

How Far Will My Plane Fly?

Overview

In this enjoyable activity students make paper planes, fly them, then estimate and measure the distances they fly. It is an ideal activity to develop the estimation and measuring skills of young adults and other active learners. Language of comparison is also encouraged.

Skills and Knowledge

- Estimating distances in metres using paces
- Measuring distances in metres with students' 5 metre strings or tapes
- Measuring to nearest $\frac{1}{2}$ or $\frac{1}{4}$ metre (optional)
- Following diagrammatic instructions.
- Organising information into tables.
- Language of measurement (longest/ longer than)

Preparation and Materials

- Photocopy Activity Sheet 1 (1 per student)
- Photocopy Activity Sheet 2 (1 per student) (optional – see below)
- Collected pile of scrap A4 Paper
- Students' 5 metre measuring strings
- Builders' Tape (optional)
- Chalk, sticks or 'markers' to lay on the ground (1 chalk or at least 3 markers per pair)

Suggested Procedure

Revision of estimating and measuring in metres – mini competition

If some time has elapsed since the students learned about estimating and measuring metres it might be necessary to revise the skills before commencing the plane activity. The following is one possibility.

Select a distance outside or along a corridor and mark each end of it with the chalk or markers you will use later.

Give each student a small slip of paper.

Explain:

- *We will now have a quick mini competition to see who can estimate this distance most accurately.*
- *I want you to pace it out (count silently to yourself).*
- *Write your estimate on this piece of paper with your name.*



When they have done this collect the papers from them and ask a couple of students to measure the line using their measuring strings, a long tape, or both (see Note below about level of accuracy).

Ask a second pair to check their measurement.

Finally, look at the papers with estimates and select the few who are closest to the measured lengths as the winners.

Note: Decide at this stage whether you think students should measure to the nearest metre or whether you can extend them to measuring to the nearest half metre.

If you want to extend them, then they should use the one metre tapes again and mark the half metres (at 50 cm) between each of the 1 m marks on their measuring strings. It is a good idea to use different coloured marks for these.

This could be extended to $\frac{1}{4}$ and $\frac{3}{4}$ but only if students have already shown confidence with halves.

Making the planes

There are a few alternatives for making the paper planes.

Alternative 1: If students already know how to make paper planes they can each make one from their own design.

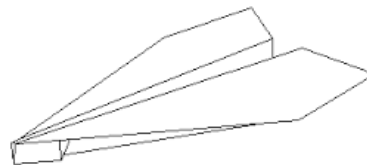
Alternative 2: Distribute copies of Activity Sheet 2 and at least one piece of paper to each student (they may need more than 1 try to get it right).

Help students to make a plane by following the instructions. You may have to demonstrate step by step so they can follow you.

Alternative 3: You or your students select alternative designs by 'googling' paper planes. These tend to have nice clips of instructions so are fun if web connected computers (or phones) are easily available.

Ensure that each student has a plane that is good enough to fly before the next stage of the activity.

When they have made the plane they should put their name or a special symbol on it so they know which is theirs.



Flying, estimating and measuring how far it will fly

Arrange students into pairs for this part of the activity.

Distribute copies of Activity Sheet 2.

Explain:

- Each pair will need to spread out so that your planes fly in different places – not into each other.
- When you find a good place use a marker or chalk to mark your a starting point on the ground.
- You can use this starting point each time you launch your plane.
- You will have five flights each and fill the results in on this table.

Explain the procedure for each flight by demonstrating with a volunteer student as 'partner'.

- **Person 1** stands on the start and flies (throws) the plane as far as possible.
- **Person 2** goes to where it lands and marks the place with a marker or chalk.
- **Person 1** then estimates the distance by pacing (stepping it out).
- Write the estimate for flight 1 in the table on Activity Sheet 1.
- Finally, both people help to measure the distance with the 5 metre measuring string.
- Fill in the distance for Flight 1 in the table.

Change places and let Person 2 fly their plane – record the measurement for **Flight 1** on their copy of the Activity Sheet.

Repeat for at least 4 flights each (5 if there is time).

Debriefing the activity – using the language of measurement

Make a table on the board and ask students to fill in their best flight distance.

Name	Longest Flight Distance (metres)
<i>Joao</i>	
<i>Sanio</i>	
<i>Mary</i>	

Decide on some winners for the best planes according to distance it will fly.



Ask :

- *Did you get better at estimating with paces while you were doing this?*

Demonstrate the language of comparison and difference by asking particular students questions similar to those on the bottom of Activity Sheet 1.

For example:

- *Mary, what was your shortest flight?*
- *What was your longest flight?*
- *So your longest flight was metres longer than your shortest?*

Demonstrate the difference by 'counting on', for example:

If the shortest flight was 8 m and longest flight was 11 m.

Then 8 m 9 m 10 m 11 m

You have 'counted on' an extra 3 m.

*So Mary's **longest** flight is 3 m **longer than** Mary's **shortest** flight.*

Ask students to complete the sentences under the table on Activity Sheet 1.

Extensions

Language of comparison

Either as a whole class or in different pair configurations students can compare their flight lengths, calculate other differences and then use them to write several more sentences using the language modelled on Activity Sheet 1.

