

Mr. Kodel – 8th Grade Science
Unit 1 – Project Outline: Density and Buoyancy

200

Name _____
Period _____

Due by: Friday, August 29, 2014

Common Core:

SCI6-8.INV1.QUSTN I can develop a general hypothesis or research thesis. I can think of a possible answer to my question if my answer is supported by data.

SCI6-8.PERS3.QUSTN I can form new questions based on my research results, and the answers to these questions will extend understanding of the issue. **SCI6-8.PERS2.DATA** I can draw conclusions related to my hypothesis. This means that I can describe conclusions about my hypothesis or thesis.

SCI11-12.COMM1 I can describe experimental error and/or research procedures.

SCI11-12.COMM2 I can present data with visual representations that enhance understanding of the issue.

SCI6-8.ACT2.IMPCT I can identify available technology for my plan. This means that I can locate what needs to be available in order to accomplish my plan.

Parent Signature: _____

ELD Standards: Writing – Edit for grammatical structures and conventions of writing; Writing – Use strategies of note taking, outlining, and summarizing.

GLPQ – Investigates the World: Designs an experiment that offers a detailed method for investigating and testing the hypothesis/research thesis. **Recognizes Perspectives:** Identifies and interprets experimental error, outliers, and/or inconsistencies in the data, and conclusion evaluates the hypothesis or research thesis based on evidence from the data; Poses and discusses new, relevant questions in response to implications of experimental or research findings. **Communicates Ideas:** Presents data with visual representations that enhance understanding of the issue and findings for diverse audiences; experimental or research presentation applies conventions of scientific communication to express ideas and learning. **Take Action:** Articulates in a reflection how the project influenced his/her thinking, choices, actions, and awareness of alternative thoughts and ideas.

Enduring Understanding: Density affects buoyancy.

Driving Question: How do I as an engineer design and build a boat that holds the most pennies without sinking?

Project Objectives:

Each student will design and build two boats to test his/her hypothesis. The second boat will be a revision of the first boat, and will be based on feedback and collaboration from peers. Based on the data collected, a conclusion will be formed by reflection on the investigation and experimentation. The student will communicate his/her scientific findings in a well written lab report.

Title: _____

Subtitle: The effect of density on the buoyancy of an object

Due by:

5

Hypothesis: **If** the density of the boat is decreased, **then** the boat will hold _____ pennies.

5

Introduction Outline:

Topic: How Density
Affects Buoyancy

What do you know about
density and buoyancy?

What do I expect to happen and
why? (Explain the hypothesis)

How am I going to test my hypothesis?
(Explain the procedure)

- Buoyancy:

7. A second boat was built using the feedback and collaboration from peers.

- How do you know if an object will float?

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Introduction:

Due by:

Poor: 20/30
Infrequently uses proper writing conventions.
Does not include most of the info from the outline

Satisfactory: 25/30
Frequently uses proper writing conventions.
Includes most of the info from the outline

Outstanding: 30/30
Well written using proper writing conventions.
Includes all of the info from the outline

7. A second boat was built using the feedback and collaboration from peers.

Procedure:

Boat specifications:

- The material used to build the boat must be tin/aluminum foil, unless you get approval for using another material by your science teacher.
- The boat must not be no bigger than a half-sheet of notebook paper (8.5"x5.5"), and no taller than 5".

Notes

Proper lab format

- Write in complete sentences using 3rd person, past tense.

Build a boat according to the specifications.

1. A boat was built according to the specifications set by the teacher.

Measure the mass of the boat.

2. The mass of the boat was measured by using an _____

Measure the volume of the object

3. The volume of the boat was calculated by _____

Calculate the density of the boat.

4. The density of the boat was calculated using the formula:

Place the boat in the water and place pennies in the boat one at a time until it sinks.

5. The boat was

Record the number of pennies the boat could hold before sinking.

6. The number of pennies

Collaborate with team to revise your boat, and rebuild a second boat.

7. A second boat was built using the feedback and collaboration from peers.

Due by:

Boat 1 -

10

10

Due by:

Data and Analysis:

Boat 1 – Initial Design

m= _____g

V=? →

V=

V=

D=? →

m= _____g

V= _____

D = m/v

D=

The density of the boat is _____ and it was able to hold _____ pennies before sinking.

15

Collaboration notes for boat revision:

20

Boat 2 – Revised Design

m= _____g

V=? →

V=

V=

D=? →

m= _____g

V= _____

D = m/v

D=

The density of the boat is _____ and it was able to hold _____ pennies before sinking.

15

Conclusion:

7. A second boat was built using the feedback and collaboration from peers.