THE FMS LEARNING FROM HOME SERIES PACK FOR

Upper Primary (9 – 12 years)

Term 4 2021

Weeks 1 and 2 Montessori learning ideas

Forestville MONTESSORI School

Thriving beyond...

Wednesday 6 October 2021

Forestville
MONTESSORI School
Thriving beyond...

Hello 9 – 12 children and parents

Welcome to back to Term 4. Just like you, we are looking forward to and counting down the days till we can all be together.

This pack covers weeks 1 and 2. Let's get the term off to a great start and enjoy exploring the following topics:

- Montessori Model United Nations – our focus this term is on the Sustainable Development Goals and how we can support them through our daily activities.
- Climate Change Science – we break into 2 studies – the Earth and Chemical Sciences to explore and investigate the enhanced greenhouse gases and action we can take to bring about change.
- Pythagoras – The Story of a Wizard – let's step back in time to ancient Greece and Egypt to discover patterns in numbers and the development of the mathematical mind.

Please print and use the checklists included to keep track of work. We ask that all work be done in sequence, and that you continue to submit work via Transparent Classroom and/or email. We will ask students to bring all their work from Term 3 and 4 to school once we can return.

Thanking you again for supporting your child's learning at home.
Lauren, Tamlin and Anthony
Upper Primary (9 – 12 years) Staff

Week 1 Zoom meeting

This week you will be joining your classmates in online Zoom meetings.

Wednesday 6 October 2021

9-12 check-in meeting	
Time	**Participants**
10.00 am – 10.40 am	All students who are working from home

Week 2 Zoom meeting

This week you will be joining your classmates in online Zoom meetings.

Tuesday 12 October 2021

9-12 check-in meeting	
Time	**Participants**
10.00 am – 10.40 am	All students who are working from home

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10 easy to follow etiquette rules for the Zoom classroom*:

1. Have materials ready
2. Stay in one spot during the Zoom
3. Don't use a fun background
4. Know when and how to use mute
5. Find a quiet spot
6. Be on time
7. Wait your turn
8. Be presentable
9. Be respectful
10.

Private chatting with your classmates is not allowed at anytime during a Zoom classroom.

Only use the chat function if you need to talk to the teacher.

If you cannot follow these steps your teacher will ask you to leave the meeting.

* *Zoom meetings may be recorded by FMS for quality control including records of students using the chat function.*

The 9 – 12 art auction masterpiece

Last term the 9 – 12's decided as a group that the 9 –12 art auction artwork will be a digital collage that shows every child in an area of the school of their choice displaying their personalities and/or interests.

This week you will continue to work from your photographs that tell a story about who you are. You will finish or make additional self portraits using the art media of your choice.

Zoom lesson focus

Week 1: Draw from images of places around the school. You can access these images on the Virtual Classroom.

Week 2: Arrange your images digitally.

Please email your pictures to me before the lesson.

Your follow up is to finish any portrait and images of the school, photograph them and email them to me at

tamlin.h@forestvillemontessori.nsw.edu by the end of week 1 so that they can be added to the whole class picture.

Check out the video on the virtual classroom for ideas, instructions and inspiration.

FMS 40 year anniversary commemorative project: Thriving together

‘Photographs open doors into the past,
but they also allow a look into the future.’ Sally Mann

This year to celebrate the 40 year anniversary we would like everyone that is willing to partake in a special photography project that marks the occasion and leaves a legacy for the future.

The idea is for every FMS family to take a photograph of the whole family in front of a doorway demonstrating their individual personalities and connection with each other. Although it is a time of distancing and separation we will connect all the images of the families to make a montage of the school community in beautiful framed poster bringing everyone together.

There will also be a special anniversary photo-book produced that includes all of the families which will be available for order for anyone that would like to own a copy.

What to do:

- put on your favourite outfits
- place yourselves in front of a doorway – it can be anywhere in the house and can be open or closed
- get the whole family in to position – you can be doing whatever you like in the photo
- set the orientation on portrait
- make sure the whole door and family fit into the frame
- set your camera or phone on timer or someone could take the picture if they don't want to be in it
- take loads of photos and most importantly have fun!

Email your favourite photos to
tamlin.h@forestvillemontessori.nsw.edu
by the Monday week 2 of term 4.

