

## PART A:

### Four-Lesson Sequence

Year Level	Year 6	
Content Description	Construct simple prisms and pyramids ( <a href="#">ACMMG140 - Scootle</a> )	
Learning Intention(s) <i>(What the teacher wants the students to learn in this lesson sequence)</i>	Students will be able to construct a 3D pyramid from a net.	
Success Criteria <i>(What students will be able to do by the end of the lesson sequence if they are successful)</i>	<ul style="list-style-type: none"> <li>• Students will understand the features of pyramids and identify their corresponding nets.</li> <li>• Students will understand that a 3D pyramid can be created from a 2D net.</li> <li>• Students will be able to construct a pyramid from a net and identify the features.</li> </ul>	
<b>Lesson 1 – Gradual Release of Responsibility - Introducing Pyramids</b>		
Resources	<ul style="list-style-type: none"> <li>- <a href="#">2D plastic triangle shape</a></li> <li>- Pyramid quiz powerpoint</li> <li>- <a href="#">2D and 3D shapes</a></li> <li>- <a href="#">Feely bags</a></li> <li>- Graphic organisers</li> <li>- <a href="#">Magnetic polygons</a></li> <li>- iPad</li> </ul>	
Introduction		
<ul style="list-style-type: none"> <li>• The teacher has a Powerpoint open – the first slide is a photo of the famous pyramids of Giza.</li> <li>• The students will be asked what they guess the maths lesson will be about from the photo.</li> <li>• The teacher will then do a fun 10-question true or false quiz with the students. The questions are fun facts about the pyramids as well as diagnostic mathematics questions to test the students' knowledge. All students will stand up and if they think the answer is true they will put their hands on their heads – false they will put their hands on their tails.</li> </ul>		
Body		
<ul style="list-style-type: none"> <li>• The teacher will begin the lesson by sharing the goals of the lesson and the lesson sequence. The summative assessment task will be presented on the whiteboard.</li> <li>• The teacher will close their eyes and grab a 2D shape from a bag on the table. The teacher will hold the shape up so the class can see and will demonstrate feeling the shape and will think out loud about the shape's features. "I can feel it is flat. I can feel it has 3 edges. Without looking I can tell it is a 2D triangle" The teacher draws the shape on the board and labels the features, and enters the features into a table (I do)</li> <li>• The teacher now puts the class into groups of 4 and places the feely bags with a 2D or 3D shape inside them onto tables around the room. The bags are labelled with a letter. The students all have a graphic organizer that mirrors the table that the teacher drew on the board.</li> <li>• The students move in their small groups from table to table, feel the bags one at a time, and discuss the features of the shape with each other.</li> <li>• In their graphic organiser they write the name of the shape and its features and draw a picture of it. (You do together)</li> <li>• The teacher moves around the room and listens to the conversations and the vocabulary the students are using as they visualise the shapes.</li> <li>• When all the groups are finished, students will return to their desks to have a class discussion to share ideas.</li> </ul>		

- The teacher writes a table on the board with 2 columns headed 2D and 3D and sorts the vocabulary and shapes that the students are saying into each with the help of volunteers (We do) The target words will be 3D, 2D, edge, apex, vertex, vertices, face. The teacher will add any of these words that were not heard from the students and explain their meaning. Some words will be in both columns.
- Now the students are asked “which bags had the pyramids? Let’s open them and see”. There are 3 different kinds of pyramids present: square-based, triangular-based, and rectangular-based. These are displayed for the class. Does anyone know the names of these pyramids? The teacher will elicit that pyramids are named after the shape of their base.
- Students are asked to choose one of the pyramids and recreate it with magnetic polygons. They then take their maths books and draw their pyramid and label it using the terms on the board (You do – also formative assessment)

**Differentiation:**

- Students can work alone or in pairs in the group stage of the lesson.
- Groups are strategically differentiated by the teacher to encourage participation and support students’ strengths and challenges.
- Some students will remain on 2D shapes and describing their features.
- Advanced students will be given the option of working with more complex pyramids (pentagonal/octagonal).
- Students who are unable to draw will have the option to use the iPads to create the images of the shapes.
- The graphic organisers will be provided digitally.
- New language will be translated for ESL students and a word wall and glossary will be created.
- If students are unable to move around the room peers will assist in delivering the feely bags.

**Conclusion**

- Students close their maths books and eyes up on whiteboard. The teacher shows photos of pyramids in real life – such as a tent, Rubiks Pyramix, Egyptian pyramids, Mayan pyramids
- The students write on their whiteboard what type of pyramid it is and hold it in front of them facing the teacher.
- The teacher chooses one correct answer and asks the student why they said that.

**Lesson 2 – Exploratory – Building 3D Pyramids**

**Resources**

- Pyramid themed Kahoot quiz.
- [Craft matchsticks](#)
- [Blue tack](#)
- Graphic organiser
- iPad
- [YouTube video](#)

**Introduction**

- The class will start with a pyramid-themed Kahoot quiz. The questions will revise what was learned in the last lesson with some fun ancient Egypt questions included too.
- The teacher will ask the students some revision questions – what type of pyramids do we know? This will elicit the answers triangular-based, square-based, and rectangle-based which the teacher will write on the board.
- The teacher will tell the students that today we will be building these pyramids.

