

Lesson Title: Air Time! Mathematical Slopes

Grade Level: 8th grade

Subject: Math

Time frame: 170 minutes (3 or 4 class periods)

Learning Goals

Learning Goals	Goal 1	How will they be met
Content Specific Goals	<p>CCSS.MATH.CONTENT.8.EE.B.5: Graph proportional relationships, interpreting the unit rate as the slope of the graph. Compare two different proportional relationships represented in different ways. For example, compare a distance-time graph to a distance-time equation to determine which of two moving objects has greater speed.</p> <p>CCSS.MATH.CONTENT.8.EE.B.6: Use similar triangles to explain why the slope m is the same between any two distinct points on a non-vertical line in the coordinate plane; derive the equation $y = mx$ for a line through the origin and the equation $y = mx + b$ for a line intercepting the vertical axis at b.</p>	<ul style="list-style-type: none">✓ Students will watch and reflect on a BrainPop video to understand how to calculate slope (they will use prior knowledge of calculating speed and distance as well).✓ Students will graph and calculate (in Collabrify Flipbook) the slope of half pipes and predict the speed, distance and airtime.✓ Students will calculate the slope of half pipes at different places on the non-linear axis to understand that slope m is in fact the same at any space.✓ Students will research and design a skate boarding half pipe based on a specific air time and distance criteria.
Technology-based Goals (NETS-S)	<p>Empowered Learner: Students leverage technology to take an active role in choosing, achieving and demonstrating competency in their learning goals, informed by the learning sciences.</p>	<p>EL & KC & ID-Students will use the Internet to gather information to design and build their own half pipe</p> <p>EL & KC & ID-Students will use a camera to capture half pipe images and video to construct their knowledge of the</p>

<input checked="" type="checkbox"/> Empowered Learner <input type="checkbox"/> Digital Citizen <input checked="" type="checkbox"/> Knowledge Constructor <input checked="" type="checkbox"/> Innovative Designer <input type="checkbox"/> Computational Thinker <input type="checkbox"/> Creative Communicator <input checked="" type="checkbox"/> Global Collaborator	<p>Knowledge Constructor: Students critically curate a variety of resources using digital tools to construct knowledge, produce creative artifacts and make meaningful learning experiences for themselves and others.</p> <p>Innovative Designer: Students use a variety of technologies within a design process to identify and solve problems by creating new, useful or imaginative solutions.</p> <p>Global Collaborator: Students use digital tools to broaden their perspectives and enrich their learning by collaborating with others and working effectively in teams locally and globally.</p>	<p>relationship between slope, distance, and speed.</p> <p>GC-Students will use Collabrify Flipbook to connect with other students, the teacher and an expert engineer around their half pipe design.</p>
<p>Other Goals</p>	<p>Learn how to perform at least 2 Skateboarding tricks http://www.exploratorium.edu/skateboarding/largeglossary.html</p>	<p>Students will use their newly built half pipe to try a few tricks!</p>

Materials Needed for Lesson (tech and non-tech)	Brain Pop (https://www.brainpop.com/math/algebra/slopeandintercept/) Collabrify Flipbook Software (free) http://www.imlc.io/apps Camera (still and video) Google Customized Search Engine https://cse.google.com Materials such as Wood and tools to construct a half pipe
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Lesson Overview

Lesson Overview: Share how the activities in the lesson will help to meet the learning goals. How will technology play a role in meeting the learning goals?

In order to understand slopes in everyday life and their relation to speed and distance. Students will learn how to calculate the slope of a skateboarding half pipe and create their own half pipe according to specific criteria on slope, speed and distance. The students already know how to calculate speed and distance, but not slope. The students will begin the lesson by watching a short video of skateboarder Tony Hawk. The teacher will start and stop the video as he is just about to exit the half pipe and the teacher will ask student's to predict how much air time he will get as he comes off the half pipe. They will do this with three or four different Tony Hawk videos. They will begin to see how slopes are related to speed, slope and distance. Next, the students will watch a short video from Brain Pop to learn how to calculate slope. While watching the video, the students will each take notes on the Collabrify Flipbook app to show how they understand slope calculation. The students will then take a field trip to the local skateboarding park, where they will take pictures of half pipes and calculate the slopes. They will make predictions based on their calculations as to which half pipes will provide the most air time and speed. Finally, they will videotape themselves going down the half pipes and calculate the airtime and speed by watching the recording. They will capture all their work in the Collabrify Flipbook app. Next the students will use pre-determined Internet websites (created by the teacher using Google Customized Search Engines) to research and build their own skate boarding half pipe. They will post their research on a private Collabrify Flipbook where an Engineer from the University of Michigan will weigh in to give them advice on their research and design ideas. They will build the half pipe (to a create a predetermined level of airtime and speed). Once built, the students will test their half pipe by measuring their own airtime and speed on their new creation. In addition, the students will learn at least two new tricks.