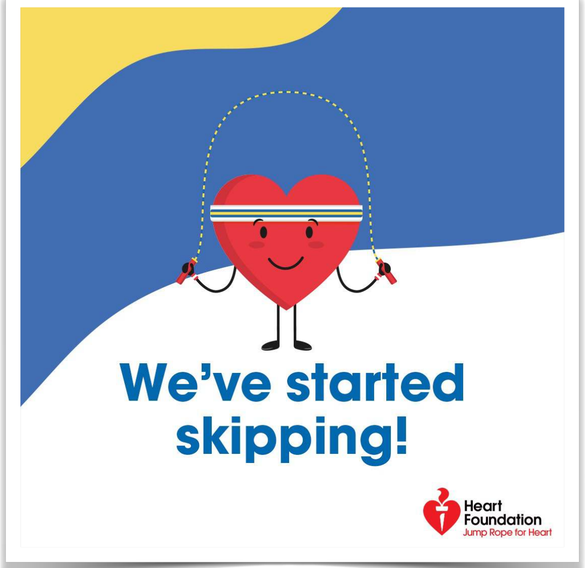
- For the photo-book we would love to have a small piece of text to accompany each family's photo of whatever you would like to share with the school community.
- Some ideas of what you might like to write about: A favourite memory of FMS, what you like about FMS, what would you like to say to families in the future or to the founders of the school, or maybe you have a family recipe you would like to share.

9 –12 Jump rope for heart

Jumping jellybeans, **Jump rope for heart** will go ahead this term in week 6 when we can all be together again having fun with our friends!

Click on this link to make your own fundraising page, get skipping and start raising money for the Heart Foundation.

Or click here for further info.



For more ideas on how you can be super sporty at home

Check out the FMS virtual classroom sport slide

Once in the virtual classroom click on the different sports to discover video tutorials and fun ways to move your body.

9 – 12 Jump rope for heart

Ready to challenge yourself?

Try out these skipping skills and tick them off once you have perfected them.

Click here for videos on how to perform these skipping skills.

Too easy or too hard?

Check out the full list of skipping challenges to master

Intermediate Skipping Skills

Skill	I am practising	I can sometimes do it	I can perform it with ease	I can teach it to someone else	Skill	I am practising	I can sometimes do it	I can perform it with ease	I can teach it to someone else
Leg Swing Cue: swing left, swing right					**Double Under** Cue: one, two, three, double				
Peak-a-boo Cue: tap left, tap right					**Criss Cross** Cue: cross, jump, open, jump				
Kick Swing Cue: kick left, kick right					**Backward Criss Cross** Cue: jump, cross, open				
Can Can Cue: knee jump, kick jump					**Side Swing Cross (Matador)** Cue: right, cross, left, cross				
Squat Jump Cue: jump, squat, straddle					**Forward 180° Turn** Cue: jump, swing and turn, jump backwards				

Heart Foundation

JUMP ROPE for HEART

Week 1: Wednesday 6 October 2021		
Start time:	**Activity:**	**End time:**
Reflection: How was your day? What do you need to continue working on? Did you have any problems? How did you solve them?		

Week 1: Thursday 7 October 2021		
Start time:	**Activity:**	**End time:**
Reflection: How was your day? What do you need to continue working on? Did you have any problems? How did you solve them?		

Week 1: Friday 8 October 2021		
Start time:	**Activity:**	**End time:**
Reflection: How was your day? What do you need to continue working on? Did you have any problems? How did you solve them?		

Week 2: Monday 11 October 2021		
Start time:	**Activity:**	**End time:**
Reflection: How was your day? What do you need to continue working on? Did you have any problems? How did you solve them?		

Week 2: Tuesday 12 October 2021		
Start time:	**Activity:**	**End time:**
Reflection: How was your day? What do you need to continue working on? Did you have any problems? How did you solve them?		

Week 2: Wednesday 13 October 2021		
Start time:	**Activity:**	**End time:**
Reflection: How was your day? What do you need to continue working on? Did you have any problems? How did you solve them?		

Week 2: Thursday 14 October 2021		
Start time:	**Activity:**	**End time:**
Reflection: How was your day? What do you need to continue working on? Did you have any problems? How did you solve them?		

Week 2: Friday 15 October 2021		
Start time:	**Activity:**	**End time:**
Reflection: How was your day? What do you need to continue working on? Did you have any problems? How did you solve them?		

