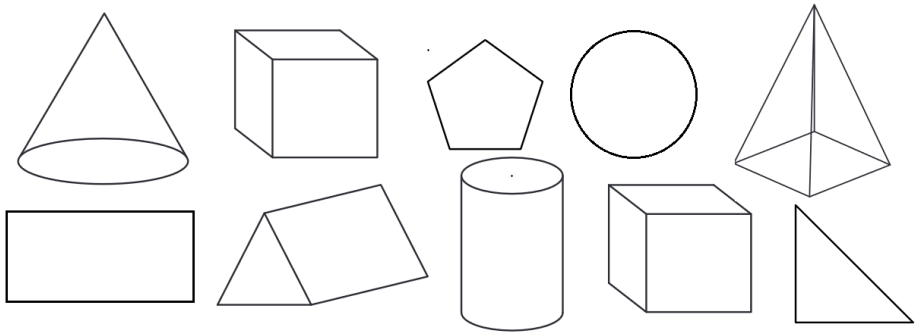
Build your dream house (Level 2)

Description	Learners will create a model of their dream house or room and learn about geometry and operations!
Leading Question	How can we use shapes to build our dream house?
Total Time Required	~ 4.5 hours in total over 5 days
Supplies Required	Paper/cardboard, ruler/measuring tape, color pens, scissors, glue/tape/stapler
Learning Outcomes	1. Understanding 3D shapes and their properties
Previous Learning	• Addition within 10 • Some knowledge of 2D shapes • Draw and Calculate Like an Architect project to get an introduction to scaling models.
Topics Covered and Skills Developed	• 3D shapes and their properties • Vocabulary – 3D shapes, faces, edges, vertices, corners • Creativity, drawing and design skills • Presentation and communication skills

Day 1

Today you will learn about creating a model of our dream house and practice some math!

Suggested Duration	Activity and Description
20 minutes	**Activity 1: Checking required previous learning** In this activity, keenly observe each geometrical shape and decide which of the shapes are 2D shapes. Decide which shapes in the diagram below are 2D or flat shapes and shade them. You can use colour for your shading.



20 minutes

3D shapes vocabulary

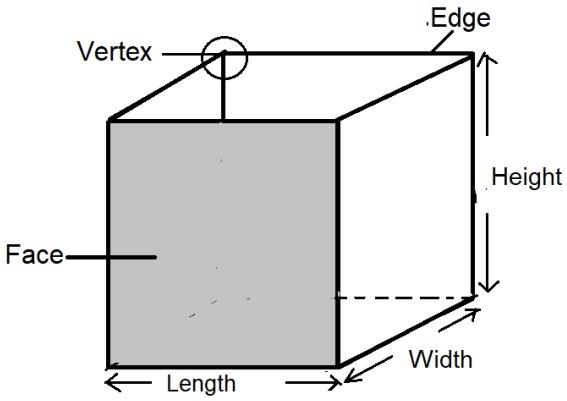
In this activity, identify the number of faces, edges and vertices of some basic 3D shapes

3D shapes are solid shapes that have three dimensions (which are length, width and height).

3D shapes have faces, edges and vertices or corners.

- The flat surfaces of a 3D shape are called faces. Curved surfaces are not called faces because faces must be flat.
- The edge of a 3D shape is the line where two faces meet
- The corner of a 3D shape is where two or more edges meet. The corner is also called the vertex. The plural for vertex is vertices

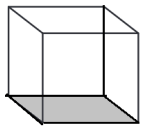
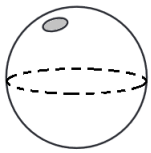
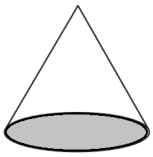
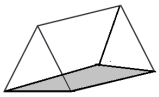
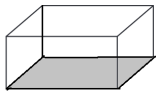
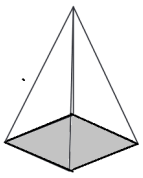
Example:



Activity 2: Properties of 3D Shapes

Draw the 3D shapes below and count the number of faces, edges and vertices (corners) and to name the 3D shapes:

EAA welcomes feedback on its projects in order to improve, please use this link: https://forms.gle/LGAP9k17fMyJrKJN7

3D shape	Number of faces	Number of edges	Number of corners (vertices)	Name of shape
				
				
				
				
				
				

Do these shapes look familiar? What 2-dimensional shape does each one look like? (e.g. a cube looks like a square, a pyramid looks like a triangle etc.)