## Body

### Introduce:

- The teacher will show the YouTube video from 1.36mins and talk the students through it. The video will be paused at the end and the teacher will model counting the number of sticks and blue tack balls used and will enter these numbers into the graphic organiser on the whiteboard.
- The teacher will ask what the stick represents (edge) and what the blue tack represents (vertices)

### Explore:

- Each student will be given 50 matchsticks, a ball of blue tack and a graphic organiser. An image of a triangular, square, and rectangular based pyramid will be displayed on the whiteboard.
- Students are asked to use their resources to build one each of these pyramids and fill in the number of sticks and blue tack balls used in their graphic organiser as they go. The students will then count their edges, faces and vertices and add these into their graphic organiser.
- As they complete each pyramid they will take a photo of it and upload it to Seesaw where they will also label one edge, face and vertex on each photo, and name the pyramid.
- When the students have finished, they are put into groups of 4 and will be given a challenge to combine their matchsticks and blue tack and to build the biggest pyramid they can. Will theirs be the biggest?

### Reflect:

- When they have finished the groups will use the iPads to record a speaker explaining how they constructed it, their reasons for using that method, and if they would do anything differently next time.
- These will be uploaded to Seesaw for the teacher to review. (Formative assessment)

### Differentiation:

- Some students may only finish building one pyramid while fast finishers will be given the challenge of building a pentagonal or octagonal pyramid.
- Students will be able to use a digital graphic organiser.
- Larger paddle pop sticks will be available if the matchsticks are too small.
- The teacher can have a discussion with extended students about the relationship between the figures in the table – is there a pattern between the number of edges, faces and vertices? What similarities can we see? What would happen if we had a hexagonal pyramid? Could we calculate the faces without building it?
- Groups are strategically differentiated by the teacher to encourage participation and support students' strengths and challenges.
- During the group challenge students can continue to explore with their own constructions if they prefer to work alone.

## Conclusion

- Students will present their giant matchstick pyramids to the class – the teacher will ask questions – which used the most sticks? Which is the tallest? The sturdiest? What shape is the base? How many faces are there?
- The teacher will decide a winner for the biggest pyramid challenge.

## Lesson 3 – Gradual Release of Responsibility – Nets of Pyramids

### Resources

- [Pyramid shape box](#) with slips of paper with Egyptian names on
- Graphic organiser
- A4 paper with nets of pyramids on

### Introduction

- The teacher has a large cardboard pyramid box. The box is filled with slips of paper with ancient Egyptian names on (Osiris/Cleopatra etc).

- The students are told that they have been transported back to ancient Egypt – they draw a slip from the pyramid and this is their Egyptian name for the next 2 lessons and the assessment.
- The teacher tells the class that in today’s lesson we will be learning about the nets of pyramids.

### Body

- The teacher holds up the now empty 3D pyramid box and tells the class a story of how a volcano erupted in ancient Egypt and the flying rocks and ash flattened the pyramid. The teacher opens the pyramid out into its 2D net and holds it up.
- The class are asked to describe what it is now. (Students have learned in the previous lesson sequence about nets of prisms so should have some prior knowledge). The teacher will elicit from the students that we have now made a 2D shape from a 3D shape – we have made the net of a pyramid.
- The teacher will ask the students to describe what they can see, and the teacher will write the vocabulary on the board. The teacher will draw the net of the pyramid on the board and label the parts (I do) The teacher will fold the net back into a pyramid and ask the class to help label the parts.
- The class will now work with their neighbour in a ‘Think, Pair, Share’ exercise. Each pair is given a 3D pyramid and a 2D net and is asked to discuss the similarities and differences between them. They write their observations in a graphic organiser. (You do together) The teacher will walk around and listen and observe.
- Ideas are then shared in a class discussion. (We do)
- Students are now given some nets of pyramids on A4 paper. They will first be asked to visualise what they think the net will make and write their guess down and justify it if possible. Then they will cut out and make the pyramid from the shape. (You do alone)

### Differentiation:

- Students can use magnetic polygons to help them visualise and work out what pyramids the nets will make.
- Some students will be extended with more complicated nets.
- The teacher will have some nets pre-cut for students who struggle with fine-motor-skills.
- The graphic organiser can be provided and completed digitally.

### Conclusion

Students are given a worksheet where they match the pyramid to its net. The worksheets are submitted to the teacher. (Formative assessment)

## Lesson 4 – Pyramid Net or Not – Problem Solving

### Resources

- [Magnetic polygons](#)
- [Craft matchsticks](#)
- [Blue tack](#)
- [Website](#) on the whiteboard
- [Approved and rejected stamps](#)

### Introduction

- Students are reminded of their Egyptian names from the last lesson and told that they are King Tutankhamun’s team of head engineers.
- As their homes were flattened by the volcano eruption, the villagers have brought 2D net designs of their new pyramids to you and you have to let them know if the designs will work to build a 3D pyramid.

