**Bulkhead Lesson - Teacher's Lesson Plan**

**Objective:**

* Introduce the concept of bulkheads in ships and guide students through a simple science experiment.
* Teach key scientific topics: Bulkheads and how to conduct a scientific experiment.
* Develop students' scientific mindset by having them run an experiment.
* Note: This lesson is typically conducted after the Cardboard Boat Challenge. If presenting to a different class who have not done the carboard boat challenge, copy the introduction slides from the cardboard boat challenge lesson.

**Materials Needed:**

* 3D-printed boats
* Weights (for testing boats)
* Water source (e.g., pool, large tub)
* Printed worksheets (one per student)
* Smartboard or projector (for PowerPoint presentation)

**Lesson Breakdown:**

**1. Presentation & Discussion**

* Use the provided PowerPoint presentation.
* Update slides: Include the school’s name on the cover slide.
* Discuss how bulkheads help ships stay afloat by dividing them into compartments.
* Explain how bulkheads have evolved over time to improve ship safety.

**2. Experiment Setup**

* Split the class into small groups and distribute Bulkhead Worksheets to guide them through the experiment.
* Provide each group with a 3D-printed boat and weights.
* Explain the experiment procedure:
  1. Place the boat in the water.
  2. Gradually add weights to simulate cargo or flooding.
  3. Record the time the boat takes to sink.
* Encourage students to record their observations and timings on there worksheet.

**3. Experiment Execution**

* Guide students as they follow the worksheet instructions.
* Circulate around the room to answer questions and assist with testing.
* After each table in the worksheet have a class discussion with all groups to understand what impact adding more weights, bulkheads or hole size has on the time to sink the vessel.

**4. Post-Experiment Discussion & Conclusion**

* Ask the class what they have learned from the experiment and the lesson.
* Discuss key takeaways:
  + How did the bulkheads affect the boat’s buoyancy and stability?
  + What real-world applications do bulkheads have in ship design?
  + What improvements could be made to ship designs based on this experiment?
* Encourage students to think about how science experiments help solve real-world problems.

**5. Post-Experiment Discussion & Conclusion**

* Explain what your company does and the engineering challenges it faces. Relate these to the experiment or the Cardboard Boat Challenge or the bulkhead experiment to highlight problem-solving skills.
* Conclude with a thank you slide and invite any questions from the students.

**Wrap-Up & Reflection**

* Encourage students to think about how science experiments help solve real-world problems.

**End of Lesson.**