Triple E Framework Considerations

Share which technology tools you plan to integrate into the lesson. Describe how each tool will help to meet your learning goals. In addition, share the instructional practices that you plan to develop in conjunction with the tool to optimize the learning.

Name of Tool	Tool #1	Tool #2	Tool #3	Tool #4
Learning goal(s) met by using the Tool	Brainpop Website Students will watch the video on how to calculate slope via skateboarding half pipes. They will do the activities associated with the video. As a reflective practice, they will be taking notes on a Collabrify Flipbook to show their understanding of what they are learning in the video. This activity will help them understand how to calculate slope. By using a video, the students can self-pace, and there are	Still and Video Camera Students will take pictures of the half pipes at the skate park in order to use a ruler or draw on them to calculate the slope. They will also be able to predict the airtime and speed that their chosen team member will end up going down the half pipe. They will meet both their math learning goals by calculating not only the slope, but also being able to determine that the slope m is the	Internet Search Engines (Google Customized Search Engine) The students will use the customized search engine (created by the teacher to pre-select websites that are authoritative and on-task) to research how to create a half pipe and how to make it according to the air time and speed specifications that the teacher sets.	Collabrify Flipbook Collabrify Flipbook will be used throughout this lesson. First as a reflective tool for individually taking notes as the students watch the BrainPop video. The reason why Collabrify Flipbook is used is so that the teacher can weigh in and comment as the students are taking notes and sketching out their mathematical

	<p>no games or rewards at the end of the video to distract the student from the learning goals.</p>	<p>same at each point along the slope on the non-vertical line. They will use the video camera to take video of their team members going down the half pipe. They will calculate the air time and speed. They will compare how close they were in their speed and airtime calculation. They will also be able to make inferences about the different angles of a slope and speed/airtime.</p>		<p>formulas. This will allow the teacher to synchronously monitor the student learning and co-engage in the learning process with the students as they demonstrate how to calculate slope from the video. It would be much more difficult to collect individual notes on paper.</p> <p>The students will share their research on a Collabrify Flipbook, this will help them collaborate with their team members but also it will allow an expert from the University of Michigan to weigh in on their work as they are working (as well as the teacher).</p>
<p>How is the Tool Being Integrated Team, individual, pairs, or other?</p>	<p>Individual</p>	<p>Teams</p>	<p>Teams</p>	<p>Teams</p>

<p>What features of the technology tool have elements of engagement? Active learning Time on Task Co-Use or Co-Engagement</p>	<p>There are few engaging pieces built into this software. It is mostly a video they watch with a few drill and practice questions. The teacher will give a software tour of how to navigate and think when using the video and completing the activities. The teacher will periodically stop and ask students to share-aloud their learning. Finally, each student's will be taking notes and reflecting on their learning in their own Collabrify Flipbook that the teacher will be monitoring and weighing in on as needed.</p>	<p>There are few engaging pieces built into the tool. The teacher will need to model "how to" think about capturing the slope so that it can be measured in a picture as well as on video. The teacher can do this through an I do, We do, You do approach at the skate park. The students will be co-using the cameras in teams. The teams will be reporting and sharing their work and conclusions via the team Collabrify Flipbook.</p>	<p>There are few engaging pieces built into the tool. The teacher will show the teams how to navigate the search engine and ask them to brainstorm as a group what they should be looking for. The teacher will develop a mentor text Collabrify Flipbook so they can understand how to begin to organize their thinking. Periodically the teacher should ask the teams to share what they are learning and their progress with the other teams. The students will be co-constructing knowledge together in their teams.</p>	<p>Collabrify Flipbook has real time collaboration built into it. Beyond using text, Collabrify Flipbook allows students to draw and sketch out ideas and the software is made for synchronous collaborative use, thus other students, teachers and experts can also type and draw on the document in real time. In addition, it has few distractions from the text of the document. The students will also either be co-using the document by working in teams or connecting with the teacher or an expert engineer through Collabrify Flipbook sharing options.</p>
<p>Which teaching moves could be integrated to aid technology in helping students engage in the learning goals?</p>	<p><input type="checkbox"/> Guided practice <input checked="" type="checkbox"/> Modeling thinking <input checked="" type="checkbox"/> Modeling navigation of</p>	<p><input type="checkbox"/> Guided practice <input checked="" type="checkbox"/> Modeling thinking <input type="checkbox"/> Modeling navigation</p>	<p><input checked="" type="checkbox"/> Guided practice <input type="checkbox"/> Modeling thinking <input type="checkbox"/> Modeling navigation of</p>	<p><input type="checkbox"/> Guided practice <input type="checkbox"/> Modeling thinking <input type="checkbox"/> Modeling</p>

