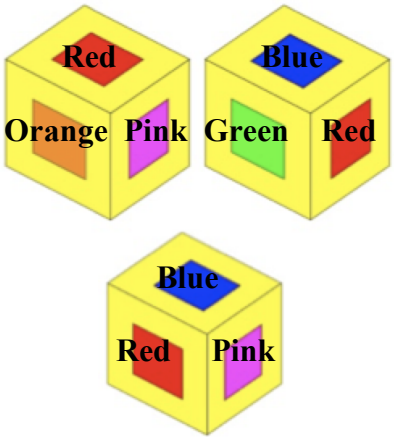
AIMSSEC

AFRICAN INSTITUTE FOR MATHEMATICAL SCIENCES
SCHOOLS ENRICHMENT CENTRE (AIMSSEC)
AIMING HIGH

HOW DO YOU SEE IT



Here are three views of the same cube.

One face (not shown) is plain yellow.

The other five faces have squares on them coloured blue, orange, pink, green and red.

Which face is opposite the blue one?

Draw a net of this cube and label the six faces.

Help

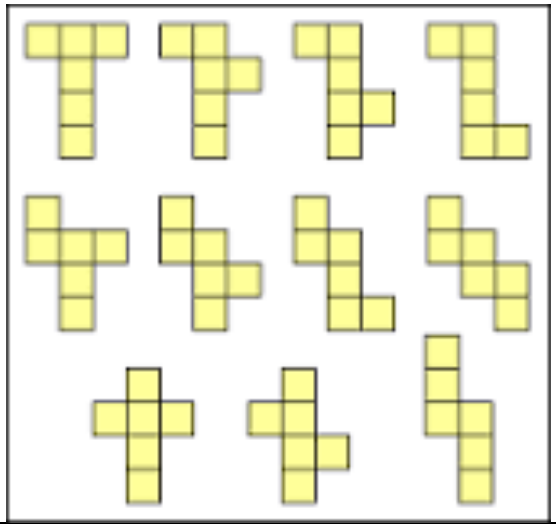
You might find or make a cube and label the faces with the colours given.

NET

Box turned inside out

Actually any cuboid shaped box will do just as well. So if you can find a cardboard box, possibly one from the kitchen at home that is being thrown away, then cut it very carefully to get a net, then you can fold and unfold it. This way you will be able to find a solution.

Extension



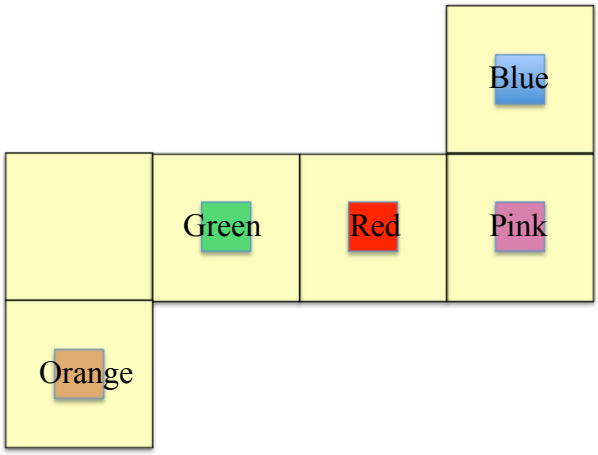
Which of these shapes will make the net of a closed cube (not an open box)?

Make a cube from one of these nets and make up your own puzzle.

If you found this task straightforward could try to make the net of a regular octahedron with 8 equilateral triangles as the faces.

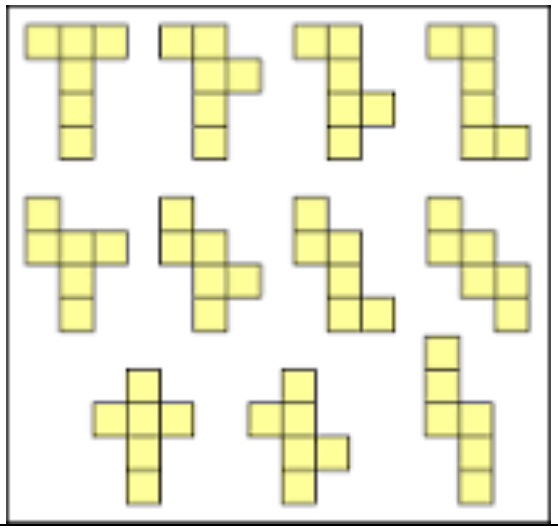
NOTES FOR TEACHERS

SOLUTION



The orange face is opposite the blue one.

