Beauty in Shapes Project (level 0)

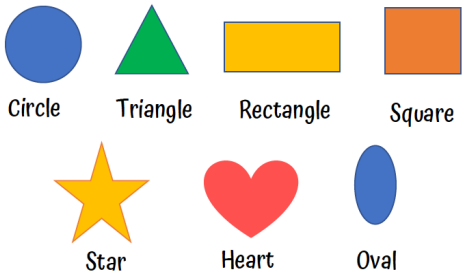
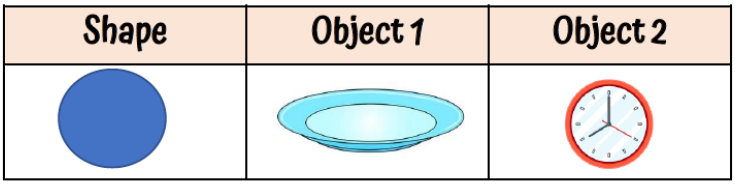
Ages 4 to 5 (Level 0)

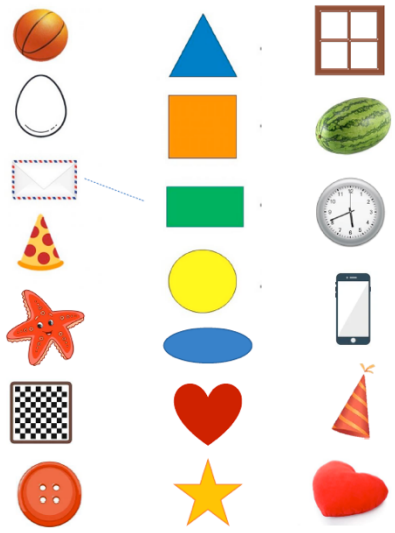
Description:	Learners will learn about shapes while using readily available examples within their homes and their bodies. Learners will also use their body parts to measure various things, learn about the need for standardized measurements, and use what they have learned to create geometric patterns.
Leading question:	Can shapes and measurements be beautiful?
Age group:	4 - 5 years
Subjects:	Mathematics: shapes and measurement, Art and design, physical exercise, and wellness
Total time required:	~4 hours over 4 days
Self-guided / Supervised activity:	Medium supervision from educator/guardian/parent
Resources required:	Paper and pencil, (optional: removable stickers like sticky notes).

Learning outcomes	▪ List the characteristics of 2-D shapes ▪ Draw 2-D shapes ▪ Write down letters of the alphabet in upper case ▪ Match 2-D shapes with objects that look like those shapes as well as letters of the alphabet that look like those shapes ▪ Learn and practice how to draw a circle, triangle, rectangle, and a square
Required previous learning	None
Inspiration	

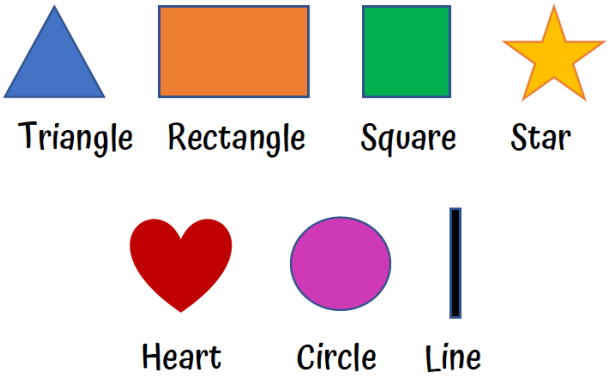
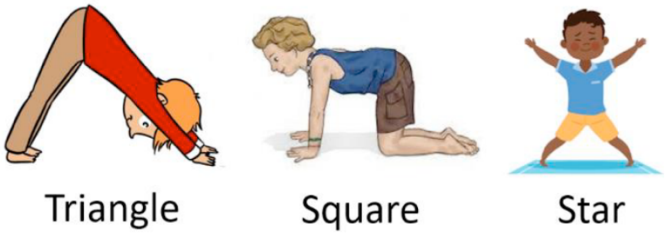
Topics/concepts covered, and skills developed
● Identifying and drawing 2-D shapes ● The letters of the alphabet ● Matching objects and shapes

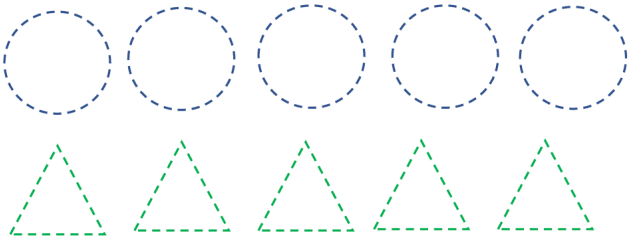
Day	Time	Activity
1	15 minutes	Learners will learn about and explore different aspects of 2D shapes Guide the learners' attention to the shapes below:

	25 minutes	 Source: https://resources.educationaboveall.org/learning-packages/level-0-ages-4-5 Spend some time looking closely at each one of them. For each case, ask learners: ▪ What do you see? ▪ Can you give one characteristic for each of these shapes? Use the learners' responses to arrive to the following conclusions: ▪ A triangle is made of 3 sides, and it has 3 angles or corners. ▪ A circle is a set of points that are all exactly the same distance from one point, which we call the center. ▪ A square has 4 equal sides and 4 right (90 degree) angles. ▪ A rectangle has 4 right angles, but its sides are not all equal. It has two long sides and two short sides. ▪ A star has 5 pointed sides. It is like 5 triangles combined. ▪ A heart has a double rounded top and is pointed at the bottom. ▪ An oval is a stretched-out circle with two long sides and two short sides. **Find the Shapes:** For each of the shapes, find and draw at least two objects that look like that shape. **Example**  Source: https://resources.educationaboveall.org/learning-packages/level-0-ages-4-5 Do the same for all the shapes you have learnt about above.