	<p>the tool</p> <ul style="list-style-type: none"> <input checked="" type="checkbox"/> Software tour <input type="checkbox"/> I do, we do, you do <input checked="" type="checkbox"/> Teacher monitoring <input checked="" type="checkbox"/> Student self-reflective monitoring <input type="checkbox"/> Co-use or co-engagement <input type="checkbox"/> Purposeful partnering <input type="checkbox"/> Gradual release of learning <input type="checkbox"/> Create a mentor text <input checked="" type="checkbox"/> Share-aloud <input type="checkbox"/> Turn and talk <input type="checkbox"/> Switcheroo <input type="checkbox"/> Other 	<p>of the tool</p> <ul style="list-style-type: none"> <input type="checkbox"/> Software tour <input checked="" type="checkbox"/> I do, we do, you do <input checked="" type="checkbox"/> Teacher monitoring <input type="checkbox"/> Student self-reflective monitoring <input checked="" type="checkbox"/> Co-use or co-engagement <input type="checkbox"/> Purposeful partnering <input type="checkbox"/> Gradual release of learning <input checked="" type="checkbox"/> Create a mentor text <input type="checkbox"/> Share-aloud <input type="checkbox"/> Turn and talk <input type="checkbox"/> Switcheroo <input type="checkbox"/> Other 	<p>the tool</p> <ul style="list-style-type: none"> <input type="checkbox"/> Software tour <input type="checkbox"/> I do, we do, you do <input type="checkbox"/> Teacher monitoring <input type="checkbox"/> Student self-reflective monitoring <input checked="" type="checkbox"/> Co-use or co-engagement <input type="checkbox"/> Purposeful partnering <input type="checkbox"/> Gradual release of learning <input checked="" type="checkbox"/> Create a mentor text <input checked="" type="checkbox"/> Share-aloud <input type="checkbox"/> Turn and talk <input type="checkbox"/> Switcheroo <input type="checkbox"/> Other 	<p>navigation of the tool</p> <ul style="list-style-type: none"> <input type="checkbox"/> Software tour <input type="checkbox"/> I do, we do, you do do <input type="checkbox"/> Teacher monitoring <input type="checkbox"/> Student self-reflective monitoring <input checked="" type="checkbox"/> Co-use or co-engagement <input type="checkbox"/> Purposeful partnering <input type="checkbox"/> Gradual release of learning <input type="checkbox"/> Create a mentor text text <input type="checkbox"/> Share-aloud <input type="checkbox"/> Turn and talk <input checked="" type="checkbox"/> Switcheroo
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				<input type="checkbox"/> Other
<p>What features of the technology tool include elements to enhance student learning?</p> <ul style="list-style-type: none"> ✓ Higher-order thinking ✓ Supports/Scaffolds ✓ Differentiation/Personalization ✓ Help students develop a deeper understanding of content ✓ Easier and more effective than traditional tools 	<p>The video allows students to have a visual of what they will be measuring at the skate park. It also permits students to start and stop the video so they can work at their own pace as they analyze the relationship between the half pipe and slopes. This could allow for differentiation of learning.</p>	<p>The value-added of the camera is that it captures the video in the moment and will allow for playback so that the speed can be measured. In addition, the still images of the slope make the slope easier to measure as a 2 dimensional object.</p>	<p>The customized search engine provides options for students of different learning and reading levels to get similar information. They will be able to learn how to construct their half pipe by using the Internet resources.</p>	<p>Collabrify Flipbook allows for students to collaborate with other students in the class, the teacher and an expert through the tool. Collabrify Flipbook also works in conjunction with the other Collabrify suite of tools (maps, writer, spreadsheets...etc) so that students can use the tool that best helps them co-construct ideas. All of the tools have collaboration built into them.</p>