Wrap up with:

- A cone has 1 flat face, 1 curved surface, 1 edge, and 0 vertex.
- A sphere has 0 faces, 1 curved surface, 0 edges, and 0 vertices. All points on its surface are the same length from the center
- A cylinder has 2 faces, 1 curved surface, 2 edges, and 0 vertices.

- A cube has 6 faces that are identical, 12 edges, and 8 vertices. The edges are of equal length and faces are of equal size. The faces are square in shape
- A rectangular prism or cuboid has 6 faces, 12 edges, and 8 vertices.
- All the faces are rectangles. The opposite faces are always the same size
- A triangular prism has 5 faces, 9 edges and 6 corners. The triangular prism has 2 faces which are triangles and 3 faces which are rectangles. The two triangle faces are always the same size
- A square-based pyramid has 5 faces, 8 edges, and 5 vertices. The faces are the flat sides and square base. There are other types of pyramids such as the triangular-based pyramid.

20 minutes **Activity 3: Drawing 3D Shapes**

You will draw some basic 3D shapes

- Let's draw each shape! Bring out your paper, pen or pencil and a ruler or any flat object with a straight side like a phone/bookmark/cardboard or fortified paper and start drawing:
- Drawing a cube or rectangular prism: to get a cube, draw overlapping squares, then join the vertices (corners) using straight lines as shown in figure A to get the shape in figure B. If you start with overlapping rectangles and join the vertices, you will get a rectangular prism.

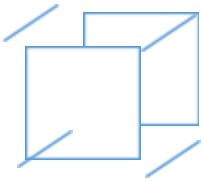


Figure A

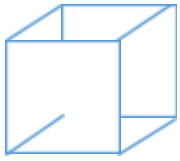


Figure B

Draw a cube and a rectangular prism (cuboid)

- Drawing a cone: since a cone has a circular base, start with a flat circle as shown in figure A, then draw two lines connecting at the top to get figure B. Another way would be to draw a triangle, then draw two half circles above and below the base. Draw a cone:

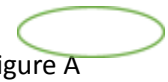


Figure A

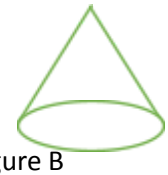


Figure B

EAA welcomes feedback on its projects in order to improve, please use this link: https://forms.gle/LGAP9k17fMyJrKJN7

- Drawing a cylinder: since a cylinder has two circular parts, start with two circles stacked on top of each other with some distance in between, then join the from both sides as shown below

Figure A

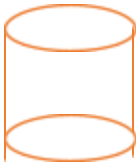


Figure B

Draw a cylinder

- Draw a pyramid: since a square-based pyramid has a square base, start with a flat square (that looks like a diamond) as shown in figure A, then join all the vertices at the top to get figure B as shown below:

Figure A

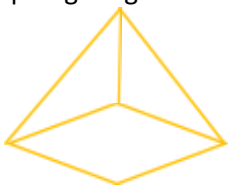


Figure B

Draw a rectangle-based pyramid

- Draw a sphere: start with a circle, then draw two curved lines across the middle part to show that a sphere is not flat like a circle

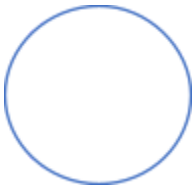


Figure A

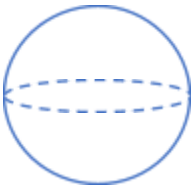


Figure B

Draw a sphere

Literacy Extension

Activity 4: 3D Shapes Song

Compose a song on faces , edges and vertices (corners) of 3D Shapes

Present the song to the family members and train them how to sing the song

	Reflection Reflect on the project activities you have done so far What are the three things you have learned from the project activities ? What two things have you found interesting ? What one thing do you still have questions about ?