URSTRONG
TRICKY SITUATIONS
FRIENDOLOGY 101

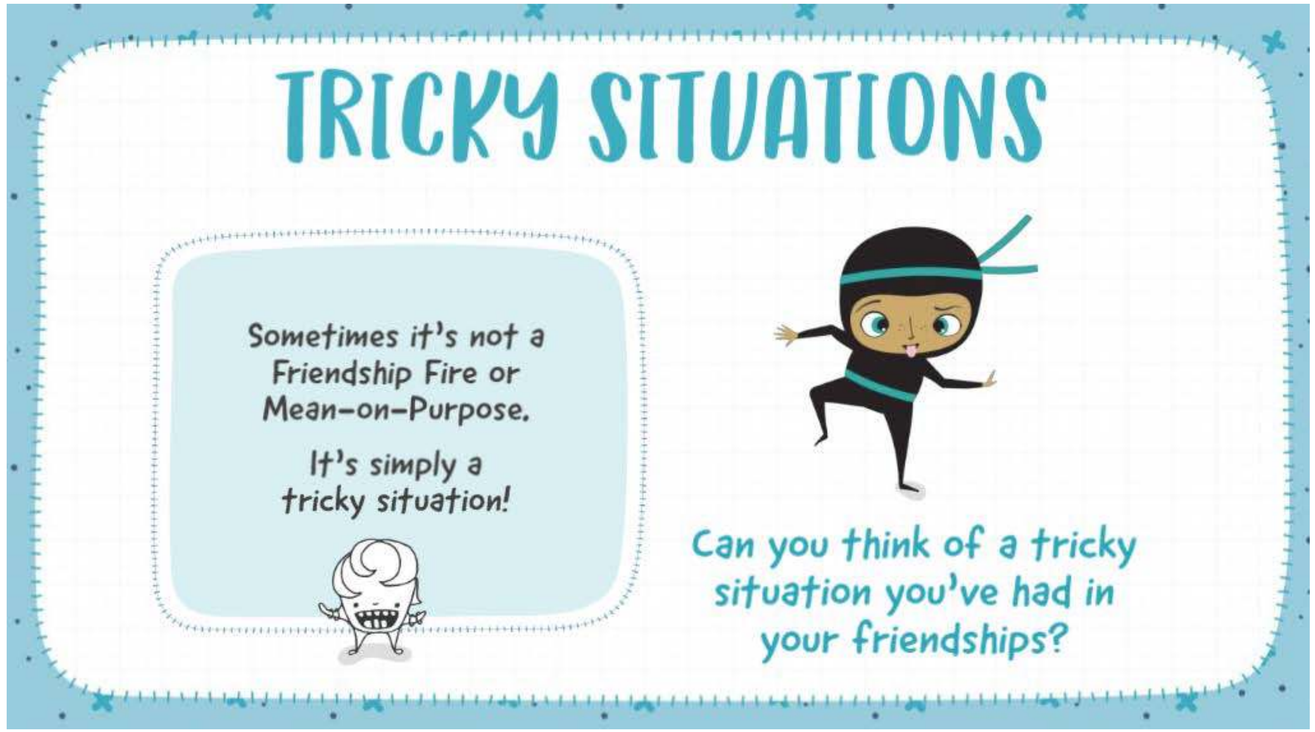
TRICKY SITUATIONS

Over the next few weeks, we will explore common scenarios, hot topics, and tricky situations that you might face in your friendships. This is an opportunity to discuss those friendship dramas that might not be classified as a conflict, but that still represent a challenge.

1: What are tricky situations?

It's very normal to encounter bumps in the road in our friendships. Remember Friendship Fact #1? No friendship is perfect. Sometimes we have situations in our friendships that aren't really a conflict, but it's something that makes you stop and think.

Watch this video as Dana explains 'tricky friendship situations': https://vimeo.com/622107418/c170083491



TRICKY SITUATIONS

2: Can you think of a tricky situation you've had in your friendship?
Here is a tricky situation, 'I had a tricky situation once. My friend invited me to go out for a walk after school, but I was really tired after a long day of studying. I didn't want to make my friend feel bad, but I also didn't have the energy and felt exhausted.'

Look at the 'tricky situations' in the circles. Choose two. In your workbook put the heading, 'Tricky situations', and describe what made these tricky situations for you.

birthday party

friendship bubble

best friends 4 ever

on-line chatting / texting

TRICKY SITUATIONS

3: Tricky situations: Saying No

Watch the video as Dana explains those situations when you have to say ‘No’:

https://vimeo.com/622113716/0a44a989d9

4: Tricky Situation: Times I’ve had to say ‘No’

Can you think of times when you had to say ‘No’?

In your workbook put the heading, ‘Tricky Situations: Saying No’. Make a list of the different times you had to say ‘no’ to someone or a group of people. Next to each situation:

- state how you felt.
- state how you think the other person or people felt.

5: Ways to kindly decline

One of the greatest skills we can learn is that it's okay to kindly decline or say no. This is an essential skill when it comes to boundaries in our friendships. Go through the list on the left and choose those that feel right for you.

It is important to remember to use the word 'because' to explain why we are saying 'no'. For instance, if someone asks you to be their partner again you could say, 'Well, actually no, because we were partners last time and I'd like to go with someone else this time. We can be partners again next time, though!' This helps you to have a good reason and doesn't leave a friend to assume the worst or rejection.

