Science 8 Forces, Fluids and Density Unit

Big Idea: **Are we all dense?**

Outcome:

FD8.2 Examine the effects of forces in and on objects in fluids, including the buoyant

 force.

Understandings:

 There are practical problems and issues regarding floating, sinking and buoyancy.

 Many people from many cultures have contributed to our understanding of buoyancy.

 The balancing of many forces on an object allows it to float or sink.

 Many technologies have been based on the scientific understanding of fluids.

 Buoyancy can be controlled.

 There are tests and processes which can be used to construct understanding of buoyancy.

Essential questions:

1. What are some problems and issues involving floating, sinking and buoyancy?
2. What contributions have people made to our understanding of buoyancy?
3. How do forces acting on an object affect its buoyancy?
4. What technologies have been developed that involve fluid and buoyancy knowledge?
5. How is buoyancy controlled?
6. How can I build my understanding of buoyancy?

Students need to know: (essential questions they are related to are in brackets)

Vocabulary/ Concepts: float, sink, buoyancy, Archimedes Principle, force, contact, non-contact, balanced, unbalanced, mass, weight, principle, variable, prototype, quantitative, pressure, area

How to: use a spring scale, conduct a fair test, use technological problem-solving

Buoyancy in nature: fish, humans, sharks

Buoyancy in constructed objects: submarines, airplanes, air ships, scuba gear, hot air balloons

Technologies impacted by “Properties of Fluids”: PDFs, float planes, surf boards, gliders, anti-freeze tester, heart pump

And be able to: (essential questions they are related to are in brackets)

 - Identify problems and issues involving floating, sinking and buoyancy. (1)

 - Examine contributions of people to the understanding of buoyancy. (2)

 - Use a spring scale to measure forces on an object and draw a force diagram. (3)

 - Compare different fluids to determine how they alter buoyant force. (3)

 - Explain how buoyancy is controlled in nature and explain the operation of constructed

devices. (4)

-Illustrate using diagrams.

-Express relationship between pressure, force and area.

-Conduct a fair test.

-Use a technological problem-solving process to design, construct and evaluate a prototype.

-Explain operation of technologies and relationship to buoyancy.

-Analyze designs.