DAY 2

Today you will think about how we can design our house!

Suggested Duration	Activity and Description
15 minutes	● First, let's understand how our own house or apartment was designed. **Activity 5: Understanding House Design Considerations** ● Walk around the house and try to identify basic geometric shapes in ceilings, walls, and different objects around the house.
20 minutes	● List the shapes and objects in your notebook as follows: - Living room: square wall, rectangle table, rectangle couch etc. - My bedroom: square wall, a rectangular ceiling, round window etc. ● The learner will do a tally count of the total number of shapes in each room and complete the table below in her or his notebook

Room	Square	Circle	Rectangle	Triangle
e.g. living room	II	I	~~IIII~~	
e.g. kitchen	I	III	II	I
Total	3	4	7	1

Reflection questions:
- What 2D shape is most common in our house?
- What 3D shape is most common in our house?

30-40 minutes	● The learner will try to draw the design of the house on a piece of paper to create a floor plan for his or her current home: ● Let's start with your bedroom. Think of what your bedroom would look like if we could remove the ceiling and look at it from the top. Example of rooms with a top view:

Source link

- Tip: if this is too difficult, instead of a top view, the learner can draw the walls of one or more rooms or spaces on separate pieces of paper/pages of his or her notebook with the help of an adult if needed.
- Draw plan for your current home, apartment, or room:
  - Draw the entire space first either from a top view or side/cross-section
  - Section the different rooms or spaces with lines representing walls. Where will you place the kitchen? Bathroom?
  - Draw the beds, tables, rugs etc. that you find in each space

Share the drawing of your current home with family members.

Day 3

Today you will come up with ideas for their house or room floor plan.

Suggested Duration	Activity and Description
20 minutes	• Today, the learner will come up with the ideas and design for their dream house or room floor plan. **Activity 6: Designing your own Dream House** • Prompts: - How do you want your house or room to look? Will the walls be square or rectangular? Can they be triangular?

- What other objects do you want there that you can draw or make?

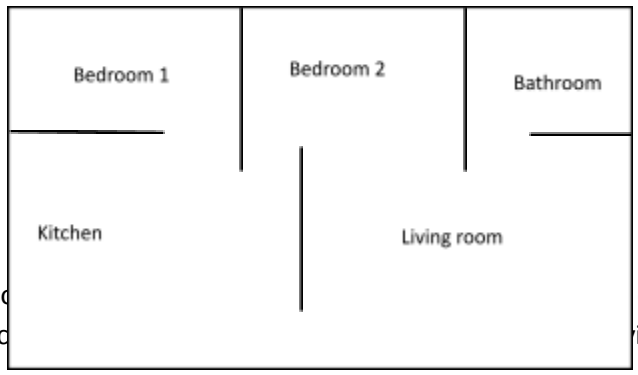
10 minutes

- The learner will recreate and complete this table in his or her notebook:

Room	Object 1	Shape 1	Object 2	Shape 2	Object 3	Shape 3	Object 4	Shape 4
Bed room	Wall	Square	Bed	Rectangular prism	Table	Cube	Pillow	Rectangle
Living room	Wall	Square	Couch	Rectangular prism + rectangle	Table	Cube		

30 minutes

- The learner will draw a plan for his or her dream home, apartment, or room based on the table above:
  - Draw the entire space first either from a top view or side/cross-section
  - Section the different rooms or spaces with lines representing walls. Where will you place the kitchen? Bathroom?
  - Draw the beds, tables, rugs etc. that you want in each space
  - Decorate and color your floor plan
- The plan can be basic following the plan the learner made yesterday or the template below, but it must contain all the items the learner wants in each room



