

Lesson Plan Template

Grade: 1st		Subject: Science	
Materials: Straws, rulers, foil, tissue paper, pipe cleaners, tape, glue, popsicle sticks, scissors, string,		Technology Needed:	
Instructional Strategies: € Direct instruction € Peer teaching/collaboration/ € Guided practice perative learning € Socratic Seminar € Visuals/Graphic organizers € Learning Centers € PBL € Lecture € Discussion/Debate € Technology integration € Modeling € Other (list)		Guided Practices and Concrete Application: € Large group activity € Hands-on € Independent activity € Technology integration € Pairing/collaboration € Imitation/Repeat/Mimic € Simulations/Scenarios € Other (list)	
Standard(s) Develop a simple sketch, drawing, or physical model to illustrate how the shape of an object helps it function as needed to solve a given problem. Analyze data from tests of two objects designed to solve the same problem to compare the strengths and weaknesses of how each performs.		Differentiation Below Proficiency: Students who are below proficiency will still be able to participate in all activities. These students will be able to construct their own drawings and still share their ideas. They will receive extra teacher support. They will be paired together so that they have more opportunities and time to think and put their ideas into practice. Above Proficiency: These students will have the potential to redesign and improve their models to their greatest capacity. They will not be held to limitations or close-ended questioning. They will be challenged to create a sleigh that goes farther each time and will be asked about why it goes farther. Approaching/Emerging Proficiency: This lesson is catered towards these students. Modalities/Learning Preferences: Tactile, Kinesthetic, Interpersonal, Visual, Spatial, Analytical	
Objective(s) By the end of the lesson, students will demonstrate their understanding of how shape affects function by designing and creating sleighs that travel down a ramp and revising their shape with different materials to make them go farther. By the end of the lesson, students will compare the strengths and weaknesses of each others' sleighs as well as their own sleighs as they improve them and redesign them. Bloom's Taxonomy Cognitive Level: Create			
Classroom Management- (grouping(s), movement/transitions, etc.) The students will begin on the carpet. Then they will move to their desks with their partners to work. They will go to the ramp to test out their sleighs. They will have freedom of movement within the classroom until the review when they clean up and look at the other students' work.		Behavior Expectations- (systems, strategies, procedures specific to the lesson, rules and expectations, etc.) Students will raise hands to speak when the teacher is talking. Students will participate in all activities, students will work together well in pairs and take turns sharing ideas. Students will listen to each other and to the teacher. Students will quickly follow all directions. Students will respond to all call and responses.	
Minutes	Procedures		
10	Set-up/Prep: Get out all materials, pull up powerpoint with videos, pair up students,		
5	Engage: (opening activity/ anticipatory Set – access prior learning / stimulate interest /generate questions, etc.) “Today we are going to be Engineers! Does anyone know what an engineer does? Engineers work together to solve problems. They invent things that help change the world and save lives. They help design buildings, roller coasters, etc. (I will show pictures on the powerpoint that show some things that engineers do).” https://docs.google.com/presentation/d/1QWKUJ71xTmKy4GjSMts4rwAHI0Pxdxb0gT-L2sAgY6c/edit#slide=id.p “Engineers follow a process called the engineering design process. Repeat that after me. (Show powerpoint slide) First, they ask, find a problem. Then, they think (brainstorm) possible solutions, then they plan, they draw a picture of how they could solve the problem, then, they create. They build a model and test it. Finally, they improve, they make their design better. We are going to use the engineering design process today to solve a problem!”		

