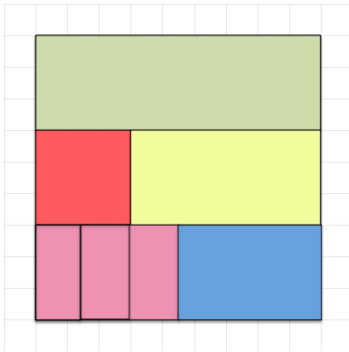


FRACTIONS BY THIRDS



This square is **one unit** and it is split into smaller parts. Label each part with the fraction it shows.

How many green rectangles make one unit?

How many small red squares make one unit?

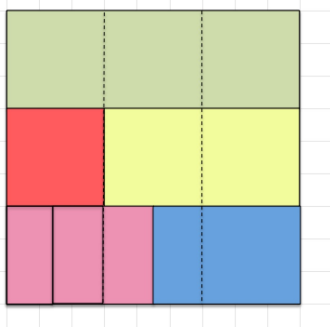
How many small blue rectangles make one unit?

How many small pink rectangles make one unit?

Which coloured bits would you use to show that three eighths is equal to one sixth $\frac{3}{18} = \frac{1}{6}$?

Which coloured bits would you use to show that two sixths is equal to one third $\frac{2}{6} = \frac{1}{3}$?

Which coloured bits would you use to show that one ninth plus two ninths is equal to one third $\frac{1}{9} + \frac{2}{9} = \frac{1}{3}$?



You may find that this 3 by 3 grid helps you to answer these questions.

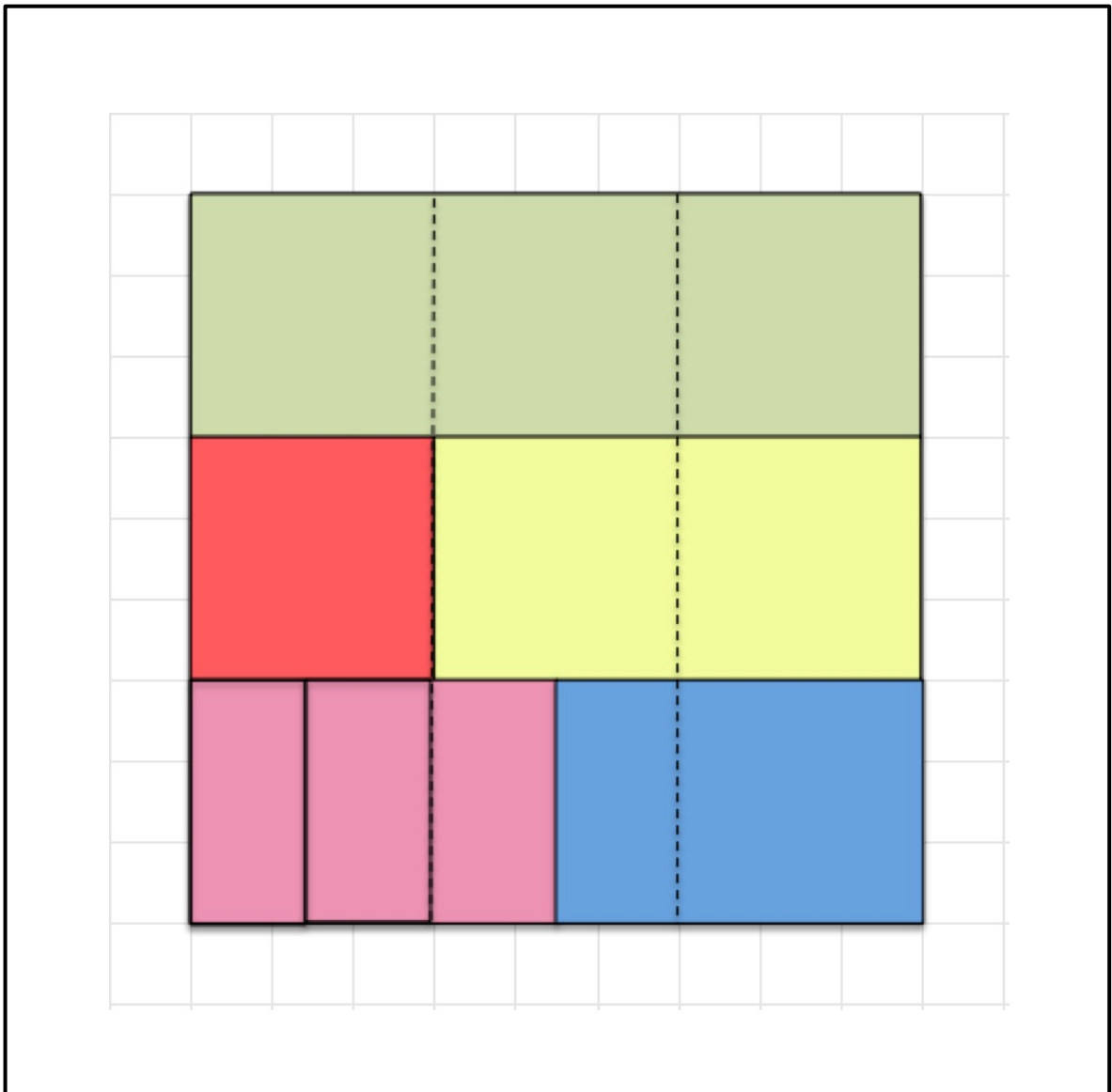
Draw your own pattern in a square and label the fractions in your pattern.

