Keep It Positive. Keep It Simple. Keep It Real.

Un-Challenge Day Two
Critical Key #2: Solve Problems

The ability to problem-solve is foundational to many areas of learning. Effective problem solvers know how to ask questions to fill in the gaps between what they know and what they don't know. Good readers do this when they figure out unknown words. Good math students use a repertoire of strategies to solve math problems. A "problem-solver" takes initiative and ownership of problems all the time: finding rides to activities, getting a new toy, solving a disagreement, etc.

20 MINUTE ACTIVITY

Penny Boat Challenge

While most of the time we want kids to engage in authentic, real world problems, this 20 Minute Activity is designed to get kids thinking about designing and testing a prototype. We've run this activity with a bunch of different kids and age groups across the country, and the kids always have a blast and learn the beauty of designing and testing!

You Need:

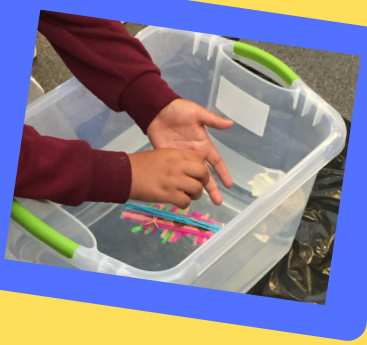
- a bunch of pennies or objects that weigh the same -
  - buttons, other coins, paper clips
- odds and ends - really anything works here -
  - paper, straws, lids, string etc.
- tape
- timer
- something that holds water - bathtub, sink, plastic tub

Steps:

- Give kids 5 minutes to design a boat that will hold pennies.
- The goal is to hold as many pennies as possible without sinking.
- After 5 minutes of design time, they get 10 minutes to build their first prototype. It's good to remind them that they will be putting their boats in water, so they need to be thoughtful about materials. For example, if they use paper and it disintegrates during the test round, they will need to be able to replace it for the final round.
- During the test round, kids place the boat on the water and test its buoyancy as you fill it with pennies, one at a time. They can decide how many pennies to test.
- After the test, they have 5 minutes to fix or change anything they want on their boat before the final round.
- During the final round, test the boat, adding one penny at a time until it sinks. Chances are your kids will want to take this challenge again and again, rebuilding their boats. Consider asking them to draw and label their designs as they go so they can see the progression in their trials. This is also a fun sibling, friend or parent competition.

Parent Tip: Do this one with your kids. Let them see you struggle or even fail.

Testing the Boat



DAILY DOINGS

Everyday: Model Solving Real World "Micro Problems" Out Loud

Take the time today to demonstrate how you solve everyday problems - out loud. This can be as simple as "I don't have all the ingredients I need. What are my options? I can go to the store, look for substitute ingredients, or make something else. Which is the best choice today?

Common Parenting Challenge: Tattling

Kids don't tattle because they need you to solve their problem.

Use tattling as a time to encourage kids to be problem solvers or solutions seekers. One of our favorite educators would say "That sounds like a kid problem. I look forward to hearing how you solved it. When she would check in, she was able to congratulate their problem-solving skills.

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PRE K - 2 ACADEMIC CONNECTIONS

- **Academic Standard -** Ask questions, make observations, and gather information about a situation people want to change to define a simple problem that can be solved through the development of a new or improved object or tool.
- **Connection -** Simple questions like "How could you change your design?" or "What materials will be best?" support thinking with this academic connection.

3RD - 5TH ACADEMIC CONNECTIONS

- **Academic Standard -** Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost.
- **Connection -** In the Penny Boat Challenge, you have a set selection of materials and a time limit. In other situations, ask "What is a problem you face? What constraints do you have when solving that problem?" For example, if your kids want a new game, cost may be a constraint.

6TH - 8TH ACADEMIC CONNECTIONS

- **Academic Standard -** Define the criteria and constraints of a design problem with sufficient precision to ensure a successful solution, taking into account relevant scientific principles and potential impacts on people and the natural environment that may limit possible solutions.
- **Connection -** Ask: "What are all of the details you need to take into consideration when designing your boat? What have you learned from science class that can help you?"

Activity Extensions & Alternatives:

Today, it really doesn't matter what the activity looks like, it's more about solving problems by designing, testing, and adapting. You could have kids try a card house, build paper airplanes, or fix something that is broken.

If your kids really love to build and design, and you want to take on a bigger project, we have just the thing! One of our favorite STEM Educators is hosting a Tiny House Camp! It's virtual and completely free.
You have to gather your own materials, but she will guide you and your kids through the design process.
Visit her at: https://www.daciajones.com