Lesson Title – Float the Boat

Grade Level – K/1

Standards –

K.ETS1.1 – Ask and answer questions about the scientific world and gather information using the senses.

1.ETS1.1 – Solve scientific problems by asking testable questions, making short-term and long-term observations, and gathering information.

Materials – foil, Styrofoam, plastic bubble wrap, wooden sticks, large bowls, water, and counting bears (or equivalent)

Procedures/Instruction

Ask/Engage-How will you engage students? Introduce design challenge in general terms- what problem will students need to solve? Review any STEM Content that students will need to apply to solve design challenge.

• Tell Students about the general idea of their challenge: Some special passengers were stranded on an island when their boat sank. They need your help! You need to build a boat that will carry as many passengers as possible to the main land using only the supplies available.

• Ask students" What makes some objects float in water and other objects sink?" Write down students' ideas.

• Read the book: Captain Kidd's Crew- Experiments with Sinking and Floating or similar book about buoyancy.

• Refer back to students' ideas on objects that float in water and objects that sink
• Discuss concept of Density by demonstrating 2 objects that are the same size, but one with a much higher density (you should choose 1 object that sinks and 1 object that floats). Show what happens when they are put in water.

• Give students an opportunity to test various materials that they could use to construct a boat: foil, Styrofoam, bubble wrap, wooden sticks, etc.

• Show students various pictures of boats and point out the different shapes. Take note at which boats seemed to be designed to carry a lot of weight.

Imagine/Brainstorm- Introduce the constraints of the design plan. Define the criteria for success. Ask each student to work independently to come up with 1-2 possible design solutions. Students should draw/label their designs.

• Students will need to design a boat that will hold 10 or more passengers using limited materials.

• Students can only use ONE of these materials to construct their boats A sheet of foil, A sheet of bubble wrap, 20 wooden sticks or 20 styrofoam peanuts

• Everyone will be given 12 inches of masking tape • Give students 10 minutes to brainstorm INDEPENDENLY. They should draw their designs in their journal.

• Discuss criteria for measurement and success. Should students stop counting as soon as the first teddy bear gets wet? Should they stop counting when the whole boat is submerged?

Plan/Design -Each student presents their ideas to their team. Student teams collaborate to come up with final design plan. Students draw final design plan and make a list of needed supplies. Each student presents their ideas to their team. Student teams collaborate to come up with final design plan. Students draw final design plan and make a list of needed supplies.

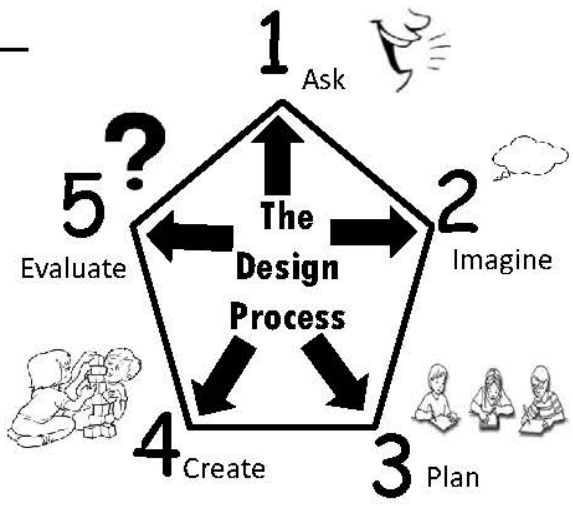
Create / Test Student teams build their design according to their design plan. Students test their design plan and record data. Student teams build their design according to their design plan. Before testing, students should make a prediction as to how many bears that their boat will hold. Students should look around the room and compare their design to other students' designs. Students should test their design by placing their boat in a container of water. Students should add bears one at a time, making sure to count as they go. Students should record their final number.

Evaluate/Improve – and repeat Steps 1-5 Students evaluate their design for success. Did it meet the established criteria? Did their final design match their planned design? How would students improve their design? • Students evaluate their design for success. Did it meet the established criteria? Did their final design

match their planned design? • Using student data, construct a simple graph • Compare designs/data to see which design was the most successful • How would students improve their designs? Repeat Design Process.

Name:_____

Student Journal



1. Ask

2. Imagine Brainstorm

Can use whole space or divide with pencil into 2 spaces

3. Plan/Design

Draw or write what materials you need for this design

4. Create/Test

Did it work?

Why or Why not? Discuss with your group.

5. Evaluate/Improve

How can you improve or make your design better next time?