HELP

Cut out the frame below, which is made up of a white outer frame and a squared inner frame, and then cut out separately the 7 coloured pieces that together make the unit square (1 whole).

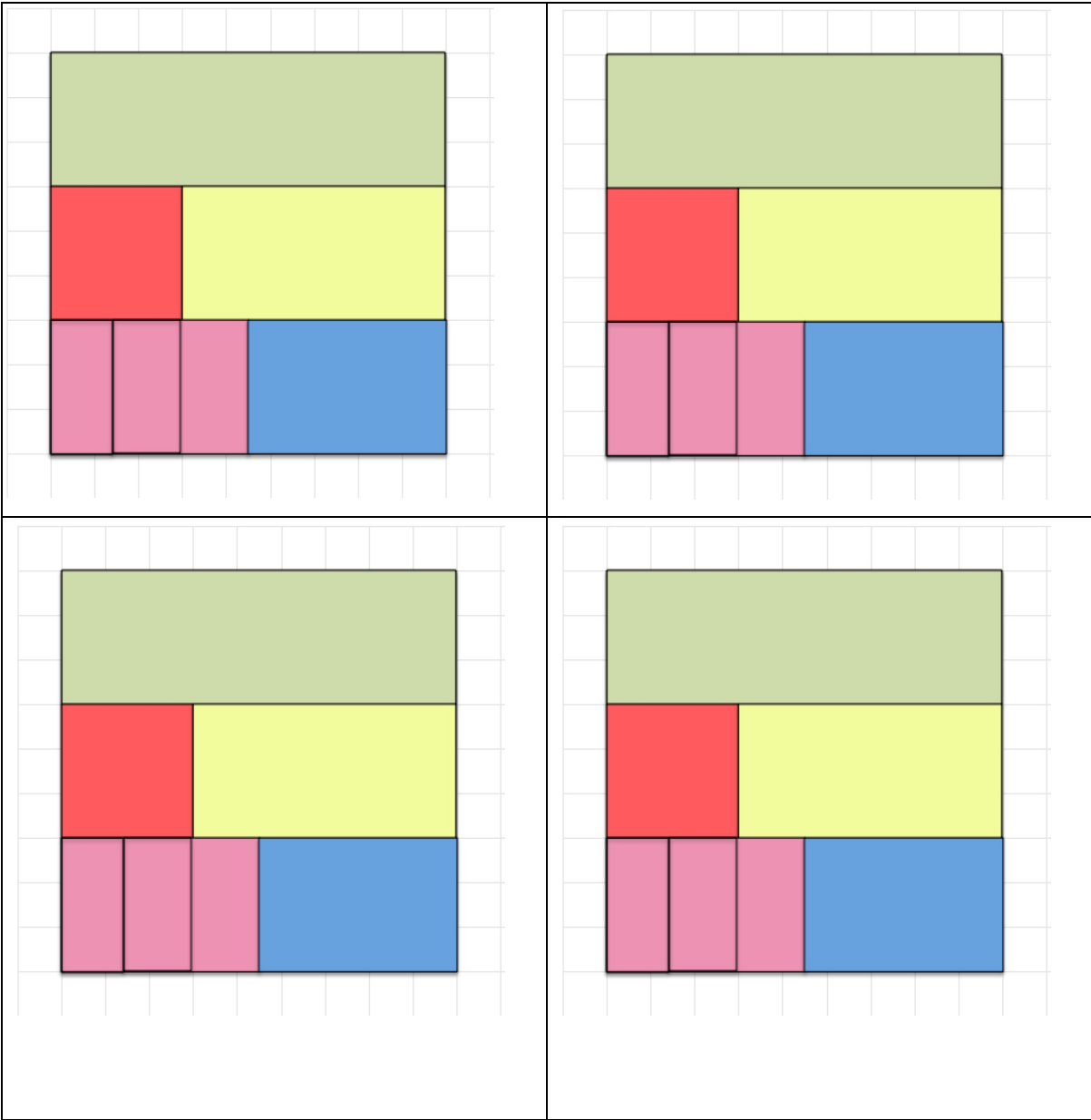
Using the original picture with this 3 by 3 grid should help learners to see that 9 of the small red squares make up one unit so they represent the fraction $\frac{1}{9}$.