	15 minutes 10 minutes	**Shape Matching:** Make a copy of the Shape-Object Matching Worksheet for the learner. Ask the learner to match up the different objects to the shapes they look like. See example below:  **Critique and revision:** Learner presents their objects for each shape to their parents or family members for feedback and suggestions for improvement. The parents or family members provide feedback using the following format: ● Praise: What did you like about the learner's work done? ● Question: Any questions or clarifications you have about the work? ● Suggestions: In what areas does the learner need to improve their work? **What shape are you?** **How to play the game:** To play the game, you will need at least 4 or more players. Instructions: ▪ Each player acts out these shapes and lines:

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

		 Source: https://resources.educationaboveall.org/learning-packages/level-0-ages-4-5 ▪ If others guess the shape correctly, the player gets a point. ▪ The player with the most points wins the game. Examples of how the learners can act out some of the shapes can be seen below. 
2	5 minutes	Learners will continue to learn how to identify shapes within their environment, practice drawing the circle and triangles and learn above some measurements that were used in the past. Guide the learners' attention to the drawing below:

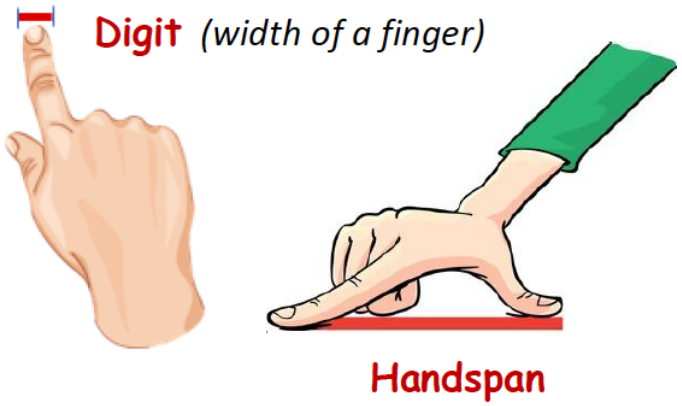
	10 - 15 minutes	 Ask the learners: What shapes do you see in the drawing above? (Answers: Circle, triangle, square etc.) **Drawing shapes:** Let us practice drawing shapes! Trace the following:
	15 minutes	 You can print a copy of the Circle and Triangle Tracing Worksheet for the learner to be able to do this activity or draw the shapes yourself ***Drawing activity:*** Draw the sun and the clouds at the top of the page using shapes and lines.
	30 minutes	**Critique and revision:** Learners present their work to their parents or family members for feedback and suggestions for improvement. The parents or family members provide feedback using the following format: ● Praise: What did you like about the learner's work done? ● Question: Any questions or clarifications you have about the work? ● Suggestions: In what areas does the learner need to improve their work?

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

Measurements:

Say to the learner: Measuring lets us know how long or short an object is. Or how heavy or light. Today, we'll learn how to measure how long an object is.

In the past, people used their bodies to tell how long something was. Today we are going to learn about 2 of these ways: The first one is the digit (width of the finger) and the second one the handspan. See the image below:

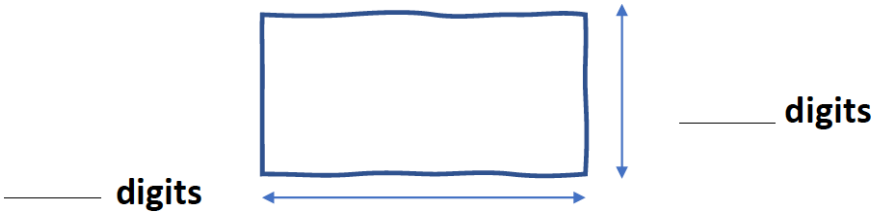


Ask the learner:

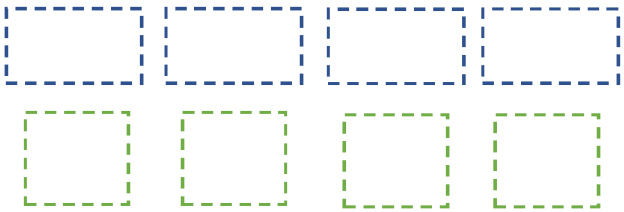
- How many digits are in your handspan? (Answer: _____)
- Which other body parts can we use to measure things?

Exercise: Using Digits for measurements.

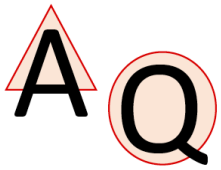
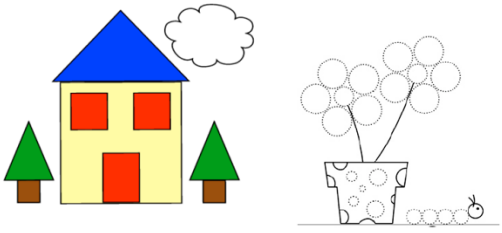
How many digits is your drawing sheet? Use your finger to find out

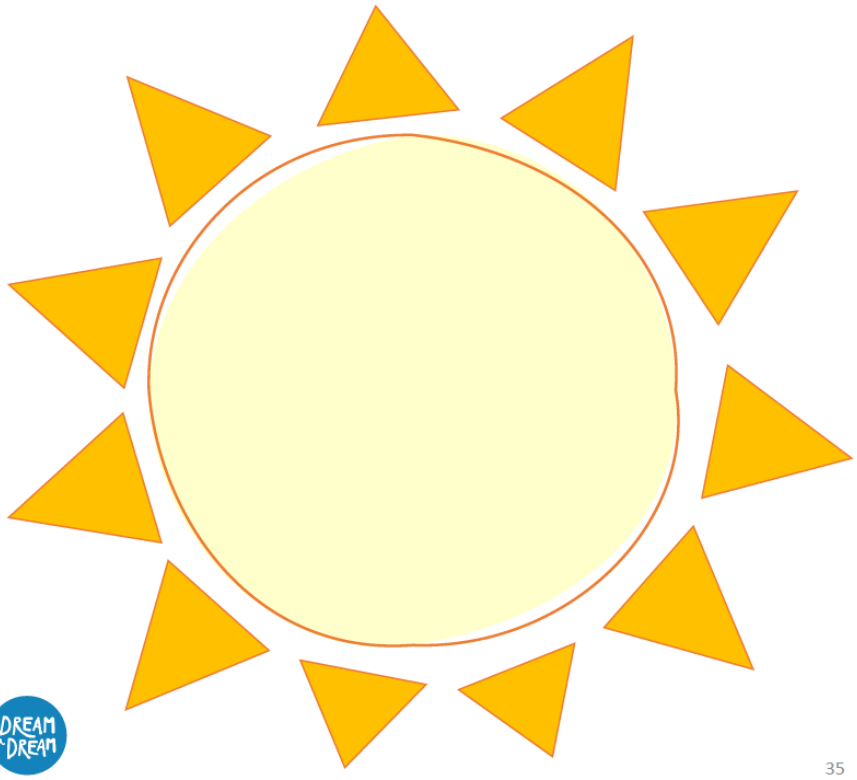


Exercise: Using hand spans for measurements.

