



Australian Government
Department of Defence
Defence Materiel Organisation



Regional
Development
Australia
HUNTER



me
program

**ASSESSMENT NOTIFICATION
PHYSICS- PRELIMINARY
ASSESSMENT REPORT**



**CC ME HOVERCRAFT CURRICULUM
RESOURCES**

Weighting: 25%

Due Date:

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ME HOVERCRAFT PROGRAM

<p>Introduction:</p>	<p>To provide students with a hands-on unit of work that will aim to:</p> <ol style="list-style-type: none"> i. Engage students in work based on simple machines and forces which form a substantial part of the draft copy of the Science National Curriculum ii. Give meaningful links and opportunities to engage in similar activities to the ME programs already embraced by the College for stage 4 and 5 students iii. Facilitate work which will involve student problem solving, team work, measurement and data analysis iv. Provide students with activities which may lead to a life time interest in engineering and design
<p>Possible stage 5 Science outcomes</p>	<p>Knowledge and understanding</p> <p>5.6.2 - Newton's laws of motion d) Analyse qualitatively common situations involving motion in terms of Newtown's laws</p> <p>Skills</p> <p>18f - select and draw the appropriate type of graph or diagram to convey information and relationships clearly and accurately 5.13 - a student identifies a problem and independently produces an appropriate investigation plan 5.15 - a student gathers first hand data accurately 5.20 - a student selects and uses appropriate strategies to solve problems</p>
<p>Possible stage 4 Science outcomes</p>	<p>Knowledge and understanding</p> <p>4.6 - identifies and describes energy changes and the action of forces in common situations 4.6.1 - c) identify object that possess energy because of their motion (kinetic) or because of other properties (potential)</p>

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Skills

- 4.13 - a student clarifies the purpose of an investigation and, with guidance, produces a plan to investigate a problem
- 4.15 - a student uses given criteria to gather first hand data
- 4.20 - a student uses an identified strategy to solve problems

Teacher Resources:

Lesson Sequence

1. Building a basic hovercraft exploring the topic of friction
- 2.3. Design and conduct experiment to test Air Hog micro-hovercrafts

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BUILDING A BASIC HOVERCRAFT

Introduction

Friction is a force that arises when things rub against each other. Friction can slow things down and eventually make the surfaces wear down. However, when surfaces do not rub against each other, there is no friction between them.

In 1955, a British man named Christopher Cockerell tested a new kind of craft and patented his idea for the first real hovercraft — a vehicle that can travel on a cushion of air over water, ice, dirt, pavement and other surfaces. Now, hovercrafts are used for rescue work on rapidly moving rivers and thin ice, cargo transport and ferrying and by the military to transport troops and equipment from boats to the shore

Aim

To construct a basic hovercraft

Safety:

Take care with all equipment as some of the bottle necks may have sharp edges.

WEAR SAFETY GLASSES AT ALL TIMES

Equipment

1 bottle neck, 1 balloon, 1 CD with bottle top already attached

PROCEDURE

1. Attach the balloon to the top of the bottle neck



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2. Blow up balloon, pinching neck to ensure air does not escape



3. Screw the top into the cap attached to the CD

4. Place the hovercraft racer on a smooth, flat surface and release the neck of the balloon, allowing air to escape. Tap the side of the hovercraft racer, and see how it glides over the surface !

5. Swap the CD for another with different number of holes in the lid and repeat.

Some ideas to explore

- Does the amount of air in the balloon effect the performance of the hovercraft ?
- Does the surface the hovercraft is placed on effect the performance of the hovercraft?
- Does the number of holes in the lid effect the performance of the hovercraft?
- What are the advantages and disadvantage of having
 - one hole in the lid
 - multiple holes in the lid

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Follow up questions

1. Define the term friction.

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2. Cars have a lot of moving parts, and therefore have areas where friction can occur. How is this friction reduced in cars?

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3. Explain how a hovercraft reduces friction.

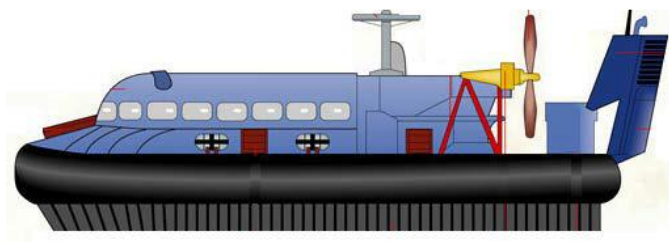
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4. Label the hovercraft diagram below to show the forces acting on a moving hovercraft.



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SURFACE EFFECT ON HOVERCRAFT PERFORMANCE

Background

A hovercraft is a craft capable of travelling over land, water, mud or ice and other surfaces both at speed and when stationary. They operate by creating a cushion of high-pressure air between the hull of the vessel and the surface below, reducing or eliminating the friction.

Within this lesson the aim is to test whether the type of surface affects the performance of our mini-hovercrafts.

Planning (How do we make this a “fair test”)

We must keep everything the same while carrying out the experiment. Except the thing we are testing.

What is it in this experiment that we are going to deliberately change?

This is called the **independent variable**

What are we going to measure so we can see a change in our independent variable?

This is called the **dependent variable**

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What are some other things that we are going to have to keep the same?

Item	How will they be kept the same



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PERFORMING AND REPORTING ON THE EXPERIMENT

Aim: (write an aim for this experiment in the space below)

Method: (a method is a step by step set of instruction for doing the experiment).
Write a method in the space below

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Results (Draw a table in the space below in which you can put your results)

Surface type	Time to cover distance (seconds)

Conclusion (write a few sentences about what you have found out)

Which surface was the best surface for the hovercraft? _____

Which surface was the worst for the hovercraft? _____

Explain why you think this was?