<p>Which teaching moves could be integrated to aid technology in enhancing the learning goals?</p>	<input type="checkbox"/> Active listening <input type="checkbox"/> Switcheroo <input type="checkbox"/> Self reflective practices <input type="checkbox"/> Visible thinking routines <input type="checkbox"/> Graphic organizers <input type="checkbox"/> Visual representations of learning <input type="checkbox"/> Reflective notebooks <input type="checkbox"/> Anticipation guides <input type="checkbox"/> Questioning practices <input type="checkbox"/> Predicting <input checked="" type="checkbox"/> Differentiation <input type="checkbox"/> Personalization	<input type="checkbox"/> Active listening <input type="checkbox"/> Switcheroo <input type="checkbox"/> Self reflective practices <input type="checkbox"/> Visible thinking routines <input type="checkbox"/> Graphic organizers <input type="checkbox"/> Visual representations of learning <input type="checkbox"/> Reflective notebooks <input checked="" type="checkbox"/> Anticipation guides <input type="checkbox"/> Questioning practices <input checked="" type="checkbox"/> Predicting <input type="checkbox"/> Differentiation	<input type="checkbox"/> Active listening <input type="checkbox"/> Switcheroo <input type="checkbox"/> Self reflective practices <input type="checkbox"/> Visible thinking routines <input checked="" type="checkbox"/> Graphic organizers <input type="checkbox"/> Visual representations of learning <input checked="" type="checkbox"/> Reflective notebooks <input type="checkbox"/> Anticipation guides <input type="checkbox"/> Questioning practices <input type="checkbox"/> Predicting <input checked="" type="checkbox"/> Differentiation <input type="checkbox"/> Personalization	<input type="checkbox"/> Active listening <input type="checkbox"/> Switcheroo <input type="checkbox"/> Self reflective practices <input type="checkbox"/> Visible thinking routines <input type="checkbox"/> Graphic organizers <input type="checkbox"/> Visual representations of learning <input type="checkbox"/> Reflective notebooks <input type="checkbox"/> Anticipation guides <input type="checkbox"/> Questioning

	<input checked="" type="checkbox"/> Share-aloud <input type="checkbox"/> Other	<input type="checkbox"/> Personalization <input type="checkbox"/> Share-aloud <input type="checkbox"/> Other	<input checked="" type="checkbox"/> Share-aloud <input type="checkbox"/> Other	practices <input type="checkbox"/> Predicting <input type="checkbox"/> Differentiation <input type="checkbox"/> Personalization <input type="checkbox"/> Share-aloud <input type="checkbox"/> Other
How does the technology extend the learning goals? <ul style="list-style-type: none"> ✓ Make learning accessible 24/7 ✓ Bridge learning goals to everyday life ✓ Soft skills 	While the video is discussing how to measure slope based on a half pipe, it is a cartoon and not very authentic.	The camera allows students to capture skate boarding in real life and slow it down so that they can measure the authentic example.	The custom Google search engine does not organically extend learning. However, there are some soft skills that come into play, including students using their inquiry skills to ask questions and gather evidence from authoritative resources to provide evidence for how to properly construct their half pipe.	Collablify Flipbook allows students to connect with an expert on engineering and construction. They are able to engage in authentic discuss through Collablify Flipbook about their construction of their half pipe.
Which teaching moves could be integrated to aid	<input checked="" type="checkbox"/> Real world issues	<input checked="" type="checkbox"/> Real world issues	<input checked="" type="checkbox"/> Real world issues	<input checked="" type="checkbox"/> Real world issues