The net can be drawn in other ways.

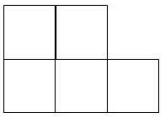


Diagnostic Assessment

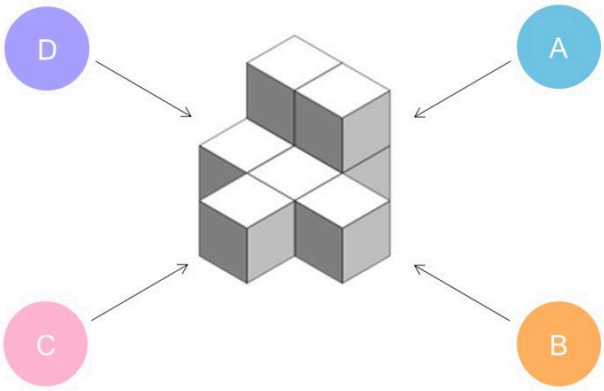
This should take about 5–10 minutes.

1. Write the question on the board, 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".
2. Notice how the learners responded. Ask a learner who gave answer A to explain why he or she gave that answer and DO NOT say whether it is right or wrong but simply thank the learner for giving the answer.
3. Then do the same for answers B, C and D. Try to make sure that learners listen to these reasons and try to decide if their own answer was right or wrong.
4. **Ask the class again 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.** It is important for learners to explain the reason for their answer otherwise many learners will just make a guess.
5. If the concept is needed for the lesson to follow, explain the right answer or give a remedial task.

Kate has the following view:



From which side is she viewing the shape?



C. is the correct answer.

Common Misconceptions

Learners who answer **A. B.** or **D**. are likely to be guessing.

https://diagnosticquestions.com

After the learners have answered this and given reasons for their answers, if you have 8 cubes available you might make this structure and turn it round so learners can see it from all 4 views. Then you could again ask them to put fingers up for their choice of answers A, B, C or D.

Why do this activity?

This activity develops observation and visualisation skills. It requires learners to visualise the adjoining faces of the cube and transfer this to a net of the cube.

Learning objectives

In doing this activity students will have an opportunity to:

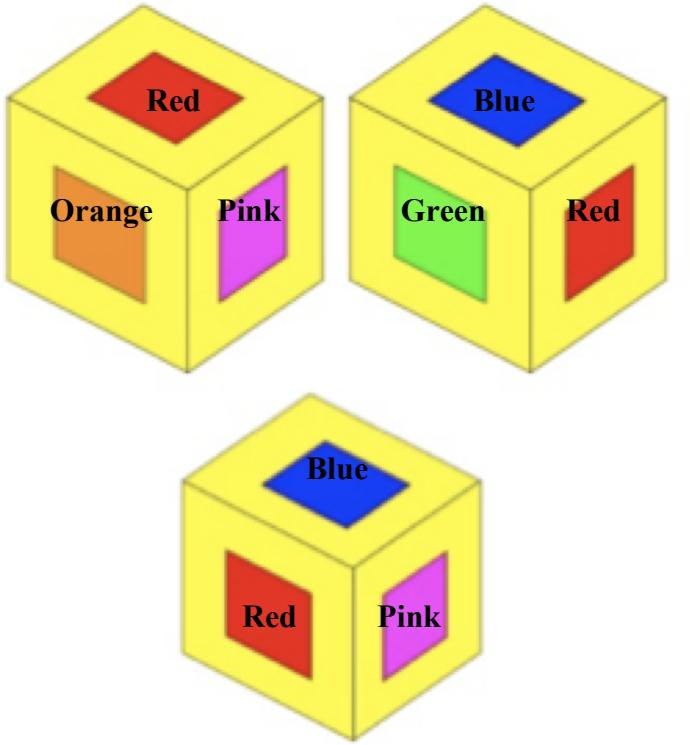
- learn to recognize the properties of a cube;
- develop their visualization skills, in particular to recognize 2 dimensional sketches of 3 dimensional objects.

Generic competences

In doing this activity students will have an opportunity to:

- think flexibly, be creative and innovative - to apply knowledge and skills;
- visualize - develop the skill of interpreting and creating visual images to represent concepts and situations.

Suggestions for teaching



Squared paper, scissors and sticky tape would be useful!

You could start by showing the group a picture of the 3 cubes and asking the question "Which face is opposite the blue one?"

When you have discussed it and what needs to be done learners could work in pairs so that they are able to talk through their ideas with a partner.

