DAY 1

Standard:

5.1.1.2.2: Identity and collect relevant evidence, make systematic observations,

4.1.2.2.2: Generate ideas and possible constraints for solving a program through engineering design

Essential Question: How do people use simple machines to solve problems?

Content objective: Students will be able to name all six of the simple machines.

Language Objective: Students will discuss the usage of simple machines with a partner

Academic Language:

- Inclined plane
- Level
- Pulley
- Wheel and Axle
- Wedge
- Screw

Set up- Introduction (9:00-9:07) - Names - Expectations - Call and response	**Step up: Before students arrive:** - Powerpoint on smartboard - Double check sound for videos! - Anticipatory set W.S. (questions about simple machines) - W.S. Simple machine- students exploration - Pencils **We do together:** Student names: Adjective that describes you then your name: **Examples**: Blooming Blair Crazy Carson **Go around the classroom having the student state their "fun name" and something about themselves?" - Favorite color - Favorite food - Etc Expectations: Have fun: We are here to make memories and having new experiences Be smart: Make choices and decisions that should be the same in any other classroom. Be safe: Make kind and respectful choices that will benefit yourself and the people around you.

	Call and response: Holy Moly-----Guacamole All set------- You bet! Peanut butter-----Jelly

Anticipatory set (9:07-9:15)	**You do alone**:
	Begin to get the students engaged with a deep thought question:
	While asking the two questions- pass out half sheet of paper and pencils
	
	Make sure to allow time for the students to brainstorm and write their answers
	
	- "*What does it mean to build something*?"
	  - Allow students to write down answer
	- "*Who has built something or seen something being built*?"
	  - Legos, lincoln logs, houses, etc
	
	- "Can you try and guess the 6 simple machines"
	  - Remind the students that if they don't know it's okay! They will learn throughout the time at STEM camp!
	
	https://www.youtube.com/watch?v=wVP5zVHGSYo
	- Watch the video to be introduced to the different simple machines- you don't have to watch the entire video.
	- While the students are watching the video: pick up half sheets of paper
	- **Make sure student's name are at the top of the paper**

Simple Machines: Crash course (2 minutes per machine) (9:15-9:27)	**I do:** On powerpoint provide a range of different examples- one simple machine per slide:
	EX: show a range of different inclined planes photos
	
	- **Inclined plane**:flat surface that is higher on one end. You can use this machine to move an object to a lower or higher place:
	  - Ramp, slanted roat, slide!
	  - **Spring scale** to show the force needed to push the load
	- **Lever:** board or bar that rests on a turning point
	  - Hammer, bottle openers, crow bars
	
	- **Pulley**: rope fits on the groove of the wheel

	- Flag poles, sailboats, blinds, crane
	  - **Fixed pulleys**: change the direction that you pull the load
	  - **Moveable pulleys**:trading force for distance - pull more but lightens the weights
	- **Wheel and Axle**: rod that goes through the wheel, wheel will turn and allows things to move from place to place
	  - Cars, roller skates, wagons, bikes
	
	- **Wedge:** incline plains used to split an object
	
	- **Screw**: inclined plane wrapped around a shaft

Exploration with worksheet: 9:30-9:50	**You do together**: Students will rotate through the different stations and write down how they are used AND draw a replica of that object (Not looking for exact measurements rather than overall concepts about that object) - Have a three minute on a smartboard-
Wrap up and send off 9:50-9:55	**We do together**: Wrap up- "We went through the 6 simple machines and how you are able to use them in everyday life!" Answer questions- depends on students Preview for tomorrow- Review of the 6 simple machines, use of simple machines in history and introduction to the Rube Goldberg machine challenge.

DAY 2

Essential Question: How do people use simple machines to solve problems?

Content objective: Students will be able to brainstorm a Rube Goldberg machine using 3 out of 6 simple machines.