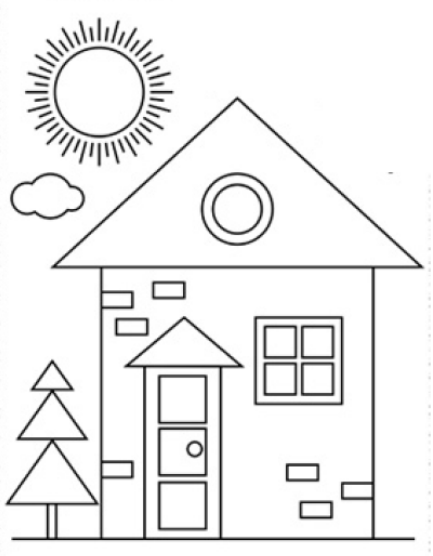
	10 minutes	Ask the learners to draw an outline of a friend's body (it can also be from a family member). Like the image below:  Ask the learners to measure the following using their handspans: ▪ Hand Length ▪ Leg Length ▪ Full Body Length **Reflection on measurement:** Educator/parent meets with the learner(s) and have them reflect on the following questions: - What have you learnt from the measurement activities? - What do you remember the most from the measurement activities? - What questions about measurement do you still have? Educator/parent ensures to respond to any questions the learner(s) may still have above measurement.
3	10 minutes	**Drawing shapes:** Let us practice drawing rectangles and squares! Trace the following: 

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

	10 minutes	Print a copy of the Circle and Triangle Tracing Worksheet for the learner to be able to do this activity or draw the shapes yourself. **Literacy extension:** Shapes in the alphabet: Ask the learner to write down all the letters of the alphabet in the upper case. Next, ask the learner to identify the different shapes they can see in the different letters of the alphabet. See example below: 
	10 minutes	Next, we are going to draw some objects using the shapes we know and have been learning throughout this project. 1. Ask the learners to draw a house using triangles, rectangles, and squares. They will need to add details to the house and compound such as a door, windows, roof, trees etc. 2. Ask the learners to draw two potted plants using shapes of their choice. See examples below: 
	10 minutes	**The Sunny Side:** Ask the learner to get in a relaxing position and then: ▪ Take 3 deep breaths. ▪ Close your eyes and think of all the things that make you happy. ▪ What comes to mind? What are you thinking about? Draw what comes to mind in the sun below:

	10 minutes	 **Critique and revision:** Learners present their work for the day to their parents or family members for feedback and suggestions for improvement. The parents or family members provide feedback using the following format: ● Praise: What did you like about the learner's work done? ● Question: Any questions or clarifications you have about the work? ● Suggestions: In what areas does the learner need to improve their work?
4	10 minutes	Learners will count the number of shapes in a house and match objects to shapes they resemble. Ask the learners to study the picture below and identify what shapes they can see in the picture. Once they have identified the shape, then ask them to count how many of that shape they can find in the picture.

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



Learners can use a table like the one below to summarize their responses.

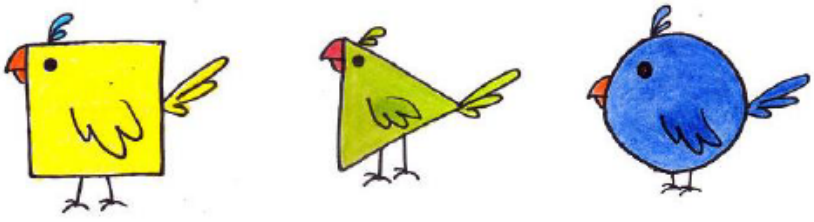
Name of shape identified	Number of shapes found
Circle	4

5 minutes

Bird Shapes: Ask the learner:

- What is your favorite bird or animal?
- Can you draw your favorite bird or animal using shapes?

See some examples below:



Story Time: Who will win?

This is the Shapes Family. In their town, there is a Lantern Competition.

	15 minutes	 The Shapes are getting ready for it. Circle and his sister, Triangle, got to work.  Circle made a lantern with circles. Triangle made one with triangles. Mr. Square and Mrs. Rectangle said, “Isn’t it boring to use the same shapes all the time?” “Let us try something new!” said Circle. Together, they made a lantern with circles and triangles.

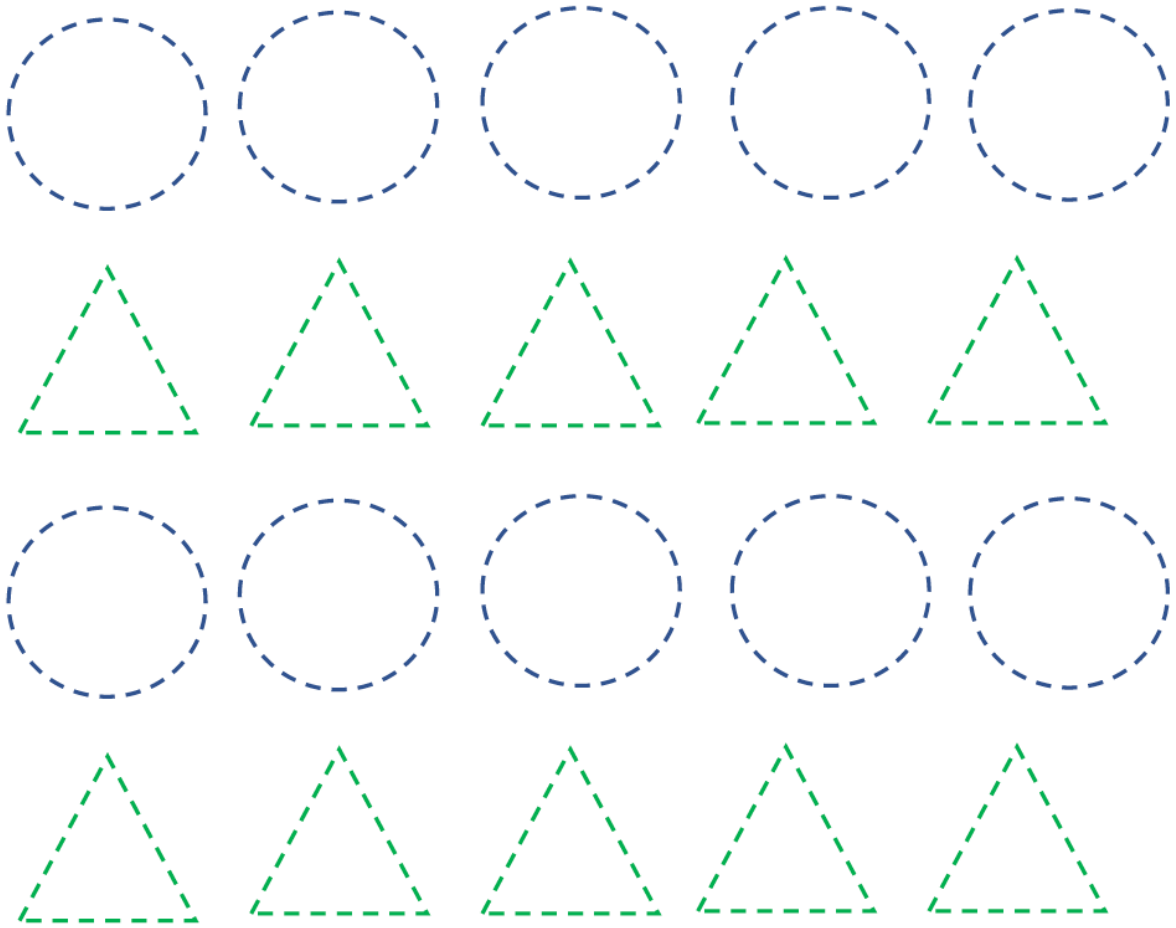
	15 minutes	 Mr. Square loved the new lanterns. Who do you think won the competition?  Ask the learner some comprehension questions: ▪ Name the characters in the story. ▪ What was the name of the competition? ▪ What did the circle use to make lanterns? ▪ What did Mr. Rectangle and Mr. Square say? ▪ Can you draw your own lantern using shapes? **Overall Project Reflection:** The learner will now think about all the exercises they have done for the past 3 days and take note of "TWO" of the following: ▪ What is the most important lesson you have learnt through this project? ▪ What are you found challenging, puzzling, or difficult to understand? ▪ What question would you most like to discuss? ▪ What is something you found interesting?
Assessment Criteria		● Observation checklists while learners are working on activities

