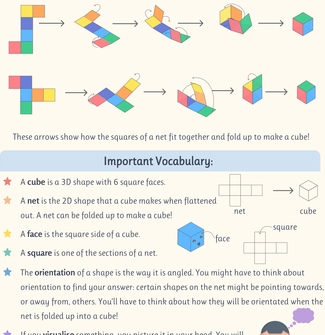
Nets and Cubes

What do you need to know?

In **Nets and Cubes** questions, you will be shown a **net** and asked to work out what it would look like when it is folded up into a **cube**.

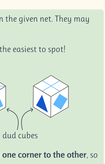
How to fold a net into a cube:



These arrows show how the squares of a net fit together and fold up to make a cube!

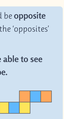
Important Vocabulary:

- A **cube** is a 3D shape with 6 square faces.
- A **net** is the 2D shape that a cube makes when flattened out. A net can be folded up to make a cube!



- A **face** is the square side of a cube.
- A **square** is one of the sections of a net.

- The **orientation** of a shape is the way it is angled. You might have to think about orientation to find your answer: certain shapes on the net might be pointing towards, or away from, others. You'll have to think about how they will be orientated when the net is folded up into a cube!
- If you **visualise** something, you picture it in your head. You will have to visualise the cube that would be made from a given net.



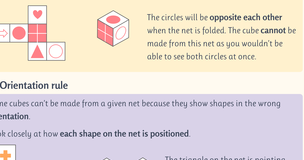
Rules:

You can use these rules to work out which cubes **cannot be made** from the net you've been given.

1) 'Dud' rule

A dud cube is a cube that has features that are **not** shown on the given net. They may show a **shape** or a **colour** that is **not on the net**.

Always start your search by looking for dud cubes - they're the easiest to spot!

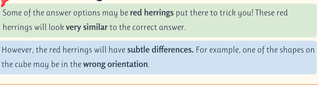


- None of the squares on the net contain lines that run **from one corner to the other**, so there won't be any lines that run from one corner to the other on the cube.
- None of the squares on the net contain **dark blue shapes**, so there won't be any dark blue shapes on the cube.

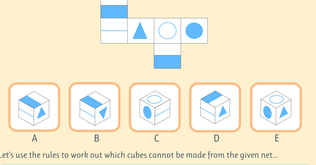
2) Opposites rule

Some cubes can't be made from a given net because squares that should be **opposite each other** when the net is folded are shown **next to each other**. This is the 'opposites' rule!

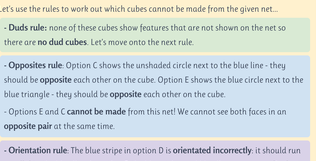
There are three pairs of opposite squares on every net. You will **never be able to see both faces in a pair at the same time when the net is folded into a cube.**



Opposite pairs - The squares that are the same colour on these nets will be **opposite faces** of the cube! You would not see two faces of the same colour when these nets are folded into cubes. Think about a dice, the faces with 1 and 6 are opposite faces.



The triangles will be **opposite each other** when the net is folded. The cube **cannot** be made from this net as you wouldn't be able to see both triangles at once.

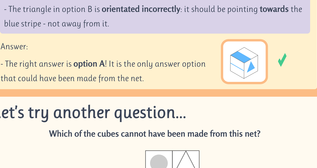


The circles will be **opposite each other** when the net is folded. The cube **cannot** be made from this net as you wouldn't be able to see both circles at once.

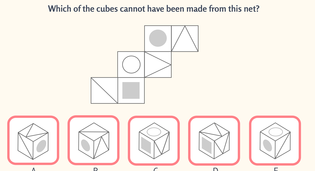
3) Orientation rule

Some cubes can't be made from a given net because they show shapes in the wrong **orientation**.

Look closely at how **each shape on the net is positioned**.



The triangle on the net is pointing **towards** the circle, so it will also point towards the circle on the cube.



The triangles on the net are pointing **towards each other**, so they will also point towards each other on the cube.

Red Herrings!

Some of the answer options may be **red herrings** put there to trick you! These red herrings will look **very similar** to the correct answer.

However, the red herrings will have **subtle differences.** For example, one of the shapes on the cube may be in the **wrong orientation**.

Let's have a look at an example...

Which of the cubes below could have been made from this net?

Let's use the rules to work out which cubes cannot be made from the given net...

- **Duds rule:** none of these cubes show features that are not shown on the net so there are **no dud cubes**. Let's move onto the next rule.

- **Opposites rule:** Option C shows the unshaded circle next to the blue line - they should be **opposite** each other on the cube. Option E shows the blue circle next to the blue triangle - they should be **opposite** each other on the cube.

- Options E and C **cannot be made** from this net! We cannot see both faces in an **opposite pair** at the same time.

- **Orientation rule**: The blue stripe in option D is **orientated incorrectly**: it should run **parallel** to the blue line. In option D the blue stripe and blue line are **perpendicular** to each other.

- The triangle in option B is **orientated incorrectly**: it should be pointing **towards** the blue stripe - not away from it.

Answer:

- The right answer is **option A**! It is the only answer option that could have been made from the net.

Let's try another question...

Which of the cubes cannot have been made from this net?

Let's use the rules to work out which cube cannot be made from the given net...

- **Duds:** None of these cubes show features that are not shown on the net so there are **no dud cubes**. Let's move onto the next rule.

- **Opposites rule:** None of these cubes show a pair of opposite faces next to each other. Let's move onto the next rule.

- **Orientation rule:** If we visualise folding the left side of the net, we can see that the line in option E is in the **wrong orientation**. The line should run **perpendicular** to how it is shown in E!

Answer:

- The right answer is **option E**! It is the **only** answer option that **could not** have been made from the net.

- All the other cubes could be made from the net.

Tips!

- Look out for **red herrings** - pay attention to the **orientation** of each shape shown on a cube.
- It may help you to draw and cut out your own version of the net. You can then fold it together to see if the shapes are in the **correct orientation**. This will help you spot any red herrings!