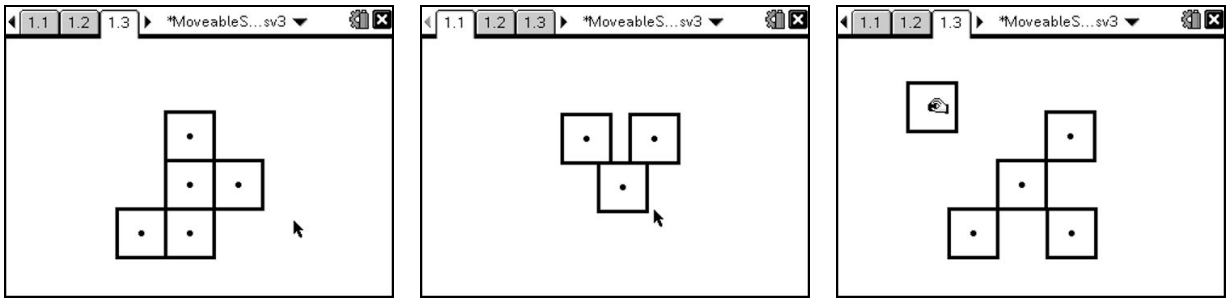
Moveable Squares
Teacher Notes

In this activity students are able to move a number of identical squares around the screen. This provides a simple but rich environment in which to explore ideas of symmetry and various other mathematical concepts.



Resources

The TI-Nspire document, MovableSquares.tns, provides pages with 3, 4, 5 and 6 squares. Although the document is perfectly usable by students working alone, it was particularly designed for use with TI-Nspire Navigator with the Screen Capture tool.

Skills required

Students need to be able to move from one page of the document to another by pressing ctrl ▶ or ctrl ◀.

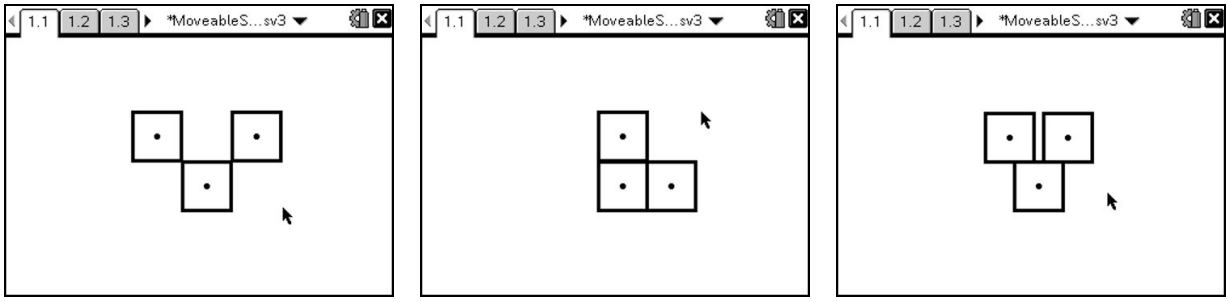
They also need to be able to move a square: place the cursor over its centre point, press ctrl and notice the closed hand. Then drag it to a new position and press .

The activity

There are many possible uses of the TI-Nspire document and three particular examples are given on the next two pages.

