

Paper/Cup Trick

Grade: 4 th		Subject: Science	
Materials: Plastic cups, Paper, Pitcher, water, paper towels		Technology Needed: N/A	
Instructional Strategies: <input type="checkbox"/> Direct instruction <input type="checkbox"/> Guided practice <input type="checkbox"/> Socratic Seminar <input type="checkbox"/> Learning Centers <input type="checkbox"/> Lecture <input type="checkbox"/> Technology integration <input type="checkbox"/> Other (list) <input type="checkbox"/> Peer teaching/collaboration/cooperative learning <input type="checkbox"/> Visuals/Graphic organizers <input type="checkbox"/> PBL <input type="checkbox"/> Discussion/Debate <input type="checkbox"/> Modeling		Guided Practices and Concrete Application: <input type="checkbox"/> Large group activity <input type="checkbox"/> Independent activity <input type="checkbox"/> Pairing/collaboration <input type="checkbox"/> Simulations/Scenarios <input type="checkbox"/> Other (list) Explain: <input type="checkbox"/> Hands-on <input type="checkbox"/> Technology integration <input type="checkbox"/> Imitation/Repeat/Mimic	
Standard(s) 3-5-ETS1-2. Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.		Differentiation Below Proficiency: Hints and Clues may be given to guide the learner. Above Proficiency: No prompting or support. Give directions only. Approaching/Emerging Proficiency: Give some hints and clues. You can fold the paper and do what you need to in order to make it balance. Modalities/Learning Preferences: Tactile, Visual	
Objective(s) At the end of the lesson, the students will demonstrate the ability to rest a cup on the piece of paper between two other cups finding out what shapes make something durable and able to hold things up regardless of material.			
Bloom's Taxonomy Cognitive Level: Apply			
Classroom Management- (grouping(s), movement/transitions, etc.) Students will work with their partners, Evens get materials, then odd.		Behavior Expectations- (systems, strategies, procedures specific to the lesson, rules and expectations, etc.) There is some collaboration but voices levels should stay at a 1. We can do this by whispering. Working efficient and effective.	
Minutes	Procedures		
	Set-up/Prep: Will need materials. 42 Plastic solo cups, water, and paper. Fill up 14 cups with water. Set the other two cups next to it with the piece of paper, and paper towel.		
5	Engage: (opening activity/ anticipatory Set – access prior learning / stimulate interest /generate questions, etc.) <ul style="list-style-type: none"> Lately you guys have been talking about engineering, correct? What are some things you know and have found out recently about engineering? Turn and talk, then discussion. 		
5	Explain: (concepts, procedures, vocabulary, etc.) <ul style="list-style-type: none"> Today I have a challenge for you I have some cups set out, 3 for each group. One cup has a little bit of water in it for weight. Please be careful so we don't spill. The goal is to get the third cup with water in it to balance and rest on top of the paper using the other two glasses. Demonstrate how the cups should be set up. Let's come up with some ideas on how you think it will work? Hypothesis 		
15	Explore: (independent, concrete practice/application with relevant learning task -connections from content to real-life experiences, reflective questions- probing or clarifying questions) <ul style="list-style-type: none"> Call even groups first to go find a station in the classroom. Let them try it for like 5-10 mins. Walk around and check up on them to make sure they are understanding and trying to figure out the problem. Call them back to the floor, and talk about it. How did that go? Did anyone get it? What was hard? Do you think you have any other ideas? Did anyone try folding the paper? What is one of the strongest shapes? (Triangle) Send them back out and let them try it for another 5 mins or so. 		
5	Review (wrap up and transition to next activity): <ul style="list-style-type: none"> Call all the students back to the floor and show and explain. Fold the paper like a fan, and rest it on top of the two glasses. You still have to be careful and balance it just right. Ask them if any of them thought about that? Why did it work? (think about the shape) 		
Formative Assessment: (linked to objectives) Progress monitoring throughout lesson- clarifying questions, check-in strategies, etc. While the students are working, I will be walking around the room checking for students understanding. Do they seem to be getting the		Summative Assessment (linked back to objectives) End of lesson: The student will be able to identify the shapes and important steps in order to make a strong base. Even paper can hold something heavy with the right construction.	

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concept? Are they working through the problem? Also taking notes about responses they are giving during turn and talk and discussion.

Consideration for Back-up Plan: An exit slip describing what the procedures and process was in order for it to work. Why do you think it worked when you folded it but didn't when you didn't fold the paper.

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 was my favorite lesson of the week. The students were so engaged and excited to figure out the challenge. The students got really excited when I told them I had a challenge for them to do. It was really funny when I told them what it was because they thought it was impossible. I didn't give them much direction the first time because I wanted to see what they did and how they worked through it as a group. They all did surprisingly well the first round. I had one group that figured it out only because a student had saw the same video online as I did. The next round was even better. More groups figured it out which was so cool to see. I had my science teacher dad try it out before and he couldn't figure it out. I also had my little brother who is going to school for engineering and he couldn't figure it out either. Once more students figured it out, others just watched them and did the same thing, but the important thing is that all groups got it eventually.

One thing I would for sure change and do better at is controlling the amount of water that spilt. I don't know how I would necessarily do that at this time but I have also thought that I could put something else in that top cup to make it heavier without having to use water. There were a ton of groups who would try to keep the cup on the paper, but would let go before it was balanced and there was water all over. I also didn't realize that some students still had stuff on their desk after I told them to clear it all off, so watching better and making sure all desks are clear.

Overall this was such a fun and great lesson. The main thing I wanted the students to get out this was for them to review and remember what they have learned in science class with Mrs. Deitrich and about engineering and apply it to other things. They accomplished this as they stated at the end of discussion that they reason it worked for so many is that the folds made triangles and that is the strongest shape. This is one I will for sure be doing again.