehend.

Individual Supports – *Supports used to target the specific needs of an individual student (e.g., ELL, student with autism, struggling reader or writer, student with significant language delays). These students may or may not have been formally identified and may or may not have an IEP or 504 plan.*

-learning partner, large print paper

One student struggles with writing, so the learning partner may write the student's ideas on the classroom chart and the student can use the large print paper for completing the exit ticket.

Instruction – When designing your instruction, consider when you will implement formal and informal assessments/evaluations, when you will provide feedback, and when you will teach academic language. Therefore, this section should include aspects written above.

Lesson Part	Description of Activities and Instruction (Teacher Does)	Description of Activities and Instruction (Students Do)	Meeting Individual & Group Needs /Learning Styles *Plans instruction to meet the needs of individual students. Adaptations are tied to learning objectives. Specific individual or group learning includes requirements in IEP or 504 plans.*
Set/Motivator: *Restate and address your Essential Question. How do you engage student interest in the content of the lesson? How does this relate to previous learning? Use knowledge of students' academic, social, and cultural characteristics.*	1. *Class, class! Please join me on the carpet. I have something that I believe you are going to be very excited about!* 2. *Thank you all for sitting so patiently. I really appreciate that. Now, I have a question and I do not want you to shout out. All you need to do is give me a thumbs up, thumbs down, or sideways. Do you remember making K-W-L charts in reading?* TTW scan the room quickly to make sure everyone is on board. *Perfect! I am so glad you all remember because we are going to make one today. Can anyone guess what our chart might be about?* TTW call on a few people to share their ideas. 3. *Hmm, I did not quite hear what I was looking for. I'm going to show you a picture and maybe that will help.* TTW show a picture of a catapult on the SMART board. *I*	1. TSW sit on the carpet in their designated spots. 2. TSW give a thumbs up, down, or sideways to answer the teacher's question. Some students will share their ideas if called on. 3. TSW look at the picture to determine what they will be discussing for the day. Some students may answer outloud.	TTW have students who need support with paying attention will be seated closer to the teacher for proximity.

	heard it! We are going to talk about catapults today!		
Instructional Procedures/Learning Tasks: *Provide specific step-by-step details of lesson content aligned with objectives, utilizing a variety of teaching strategies.*	4. *So, you know that we are talking about catapults today, but before I tell you anything, I want to see what you know. We are going to fill out this chart as a class. So, right now be thinking of some things that you already know about catapults. When you are ready to share, place your hand on your head.* 5. TTW wait until most of the class is ready to share and will begin drawing names out of the jar. The child will write their idea on the chart if they wish. TTW draw names until there are no more ideas left. 6. *Wow! You guys know a lot about catapults! However, I bet there are still some things that we do not know about them. Who has a question that they have about catapults?* TTW call on 5-6 students to share and will write their questions on the K-W-L chart. 7. *Perfect. I have a book here that was written to tell readers all about catapults. It is called <u>The Art of the Catapult</u>. Should we read it and try to answer our questions?* 8. *I agree.* TTW begin reading the story pausing occasionally to ask questions. Some questions may include: *Why do you think people in history used catapults?* *Do you think that was a push or pull? Why?* *Is there something you would do differently?* 9. Once the story is complete, TTW have the students sit and think about the new information they learned from the book. 10. *Alright class. Now we need to fill out the last column of our chart-*	4. TSW think of ideas they know about catapults and will place their hand on their head when ready to share. 5. TSW share their ideas when called on. 6. If called on, TSW share what question they would like answered about catapults. 7. *Yes!* 8. TSW listen to the story being read and will answer the questions asked throughout the story. 9. TSW recount what they learned from the book. 10. TSW give a thumbs up if they have a new idea and will share the idea when called on. If they	- The teacher can call on students who need more support with paying attention to answer questions to keep them engaged in conversation. -TTW allow more time for students to think about answers before asking students to discuss. -TTW have an example K-W-L chart for those students who need the support. -A learning partner will be given to a student who struggles with writing. -For students who need more challenge, more in-depth questions can be asked for follow-up. -Encourage more in-depth responses for students who need more challenge. -Teacher may ask guiding questions to lead students

	what we learned. If you have a new idea that is not already on our chart, please give me a thumbs up. TTW call on the students to share what they learned and write it on the chart if they choose. 11. *WOW! Look at all of those things that we did not know about catapults! Do you guys think that you know quite a bit about catapults now?* TTW wait for students to answer. *Do you think you all could design and build one??* TTW wait for the excitement to die down. 12. *Well, the rest of this week we are going to work in groups to design, build, and test catapults that we will use in a competition on Friday! Does that sound interesting? I am so glad that you all are excited! It is almost time for recess, but you have an exit ticket to complete.* 13. TTW complete the closure.	choose to, they will write their idea on the chart. 11. TSW share their opinions and will show excitement in creating their own catapults. 12. TSW get excited about the upcoming project and then will settle down to hear about the exit ticket. 13. TSW complete the closure.	to key ideas they have not named.
Questions and/or activities for higher order thinking: *These are open-ended and cannot be answered by yes or no. These can be asked at various points throughout the lesson and guide rather than direct student thinking.*	1. Why do you think people in history used catapults? 2. Do you think that was a push or pull? Why? 3. Is there something you would do differently?	Provide exemplar student responses here. 1. They did not have guns like we do. They were easy to build. 2. Push because it is pushing the rock across the wall. Pull because the person is pulling the catapult back. 3. I would use a bigger holder so I could throw more at once.	Extended time will be allowed for students to think about their responses before answering if they need it. The teacher may ask supporting questions to guide their thinking to answering the HOT questions.
Closure: *Makes clear connections to real-world situations and requires students to reflect on and apply their learning through verbal or written expression.*	1. *For this exit ticket, you are going to write down three things that you learned about catapults that you did not know before.*	1. TSW write three things they learned.	One student will be given the large print paper for writing the