They could draw a net of a cube on squared paper and cut it out. Then by folding and unfolding it they can experiment with how the colours will appear on the paper and on the cube. They could write B, R, P, G and O in pencil (that can be rubbed out and changed) on the faces of their cube net.

The net can be any arrangement that can be folded into a cube, not necessarily the first one shown in the solution.

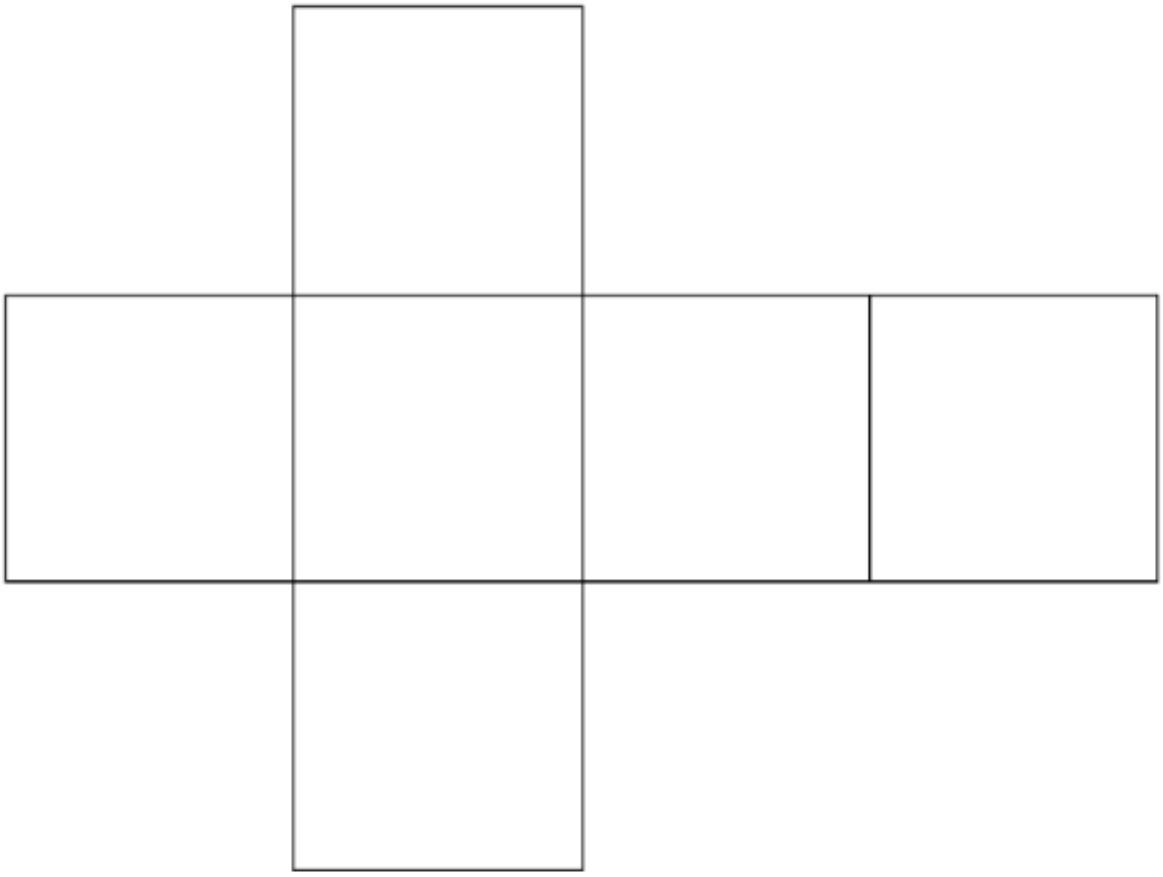
At the end of the lesson, the learners could show the whole group both their cubes and the nets they have drawn. The class' work would make a great display, along with a copy of the challenge itself.

Key questions

- Why do you think these two faces are next to each other on the cube?
- Look at these two faces. Which other one goes near them?