<p>technology in extending the learning goals?</p>	<p><input type="checkbox"/> Partner with real world organizations</p> <p><input type="checkbox"/> Connect with authentic experts</p> <p><input type="checkbox"/> Engage students in authentic discourse with others</p> <p><input type="checkbox"/> Pen Pals</p> <p><input type="checkbox"/> Student's investigate and direct their own project</p> <p><input type="checkbox"/> Role playing</p> <p><input type="checkbox"/> Use authentic tools that are prominent in everyday life</p> <p><input type="checkbox"/> Other</p>	<p><input type="checkbox"/> Partner with real world organizations</p> <p><input type="checkbox"/> Connect with authentic experts</p> <p><input type="checkbox"/> Engage students in authentic discourse with others</p> <p><input type="checkbox"/> Pen Pals</p> <p><input type="checkbox"/> Student's investigate and direct their own project</p> <p><input type="checkbox"/> Role playing</p> <p><input checked="" type="checkbox"/> Use authentic tools that are prominent in everyday life</p> <p><input type="checkbox"/> Other</p>	<p><input type="checkbox"/> Partner with real world organizations</p> <p><input type="checkbox"/> Connect with authentic experts</p> <p><input type="checkbox"/> Engage students in authentic discourse with others</p> <p><input type="checkbox"/> Pen Pals</p> <p><input checked="" type="checkbox"/> Student's investigate and direct their own project</p> <p><input type="checkbox"/> Role playing</p> <p><input type="checkbox"/> Use authentic tools that are prominent in everyday life</p> <p><input type="checkbox"/> Other</p>	<p><input type="checkbox"/> Partner with real world organizations</p> <p><input checked="" type="checkbox"/> Connect with authentic experts</p> <p><input checked="" type="checkbox"/> Engage students in authentic discourse with others</p> <p><input type="checkbox"/> Pen Pals</p> <p><input type="checkbox"/> Student's investigate and direct their own project</p> <p><input type="checkbox"/> Role playing</p> <p><input type="checkbox"/> Use authentic tools that are prominent in everyday life</p> <p><input type="checkbox"/> Other</p>
<p>Lesson set up. How will I prepare for this piece of technology in this</p>	<p>Student accounts should be pre-set up in BrainPop, so they can easily login and get started without</p>	<p>Make certain that each team has a camera that can capture stills and at least 30 seconds of video.</p>	<p>Teacher should set up the Google custom search engine and tiny the URL so the link is easy for the</p>	<p>Google Accounts should be set up (Collabrify Flipbook works with Google)</p>

<p>lesson?</p> <p>What do I need to do to get the technology ready?</p> <ul style="list-style-type: none"> ✓ Selecting the just right tool or part of the resource ✓ Setting up Accounts ✓ Differentiating ✓ Personalizing ✓ Creating models or mentor 	<p>distraction.</p> <p>The teacher may want to pre-plan a note-taking template for the video (at least for students who may need this support).</p>		<p>students to access.</p>	<p>The expert engineer should know how to connect with the student teams.</p>
<p>Assessment</p> <p>How will you assess the activities happening through the tool?</p> <ul style="list-style-type: none"> ✓ Monitoring/observations ✓ Formative assessment ✓ Informal assessments ✓ Summative assessment 	<p>Students' will be assessed via monitoring by the teacher as they are watching the video. In addition, they teacher will ask the students to take notes via Collabrify Flipbook and share the notes with the teacher. The teacher can monitor the note-taking to make certain they are understanding how to properly calculate slope.</p>	<p>The teacher will be observing and monitoring the team's activities with the camera. In addition, each team will post their findings on their collaborative Collabrify Flipbook that the teacher can see and monitor as they are posting. The teacher can give feedback via the Collabrify Flipbook.</p>	<p>The teacher and an engineer will be observing and monitoring the team's activities and research choices in Collabrify Flipbook. In addition, the teacher will be evaluating the final half pipe that the students to constructed and test to see if it met the assignment criteria.</p>	<p>The teacher and an engineer will be observing and monitoring the team's activities in Collabrify Flipbook. In addition, the teacher will be evaluating the final half pipe that the students to constructed and test to see if it met the assignment criteria.</p>

Procedures

What is the minute-to-minute activity that will be happening in the lesson. Describe what the teacher is going to do and say, as well as what the students are going to do.

