



EPISODE 4: RECIPE FOR DISASTER

JIWI'S MACHINES



AIR FORCE

TO TEACHERS AND PARENTS

A large focus in teaching science is around encouraging both curiosity and the skills and dispositions to be able to find out or test things for yourself. This includes developing an understanding about how science itself works. The New Zealand Curriculum calls this the Nature of Science.

Tips about how to encourage these aspects are given in a



Use these to get your children talking, discussing, testing and thinking about the science involved in Jiwi's Machines. Have fun! The science content involved in Jiwi's Machines relates to the Physical World Achievement Aims of the New Zealand Curriculum.

<http://nzcurriculum.tki.org.nz/The-New-Zealand-Curriculum/Learning-areas/Science/Achievement-objectives>

AIR FORCE

In AIR FORCE we see Jiwi and Luke testing ideas about mass and surface area. This relationship is an important one to have an appreciation of and can be relatively easily explored.

ACTIVITY 1:
EXPLORING SURFACE AREA VS MASS
(1 hour)

BIG SCIENCE IDEA: Objects with greater surface area are pushed more easily by air.

Recreate Jiwi and Luke's demonstration using a fan and some newspaper.

What else would the children like to find out?

COMMUNICATE IN SCIENCE

What did you observe?
Is it measurable?
What might this mean?



JIWI WONDERS



Can you design an investigation using 5 pieces of newspaper all the same size but fold or screw up each piece differently to see how they lift when put above the fan?



Is there a relationship between surface area and mass to get the most lift (height)?



How is this useful in everyday life around us? Where do we see this idea in everyday life?

CHALLENGE:

WINGS OF A SEED

(1 hour)

Many seeds need to escape from being close to their parents and find a bit more space to grow in. They have adapted to drift through the air further from their parent. If you can find some sycamore or maple seeds, these make a terrific link to the relationship of mass and surface area. Let children drop them from a range of heights and observe what happens. The BP Challenges have a most appropriate challenge called “Wings of a Seed” which can be found here: <http://www.starters.co.nz/bpchallenge-index>

BRAINSTORM:

WHAT ARE THE FEATURES OF A BIRD'S AND AIRPLANE'S WING?

The Ministry of Education Building Science Concepts: Book 17: FLIGHT - CONTROL IN THE AIR has many related concepts and activities. An overview is found at <http://scienceonline.tki.org.nz/What-do-my-students-need-to-learn/Building-Science-Concepts/Titles-and-concept-overviews/Flight-Control-in-the-Air> The Science Learning Hub website also has a unit on Flight that includes fabulous NZ examples which can be found at <http://sciencelearn.org.nz/Contexts/Flight>

ACTIVITY 2:

BUILD A KITE

(1.5 hours)

Kites are another great way of demonstrating the importance of surface area vs mass when wanting to have something airborne. As part of the Science Learning Hub's unit about Flight there is a terrific kite making lesson.

<http://sciencelearn.org.nz/Contexts/Flight/Teaching-and-Learning-Approaches/Kites>



MATERIALS

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| Activity 1 Fan Newspaper | Challenge Seeds (sycamore, maple) | Activity 2 Kite building materials |
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NZ CURRICULUM PLANNING SUMMARY

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| Contextual Achievement Objective: PHYSICAL WORLD; Explore and investigate physical phenomena in everyday situations. | Nature of Science Achievement Objective: INVESTIGATING IN SCIENCE; Students need to be taught relevant procedural concepts to undertake an investigation |
| Big Science Idea: Objects with greater surface area are pushed more easily by air. | Big Nature of Science Idea: Scientists make observations and inferences. |
| Weblinks: http://scienceonline.tki.org.nz/Nature-of-science/What-is-the-Nature-of-Science/Teacher-suggestions-Investigating-in-science/Student-investigations-may-involve-a-variety-of-skills http://scienceonline.tki.org.nz/Introducing-five-science-capabilities/Gather-interpret-data | Capability focus: GATHER & INTERPRET DATA; an observation is something that you can see, touch, smell, hear or taste. An inference is meaning you make from an observation. What did you see? (observation) What might that mean? (inference) What is the difference between an observation and an inference? |