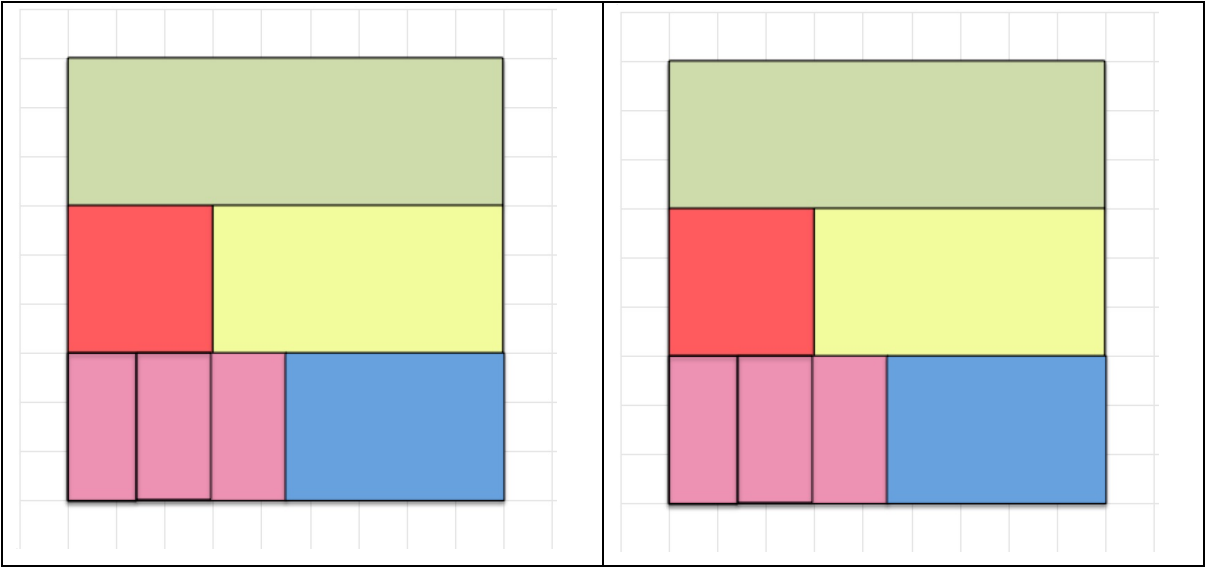
Following on from that, and using the 3 by 3 grid, learners should be able to answer the original questions.