Time stamp and what is the teacher going to do	What are the students going to do?	What is the teacher going to say?
<p>0-5 Minutes: Teacher will introduce the project with a video of Tony Hawk</p> <p>5-7 Minutes: Teacher shows how to use BrainPop (modeling thinking and a “we do”)</p> <p>7-25 Minutes: Teacher will circulate and monitor</p>	<p>Students will watch the Tony Hawk Videos and make predictions, answer teacher’s questions from direct instruction.</p> <p>Students will watch the teacher model and participate in the “we do”</p> <p>Students get out laptops and begin to use</p>	<p>“Today we are going to learn how to become Tony Hawk! Watch this video and when I stop it, I want you to predict how much air time , in seconds, Tony will get.” Ask probing questions...”why did you predict that?” “How does the half pipe play a role in your prediction?” “You are going to have a chance to build your own skate boarding half pipe!</p> <p>“Eyes on me as I show you how to login to BrainPop. Once you login you will click on the slope video. You will watch this video. As you watch I want you to take notes of how to find the slope of a half pipe. As you watch the video, you will be using Collabrify Flipbook to sketch out your ideas on how to calculate slope of a half pipe. For example, as I watch this scene I notice that the half pipe seems to have a steep slope, I am going to write that down in my Flipbook notes. I am going to count the seconds that it takes the skateboarder to come down from the air. Let’s count that together. It says that he went 5 feet. What did everyone get for the air time? How can we calculate the speed of how fast he went in the air? Good. Now the trick is going to be figuring out the slope. That is your task. As you watch the video, write down the equation you need to know in Flipbook. You can rewind the video or pause it. There is no rush getting through the video. I will be monitoring your work in Flipbook. After you think you understand how to calculate the slope, try the practice quiz.”</p> <p>“Now it is your turn, please get a laptop and login to BrainPop and Collabrify Flipbook. Please share your Flipbook with me so I can</p>