6: Practice kindly declining

Read the scenario on the left. Think of 3 ways that you are going to kindly decline or say no.

In your workbook put the heading, 'Ways to Kindly Decline'.

- Copy the scenario
- Underneath the scenario write how you would kindly decline.
- Make sure you use 'because' in your response as this helps you to state a good reason.
- You could start with this sentence stem: "Thank you for your invitation for a sleepover. I have to say no because ……..

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Mindfulness and Wellbeing **URStrong: Tricky Situations** Use this checklist to review all content for Weeks 1 & 2.	To do	Underway	Completed
Week 1 & 2 Pack			
1. Watch the ‘Tricky Friendship Situations’ video			
2. Describe 2 x the ‘tricky friendship situations’			
3. Watch the ‘Tricky Situations: Saying No’ video			
4. Listing Tricky Situations: Times I’ve had to say no			
5. Read ‘Ways to kindly decline’			
6. Practice kindly declining x 3 responses			

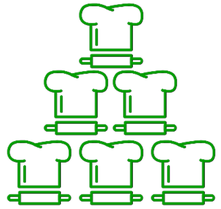
Kitchen chemistry: Kids can cook

Back to school week and I'm sharing a quick no fuss mid-week dinner recipe that you can do to impress the family. This is a great take on a traditional tray bake - Macaroni and Cheese. This recipe comes from my good friend Hieu Nguyen who used to be the Creative Director and Designer for the Australian Women's Weekly Food magazine. Hieu has moved on and is doing great creative work in New York.

The recipe I'm sharing is 'Buttermilk Mac 'n Cheese'. The Women's Weekly test kitchen says that you can cook this dish in 20 minutes! Don't forget to add in preparation time. Let's put it to the test.

Here are some some hints to help you speed things up:

- Collect and measure out all your ingredients before you start.
- Ask an adult to help you with the stove top, oven or grill, and when handling boiling water.
- Boil the kettle so you have boiling water ready to go into the saucepan to cook the pasta.
- Wear an apron and clean up as you go!



Raffa's recipe difficulty levels

One chef hat = Pretty easy to make

Two chef hats = Medium level

Three chef hats = Hardish to make

Kitchen chemistry: Kids can cook

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Ingredients – Serves 4	
Difficulty:	
Macaroni pasta	250 grams
Sour cream	300 ml
Buttermilk	375 ml
Nutmeg, ground	½ teaspoon
Peas, frozen	1 Cup
Lemon rind, finely grated	1 teaspoon
Baby spinach leaves	60 grams
Pizza cheese, grated	250 grams
Panko Japanese bread crumbs	35 grams
Thyme leaves - fresh or dried	1 tablespoon
Salt and pepper to season	
You can add a protein:	
Chicken, cooked and shredded	320 grams
Tuna, in oil, drained and flaked	425 Grams
Bacon, chopped and fried till crisp	4 rashers
Gluten free or vegan? Make changes to suit.	

1. Preheat the oven to 200ºC.
2. Oil a 2.5-litre (10-cup) ovenproof dish.
3. Cook pasta in a large saucepan of boiling water until tender; drain.
4. Heat sour cream and buttermilk in a large saucepan over low heat until warmed and combined; do not allow to boil.
5. Stir in your choice of protein if using.
6. Stir in nutmeg, peas, lemon rind, and spinach.
7. Stir in about three-quarters of the cheese; stir until smooth.
8. Season with salt and pepper to taste.
9. Combine remaining cheese, the breadcrumbs and thyme in a small bowl.
10. Stir pasta into hot cheese sauce; spoon into dish.
11. Scatter with breadcrumb mixture.
12. Bake for 20 minutes or until bubbling and browned lightly. Stand for 5 minutes before serving.
13. Serve with a side salad, or steamed vegetables.

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Montessori Model United Nations

Weeks 1and 2:

SUSTAINABLE DEVELOPMENT GOALS

MONTESSORI MODEL UNITED NATIONS

Inspiring youth to create a better world

Focus question: What are the United Nations Sustainable Development Goals?

The United Nations introduced the Sustainable Development Goals (SDGs) in 2015 as a global plan to reduce poverty, protect nature and enable everyone to live in peace and prosperity. Over the next few weeks, we will explore the United Nations Sustainable Development Goals and understand why they are important.

"We only have one planet. We have nowhere else to go. If we use our creative powers properly we don't need anywhere else. If we take care of it, and each other, everything we need is right here"

Sir Ken Robinson
Author / Educator

1: What are the Sustainable Development Goals?