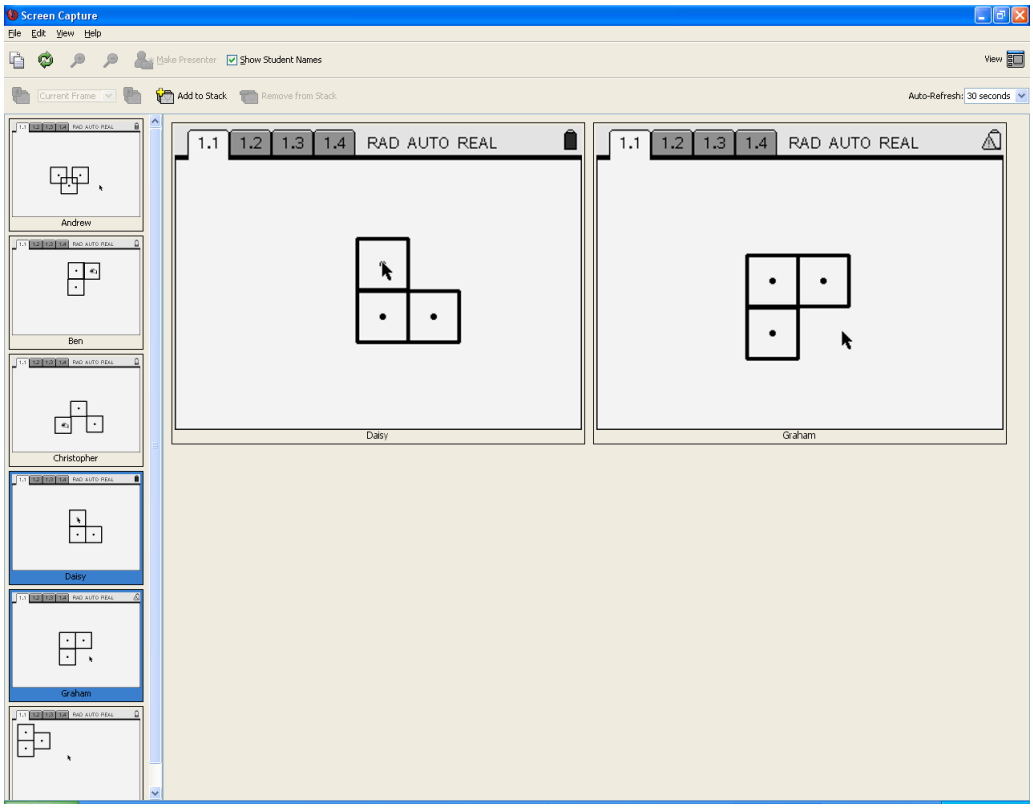
1) One line of symmetry

Students can be asked, for example, to arrange the 3 squares on page 1.1 in such a way that the arrangement has one line of symmetry. In how many different ways can this be done?

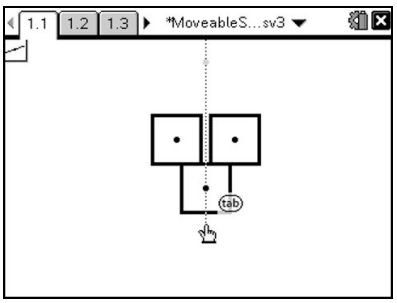


Discuss the rules for placing squares (e.g. Must they be touching? Must they be placed side to side? Is corner to corner OK? Can they overlap? Do we mean exactly one line of symmetry and not two?)

Using the Screen Capture tool within the Navigator software enables every student's shape to be displayed on the screen at the front of the class – an example is shown below.
Are Daisy's and Graham's arrangements the same?



Students can be asked to draw the line of symmetry by pressing menu 7 4.



Having established appropriate rules for placing squares, students can repeat the process for 4, 5 or 6 squares.

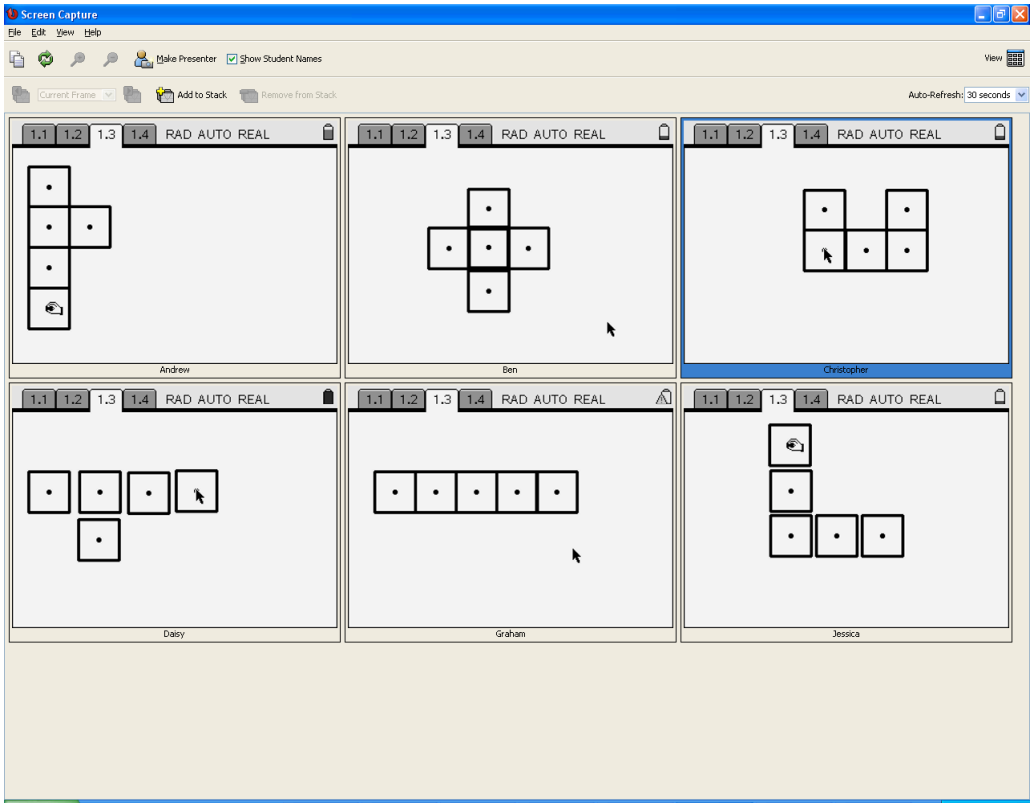
2) Pentominoes

On page 1.3 arrange the five squares so that they are fully connected along their edges (i.e an orthogonal connection). How many different shapes (known as pentominoes) can be found?

With the Screen Capture tool every student's pentonino to be displayed on the screen at the front of the class.

Are these two the same? How many different ones have we got? Can anyone find a new one?

Once a complete set has been found students can be asked to describe the symmetries of each pentomino.



Students can then repeat the activity using 3, 4 and 6 squares.
Many further puzzles and activities with pentominoes can be found on the internet.

3) Nets of a cube

On page 1.4 arrange the six squares so that they form the net of a cube.

How many distinct nets can be found?