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

	• Learners understand the differences between 2D shapes (number of sides, number of angles, etc.) • Learners recognize shapes in objects around them • Learner's answers about their conclusions and reflections • Learner's creativity in the daily activities • Learners review and improve their work based on feedback • Learner's engage in a brief conversation based on their comprehension of a story.

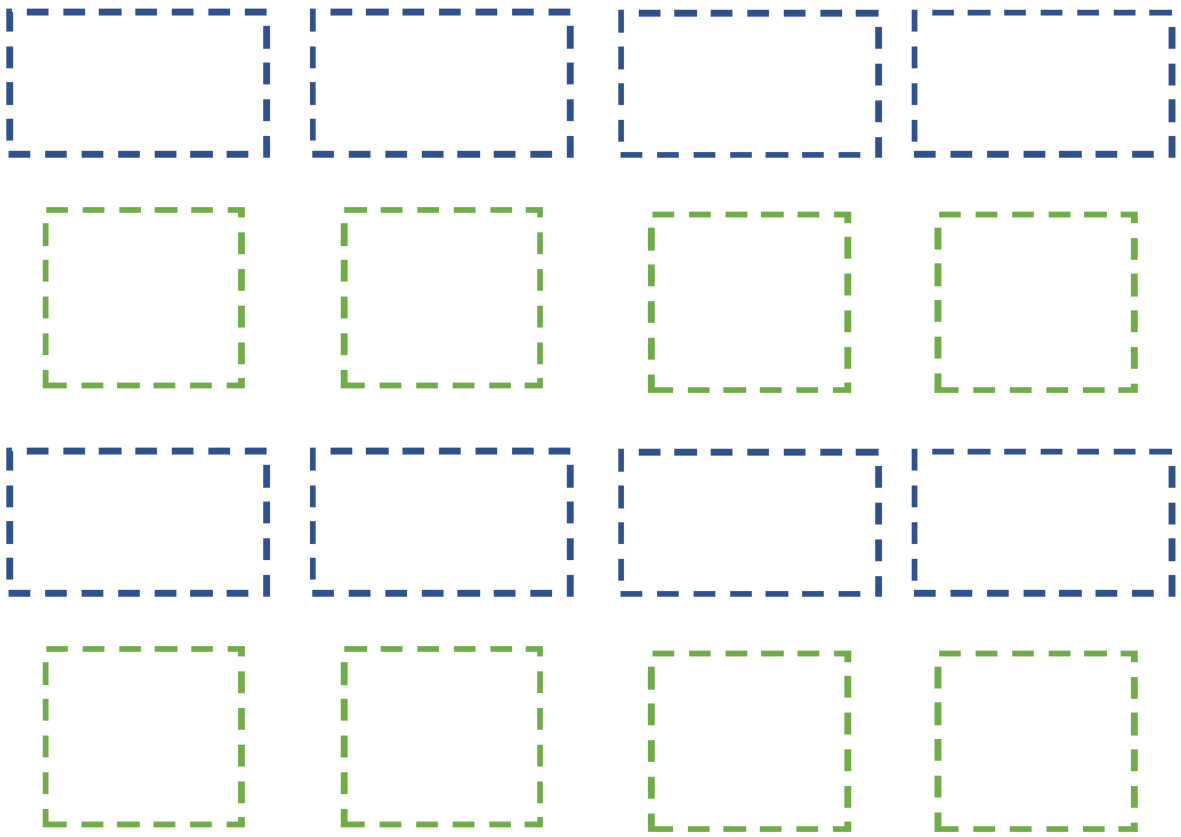
APPENDIX 1:

Circle and Triangle Tracing Worksheet



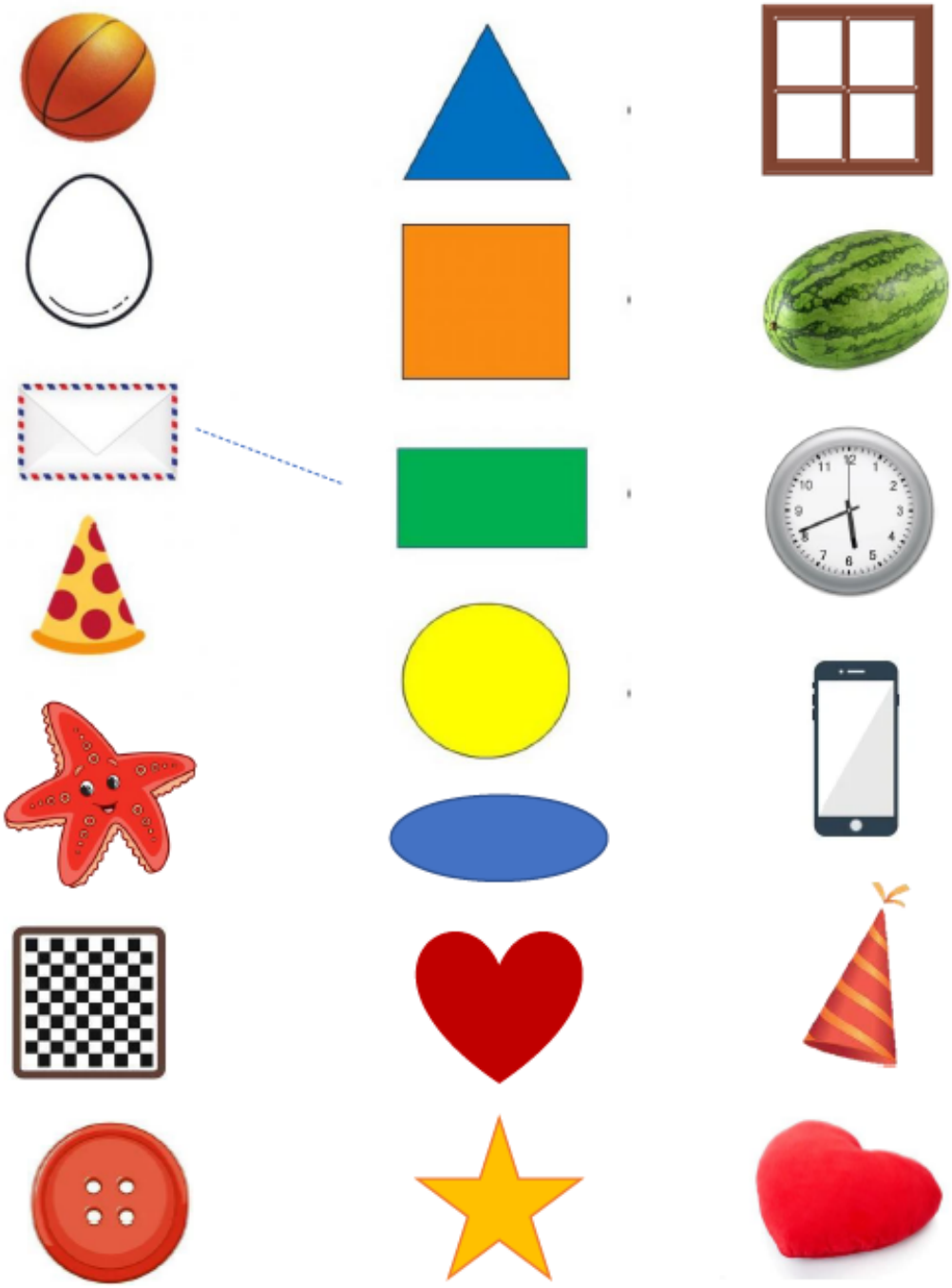
EAA welcomes feedback on its projects in order to improve, please use this link:
https://forms.gle/LGAP9k17fMyJrKJN7

Rectangle and Square Tracing Worksheet



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

Shape Object Matching Worksheet

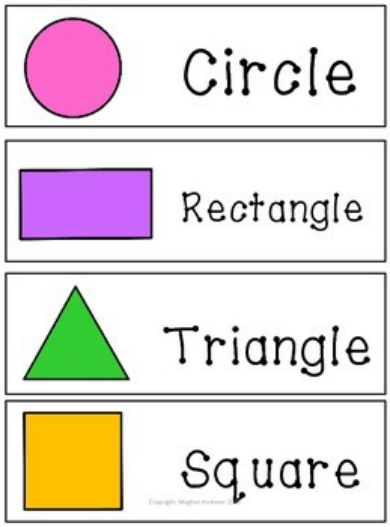


EAA welcomes feedback on its projects in order to improve, please use this link:
https://forms.gle/LGAP9k17fMyJrKJN7

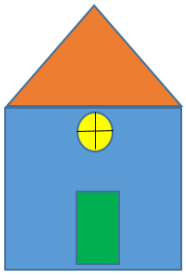
BEAUTY IN SHAPES AND MEASUREMENTS

Ages 4 to 7 (Level 1)

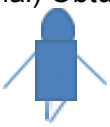
Description:	Learners will learn about shapes while using readily available examples within their homes and their bodies. Learners will also use their body parts to measure various things, learn about the need for standardized measurements, and use what they have learned to create geometric patterns.
Leading question:	Can we find any beauty in shapes and measurements?
Age group:	4 to 7 years old
Subjects:	Mathematics: shapes, measurements, and patterns Art: Math-based art using shapes and patterns
Total time required:	~90 minutes a day for 3 days (total of ~5 hours)
Self-guided / Supervised activity:	Supervised by parents / guardians
Resources required:	Paper and pencil, (optional: removable stickers like sticky notes).

Day	Time	Activity and Description
1	10-15 mins	Introduction to the main 2-dimensional shapes: triangle, square, rectangle, and circle. Guide the learners' attention to the shapes below:  Source: https://www.teacherspayteachers.com/Product/4-Basic-Shapes-Bundle-Circle-Triangle-Square-Rectangle-1959150 Spend some time looking closely at each one of them. For each case, ask learners:

		- What do you see? - Can you give one characteristic for each of these shapes? Use the learners' responses to arrive to the following conclusions: ● A triangle is made of 3 sides, and it has 3 angles or corners. ● A circle is a perfect shape of a set of points that are all exactly the same distance from one point which we call the center. ● A square has 4 equal sides and 4 right (90 degree) angles. ● A rectangle has 4 right angles, but its sides are not all equal.
	10 mins	Find at least 3 objects at home that are squares. Draw one of them.
	10 mins	Find at least 3 rectangles at home. Draw these rectangles in your notebook.
	10 mins	Go and find 10 circles around the house. Can you draw a perfect circle without tracing?
	15 mins	Go and find 10 triangles hidden around the house. Put a sticker on every triangle you find (optional) and draw it in your notebook.
	30 mins	The parent and learner go around the house to see all the triangles that the learner found out and identify ones he/she may have missed and put stickers on. From the triangles, identify which ones are: ● Equilateral (have 3 equal sides, and angles) ● Isosceles (having 2 equal sides and one other side that is longer or shorter) ● Right (having a 90-degree angle which looks like a L letter) *Optional- Obtuse (having one 'wide' angle) *Note: if some types of triangles were not found at home, the parent is to draw them and explain the difference with the ones that they found.

	15 mins	Draw at least 3 objects that have a combination of 2 or more shapes from the list of shapes in this lesson, i.e.: square, rectangle, triangle and circle. For practice, you may draw a house like this that contains all the four shapes:  HINT: if learners are struggling with ideas of what to draw, you may recommend some objects like a car, a phone, radio, ...etc.