Language Objective: Students will collaborate with a group to design Rube Goldberg machine

Academic Language:

- Inclined plane
- Level
- Pulley
- Wheel and Axle
- Wedge
- Screw
- Design
- Revise
- Collaborate

Set up: Introduction (9:00-9:07)	**Set up- Before students arrive:** - Materials for the set up are placed into a designed area. (Putting everything into the red solo cups works really well) - White paper (blue print) - pencil **I Do**: Review of student names- Ask their favorite color! Expectations for the day: -Be smart, be safe and be kind *if something stood out from the day before- lots of talking, not raising hands or anything from the other teachers* Review of simple machines: - Hold up different examples of the simple machines- ask students to raise their hands and name simple machine - If time allows: ask students for real life examples -
Relation to history (9:07-9:15)	**We do together**: "This video explains a large amount of how the pyramids were built- there will be a lot of math concepts- - I want you to focus on the way the simple machines are used - What would happen if they didn't have that simple machine- how much harder would it be? https://www.youtube.com/watch?v=52V9jmrgSbI - During this time- walk around the classroom and begin to start putting students into groups

Objective of the Marble Run (9:15-9:25)	**I Do**: https://www.youtube.com/watch?v=nf094faga5w "Create a track that the marble can roll through and end up in the red cup. Students must have 4 exchanges and at least 3 simple machines! Machine must fit inside of a 2ft by 2ft square- White poster board- make sure students know their group number - Session one is written in BLACK - Session two is written in RED The white poster board needs to stay flat on the table at all times. You can not purposely cut the poster board- this is the base of the machine." Materials: - 2 feet of masking tape - 10 dominos - 3 red solo cups - 20 flexible straws - 15 paper clips - 10 rubber bands - 3 small white cups - 5 toilet paper rolls - 2 sheets of paper - 1-meter sticks - 1 pulley - 1 spring - 1 black wheel - 1 Black Foam tube - 1 scissors - 2 marbleS
Brainstorming: (9:25-9:35)	**You do alone:** After placing the students into their groups allow for time of exploration and brainstorming individually- they touch the materials to see how they work- see how the dominos fall- how the different materials can bend or be set up-

	Begin designing the blueprint- provide students with a plain piece of paper and pencil - Students will be given time to brainstorm what they think a machine would look like-rough sketch

Groups: (9:45-9:50)	**You do together**:
	
	Split students into groups of 3 or 4 (depending on class size)
	- Students bring all of their supplies and stuff to their new area
	
	- Once seated: "What makes a good team?"
	  - Allow for students to answer
	  - Looking for concepts of listening, respecting and be kind of others ideas
	  - Provide different problem solving techniques:
	  - "I like this part of your idea, but I think we should add this too…"
	  - "It is okay to ask for help"
	  - "Don't say something, that you wouldn't want to said you"
	
	1. Begin blueprint- Where the marble will begin and label what simple machines you will be using
	2. Raise hand and wait for approval from staff (just so that the group has a general idea of what is going to happen)
	3. Once approved- students may begin construction of the machine

Wrap up and send off (9:50-9:55)	**We do together**: - Clean up: Leave constructed items on the white poster board - All materials not being used need to be placed in a red solo cup- It doesn't have to look pretty, just put away nicely :) - Make sure marbles are given back to the teacher and scissors are returned to the proper spot. Students must sit with their group when entering the classroom tomorrow!

DAY 3:

Essential Question: How do people use simple machines to solve problems?

Content objective: Students will be able to brainstorm a Rube Goldberg machine using 3 out of 6 simple machines.

Language Objective: Students will collaborate with a group to design Rube Goldberg machine

Academic Language:

- Inclined plane
- Level
- Pulley
- Wheel and Axle
- Wedge
- Screw
- Design
- Revise
- Collaborate

Introduction (9:00-9:07)	**Before students arrive:** Have videos read and powerpoint on the smartboard **I do** While entering the classroom remind students to sit at their group table Review student names! Review of student expectations - Anything noticed from the day before - Be smart - Be kind - Be safe *If needed an overview of team work expectations **
Chain reaction (9:07-9:10)	**You do alone**: https://www.youtube.com/watch?v=Hmb0Q0Q_7jo While watching the video prompt the student with a range of questions: - Do you think the people who built this machine were able to do it right the first time ? - What do you think will happen if one thing goes wrong or is a little off? - Do you think they had to revise their plan?