This lesson we are going to see if we can recognise if nets will work without folding them.

## Body

- The teacher will demonstrate for the class with a net on the whiteboard. It will obviously not work as it has different shapes on each side. The teacher will stamp 'rejected' on the net and explain why.
- The students will be split into small groups for this task. Each group will have specific roles. There will be a group manager, a note-taker, a messenger, and a timekeeper. The manager will make final decisions if the group can't agree, the note taker will fill in a graphic organiser, the messenger will liaise with the teacher if required and the timekeeper will keep the group on task.
- Each group are given 10 nets and have to discuss whether they are going to approve or reject the nets. The groups need to stamp their nets approved or rejected and make 2 piles. With the approved nets the students then need to visualise, name, and draw what pyramid they think the net will produce. With the rejected pile the students need to give feedback to the villagers and explain why it wouldn't work. The groups then need to offer suggestions to fix the rejected designs. Students can use manipulatives to help them such as matchsticks, blue tack, magnetic polygons.
- When the groups are finished they can cut out the nets and construct them to see if they work.
- The teacher will move around the room and observe the groups and listen to their conversations and calculations (formative assessment).

### Differentiation:

- The teacher can use strategic groupings for this exercise and allocate different nets of varying complexity.
- Some nets will be basic triangle-based pyramids while the more complex nets will have different bases. The more advanced students can be challenged with irregular pyramids.

## Conclusion

- The class will join back together to discuss their findings.
- Groups will present their ideas to the class.
- Students will have the chance to compare findings and ideas

## **Maths Pyramids and Nets Summative Assessment Task Sheet**

Year 5 – Term 3

**Name:**

**Class:**

Due Date: 16<sup>th</sup> October 2023



Summary: To design and build a 3D model of a pyramid from a 2D net.

Conditions: Individual task

Resources available: A4 and A3 paper, pens, crayons, sticky tape, scissors, rulers, iPads, craft box for decorations

### **Task**

You are a villager in the ancient Egyptian city of Thebes. A volcano destroyed your village but luckily you escaped. You need a new pyramid to live in and you have to design and build it yourself. Think of the following questions:

- What shape will the base be?
- How big will it be?
- How will you decorate it?

You will need to follow the below steps:

1. Design the 2D net of your pyramid.
2. When the net is complete take a photo and upload it to Seesaw. Label the parts using mathematical language.
3. Make your 3D pyramid from your net.
4. When your pyramid is complete take a photo and upload it to Seesaw. Label the parts using mathematical language.
5. Decorate your pyramid.
6. Use the iPad to make a short video presenting your pyramid and explaining how you built it and why you chose the design. Upload this video to Seesaw.

Your teacher (AKA Queen Nefertiti) will make a display village of the class pyramids for your friends and family to come and see – so make them great!

Criteria	A	B	C	D	E
A 2D net of a pyramid is designed and uploaded to Seesaw.	A 2D net of a pyramid with some complexity has been accurately designed and uploaded to Seesaw.	A 2D net of a pyramid has been accurately designed and uploaded to Seesaw.	A 2D net of a pyramid has been designed and uploaded to Seesaw	A 2D net has been designed and uploaded but it is not a pyramid.	No 2D net of a pyramid has been designed or uploaded.
/10 marks	10 – 9	8 – 7	6 - 5	4 - 2	1 – 0
A 3D pyramid is constructed and a photo is uploaded to Seesaw.	A 3D pyramid with some complexity has been accurately constructed and a photo uploaded to Seesaw.	A 3D pyramid has been accurately constructed and a photo uploaded to Seesaw.	A 3D pyramid has been constructed and a photo uploaded to Seesaw.	A 3D shape has been constructed and a photo uploaded, but it is not a pyramid.	No 3D pyramid has been constructed and no photo uploaded.
/10 marks	10 – 9	8 – 7	6 - 5	4 - 2	1 - 0
The photos of the net and the pyramid have been labelled in Seesaw with mathematical features.	The 2D net and 3D pyramid are accurately and clearly labelled using a wide variety of mathematical vocabulary.	The 2D net and 3D pyramid are correctly labelled using mathematical vocabulary.	The 2D net and 3D pyramid are labelled with basic mathematical vocabulary.	The 2D net and 3D pyramid are labelled with some incorrect mathematical vocabulary.	The 2D net and 3D pyramid are not labelled.
/10 marks	10 – 9	8 – 7	6 - 5	4 - 2	1 - 0
A video is made to present the pyramid model and describe the planning and construction process.	The video contains a clear explanation of the student's thinking process and reflects on the choices made in the planning and construction.	The video contains a description and explanation of how the pyramid was planned and constructed.	The video describes how the pyramid was planned and constructed.	The video contains limited description or explanation of the planning and construction process.	No video has been submitted.
/10 marks	10 – 9	8 – 7	6 - 5	4 - 2	1 - 0

Total Mark: /40

Self assessment – please circle how you feel you performed in this assessment task.