	2. *As you finish that, you may get your water bottle and line up at the door. Hand me your exit ticket. I want you all to start thinking about who you want to work with and some ideas you have for your catapult. We will start designing tomorrow, so you need to be ready!* 3. TTW join the students at the door and wait for everyone to be ready to go outside.	2. TSW get their water bottles and line up at the door when they finish the exit ticket. They will hand their ticket to the teacher. Students will begin thinking about who to work with and a possible design to create. 3. TSW get ready by standing quietly in line to go outside.	responses. Reminders will be given on how to line up to go outside if needed.

Material/Resources: *What do you need for this lesson? Identify, within a bulleted list, the specific materials and resources that you will use. Describe how these materials and resources add value, depth, and extend students' learning.*

- Book *The Art of the Catapult* by William Gurstelle- the teacher will read the book aloud and the children will use the information in the book to complete the chart
- Large chart paper for the K-W-L chart- by providing large paper, all the students will be able to write their ideas and repsonses on the chart
- Markers-markers will ensure everyone can read the chart as students write on it
- Paper for the exit ticket- students will write three things they learned on an exit ticket; this paper would ideally be smaller (half sheets or stickies)
- Example K-W-L chart for targeted support
- Other catapult books on different levels for students to use

Technology: *(a) Describe the technology you plan to use in your lesson, (b) How does the identified technology in your lesson improve student learning? If applicable, (c) explain how you will use this technology to support a variety of student needs within the learning environment, and (d) If you used this technology to design and implement formative and/or summative assessments, please explain. Did you use the technology to collect and/or analyze your data to inform instruction? Explain.*

- SMART board- The teacher will pull up a picture of a catapult via the internet to give the students a hint about what the lesson will be. By using the SMART board, all children will be able to see the picture at once and the teacher will have it handy to use as reference.

Co-Teaching Strategies Used: *(highlight and explain all that apply): One Teach, One Observe; One Teach, One Assist; Station Teaching; Parallel Teaching; Supplemental Teaching; Alternative (Differentiated); Team Teaching*

For this lesson I would use the one teach, one observe. During discussion time and while I was reading the story, I would have the other teacher be observing student behaviors. I would have him/her look for students who were engaged and paying attention, those who were talking out of turn or about unrelated topics, and observing those who were not vocally participating to see if they were following along and comprehending. I would use this information to change seating arrangements, assess comprehension, and plan for future discussions.

Management
Management: *Explanation of processes and/or procedures, transitions from one activity to another, strategies for gaining attention, motivating students to engage in the lesson and focus on learning (e.g. work boards, posted procedures, modeling, positive feedback, redirection). If management decisions were addressed above, please bold those processes and procedures.* I will be periodically asking children to show me repsonses to questions or thoughts in ways that are not speaking to keep engagement and focus attention. There are posted procedures in how to go to and from the rug for group time. Students walk to the rug and sit in their designated spots, and then wait until called upon to leave the rug. The students have practiced and know how to line up to leave the room as well. The students will be reminded of these procedures should they need it.
Theory/Rationale
I am choosing to use a whole-group, child-led approach for this lesson. It is important that the teacher know what the children already know about a topic. This is easiest by allowing the children to show you. It is also important that the children have to opportunity to converse with one another and bounce ideas around to gain a deeper understanding of what is being taught. Acooridng to Chaillé and Davis, "peer interaction is an important part of classroom activities" (2016, p.63). By allowing them to collaborate with each other, they understand that their thoughts are just as important as the teacher's. I am also doing a K-W-L chart in the lesson. These charts provide students with a visual of what they already knew about a topic and how much they learned after a lesson. This is a simple assessment tool for the teacher and a resource the students can use in the future.

Chaillé, C., & Davis, S. M. (2016). *Integrating math and science in early childhood classrooms through big ideas: A constructivist approach.* Pearson.

Unit Evaluation Plan (f)

Overview

I will be using both formative and summative assessment throughout the until plan. In the beginning, I want to gain an idea of what my students know about force and motion and the vocabulary words associated with them. I will use assessment throughout to make sure the students are progressing in their knowledge and understanding of the science behind forces and motion addressed as well as in other areas such as scientific thinking and processes.