This short video is your introduction to the 17 Sustainable Development Goals.

https://www.youtube.com/watch?v=0XTBYMfZyrM&t=52s

2: Big Problems

Imagine that you are the prime minister or president of a country. You are faced with the following question:

'What are the biggest problems faced by people in our community / country / worldwide?'

On the next page brainstorm (with mum, dad or other family members) and try to identify some of the biggest problems facing our local community, our country, and the world today.

You can print or copy the brainstorm sheet onto an A4 size piece of paper.

Brainstorm: What are the biggest problems faced by people

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In our community?

In our country?

In the world?

1 NO POVERTY
2 ZERO HUNGER
3 GOOD HEALTH AND WELL-BEING
4 QUALITY EDUCATION
5 GENDER EQUALITY
6 CLEAN WATER AND SANITATION
7 AFFORDABLE AND CLEAN ENERGY
8 DECENT WORK AND ECONOMIC GROWTH
9 INDUSTRY, INNOVATION AND INFRASTRUCTURE
10 REDUCED INEQUALITIES
11 SUSTAINABLE CITIES AND COMMUNITIES
12 RESPONSIBLE CONSUMPTION AND PRODUCTION
13 CLIMATE ACTION
14 LIFE BELOW WATER
15 LIFE ON LAND
16 PEACE, JUSTICE AND STRONG INSTITUTIONS
17 PARTNERSHIPS FOR THE GOALS

3: Global goals

The 17 Sustainable Development Goals are shown on the previous page.

You will need:

- 6 sheets of A4 paper
- print a copy of the previous page or alternatively you can draw and colour your own
- scissors
- glue
- brainstorm sheet.

Your task:

- Print and cut out each of the goals or alternatively draw and colour each of the goals.
- In order glue 3 of the goals to each sheet of paper.
- Look at each goal. Look at your brainstorm sheet.
- Next to each goal write the problem that is tackled by that goal.

Sample Sustainable Development Goals Sheet Page 1.

Your A4 pages should be set out like this:

- 6 sheets of A4 paper
- 3 goals per page in order.

4: Understand the global goals

In this video Malala Yousafzai introduces you to the World's Largest Lesson.

https://worldslargestlesson.globalgoals.org/resource/malala-introducing-the-the-worlds-largest-lesson/

5: Go goals

These 17 goals of sustainable development should be achieved by the year 2030. That's just 9 years from now. To achieve the goals, countries, companies, and citizens should all work together, and share the responsibility to spread the word about them. If you've never heard of them before, it's time to act! Being aware of the challenges this world holds is the first step.

Here is a downloadable board game based on the Sustainable Development Goals 'Go Goals' to play with your family:

https://go-goals.org/downloadable-material/

6: Elyx, the United Nations' digital ambassador

Elyx, the United Nations' digital ambassador, uses various expressions and actions to help demonstrate the meaning of each Sustainable Development Goal. Created by French artist YAK, Elyx has no race, sex or nationality and is a universal character promoting the importance of the United Nations' work. Read the book online:

https://issuu.com/unpublications/docs/sdg_yak_en

7: Your task:

Now that you know more about the Sustainable Developmental Goals, what other problems can you add to the goals sheets?

8: World problems

Here is a list of problems faced by people around the world today:

- Poverty
- Inequality between countries
- Hunger
- Poor health and disease
- Dirty water
- Lack of sanitation
- Poor education – some children can't go to school
- Low-paying and not enough jobs
- Low economic growth – countries do not earn enough money to pay for everything their people need
- Gender inequality – men and women are treated differently and not given the same opportunities
- War, fighting and instability
- People don't feel safe
- Violence between people
- Corruption and injustice
- No respect for human rights
- Countries never work together or agree on anything
- Not enough energy for everyone to live comfortably
- Un-safe towns and cities
- Weak infrastructures, poor technology and communications
- Unsustainable cities that consume more than the world can produce
- There's too much wastage of resources and not enough re-cycling
- Climate change
- Polluted seas and oceans
- Damaged habitats
- We have limited access to technology and expensive mobile phones and computers
- People don't feel they are protected properly
- Population growth
- Obesity
- Racism
- Breakdown of communities

Your task:

Read each problem then match and write the problem next to the appropriate goal.

9. What the global goals mean to me

You will need:

- 1 sheet of A4 paper
- colour pencils and markers.

Your task:

- Draw a single comic frame image showing you using your superpower to help meet one of the Sustainable Development Goals.
- Add into a speech bubble your idea of how you can help with the global goals.

