

Dynamic Darts

You need

- ★ paper
- ★ measuring equipment (e.g., a tape measure, a stopwatch, a large protractor)
- ★ classmates

TECHNOLOGY

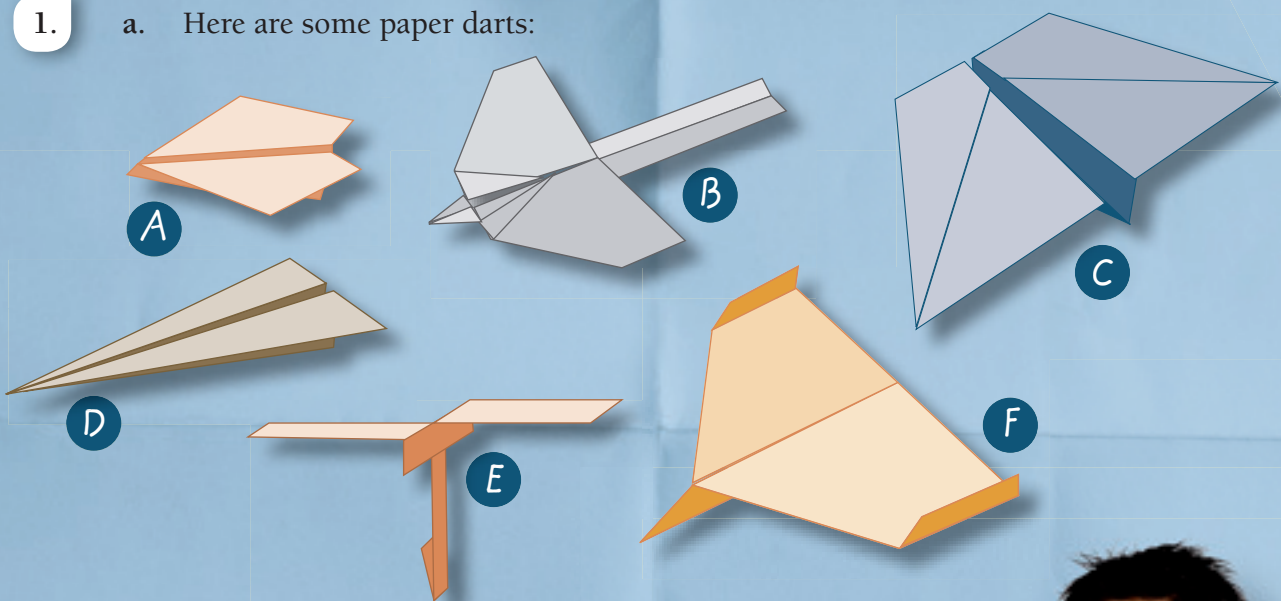
Making models is a useful and economic way to explore and evaluate designs.

The performance of a paper dart can be judged in different ways: its speed, how far it travels, how straight it flies, and how long it's in the air.

Activity One

1.

a. Here are some paper darts:



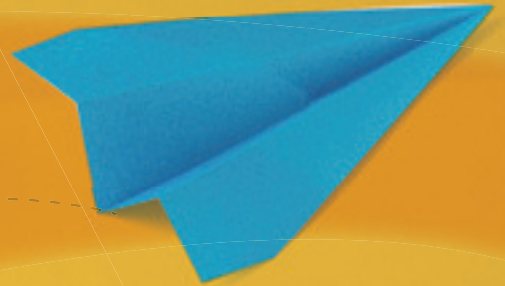
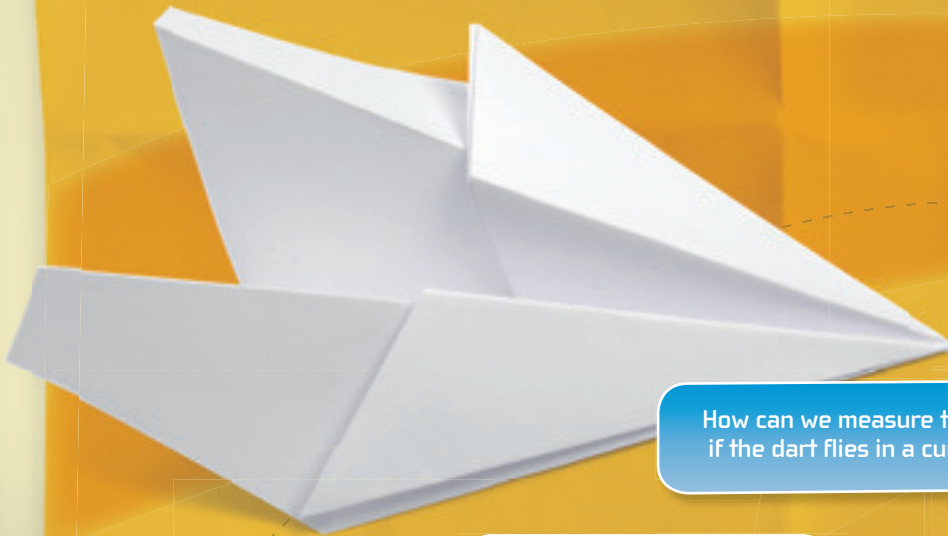
Which dart do you think will:

- fly the fastest?
 - fly the furthest?
 - fly the straightest?
 - stay in the air the longest?
- b. Explain your thinking to a classmate.



2.

- a. Working in a group of 2–4, choose one of the performance categories from question 1a.
- b. Make several different paper darts, each from a single sheet of A4 paper.
- c. Decide how you will evaluate their performance.



How can we measure the distance if the dart flies in a curve?

How can we measure how straight a dart flies?



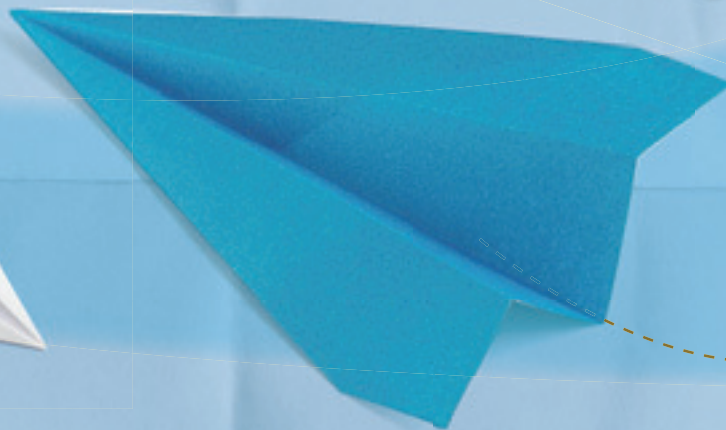
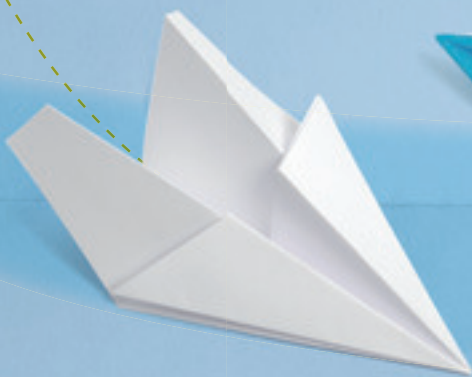
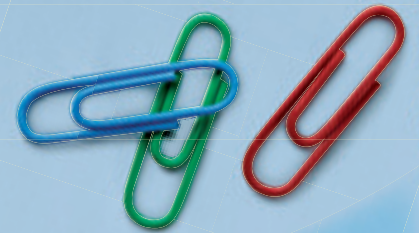
- d. Fly each dart at least three times. Take whatever measurements you need. Which dart performed best in your chosen category? How does your data show this?
- e. Based on your trials:
 - i. what attributes (design features) appear to improve a dart's performance?
 - ii. what attributes appear to have a negative effect on a dart's performance?

Activity Two

1.
 - a. Using your results from **Activity One**, select the design(s) that performed the best in your chosen category.
 - b. Brainstorm how you might modify the dart to further improve its performance. Here are some ideas:
 - use extra materials such as paper clips, staples, tape
 - change the size or length:breadth ratio of the paper
 - change the type of paper
 - change the position of the folds.

Each person in the group could investigate a different modification.

- c. Test your modified designs. Use the same measuring method as in **Activity One**. Record your results.
 - d. Which modifications worked? Use what you have learnt to make your “best ever” dart.
 - e. Measure the performance of your “best ever” dart.



2. Write a report showing the process you used to improve your dart's performance. Support your findings with data.

3. Calvin's group chose “stay in the air the longest” as their category. Their best performance went from 3 seconds (s) to 6.5 s. Mali's group chose the “fly the furthest” category. Their best performance increased from 6.2 metres (m) to 10.8 m.

Which group had the greatest improvement? Explain your reasoning.

Focus

Using measurement data to improve designs