Day 2	10-15 mins	Units of length and body parts Introduce the fact that a long time ago, people used their body parts as measurement units. See the Day 2 worksheet. (Alternatively, if internet were available, here is a good presentation on this: https://prezi.com/r-6odwf4fy5k/usage-of-body-parts-to-measure-objects/)
	15 mins	How tall are you in your own span? The span is the measure using your own hand from the tip of the thumb to the tip of your little (pinky) finger. Stand against a wall and place a sticky note on the wall at the top of your head. Measure how many spans is that? How tall am I, measured with my own span? How tall is dad, measured with his own span? How tall is mom, measured with her own span? How tall is my sister or brother, measured with her/his own span? Try it with other family members and ask them to measure their height with their own span length. Can you make a conclusion on this? 😲 *Hint: do all family members have a similar count of spans when measuring their height? Do you want to see if this also applies to friends and their families?

	20 mins	Which is longer: your height, or your Fathom (Fathom is the distance between your hands when your arms are stretched sideways)? Sleep on the ground and let your brother/sister place a mark/sticky note where the bottom of your feet touches the floor, and one at the tip of your head. Open your arms and lay facing down horizontally between the 2 marks. Which distance is longer? Try the same with other family members, what do you think? Are the measurements the same?
	10 mins	How many spans is a cubit? (A cubit is the length from your elbow to the tip of your longest finger) Try the same with other family members, what do you think? Are the measurements the same?
	10-15 mins	Parents challenge the learners to form the following shapes using their bodies: In how many ways can you form a square using your body? (hint: using your chest and arms, or a small square using your fingers, ….) In how many ways can you form a rectangle using your body? In how many ways can you form a circle using your body? (using your arms, or using your fingers)
	15 mins	Triangles: Using your body parts against a wall or the ground, form the following triangles: - Right (for example, one leg vertical, and the other stretched sideways) - Isosceles (for example, stand straight, and slightly open your legs) - Equilateral (for example, use your cubits, and the side of a table) - (*Optional) Obtuse (having an angle that is larger than 90 degrees) 
	15 mins	What is the height of the room in Fathoms? You can estimate that in the toilet or kitchen, where you have tiles on the wall (if they are tiled, if it is not tiled, measure the height up to the point where you can reach). Measure your height in tiles, then count how many tiles are there from floor to ceiling (if they are tiled, if it is not tiled, measure the height up to the point where you can reach). Hence, conclude, how many of your

		heights can fit on top of each other from floor to ceiling? (as you recall, your fathom is almost equal to your height)
	15 mins	Reflection: Use your foot to measure the room's *length*. Repeat by asking one of your parents or older siblings to measure the same room length using his foot. How different are the 2 measurements? Why do you think people came up with standard units of measurement?
	5 mins	Conclusion: the parent must reinforce that the need for standard units is important because people of different heights would have different measurements of the same object! You can share some examples of standard units of measurement for length that are applicable to your context - meters, kilometers, miles, yards, acres, etc
Day 3	10 mins	**Math based Art** Introduction: Let me show you a drawing (day 3 worksheet): a cartoon adaptation of the Vitruvian Man, by Leonardo Da Vinci. What do you see? Give learners some time to describe the drawing. Guide students to notice as many details as they can. - How do you connect this drawing to what you have learned the previous days? - What is something new that we can learn from this drawing? (Some discussion points may include: It shows a man inside a square and a circle, it confirms one of their earlier observations that one's own fathom is equal to the person's height, etc.).
	60 mins	Look at the day 3 worksheet and work on challenges number 1 to 5. *Optional: can you recreate the pattern in number 6?
	15 mins	Critique and revision: Learners present all the patterns developed to their family members for feedback and suggestions for improvement. Family members provide feedback using the following prompts: Praise: What did you like about the learner's patterns done? Question: Any questions or clarifications you have about the patterns drawn? Suggestions: In what areas does the learner need to improve their work?

		Learners make the edits and suggestions (if any) to their work to make it better.
	15 mins	Reflection: - How did Math help you in creating geometric patterns? - Do you think patterns are beautiful? Why? - Where have you noticed patterns before in real life? Probe: buildings? - Would you try to create patterns? What for, and where would you place them?
	Bonus challenge	Learners are challenged to create a new pattern, other than the ones on the worksheet, on a whole sheet of paper (A4) that they can work on during their free time.

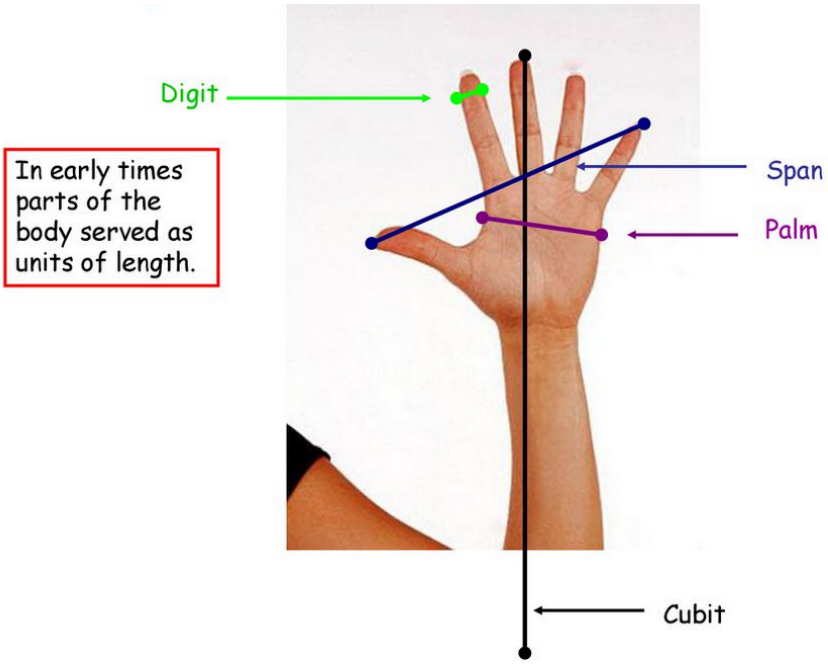
Assessment criteria:

- Observation checklists while learners are working on activities
- Learner's answers about their conclusions and reflections
- Learner's creativity in the day 3 activities and closing challenge