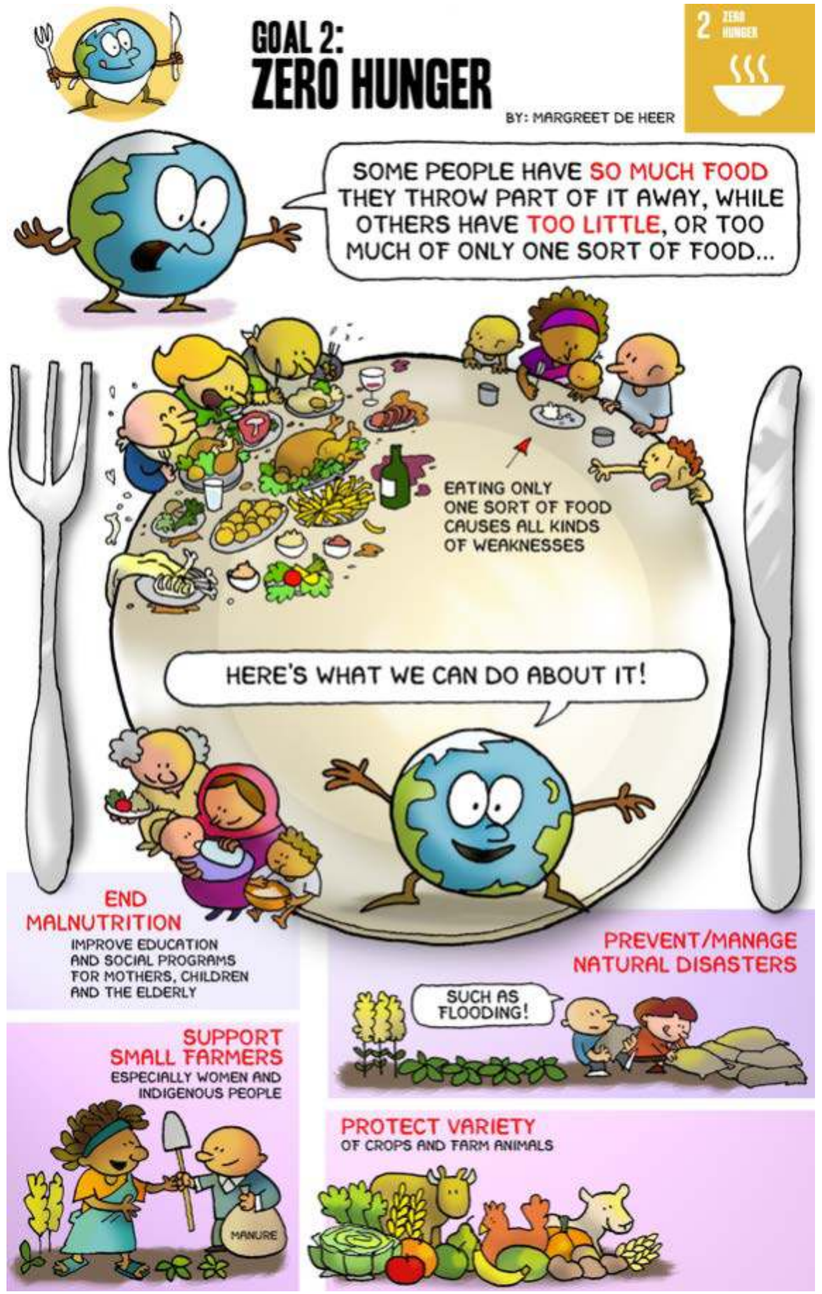
10. Then finish these sentence stems reflecting your views on the global goals and what they mean to you.

The global goals mean _____ because _____ .