Lesson Plan Template

10	<p>Explain: (concepts, procedures, vocabulary, etc.)</p> <p>“So today, we are going to work together to solve a problem. Are you ready to see what the problem is? Your challenge is to build a new sleigh for Santa! Can you build a sleigh that will go down a ramp and travel the farthest? You will have a bunch of different materials including popsicle sticks, pipe cleaners, tape, glue, etc. Before we get to building, does anyone know what a ramp is? Let’s watch a video to find out.”</p> <p>I will play one part of a video that explain ramps and inclined planes. I will pause the videos at various spots to discuss with students so they do not get lost in the video.</p> <p>Key points from the video:</p> <p>A ramp is something long and flat with one end higher than the other (I will show the students the ramp that they will be using) Some ramps are steeper and some are less steep (Change the tilt on the ramp to show)</p> <p>Machines help us do work (Simple machines)</p> <p>Ramps can be used to push things up it or pull things down it. Today we are focusing on the sleighs moving down the ramp.</p> <p>“Alright, now, again, this is the ramp we will be using. Our job is to build a sleigh that will go down this ramp and travel the farthest. Are you ready to build? I will assign you your groups. You will be working as teams to build your sleighs. Here are you materials. (I will show the students each one so they can start thinking about how they can build a sleigh). After I give your your team, your job is to find a spot in the classroom to work. (go back to design process slide) So our first task was to find a problem. We now have a problem. So next, we need to brainstorm and think about how we could solve it. Your first task will be to think about how you might build your sleigh out of these materials. Remember, it can look however you want, it just needs to be able to go down the ramp. It will also need to hold Santa (show picture of santa and the present to cut out). So think about how you might build your sleigh using these materials (show picture of example sleigh on powerpoint) Then, you are going to draw any ideas you have for your sleigh on this paper. Let’s say I think I could use the pipe cleaners for the bottom of the sleigh. You could draw that on your paper. Does anyone have any questions about drawing? When I call your team, you can come get a piece of paper, find a spot to work, and start drawing. While we are thinking, and planning, we are going to be quiet, a voice level zero, so that everyone can think. Don’t worry, you will get to talk in your team in a couple minutes. Does anyone have any questions? Here are your teams.”</p>
20	<p>Explore: (independent, concrete practice/application with relevant learning task -connections from content to real-life experiences, reflective questions- probing or clarifying questions)</p> <p>I will call teams, hand out paper, and make sure everyone gets started on the task.</p> <p>“Hands on Top (that means stop). Okay, now, it’s okay if you didn’t quite finish drawing your ideas because now you get to share them. In your team, talk about what you drew and any ideas you have for building the sleigh. What are some important things that we should be doing when talking in our teams? (taking turns, listenings, etc.) I am going to pass out a popsicle stick to one person in each team. When you have the popsicle stick, it is your turn to talk. Then, pass the popsicle stick to a teammate when you are done. Make sure everyone gets a chance to talk. If you don’t have the popsicle stick, your lips should be zipped and your listening ears should be on. Here are the popsicle sticks. When you are done sharing and have a good plan, come show me your plans and tell me about them and then I will let you start building.</p> <p>Remember, Santa and the presents need to fit in the sleigh and stay in.</p> <p>“When you think you are ready to test your sleigh, bring it over here to the ramp, and we will let it go down and mark how far it goes.”</p> <p>I will continues helping students, making sure students are on task, and testing the sleighs. After students test their sleigh, I will give them the Lab sheet to fill out. Then they can begin improving their sleigh to see if it can go faster.</p>
10	<p>Review (wrap up and transition to next activity):</p> <p>After students have all finished their trial runs, we will talk about which ones went the farthest.</p> <p>“Why do you think they went the farthest? Take a walk around the room and look at the other sleighs. Were they different than yours? Did they all go down the ramp? Were you all successful? Talk to your team, were you able to improve your sleigh and make it go faster? (Share aloud). Alright, great job engineers! You all used the engineering design process to solve the problem and complete</p>

Lesson Plan Template

the challenge! Now it's time to clean up. You can put your sleighs on the back table. Return any leftover materials to the piles. Turn in your design sheets on the back table"

This lesson may be broken up into two days depending on how long it takes. The students may stop at just drawing their designs and sharing them or they may begin building before stopping.

Formative Assessment: (linked to objectives)

Progress monitoring throughout lesson- clarifying questions, check-in strategies, etc.

The formative assessment for this lesson will be their design sheets.

Consideration for Back-up Plan:

Summative Assessment (linked back to objectives)

End of lesson:

The summative assessment for this lesson will be the sleighs in combination with the participation and effort in their groups.

If applicable- overall unit, chapter, concept, etc.:

Reflection (What went well? What did the students learn? How do you know? What changes would you make?):

This lesson was so fun! I was very impressed with the students. The powerpoint was a good visual tool and helped the students to understand what engineers do. The chart with the engineering design process was really helpful. I had all of the students sit down and be quiet before giving them paper individually to plan and think. They took their paper, did a silent gallery walk by the materials to see what they could use, and then got to work. I was very surprised with how well the students did with this. They were quiet and respectful and very orderly. It reminded me about how important clear directions are. After they had a plan down, I paired the students up. The popsicle stick idea worked really well! After the students had a plan, they did check ins with me before building. That was a great time to see what the students were up to! The students were all 100% engaged. They were on task. When they tried out their sleighs and they didn't work like they wanted, they revised them. After a while, we cleaned up and they had to go home. The next day, the students finished their sleighs and their testing. There were two groups that were originally struggling. I realized I should have made a couple different pairs. However, one student was back from being sick and really was able to help out one of the groups. The other group had a good plan but was thinking very hard and did not get much done. After the time was up, they were very disappointed and threw their sleigh away. I went over and asked what happened? They told me that it had not worked. Luckily, my ramp had not worked very well either and I had had to go to the recycling closet and make a new one while the students were working. I reminded my students that my ramp hadn't worked either and the new one could still be a lot better. Then I told them that sometimes it takes engineers many many tries to find a solution to a problem. They slowly smiled and took the sleigh out of the garbage. It was a really neat moment for me as a teacher. It helped me realize that when things go wrong, good can be brought out of it. Students need to know that making mistakes is okay and failing is good as long as you try again. We did not get to the recording sheets. I realized while teaching that it was going to be a lot for the students. Instead, we did some reflection questions after cleaning up. In the future, I would consider having them write something about their experience. If I had an older grade, I think the recording sheet would be really neat and a writing piece would be really cool for the students to do as a reflection. The students went home with plans to make ramps out of their stairs and put their sleighs down them. I had a lot of fun teaching this lesson. Next time I will be sure to make a better ramp, try to pair the students together better, have a writing assessment piece for the students or even a video where they can record their reflection, and make sure to go over how to work in groups and pairs. I will definitely be using this lesson again.