Example of Marble ride: (9:10-9:20)	**We do**: Put dominos on a tape that are too far part- attempt to have a domino fall- Prompt students in design process and problem solving - "What do you think we need to change?" - "How could we revise our model to try and make it work?" - "Should we test it again or just give up?" *Allow the student's to collaborate with others around them Video as inspiration if time allows: (Connects back with the different angles of inclined planes) https://www.youtube.com/watch?v=LYJFgapz_5U
Work time (9:20-9:50)	**You do together**: Allow for students to work in groups - Set a 3 minute timer on your watch to curriculate throughout the groups - If students are stuck - "Let's think through the six simple machines and our materials to see what we can change to help solve our problem" - "How about we think through where our marble starts and how you think it could end" 7 minutes of clean up - Clean up: Leave constructed items on the white poster board - All materials not being used need to be placed in a red solo cup- It doesn't have to look pretty, just put away nicely :) - Make sure marbles are given back to the teacher and scissors are returned to the proper spot.
Wrap up and send off (9:50-9:55)	**We do together:** Demonstration of the marble challenge - Students will be given a short amount of time to put final finishing on their models - A short presentation will be given with what materials you used

DAY 4:

Essential Question: How do people use simple machines to solve problems?
Content objective: Students will collaborate with their groups and present what materials and simple machines used in their model
Language Objective: Students will present their model to the class verbalizing their thought process
Academic Language:

- Inclined plane
- Level
- Pulley
- Wheel and Axle
- Wedge
- Screw
- Design
- Revise
- Collaborate
- Materials

Introduction (9:00-9:07)	**Before students arrive:** Have totes or signs where students will put their materials when finished **I do:** Review of names and expectations for the day: - Students must work in their own area as a group - Be Smart - Be safe - Have fun *If you can't get your machine to work, it's okay! We are just trying to combine machines- think about what you could do in order to revise and improve your machine"
Work time: (9:10-9:30)	**You do together**: Students will be given 15 minutes of work time: construction and attempting the marble drop Students will be able to put final touches upon their piece. If they are finished-try to increase speed With 5 minutes remaining in work time: - Remind the students that they will have to explain the simple machines they used - If their machine is not finished- Student will discuss what

	they would have done
Demonstration day! (9:30-9:45)	**We do together**: Groups will take turns rotating throughout the classroom seeing the different groups: Students will Explain: - For extra reference 1: simple machines that are used 2: What materials were used ● If this machine didn't work or isn't finished-what would they want to do ● What materials would they want to add
Teardown (9:45-9:50)	**You do togethe**r: -All of the "Stem village" materials need to be placed back in their labeled bins Anything that can be recycled should be placed in the recycling - If a toilet paper roll is still intact REUSE Anything that should be thrown away should be placed in the trash NOT on the floor *Leave the room better then you came* If extra time allows: go for a walk outside and have the students try and find all 6 simple machines in their everyday life! - Review of outside expectations - Stay where a teacher can see you - Make sure you are using your walking feet in the hallway - Inside voice in the hallway (other students are learning) - Stay on the sidewalk unless told otherwise - Make safe and respectful choices :) - Come back to the classroom with about 10 minutes left (enough time to get the students settled and work on the exit ticket)
Exit Ticket 9:50-9:55	**You do alone**: Hand out pencils and exit tickets *When the students are finished they may doodle on the back of the 6 simple machines* What is your favorite simple machine? Name one simple machine you see in everyday lives? Was your marble fall successful? - If not, what could you have changed?

	When it is time to leave: Have them line up at the door after handing the exit ticket to the line leader :) When leaving from the cafeteria make sure to say something to the students even better if you are able to state their name!