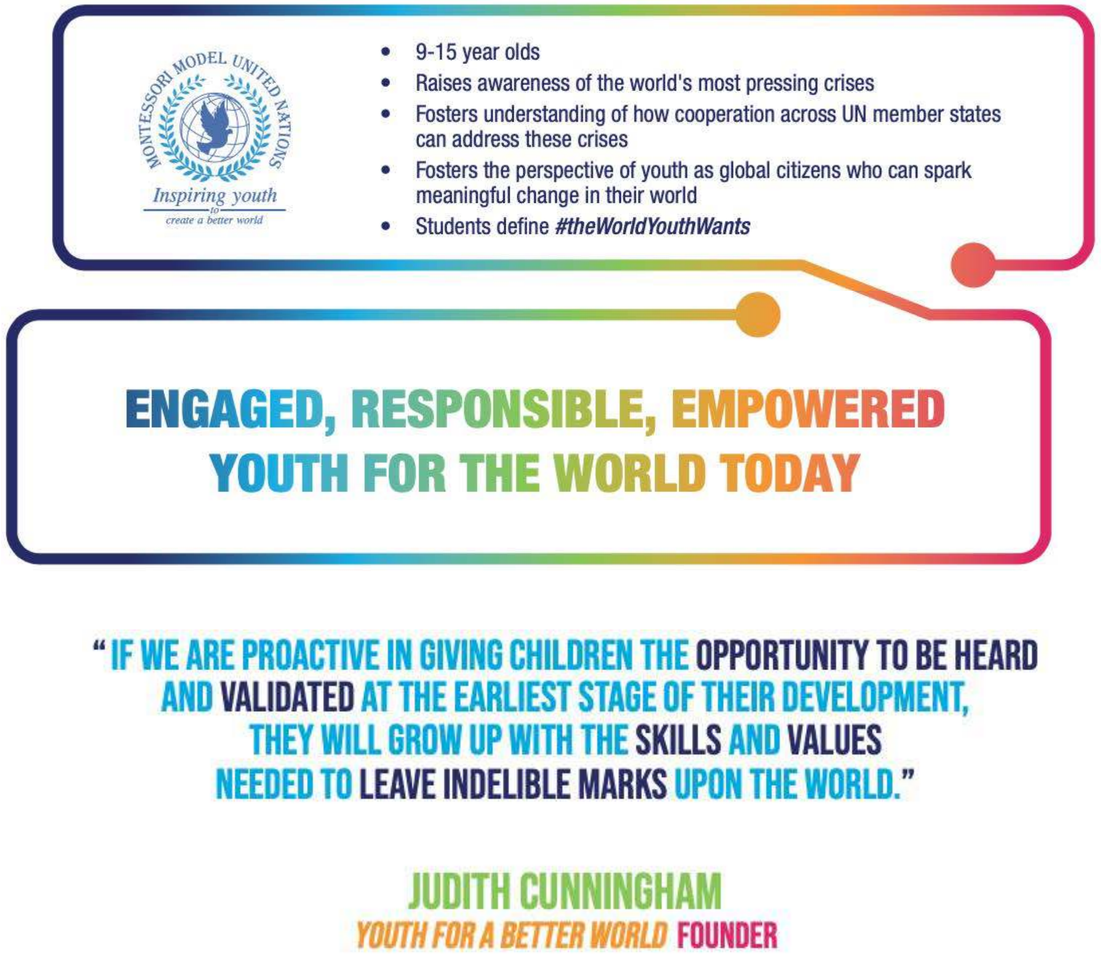
The global goals were developed so _____ .

The global goals raise awareness for people to _____, but _____ .

Add these to your comic.



Montessori Model United Nations Sustainable Development Goals Use this checklist to review all content for Weeks 1 and 2.	To do	Underway	Completed
Week 1 & 2 Pack			
1. Watch 17 Sustainable Development Goals video			
2. Big problems brainstorm sheet			
3. Global goals: 6 x A4 sheets / 17 goals / add problems			
4. Understand the Global Goals: Watch the World's Largest Lesson video			
5. Go Goals!: Download, make and play the Go Goals game			
6. Read the Sustainable Development Goals book online			
7. Add further problems to the Sustainable Goals sheets			
8. World problems: Read through the list and add the problems to the Sustainable Goals sheets			
9. What the global goals mean to me: Single comic frame image showing you using your superpower to help meet one of the Sustainable Development Goals. Add speech bubble.			
10. Finish the global goals sentence stems x 3. Add to your comic.			
11. All work to be finished by Friday 15 October 2021.			
12. Keep all beautifully presented written work together in a binder ready to bring to school.			



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climate change science

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Earth Sciences

Over the next few weeks, we will explore the effects of climate change through the earth sciences. Our learning goal is to bring together everything we know about the planet we live on and the air we breathe.

1. Concept Map

On the next page you will add information to the concept map. Write bullet points about what you know so far about our planet Earth.

Think about:

What do you know already about the Earth?
The Earth as a planet – shape, location, what it does.
The Earth's surface – features, layers.
The Earth's atmosphere – features, layers.
The Earth's hydrosphere – features, layers.

Concept map: What do I know about the Earth?

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The Earth as a planet

The Earth's surface

The Earth's atmosphere

The Earth's hydrosphere

2. Read the focus text below

You can then add further information to the Concept Map.

Focus text: The Earth

The Earth

The Earth is a spherical planet in space that moves around the sun. The sun is the source of most of the Earth's energy, providing heat and light. While the Earth is revolving around the Sun, it also rotates on its own axis.

What is the Earth's surface made of?