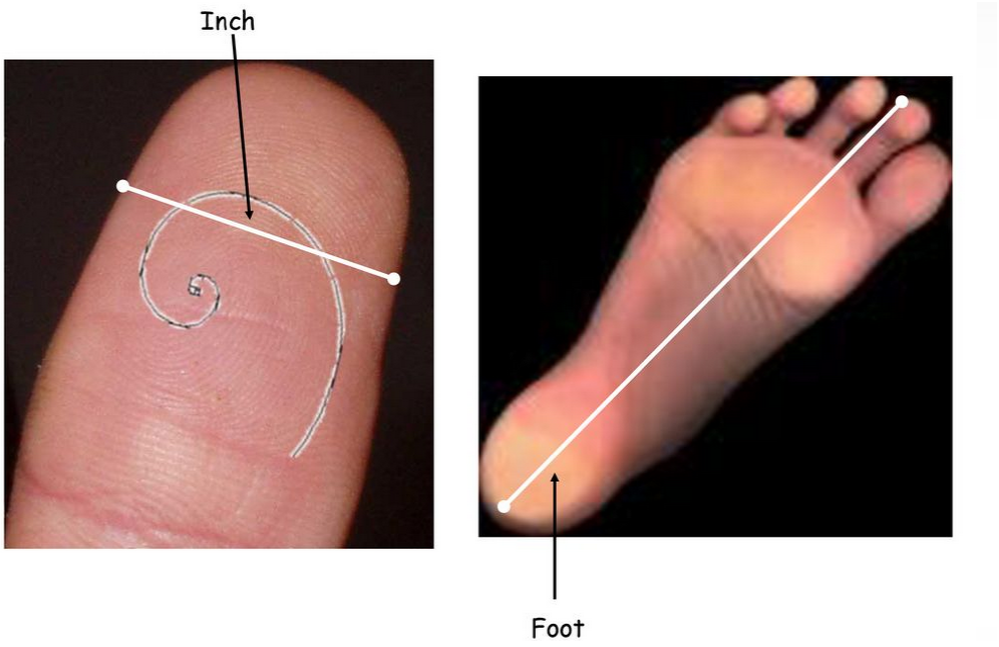
Topics/Concepts Covered	- 2-D shapes - Length - Types of triangles - Measurement - Standard units of measurement - Patterns
Learning outcomes:	- List the characteristics of 2-D shapes - Construct different types of triangles - Describe the relation between lengths of parts of the human body - Estimate lengths using the body - Create beautiful patterns using 2D shapes
Required previous learning:	- Counting
Inspiration:	This presentation: https://prezi.com/r-6odwf4fy5k/usage-of-body-parts-to-measure-objects/

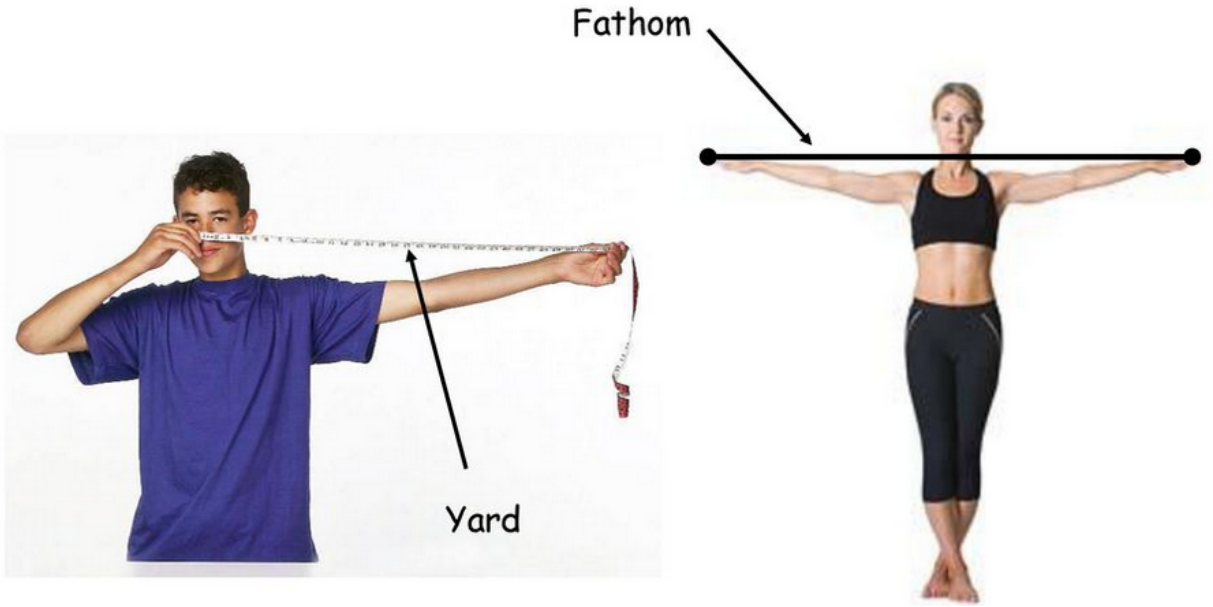
Additional enrichment activities:	Learners are challenged to create a new pattern, other than the ones on the worksheet, on a whole sheet of paper (A4) that they can work on during their free time. (Parents may choose to hang this in the house for decoration!)

Day 2 Worksheet- Body dimensions



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



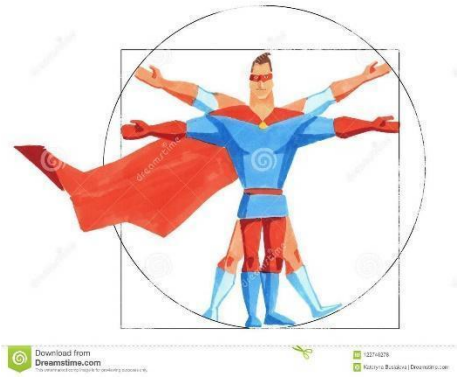


Source: https://slideplayer.com/slide/14948703/

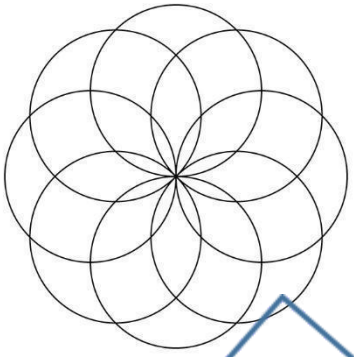
EAA welcomes feedback on its projects in order to improve, please use this link: https://forms.gle/LGAP9k17fMyJrKJN7

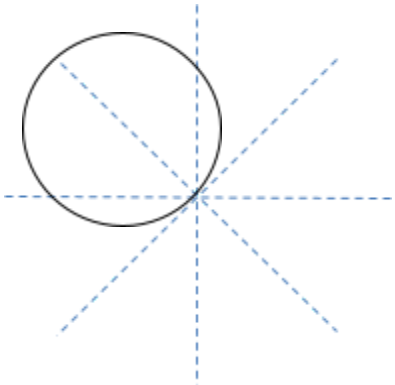
Day 3 worksheet

Cartoon hero based on the Vitruvian man drawing by Leonardo Da Vinci. What does the square tell you? (Hint: fathom versus height?)