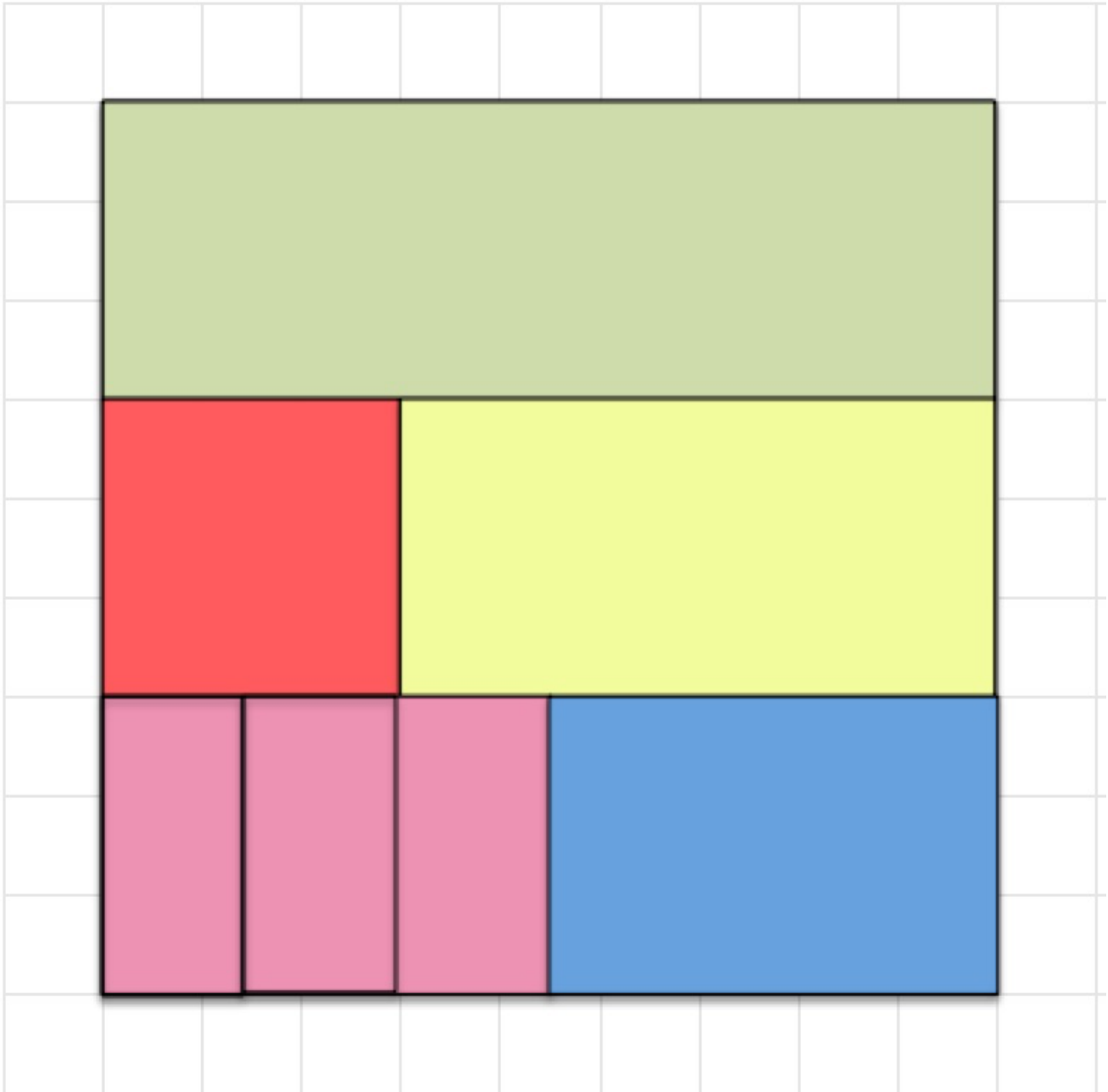


NEXT

Create your own problems for others to solve that involve one square unit split up into fractional parts.

