Investigation Guide

Changing the Triangle

Use this guide in conjunction with the video *Changing the Triangle* available from Cube Tube.
http://www.mathematicscentre.com/mathematicscentre/cubetube.htm

You Need

- A ruler and a pair of scissors

1. View the video. It is only 11 seconds long, so you might have to watch a second time to realise what happens.

Challenge

The secret to changing the triangle into a rectangle is how it has been cut.
Your first challenge is to find out what is special about where the cuts have been made.

2. Rule up any shape of triangle on any old piece of paper and cut it out.
3. If you can make it work with one triangle try again with a very different shape of triangle.
4. Work with a partner until you can explain to someone else where the cuts need to be.
5. Record your explanation, in your journal.
6. Swap triangle pieces a few times with other people until you can easily change any triangle into a rectangle.
7. Add instructions for moving the pieces to your journal record. The person on the video didn't use very mathematical words. Can you think of better mathematical words to use?

Challenge

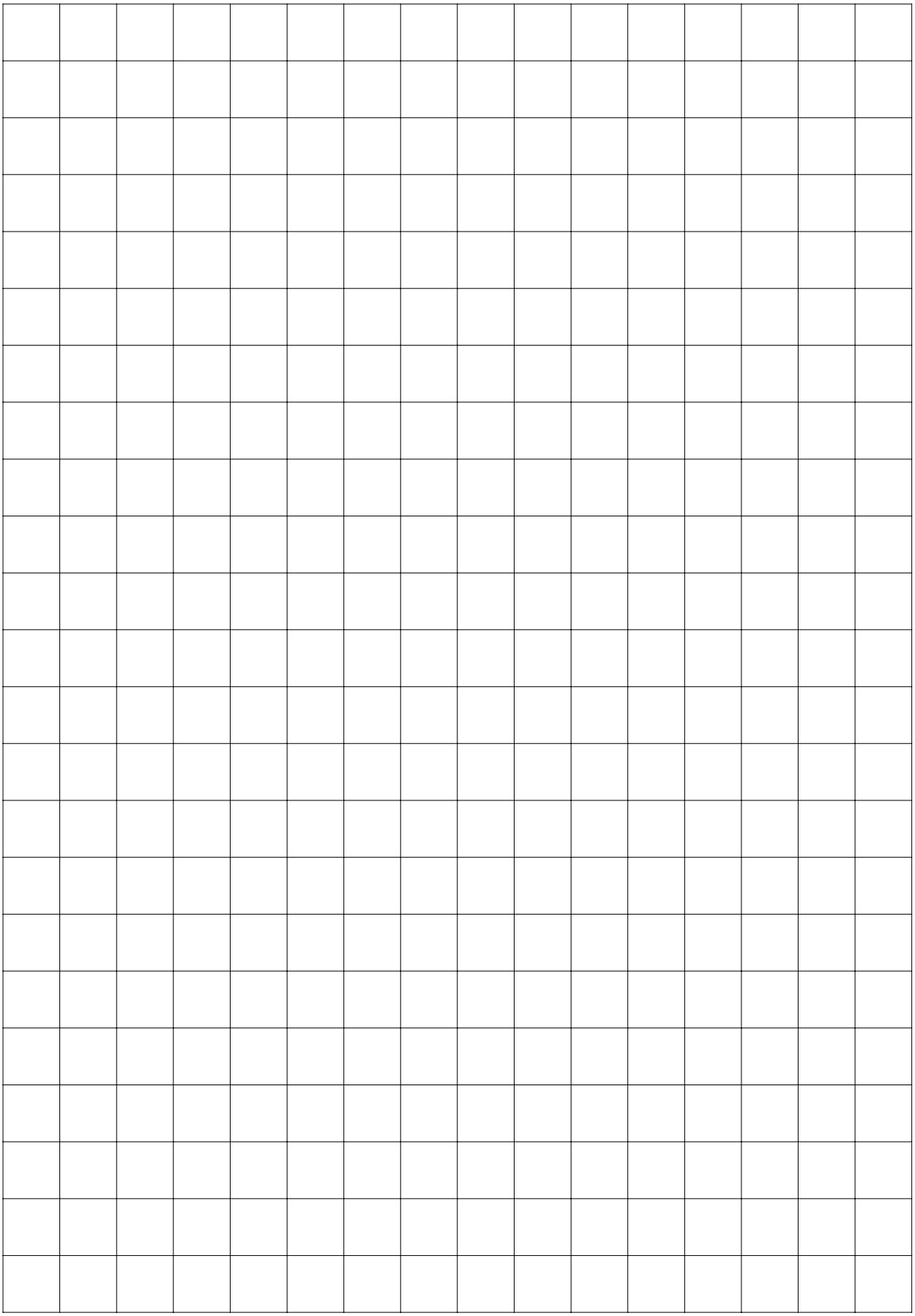
Your second challenge is to explain how to use your instructions to work out the area of a triangle.

8. Work with a partner until you can explain to someone else how the area of the triangle and the area of the rectangle are related?
9. Continue working with the partner until you can finish this sentence:
   To find the area of any rectangle...
10. Record your sentence in your book.
11. Rule three triangles on the graph paper on the next page.
    Use your ruler to help you work out each area.
    Check your calculations by counting squares.
    Each square measures 1 square centimetre.
12. If your teacher has Maths300 software, try some computer challenges from *Area of a Triangle*.

Think About Your Work

With your partner, read through Working Mathematically on Page 3.
Discuss and record how you have worked like a mathematician.

Square Line Paper



Working Mathematically

First give me an interesting problem.

When mathematicians become interested in a problem they:

- Play with the problem to collect & organise data about it.
- Discuss & record notes and diagrams.
- Seek & see patterns or connections in the organised data.
- Make & test hypotheses based on the patterns or connections.
- Look in their strategy toolbox for problem solving strategies which could help.
- Look in their skill toolbox for mathematical skills which could help.
- Check their answer and think about what else they can learn from it.
- Publish their results.

Questions which help mathematicians learn more are:

- Can I check this another way?
- What happens if …?
- How many solutions are there?
- How will I know when I have found them all?

When mathematicians have a problem they:

- Read & understand the problem.
- Plan a strategy to start the problem.
- Carry out their plan.
- Check the result.

A mathematician's strategy toolbox includes:

- Do I know a similar problem?
- Guess, check and improve
- Try a simpler problem
- Write an equation
- Make a list or table
- Work backwards
- Break the problem into smaller parts
- Act it out
- Draw a picture or graph
- Make a model
- Look for a pattern
- Try all possibilities
- Seek an exception
- ...

If one way doesn't work I just start again another way.