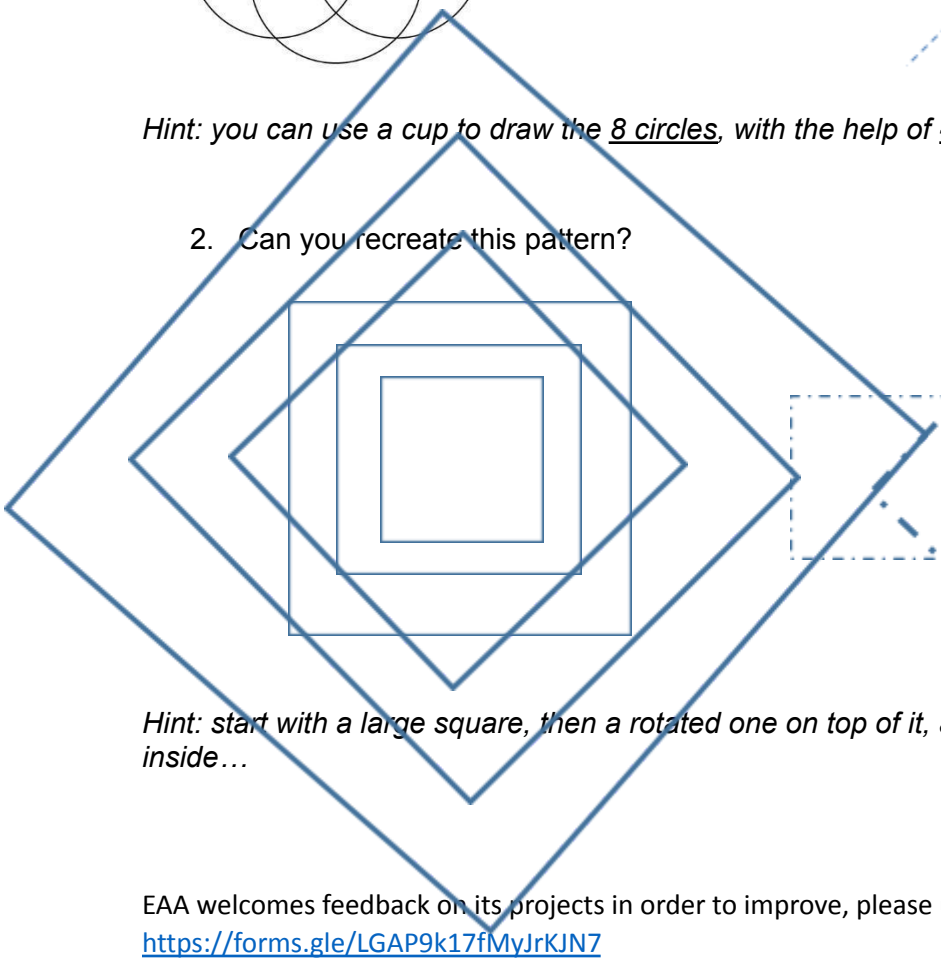
1. Can you draw the following Mandala?

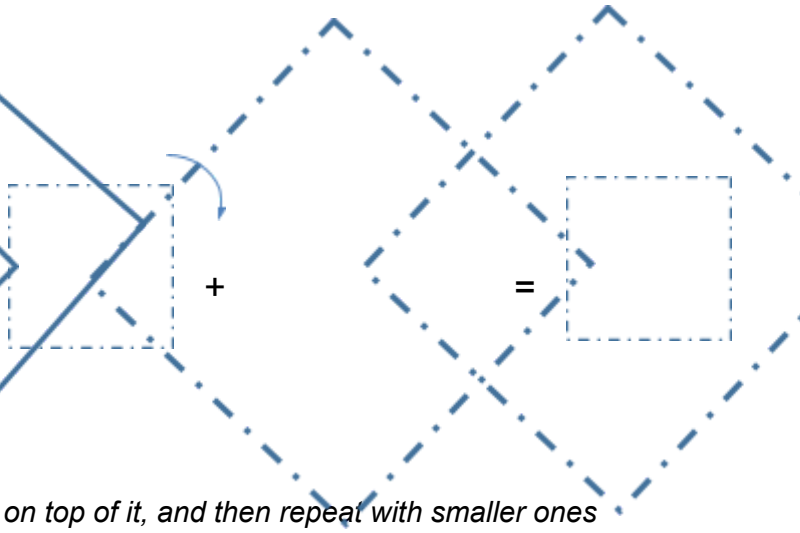




Hint: you can use a cup to draw the 8 circles, with the help of 4 intersecting segments.

2. Can you recreate this pattern?

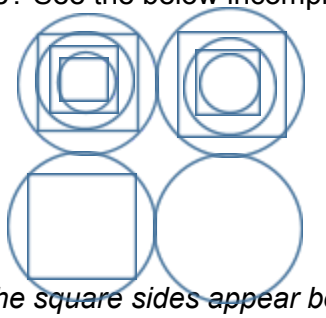




Hint: start with a large square, then a rotated one on top of it, and then repeat with smaller ones inside…

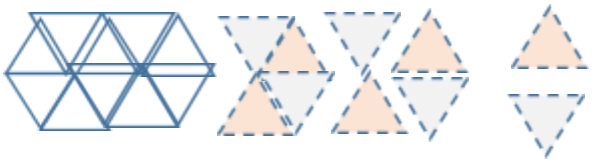
EAA welcomes feedback on its projects in order to improve, please use this link:
https://forms.gle/LGAP9k17fMyJrKJN7

3. Can you create a pattern using two different shapes with repetition to create a larger image? See the below incomplete shape made of circles and squares.



(Do the square sides appear bent or not?)

4. Here is another example of a pattern using one equilateral triangle repeatedly. Recreate this pattern on a small sheet of paper (A5 size).



5. 3D illusions: Do you know how to draw a cubic box?

To draw the below cube, you first need to draw the shape, and then to add colors (3 different levels of intensity) to make the effect of light and shadows.

6. (*Optional) Can you draw a pattern by putting those shapes next to one another? Then another layer below? *Then fill a whole page of your notebook with this pattern.*