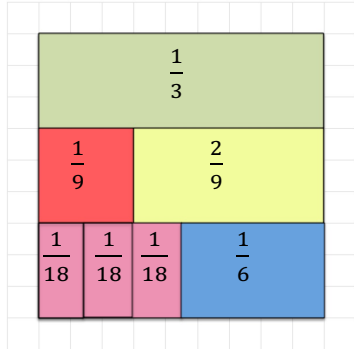






NOTES FOR TEACHERS

SOLUTION



Three green rectangles make one unit. The green rectangle is $\frac{1}{3}$.

Nine small red squares make one unit. The red square is $\frac{1}{9}$.

Six small blue rectangles make one unit. The blue rectangle is $\frac{1}{6}$.

Eighteen small pink rectangles make one unit? The pink rectangle is $\frac{1}{18}$.

The three pink rectangles show that three eighteenths equals one sixth: $\frac{3}{18} = \frac{1}{6}$.

The three pink rectangles and the blue rectangle show that two sixths equals one third $\frac{2}{6} = \frac{1}{3}$.

The red rectangle and the yellow rectangle show that one ninth plus two ninths equals one third $\frac{1}{9} + \frac{2}{9} = \frac{1}{3}$.

DIAGNOSTIC ASSESSMENT This should take about 5–10 minutes. Do the quiz at the start of the lesson and at the end.

Write each of the 4 questions on the board; each time say to the class:

“Put up 1 finger if you think the answer is A, 2 fingers for B, 3 fingers for C and 4 fingers for D”.

1. Notice how the learners respond. Ask a learner who gave answer A to explain why he or she gave that answer. DO NOT say whether it is right or wrong but simply thank the learner for giving the answer.
2. It is important for learners to explain the reasons for their answers. Putting thoughts into words may help them to gain better understanding and improve their communication skills.
3. Then do the same for answers B, C and D.
4. Try to make sure that learners listen to these reasons and try to decide if their own answer was right or wrong.
5. Ask the class to vote for the right answer by putting up 1, 2, 3 or 4 fingers. Notice if there is a change and who gave right and wrong answers.
6. The lesson to follow provides a remedial task to help learners to understand these concepts so the Diagnostic Quiz can be given at the start and the end of the lesson.

1. Which shape has 1 out of 3 parts shaded?
2. Which shape has 2 out of 3 parts shaded?
3. Which shape has 8 out of 30 parts shaded?
4. Which shape has 2 out of 4 parts shaded?

The correct answers are given below. What is this fraction of the whole in its lowest terms?

Question 1: B equal to $\frac{1}{3}$.

Question 2: D equal to $\frac{2}{3}$.

Question 3: C equal to $\frac{4}{15}$.

Question 4: A equal to $\frac{1}{2}$.

Why do this activity?

By doing this activity learners use and develop their visualising skills along with their knowledge of fractions. Learners get practice in understanding the concept of equivalent fractions, before having to use the concept when adding fractions, by investigating for themselves the representation of fractions, and talking to other learners and to the teacher about how many of the small parts make up one whole, that is the unit square. This activity gives a richer experience than just dealing with fractions numerically.

Learning objectives

In doing this activity students will have an opportunity to:

- practice recognizing and using equivalent forms of common fractions with 1-digit or 2-digit denominators in which one denominator is a multiple of another (thirds and ninths and also sixths and eighteenths).
- develop their visualisation skills by making conceptual links between numerical and pictorial representations of fractions.

Generic competences

In doing this activity students will have an opportunity to:

- develop the **skill of visualization** and interpreting and creating visual images to represent concepts;
- **work in a team** to
 - collaborate and work with a partner or group and
 - through discussion help each other to solve a problem or understand a concept better.

Suggestions for Teaching

Start with the diagnostic quiz (see pages 6 and 9).

The learners should have a copy of the question on page 1. You may like to copy it on the board or photocopy it from the top half of page 1. The learners could work in small groups and cut up the pictures on page 3 to see how many smaller parts fit each larger part or fit into the whole unit.

Emphasise to learners that the unit square represents ONE UNIT and the challenge is to find information about the fractions represented by the different parts of the square. After starting the lesson with the diagnostic question it is important to let the learners investigate for themselves. The teacher should observe and only ask questions.