- Tip: allo designs are realistic vision

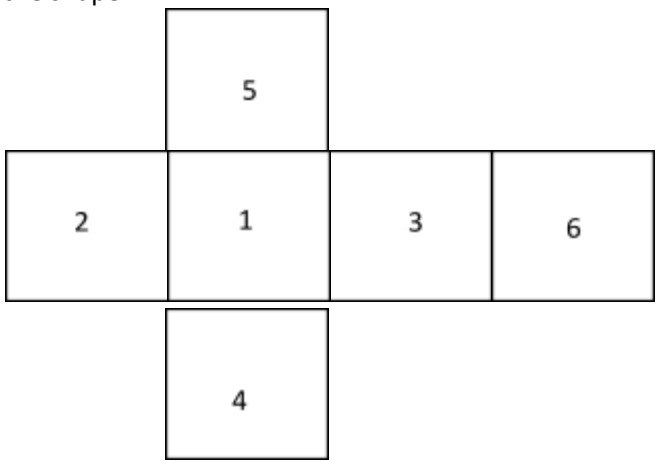
EAA welcomes feedback on its projects in order to improve, please use this link: https://forms.gle/LGAP9k17fMyJrKJN7

Day 4

Today you will create the shapes from the table completed yesterday and finalize the design of the house!

Suggested Duration	Activity and Description
40-60 minutes	**Activity 7: Producing pre-fabricated 3D shapes for the Dream house**

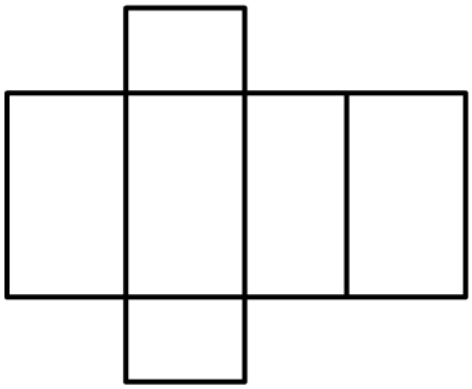
- The learner will make all the shapes using paper. The learner will draw 2D shapes on paper and cut them out using scissors. For 3D shapes, paper will be cut in the following ways:
  1. To make a cube: we know that a cube has equal or square sides. First, draw six squares in this shape on a piece of paper then cut out the entire shape:



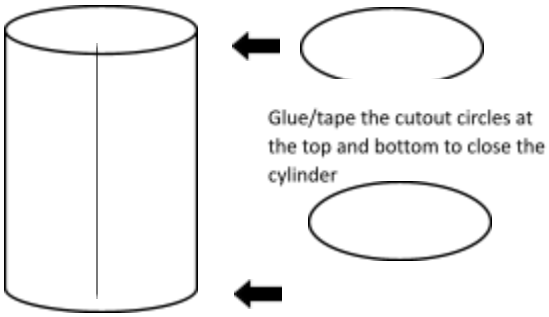
Instructions:

- Keep square 1 down and bring up squares 2, 3, 4, and 5
- Tape or glue all of them together to create an open cube
- Bring up square 6 to close the cube. You can cut out square 6 if you want an open cube for your house.
- You can use this cube as a table or other object to place in your rooms!

  2. To make a rectangular prism: we know that a rectangular prism has rectangular sides. First, draw six rectangles in the shape shown below and cut out the entire shape. Then repeat the instructions from the cube, keeping rectangle 1 down and raising the other sides:

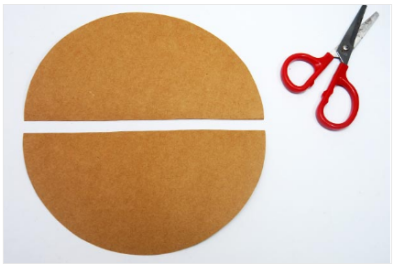


3. To make a cylinder:
    - Cut out the piece of paper you want to use to make a cylinder for your furniture
    - Roll the paper so both ends meet as shown below:



    - Tape the line where both ends meet to make a cylinder
    - If you want to close the cylinder, you can take the shape you have made and draw two circles on a separate piece of paper using one of its ends. Cut out the circles and tape or glue them on to the top and bottom parts of the cylinder (the faces of the cylinder)
4. To make a cone: we know that a cone has a circular base, so first, draw a circle, then follow the instructions below:

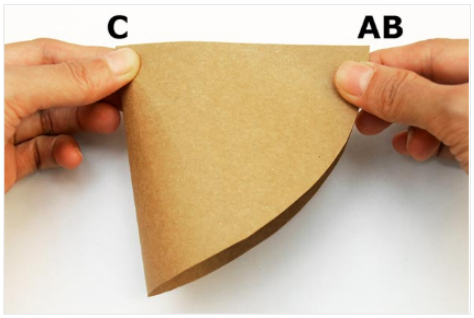
1. Cut out a circle



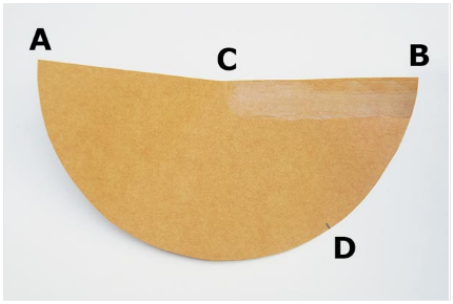
2. Cut it in half

EAA welcomes feedback on its projects in order to improve, please use this link: https://forms.gle/LGAP9k17fMyJrKJN7

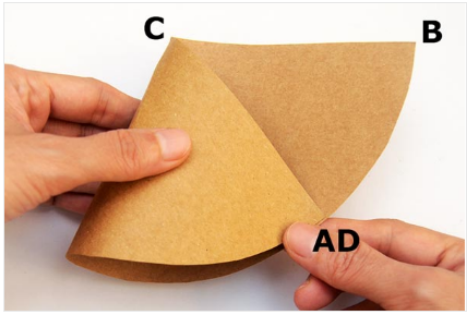
3. take one half-circle



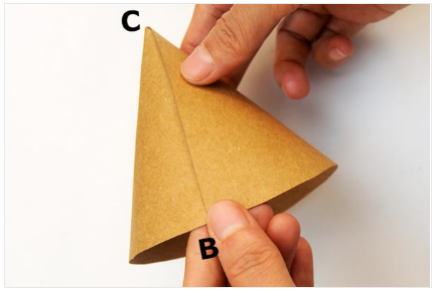
4. Join both ends and mark the vertex C



5. Apply glue and mark point D at the bottom



6. Bring one tip to the bottom, mark that point AD



7. Bring point B down to the curved edge to make a cone!

- Tip: make sure you color the papers before you make the shapes!

EAA welcomes feedback on its projects in order to improve, please use this link: https://forms.gle/LGAP9k17fMyJrKJN7

Day 5

Today you will finalize the design of his or her house and present it to the family!

Suggested Duration	Activity and Description
30 minutes	● **Assembling own Dream House** ● First, the learner will create a big cube or rectangular prism for his or her dream house, room, or apartment. Make sure the shape is big enough to fit all the objects you created yesterday!
20 minutes	● The learner will assemble all the objects inside the larger rectangular prism and finalize the design of the house. He or she can draw any additional decoration such as mirrors, paintings, photo frames etc. if he or she does not want to create more shapes
10 minutes	● The learner will present the finalized design to the family and describe: - How she or he decided on the shape of the house and rooms - How she or he created the objects and the shapes used - Overall thoughts about the process ● Family will provide feedback. The feedback will include: - What do they love about the dream house? - Any questions they have for the learner
10 minutes	**Final Reflection** Reflect on your learning and experience in the project ● What are the two most important things I learned from the project? ● What were my roadblocks/challenges in the project? Who helped me to overcome them? ● What would I do differently next time I do another project?

Assessment criteria

- Completed house or room with walls, floors, and furniture objects comprised of 2D and 3D shapes.
- Final presentation of design process

EAA welcomes feedback on its projects in order to improve, please use this link: https://forms.gle/LGAP9k17fMyJrKJN7

Additional Enrichment Activities

The learner can journal his or her process of designing the house and provide the dimensions of the rooms and spaces, calculate the perimeter (sum of sides or diameter in 2D shapes)

Modifications to simplify

- The learner can draw the designs of each room on a separate piece of paper in a 2D format instead of creating a 3D model.
- The learner can create only one type of 3D shape (e.g. cube) or simply draw the pattern on a piece of paper following the templates provided above in day 4