

Teacher Notes

Rationale

Mathematics investigations open students' minds to the possibility of multiple approaches, multiple outcomes and multiple solutions. When linked to the world in which they live, open-ended investigations can help students see the relevance of mathematics within their lives. They also provide wonderful opportunities for differentiation, enabling students to feel confident and successful as they engage with tasks at their own individual level.

Overview

This mathematics investigation has been designed to accompany a unit of work on length. It requires students to apply their knowledge and understanding of measuring distance to a real-world situation.

Objective

To use a scaled measuring instrument to measure the distance flown by a paper plane.

Duration

Approximately two 60 minute lessons

Prior Learning

Before commencing the investigation, students should be familiar with the following concepts:

- the importance of using common units of measurement
- reading and interpreting scales on a range of measuring instruments.

Differentiation: Supporting Students

Less capable students could be supported in their learning by allowing them to consult with a teacher or teacher aide during the designing and constructing process. Alternatively, the task could be simplified by measuring and calculating the distance flown by only one plane design (rather than three).

Differentiation: Extending Students

More capable students could be encouraged to increase the sophistication of their design diagrams by measuring and labelling each section of their paper planes e.g. body length, wing span, tail height. Students could also be challenged to create a column graph to represent the total distance flown by each of their paper plane designs during the test flights.

Monitoring Student Understanding

Due to the open-ended nature of this investigation, students' responses will vary significantly. For this reason, no answer sheet has been provided. Teachers must therefore check that each student has completed the investigation according to the task requirements.





The Scenario

Every year, your town holds a paper plane flying competition. Children design their own paper planes, then fly them against each other. The designer of the paper plane that flies the furthest is the winner!

This year, you are finally old enough to enter the competition. There is only one problem - you have designed three different paper planes and you can't decide which one to enter in the competition!

You have decided to test all three of your paper plane designs to see which one flies the furthest. You will accurately measure and record the distance flown by each paper plane, then use the information to make a decision about which design to enter in the competition.

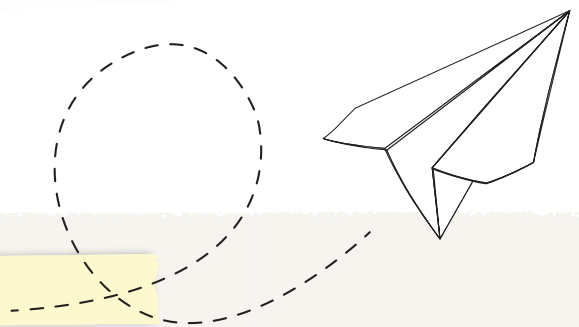
The Task

Design three different paper planes to test for the paper plane flying competition.

Follow the competition rules, set out below.

Competition Rules

- Each paper plane must be constructed from a single piece of A4 paper.
- The exterior of the paper plane may be decorated using pencils or markers only.
- Attachments of any kind are not permitted.
- The use of tape, glue or adhesives of any kind is not permitted.
- Rips may be made in the paper plane by hand. The use of scissors is not permitted.



The Procedure

1. Check your understanding of the task

Carefully read through the task and the list of competition rules. If there are any instructions that you do not understand, ask your teacher to explain them to you.

2. Design and construct your paper planes

Design, construct and decorate three different paper planes. Draw or take a photograph of each design to be recorded on the Designing and Constructing Worksheet. Remember to follow to competition rules throughout the design and construction process.

3. Make a prediction

Which paper plane design do you think will fly the furthest and why? Record and explain your ideas on the Conducting the Investigation Worksheet.

4. Choose a scaled measuring instrument

Decide how to best measure the distance flown by each paper plane during the test flights. Record and explain the reasons for your choice on the Conducting the Investigation Worksheet.

5. Conduct three test flights for each paper plane design

Test each paper plane three times. Use your chosen scaled measuring instrument to record the distance flown on each test flight, then record the distances in the table provided. Calculate the total distance flown by each paper plane by adding the three distances from each test flight together.

6. Make a decision

Based on the results of the investigation, decide which paper plane design to enter in the competition.

The Materials

- Blank sheets of A4 paper
- Scaled measuring instruments (small ruler, large ruler, tape measure, trundle wheel)
- Coloured pencils or markers



Name _____

Date _____

Designing and Constructing

Design and construct three different paper planes. Give each design an interesting name. Draw a sketch or take a photograph of each design to display in the boxes below. Write a sentence to explain the features of each design.

Design 1: _____

Design 2: _____

Design 3: _____



Name _____

Date _____

Conducting the Investigation

Prediction

I think design number 1 / 2 / 3 (circle one) will fly the furthest. I think this because:

Measuring Distance Using a Scaled Instrument

I am going to use a small ruler / large ruler / tape measure / trundle wheel (circle one) to measure distance. This is the best instrument to use because:

Collecting and Recording Data

Conduct three test flights for each of your paper plane designs. Record the distance flown on each flight.

Once you have conducted all three test flights, calculate the total distance flown by each paper plane.

	Test Flight 1	Test Flight 2	Test Flight 3	Total Distance
Design 1				
Design 2				
Design 3				

Conclusion

My prediction was correct / incorrect (circle one).

The winner paper plane design was design number 1 / 2 / 3 (circle one).

I know this because:



Name _____

Date _____

Reflection

1. Did you enjoy working on this investigation? Give reasons to explain your answer.

2. Did you face any challenges during the investigation? If so, how did you overcome them?

3. How do you feel about your winning design? Is there anything you would change about it?

4. Do you think this investigation was a 'fair test'? Why or why not?

5. Circle the statement that best suits how you feel about measuring distance after completing this investigation.

- a) I feel very confident measuring distance.
- b) My understanding of measuring distance is improving.
- c) I still need some help when measuring distance.