Follow-up ideas

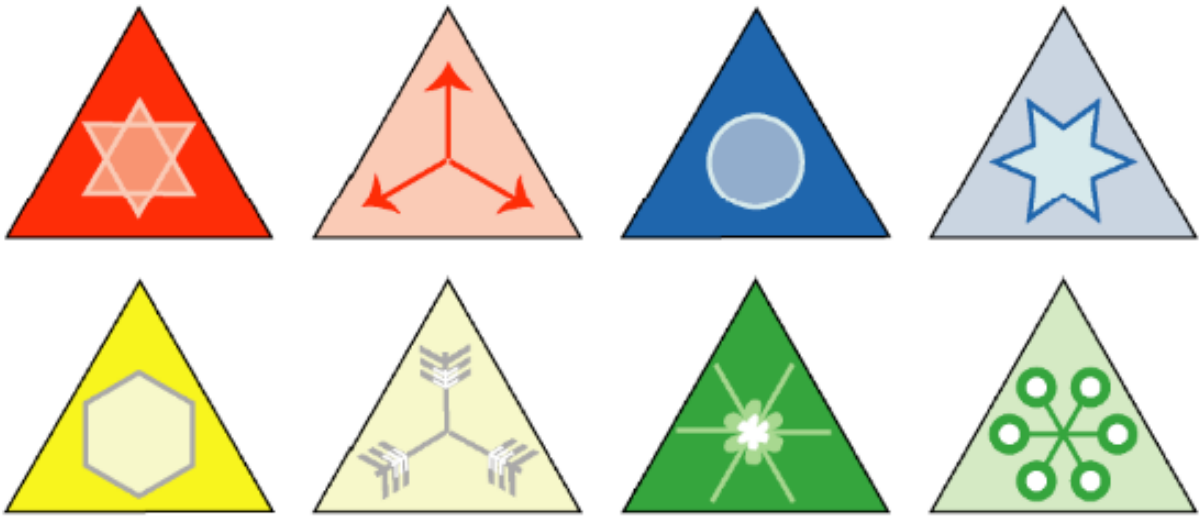
Cube Nets https://aiminghigh.aimssec.ac.za/years-6-10-cube-nets/
Three Views https://aiminghigh.aimssec.ac.za/years-4-8-three-views/
Make an Octahedron – see worksheet on page 5.



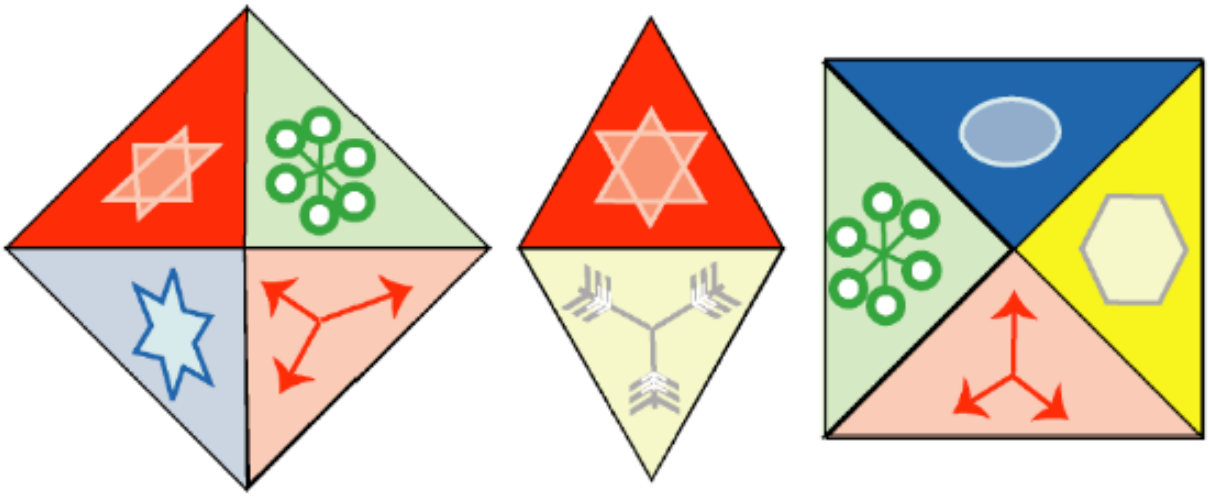
Make an Octahedron

An octahedron has eight faces which are equilateral triangles.

Here are the faces of an octahedron:



Here are three views of the octahedron:



Can you draw the octahedron's net?

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 up to Secondary 5 in East Africa. **Note:** The mathematics taught in Year 13 (UK) and Secondary 6 (East Africa) is **not** included in the school curriculum for Grade 12 SA.				
	Lower Primary or Foundation Phase **Age 5 to 9**	**Upper Primary** **Age 9 to 11**	**Lower Secondary** **Age 11 to 14**	**Upper Secondary** **Age 15+**
South Africa	**Grades R and 1 to 3**	**Grades 4 to 6**	**Grades 7 to 9**	**Grades 10 to 12**
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**
East Africa	**Nursery and Primary 1 to 3**	**Primary 4 to 6**	**Secondary 1 to 3**	**Secondary 4 to 6**