I will monitor their words and actions for understanding using anecdotal notes and checklists. For the end of the unit, students will be designing and working with catapults to determine forces required to launch objects to a certain destination. Assessment will be during the planning, designing, experimenting, and competing to ensure students understand forces and other science practices such as the scientific process. I have considered individual needs and abilities present in the classroom through previous observation and have determined that each student should be able to participate. Teacher assistance will be provided if needed to those who may need more support throughout the unit.

Formative

I will be using formative assessment from the beginning to the ending of my unit plan. This will be used to make sure students are progressing in their understanding and to guide where my teaching and activities should go as the days go on. In the initial activity, I will be taking note of students' language use and will determine if they have a basic idea of physical science in relation to forces as well as other science-related practices. From there, I will move on to the more extensive activities. The main assessment that will be used is anecdotal notes. This will be a quick way for me to see where the children are and what questions or misconceptions I should address as we go through the lesson.

I will also use a checklist system. For example, in the motion video activity, I will be asking students if a push or pull occurred for each act and check whether the children got them correct. I will do this either orally or via an exit ticket to the next activity for the day.

During the end of unit project, I will be assessing the students' knowledge of the scientific process (planning, design, testing, revising) by looking at their drawings of their catapults and discussing with them the changes they have made over the week to see if they understand the steps to the process.

Summative

The final experience will be the competition of their catapults. The students will have to exert certain amounts of force on their catapults by pulling the throwing arm down. Students will be recording the results of their catapults and will keep score of how many targets they hit. Students will be required to explain on their recording sheet what they had to do to make the pom-pom go a certain distance. This will be used as a determinant if students understand the relationship with an object, force, and motion of the object.

A Letter to Parents (g)

Dear Families,

Over the next two weeks we are going to be exploring forces and motion in science. There will be many activities that the students will participate in to help gain a deep understanding of this concept.

For this unit, we will be focused primarily on pushes and pulls and their effects on objects. This unit will include many things from reading, writing, exploring, engineering, and group collaboration activities that will allow the students to fully engage in force and motion experiences. Our end of unit project will be a catapult making and catapult competition. The students do not know about this activity yet, but it has been a big hit in years past, so I have a feeling they will be equally as excited! There will also be a field trip in this unit on next Friday. We will be visiting a taffy making store in Gatlinburg! The children are very excited about this trip and I hope that you will be too.

I hope that you will be involved throughout this process. I would love to have parent volunteers in the classroom and on the field trip. You are more than welcome to join us on the trip and to try some yummy taffy from some amazing candy makers. I would also love to have some volunteers during our last week. The children will be designing, building, and testing their catapults before the big competition day and extra hands are always nice. If you are unable to volunteer, we would love donations of catapult building materials! Some of the things we need are: popsicle sticks, rubber bands, bottle caps, straws, pom-poms, or anything your child suggests for catapult building.

I am very excited to get this unit underway! The children will be learning a lot over the next couple of weeks and I encourage you to extend their learning to things at home. Your child will be given different motion books to read at home over the next two weeks, so there may be some ideas for you all to try. If you have any suggestions for activities or resources to use, please send them to me!

If you have any questions or concerns, do not hesitate to contact me via email at atkins@jcs.net or through the Remind App. Thank you for your constant help and participation in the classroom. I could not do it without you!

Regards,

Ms. Atkins

List of References (h)

Teachers

Barrett-Zahn, E. (2019). Motion and stability: Forces and interactions. *Science & Children, 56(7).*

Bybee, R. W. (2014). The BSCS 5E instructional model: Personal reflections and contemporary implications. *Science and Children*, 51(8), 10-13

Chaillé, C. & Davis, S. M. (2016). *Integrating math and science in early childhood classrooms through big ideas: A constructivist approach.* New York, NY: Pearson.

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https://thestemlaboratory.com/category/second-grade/engineering-second-grade/

https://www.youtube.com/watch?v=FOcY37oGhj8

Families

http://www.pbs.org/parents/education/science/tips/science-resources/

https://www.nsta.org/parents/

https://www.sciencebuddies.org/parent-resources

https://thestemlaboratory.com/category/second-grade/engineering-second-grade/

http://www.readingrockets.org/extras/stem_series

Children

https://childsci.org/popsicle-stick-catapult/

https://www.sciencebuddies.org/student-resources#stemactivities

https://www.science-sparks.com/how-to-make-a-catapult/

BrainPOP Jr.

List of Resources Used in the Unit (i)

Materials and supplies

- Chart paper
- Markers
- Scooters
- Pom-poms
- Straws
- Science journals for each student
- Marbles
- Paint
- Bulletin paper
- Large rope
- Popsicle sticks
- Tape
- Rubber bands
- Copy paper
- Graph paper
- Targets
- Bottle caps
- Hot glue (teacher only)
- Sugar
- Cornstarch
- Butter
- Corn syrup
- Salt
- Water
- Vanilla extract
- Flavor extract (any)
- Food coloring
- Candy thermometer
- Pot
- Glass dish

Print and non-print

- *Motion: Push and Pull, Fast and Slow* by Darlene Stille
- *The Art of the Catapult* by William Gurstelle
- Books about motion
- Books about catapults
- Group and self-evaluation form

Technology resources

- Computer
- SMART board
- Camera for documentation

Other

- Field trip permission forms