If learners are struggling you could point out to the learners that the picture is superimposed onto squared paper and takes up 9 squares by 9 squares. Ask the learners to mark the fractions on the smaller bits of the picture. Give them some time to do this. Then you might conduct a class discussion using the key questions to ask learners about the equivalent fractions illustrated in the diagram. Using a copy of the diagram drawn on the board, or photocopied from page 4, ask different learners to label the parts ($\frac{1}{3}, \frac{1}{6}, \frac{1}{9}, \frac{1}{18}$) and give reasons for their choices.

Each learner could paste a copy of the diagram into their workbook and label the parts. Also the class could make a poster for the classroom wall.

Key questions

- What shapes have you found?
- Which is the biggest/smallest shape?
- How many of that shape would you need to make up one unit?
- Tell me how you found that out?
- How many green rectangles make one unit? So what fraction is the green rectangle?
- How many small red squares make one unit? So what fraction is the red square?
- How many small blue rectangles make one unit? So what fraction is the blue rectangle?
- How many small pink rectangles make one blue rectangle?
- How many small pink rectangles make one unit? So what fraction is the pink rectangle?

Follow-up

Or see FRACTIONS BY HALVES

<https://aiminghigh.aimssec.ac.za/years-5-6-fractions-by-halves>

and CHOCOLATE <https://aiminghigh.aimssec.ac.za/years-4-8-chocolate/>

Go to the **AIMSSEC AIMING HIGH** website for lesson ideas, solutions and curriculum

MATHS



TOYS

links: <http://aiminghigh.aimssec.ac.za>

Subscribe to the **MATHS TOYS YouTube Channel**

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Download the whole AIMSSEC collection of resources to use offline with the **AIMSSEC App** see <https://aimssec.app> or find it on Google Play.

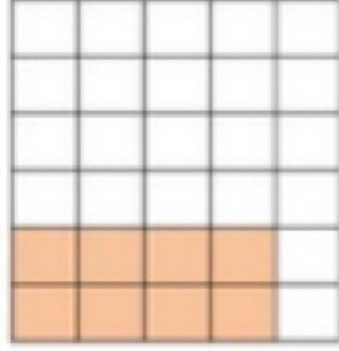
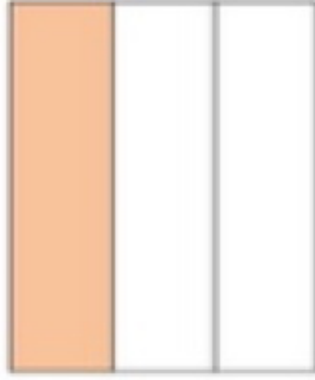
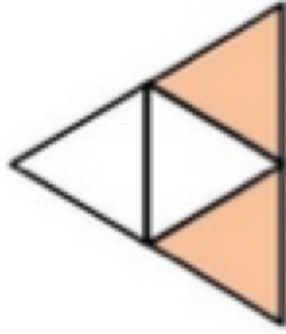
Note: The Grades or School Years specified on the AIMING HIGH Website correspond to Grades 4 to 12 in South Africa and the USA, to Years 4 to 12 in the UK and school years up to Secondary 5 in East Africa.

New material will be added for Secondary 6.

For resources for teaching A level mathematics (Years 12 and 13) see <https://nrich.maths.org/12339>

Mathematics taught in Year 13 (UK) & Secondary 6 (East Africa) is beyond the SA CAPS curriculum for Grade 12

	Lower Primary Approx. Age 5 to 8	Upper Primary Age 8 to 11	Lower Secondary Age 11 to 15	Upper Secondary Age 15+
South Africa	Grades R and 1 to 3	Grades 4 to 6	Grades 7 to 9	Grades 10 to 12
East Africa	Nursery and Primary 1 to 3	Primary 4 to 6	Secondary 1 to 3	Secondary 4 to 6
USA	Kindergarten and G1 to 3	Grades 4 to 6	Grades 7 to 9	Grades 10 to 12
UK	Reception and Years 1 to 3	Years 4 to 6	Years 7 to 9	Years 10 to 13



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