<p>the students as they are using BrainPop. They will also be using their iPad to see the individual student's work in Flipbook.</p> <p>25-30 Minutes: Teacher will ask students to participate in a Share-aloud</p> <p>30-40 Minutes: Teacher continues to circulate and periodically sits down with students as they work.</p> <p>40-45 Minutes: Teacher will ask students to participate in a Turn and Talk.</p> <p>45-55 Minutes: Teacher places students in teams and asks them to prepare for their field trip to the</p>	<p>the BrainPop Website at their own pace</p> <p>Students will share what they have learned thus far about calculating slope.</p> <p>Students will continue to work on understanding Slope via the Brainpop video and activities on the website. They continue to share ideas in Flipbook.</p> <p>Students will find a partner and share what they have learned about calculating slope on a half pipe. A couple pairs will be asked to share out.</p> <p>Students will get in their pre-determined teams, set up their Collabrify Flipbook for the team, share it with everyone. They will make a plan for each team member to</p>	<p>monitor your work. Begin watching the video at your own pace. I will walk around to help and check in on your work.”</p> <p>“Hands off computers and eyes on me. I want you to look at your notes for 30 seconds. I want you to find two things to share that you have learned about calculating slope.”</p> <p>“Hands off computers and eyes on me. I want you to look at your notes for 30 seconds. I want you to find a partner from your pre-assigned team and share how you know how to calculate slope on a half pipe.” “I will ask two teams to share out loud what they know.”</p> <p>“Now it is time to get into your teams of 4. Please take a minute and give everyone a role from the list on the board. Then set up your Flipbook for the team and share it with me. Decide on whose cell phone camera you will use. It needs to be able to take a still picture and capture at least 30 seconds of video at a time. Your plan should be</p>
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<p>Skate Park the next day</p> <p>DAY 2 (at Skate Park)</p> <p>0-5 Minutes: Students are placed in teams and teacher explains the procedures for the day.</p> <p>5-10 Minutes: Teacher models through guided practice how to use cameras to capture slope. And then how to calculate the slope from the image. Teacher used “I do, We do, You do” to work with students on creating a mentor text sample of what the students will create.</p> <p>10-35 Minutes: Teacher will monitor teams as they document their learning in Flipbook and circulate as teams are working at the Skate park</p>	<p>have a role at the skate park the next day (note taker, camera person, measurer, double-checker)</p> <p>Student will gather in their teams with their mobile devices. They should have one camera and one or two devices to document the experience with Collabrify Flipbook. They will listen to the instructions and watch the guided practice model by the teacher.</p> <p>Students take pictures of three half pipes and calculate the slopes. They then make predictions on which ones will have the most air time and speed. They will document their learning in Flipbook.</p>	<p>documented in your Flipbook.”</p> <p>“Please get into your teams. Eyes on me as I show you how to use your camera to capture the image of a half pipe so you can calculate the slope. You can select any of the half pipes here at the skate park. I am going to take a picture at the side angle so I can see the slope. I want everyone to come take a look at what I mean. Now I am putting the picture into Flipbook and I will sketch out how to calculate the slope here in Flipbook. I will find the Rise and the Run. Now that I have found the slope, I will try to estimate the distance, speed and air time that my chosen team member will get when he or she actually goes down the half pipe. This is a prediction, but to make a good prediction I need to think about the slope and how it will play a role in my prediction. My slope is pretty steep...what does that mean?” Student’s answer. “How can it help me determine my prediction?” Student’s answer. Now let’s do one together.” Students and teacher will work on one together. “Alright now it is your turn, please make sure to document everything in Flipbook, I will be monitoring your work in there.”</p>
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<p>35-45 Minutes: The teacher models how to use the video camera to video tape someone going down the half pipe and how to use that video to calculate speed, distance and time.</p> <p>45-55 Minutes: Teacher will monitor teams as they document their learning in Flipbook and circulate as teams are working at the Skate park</p> <p>55-60 Minutes: Teacher asks students to pause and turn and talk to reflect on what they are learning about the relationship between slope, speed, and distance.</p>	<p>Students watch the teacher model how to calculate the speed, time and distance by having someone do the half pipe.</p> <p>Students take videos of one team member going down each slope. Students then use the videos to calculate the air time and speed. They compare and contrast them, trying to understand how slope plays a role.</p> <p>Students reflect in their teams with a turn and talk and then as a share-aloud with the whole group.</p>	<p>“Now I need a volunteer to skate down my chosen half pipe while I video tape. Remember we predicted that the air time would be 4 seconds and the distance would be 5 feet. Let’s see how accurate we are. I am going to make sure I get the person the edge of the half pipe and the landing spot so I am doing a long shot. As our student goes down the half pipe, I want everyone to count how long they are on the ramp and how long they are in the air.” Now the student goes down the half pipe while the teacher video tapes. “What did everyone get?” “So the air time was 2 seconds and the distance was 3 feet when we measure it in real time on the ground. So what is the speed? How do we calculate that?” Students share answers and they do it together. They re-watch the video to double-check their work.</p> <p>“Now please take a minute to turn and talk with someone in a different team about what you know about slope, speed and distance. Also, what you still wonder about slope, speed and distance. Finally, share how this will impact the building of your own half pipe.”</p>
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<p>DAY 3: In Classroom</p> <p>0-3 Minutes: Teacher introduces the goal for the day. Teacher reviews what they learned about slope in the previous two classes.</p> <p>3-5 Minutes: Teacher models how to use the Custom Search Engine</p> <p>5-20 Minutes: Teacher monitors work by circulating and checking work via Flipbook.</p> <p>20-30 Minutes: Teacher asks teams to do a Switcheroo</p> <p>30-50 Minutes: Teacher monitors work by</p>	<p>Students listen to teacher as they review the goals for the day.</p> <p>Teams work together to research how to build a half pipe. They post their findings on Flipbook.</p> <p>Teams each share their Flipbook with another team and begin to comment and give feedback on the other team's work.</p> <p>Teams work together to research how to build a half pipe. They post their findings</p>	<p>“Today we are going to start working on your research to build your half pipe. Remember that you need to build a half pipe that allows your chosen teammate to have at least 2 seconds of airtime but no more than 5 seconds. In addition, you need to make sure you go at least 2 feet. You will be using the Custom Search engine I created to do all your research. Before starting your research, I want your team to brainstorm the important keywords that you need to use in order to refine your search. This brainstorm should be reflected in your Flipbook. When you use the custom search engine, you will need to put quotes around connecting words such as “half pipe” or “slope intercept”. You need to come up with materials to build your half pipe and determine the slope of your half pipe (provide evidence that this slope will meet the criteria).” I will be monitoring your work in Flipbook.”</p> <p>“Time for a switcheroo. Please share your Flipbook with the team to your right. Give comments on their resources that they have found, the materials they are selecting, and how they are determining the slope. Saying “good job” is not helpful feedback. Helpful feedback is asking probing questions or suggesting other resources.”</p>
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<p>circulating and checking work via Flipbook.</p> <p>50-55 Minutes: Teacher tells teams how to share their research with the engineer expert.</p> <p>55-60 Minutes: Teacher will share the building process. Teams will have one week to build their Half Pipe and demonstrate it the next week in class (if time, they could build during the next class and bring in materials). Teacher will share the rubric that will be used to assess their projects.</p>	<p>on Flipbook.</p> <p>Teams work together to research how to build a half pipe. They post their findings on Flipbook.</p>	<p>“Please share your research and two questions that you would like them to respond to with our expert...engingeertom@umich.edu. Dr. Russell will weigh in to your work over the next week.”</p>
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