Snazzy Snowflakes
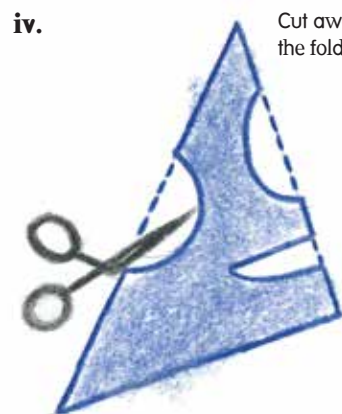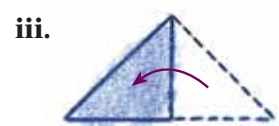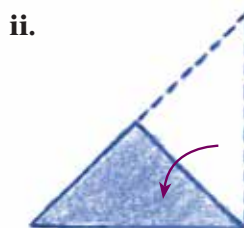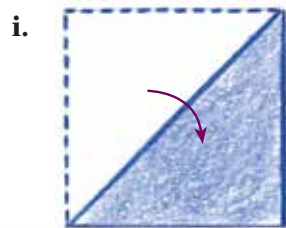
You need: squares of paper (thin is best), scissors

Lome is making paper snowflakes from squares of paper. The instructions below show how he does it.

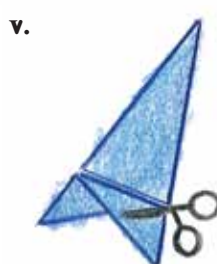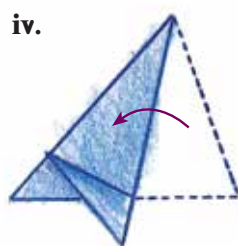1. **a.** Make several different snowflakes using these instructions:

    i. **ii.** **iii.**

    iv. Cut away parts of the folded square.

    b. How many axes of symmetry does each flake have?
    c. Describe the symmetry as a rotation.
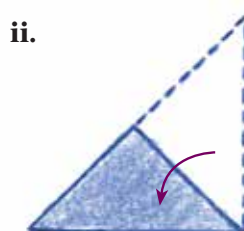
2. **a.** Make several different snowflakes using these instructions:

    i. **ii.** **iii.** These two angles should be the same.

    iv. **v.** **vi.**
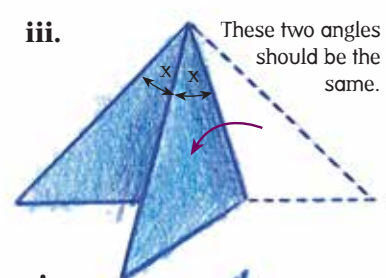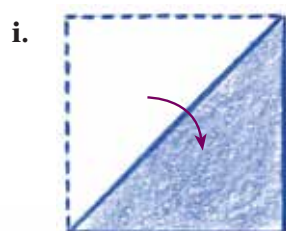
    b. How many axes of symmetry does each of these flakes have?
    c. Describe the symmetry as a rotation.

3. **a.** Make a snowflake with 8 axes of symmetry.
    b. Can you make one with 3 axes or 5 axes? Explain why or why not.

4. Experiment with different ways of folding and cutting a sheet of paper. (For example, fold a square as you would for the nose of a paper dart, then remove parts by cutting.) Describe the symmetries you discover, using the language of reflection and rotation.

5. The pattern on the right (which is not a snowflake) was cut from a square folded like this:
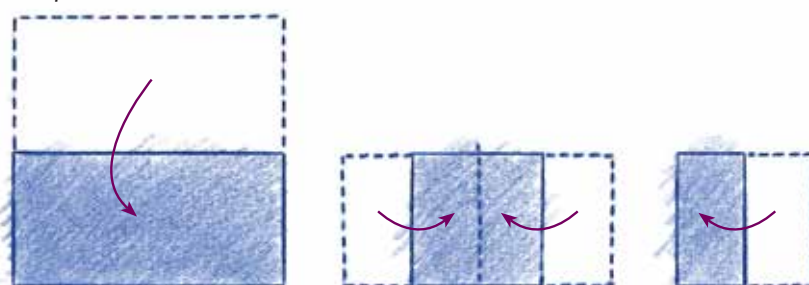
    a. Describe its symmetries, using the language of reflection and rotation.
    b. Make your own designs, using the same series of folds.

1. Complete the table for a square folded through the centre to make a snowflake:

Number of folds	Number of layers	Number of axes of symmetry
1		
2		
3		
4		
5		
10		

2. Start with the biggest square you can cut from an A4 sheet of photocopier paper. Experiment to find the maximum number of axes of symmetry your paper snowflake can have. Describe what you find.

Find out about real snowflakes. How are they formed? How many axes of symmetry do they have? Present your findings in the form of a poster. Add some of your cut-out snowflakes.