



C45



20-25 minutes

MISSION IMPOSSIBLE – SPATIAL COMBINATORICA



- To facilitate the discovery that we can construct large building blocks from smaller ones
- To practise constructing a large building block using different combinations of smaller building blocks
- To promote flexibility, creativity and spatial imagination – the ability to create several solutions to a problem
- To develop the ability to record solutions to a 3D problem by drawing a detailed 2D diagram
- To develop self-regulation

FROM YOUR BLOCK SET

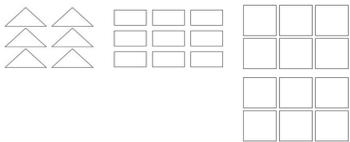
- ❖ One large half-cube, one large prism and one cuboid
- ❖ Access to your full block set



- ❖ Brickie Bill



- ❖ 4 Outline Diagram sheets – one of large prisms, one of cuboids and two of large half-cubes (per child)



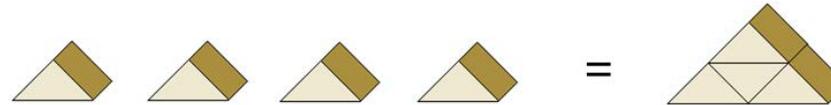
- ❖ A pencil (per child)
- ❖ A 'magic wand'



Note: Don't let your child see the diagrams on these sheets! They don't need to find all the combinations for each part of the session, but the more possibilities that they discover, the better.

'Abracadabra, Flying Pig, Four Small Prisms Become One Big!':

Give your child four small prisms and a magic wand. Ask them to wave the wand and say, '*Abracadabra, flying pig, four small prisms become one big!*' At that moment, make the large prism with their four small ones as shown here:



Now introduce Brickie Bill. Say: *Brickie Bill and his friends are going to build a new swimming pool in Toy Town. The problem is that some of the building blocks the architect has drawn will be too big and heavy for the workers to lift and carry about. And they don't have suitable trucks or lifting equipment. Can you think how they could solve this problem?* Listen to their ideas, make the necessary 'excuses' regarding what wouldn't work and agree that they could use smaller blocks.

Constructing a Large Prism from Smaller Blocks:

Put a large prism on the table. Give your child the sheet with several outline diagrams of a large prism. Say: *Can you think about which smaller blocks they could use to make the large prism? Brickie Bill needs to see as many different solutions as possible. This will really help Brickie Bill and his friends as they will be able to make big blocks out of blocks that are small enough to carry.*

CONTINUED ON THE NEXT PAGE



- Your child can construct large building blocks (prism, half-cube, cuboid) from smaller ones.
- Your child can construct a large building block in several ways, using differing combinations of smaller building blocks.
- Your child can draw detailed 2D diagrams of their solutions by tracing around the blocks.
- Your child can answer quiz questions correctly, either verbally or by demonstrating the answer with blocks.



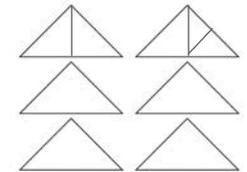
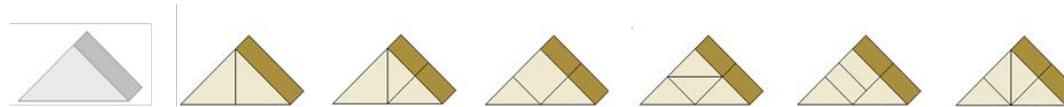
KEY TO LEARNING
@HOME

MISSION IMPOSSIBLE – SPATIAL COMBINATORICA – continued



While your child is covering the outline prisms on their sheet with smaller blocks, have Brickie Bill ‘look’ at them and ‘thank’ your child for working so hard to find all the different solutions to the problem. (Don’t wait until your child has finished to have Brickie Bill do this as they won’t have enough small prisms to make all six possibilities shown below at once.) Have Brickie Bill explain that he wants to show his friends all the different ways of making big prisms from smaller blocks, but he knows he won’t be able to remember all the ones that your child will come up with. Ask your child if they have any ideas about how to help Brickie Bill remember.

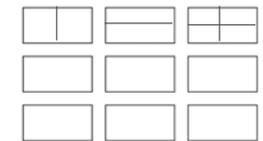
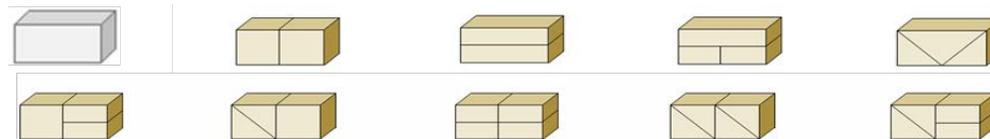
Listen to their ideas, and then agree that they can draw around the blocks, leaving traces/marks on the paper, and then Brickie Bill can take the drawing away, and he and his friends will be able to see all the different arrangements of blocks that can be used to make the prisms. At this point, ask your child – for the combinations that they have already thought of – to draw around the blocks and then to take them away, leaving the marks on the paper. Then they can move the blocks as they finish each combination and use them to create other combinations on the other prism outlines, drawing around each accordingly until they have filled the sheet with the combinations that they have discovered.



When they have finished, have Brickie Bill ‘check’ what they have done, ‘collect’ the sheet and ‘thank’ them again.

Constructing a Cuboid from Smaller Blocks:

Have Brickie Bill come back and remind your child that he also needs help from them with another of the blocks that the architect used – the cuboid. Have him reiterate that this is too big and heavy too. Repeat the process done above, this time with a cuboid and the Outline Diagram sheet of cuboids.

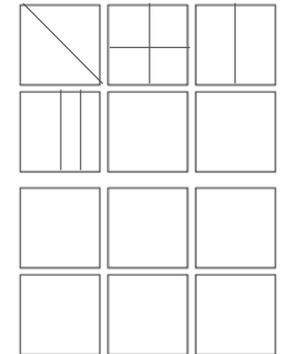
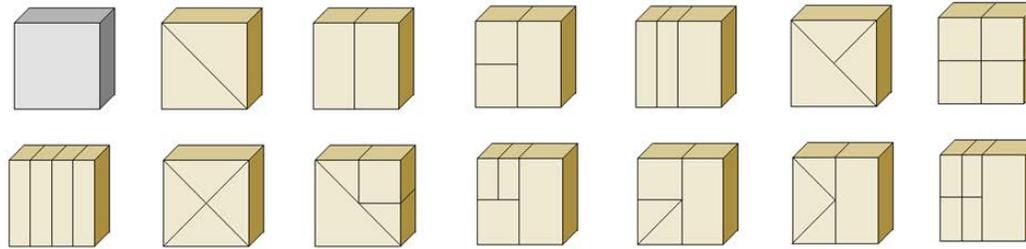


CONTINUED ON THE NEXT PAGE



Constructing a Large Half-Cube from Smaller Blocks:

Repeat the process once more, this time with a large half-cube and the Outline Diagram sheet of large half-cubes.



Construction Quiz – ‘What block can it be?’

Ask your child some questions about the block shapes that result when we combine small blocks to make bigger blocks. Ask them one question at a time, encouraging them to close their eyes, visualise the answer and then say it out loud. There is more than one possible answer for some questions.

If they cannot answer verbally (or answer incorrectly), ask them to open their eyes, find the two blocks and show the answer by building it.

Here are some examples of questions:



- What building block can be made from two prisms?
- What building block can be made from two cuboids?
- What building block can be made from two half-cubes?
- What building block can be made from two quarter-cubes?
- What building block can be made from two half-cylinders?
- What building block can be made from two short cylinders?

Cut out Brickie Bill.



