

STEAM Curriculum

Title of the Activity: Cups Structural Challenge

Materials: Plastic cups of different sizes, and popsicle sticks.

Activity Description: Place children in teams and encourage them to utilize plastic cups to build the tallest structure possible. The size of the base can vary depending on the design.

Science Content: Eye tracking, visual perception, spatial relationship, cause and effect. Inquiry to observation and investigation.

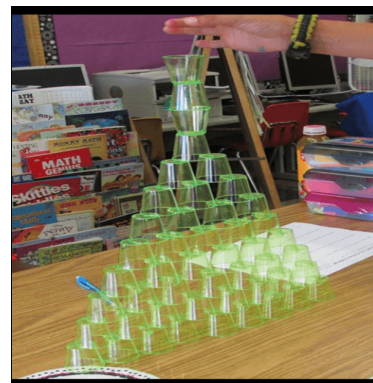
Mathematical Content: Child will respond to the objects observed. Repeats actions that have an effect. Child can estimate and count the number of cups needed to complete the challenge. Differentiate sizes of materials. Child will play with different patterns to create the structure.

Connections to Engineering: Child practices a sense of space, and balance. Constructing the structure involves designing, testing it and improving the design.

Additional 21st Century Skills: Teamwork, Cooperation, Creativity, Problem-solving and Communication.

Questions: How are you thinking to start your structure?, What did you do to balance the cups?, How can you improve your design?, Are there other materials you can add you your design? Compare your structure with others', how are they the same, how are they different?

Vocabulary: Structure, balance, highest, cups, compare, measure, add, and subtract.



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Title of the Activity: Sail boats (earth, science, physics)

Materials: recyclables such as empty plastic bottles, wine corks, popsicle sticks, Legos, fabric, pieces of wood, aluminum trays, foam, etc. Glue, several basters, straws, sensory table or tub with water.

Activity Description: Create a sail boat using recyclable materials or use toy boats to allow children to experiment with wind power. The sails on the boat must be stiff enough to cause resistance to air. Invite children to use basters or straws to create wind to move the sail boat in different directions.

Science Content: Moving air and water create force that can move objects. Sailboats are propelled by the wind pushing directly against the sail. Direction of movement can be manipulated. When the leading edge of the sail points into the wind, an area of low pressure is created on the side of the sail (like airplanes). This is one of the reasons that sailboats can move in directions other than just downwind.

Mathematical Content: Predicting and experimenting with different size boats and sails. Measuring distances and using directional terms and vocabulary which are part of geometry: near, far, toward, away, fast, slow.

Connections to Engineering: Ship building is also referred to as naval engineering. People who build ships are called shipwrights. Building boats is one of the oldest forms of engineering.

Open Ended Questions: What happens to the boat when you blow air? Can you move your boat in a different direction? Which boat do you think is going to get to the other side first? Why? How can you make your boat move faster? Slower? Away?

Vocabulary: distance, velocity, slope, pressure, force, motion, measure, near, far, toward, away, movement.



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Title of the Activity: Simple Machines-Catapults (Physics)

Materials: Rubber bands, tongue depressors-art craft sticks, plastic spoons, playdough, pompoms.

Activity Description: Make a cross with tongue depressors, leave one end open, and connect the sticks using the rubber bands. Attach the plastic spoon to one of the cross' sides. Place an object in the spoon, hold it down with your finger and let it go. Estimate how far the object will land, measure the distance. Make predictions, contrast and compare the results based on the weight or size of the object.

Science Content: Experiment with materials, talk about characteristics of the objects: rounded, pointed, soft, heavy, long, etc. Predict what would happen if you launch a light/heavy/small/big objects. Document the findings.

Mathematical Content: Graph the results of the experiment. Talk about what happened during the trials. Measure how further each object landed. Compare and contrast the results.

Connections to Engineering: Constructing a catapult involves physical principles such as how weight affects distance, gravity, and the structure of the catapult. Explore a variety of materials and test their durability, resistance, efficiency and creative design

Open Ended Questions: How can you build a catapult for small/ big objects? I wonder which material will travel furthest. What would happen if you launch 2 objects at once? Tell me what you did to launch the pompom in that direction.

Vocabulary: distance, velocity, slope, presure, force, motion, measure, how long, weight, height, longer, shorter, further, closer, direction, heavier, lighter.