Timing the flights

You could ask students to repeat the flying exercise but this time ask them to measure how long their plane will stay in the air. (How many seconds will it fly?)

Students can either time the flight with a stopwatch, a watch with a 'seconds' hand, or they can estimate using a counting strategy, such as 1 cat and dog, 2 cat and dog or 1 banana, 2 bananas.

Follow up: building more sophisticated planes

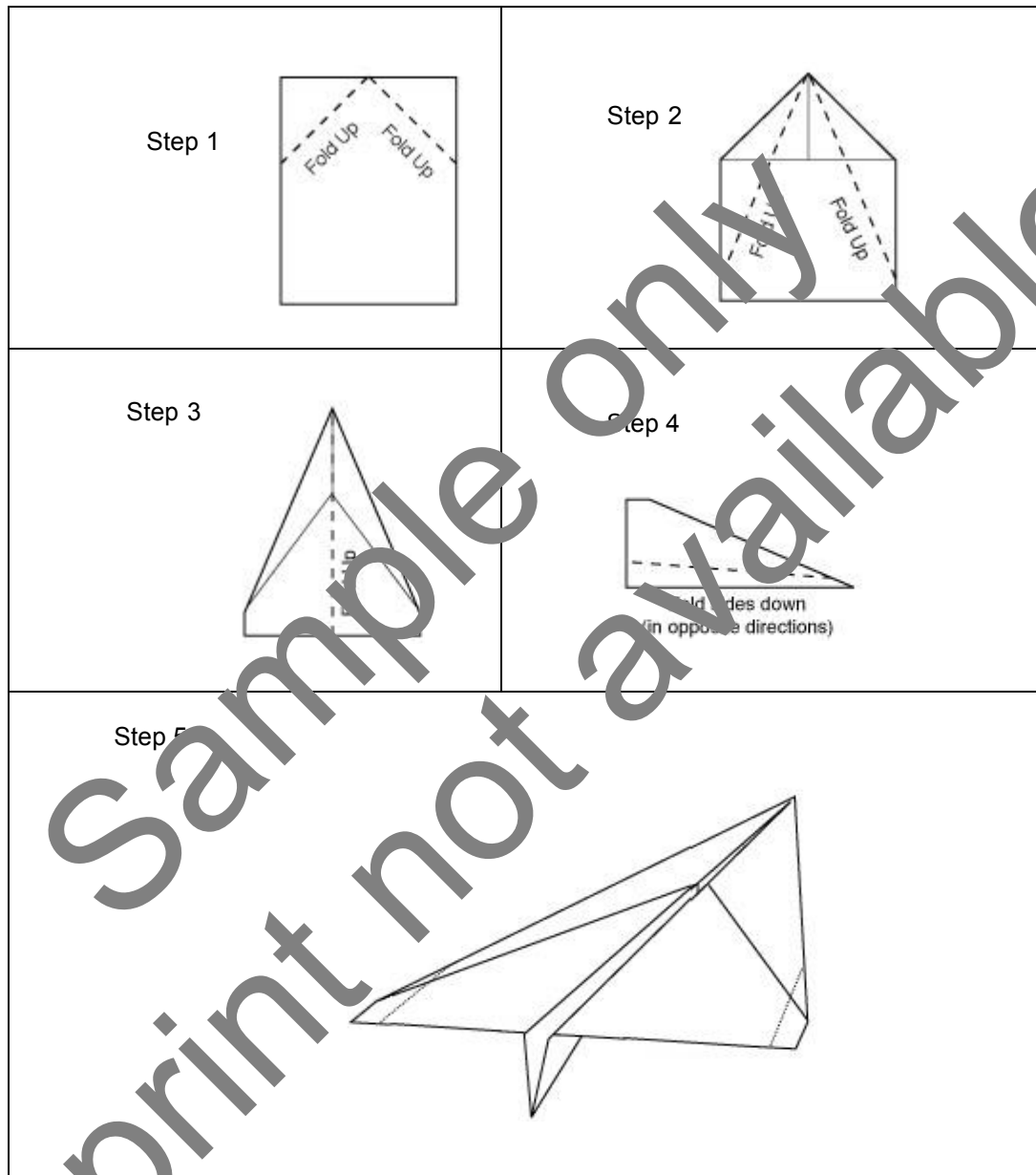
If students are interested in the plane creation part of this activity they can be encouraged to look at alternative designs for planes. They could search 'paper plane' sites where a whole world of extreme enthusiasts will be opened to them. Interested students could bring their new creations to class another day for a repeat challenge using either time or distance as the winning criteria.



How far will my plane fly?

Activity Sheet 1

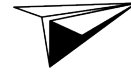
Use A4 paper and follow these instructions to make a paper plane.



How far will my plane fly?

Name:

Partner's name:



Flight	Estimated Distance	Measured Distance
Flight 1		
Flight 2		
Flight 3		
Flight 4		
Flight 5		

Fill in the spaces for these sentences:

My longest flight was

My shortest flight was

My partner's longest flight was

My best flight was metres [longer / shorter]
than my partner's [circle the correct word]