The Earth's surface is mostly made up of water. The remainder is land. At the top and bottom of Earth are the poles: the Arctic in the north and the Antarctic in the south. The poles are made up of ice. The ice at the Arctic is mostly sea ice (formed on top of the ocean). The ice in Antarctica is land ice (formed on top of rock).

The atmosphere

The air around us is the Earth's atmosphere, made up of different gases. The most important gas for living things is oxygen, because without it, they would not survive. The atmosphere has other gasses that help keep the Earth warm. They act like a greenhouse or like the windshield of a car out in the sun, keeping the sun's warmth trapped in our atmosphere, and are called greenhouse gases. Air in the atmosphere moves around the planet from one place to the next.

The oceans

The oceans around Earth are interconnected. Warm water near the Equator moves to cool water at the poles and back again, keeping everything in balance.

How humans affect the Earth

When humans make changes to the Earth, there are consequences for all living things. Sealed surfaces such as bitumen are not viable habitats for living things. Rain cannot soak into some surfaces, like bitumen, so living things can't use it. Instead, rain on roads runs into drains and out to sea.

These changes that humans are making affect all living things on Earth. We have to protect Earth by acting thoughtfully and carefully whenever we use Earth's resources. We have to reduce, re-use and recycle to conserve the Earth's resources.

Rotation and revolution of the Earth

3. Watch the video 'Rotation and Revolution of the Earth'

https://www.youtube.com/watch?v=CqkQv617bcw

As you watch the video write down in bullet point facts about rotation and revolution movements of the Earth.

Facts about the Earth's rotation	Facts about the Earth's revolution

Rotation and revolution of the Earth

4. Rotation and Revolution Facts Graphics

Now that you know more about the rotation and revolution of the Earth it is time to visualise these facts. Do not copy the graphics from the video.

You will need:

- 5 sheets of A4 paper
- colour pencils and markers

Your task:

- Draw and label a diagram that explains the tilt of the Earth and one rotation.
- Draw and label a diagram that explains day and night.
- Draw and label a diagram that explains how long it takes the Earth to go around the Sun in an ellipse.
- Draw and label a diagram that explains the 4 seasons.
- Draw and label a diagram that explains summer in the Southern Hemisphere.

Earth word web

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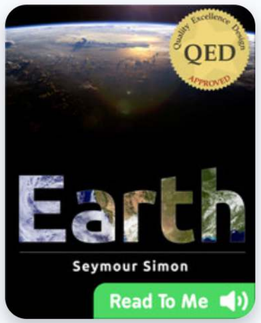
5. Earth word web
The book ‘Earth’ has been assigned to you. Read it on Epic. Use the Class Code: zym2499 to access the book.

Complete the following word web to show relationships between words that relate to our planet Earth. Draw arrows to show connections between the words. Write a short phrase on the arrows to show how the words are related to each other.



solar system

continents

water

ice

land

Sun

planet

is a

Earth

climate zones

axis

night

orbit

atmosphere

day

oceans

Write like a scientist

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6. Write like a scientist - Your task:

Now that you have collected information about the Earth it is time to write like a scientist. Over the next few weeks, we will write an information report on the Earth. We will use our notes to shape the following paragraphs:

- Section 1 – The Earth
- Section 2 – What is the Earth's surface made of?
- Section 3 – The atmosphere
- Section 4 – The oceans
- Section 5 – How humans affect the Earth

Let's start with Section 1 – The Earth

This is the opening to our information report. We can use two paragraphs to give a brief explanation about the Earth.

In paragraph 1 we want to state what the earth is, where it is located and its connection to the Sun and Solar System. We can also mention briefly that the earth has a surface, atmosphere, and hydrosphere.

In paragraph 2 we want to briefly explain some important phenomena to do with the earth – rotation, revolution, and the effects these have on the Earth.

Do you remember how to write a 'Sizzling Start'? We can use a Sizzling Start to create an engaging introduction to our information report. A great way to do this is to team up a fascinating fact with a Sizzling Start.

Find an opening fact about the Earth. Then use one or more of the following Sizzling Start techniques to start your first paragraph:

- start with a sound
- start with an action
- use a question
- paint a word picture.

Write a draft of your first paragraph now.

You can also start your second paragraph with another but different Sizzling Start.

Write your second paragraph now.

Proofread and Edit:

Read your draft out aloud. Does it make sense? Make changes as necessary. Check spelling, punctuation, and grammar. Use the writing proofreading and editing charts.

Publish: Type up a good copy of your first and second paragraph.

Year 6: Climate change science

Chemical Sciences

Over the next few weeks, we will explore the effects of climate change through the chemical sciences. We will focus on materials such as plastics and metals, and the impact on the environment as we dig oil and minerals out of the ground.

Focus text: The enhanced greenhouse effect

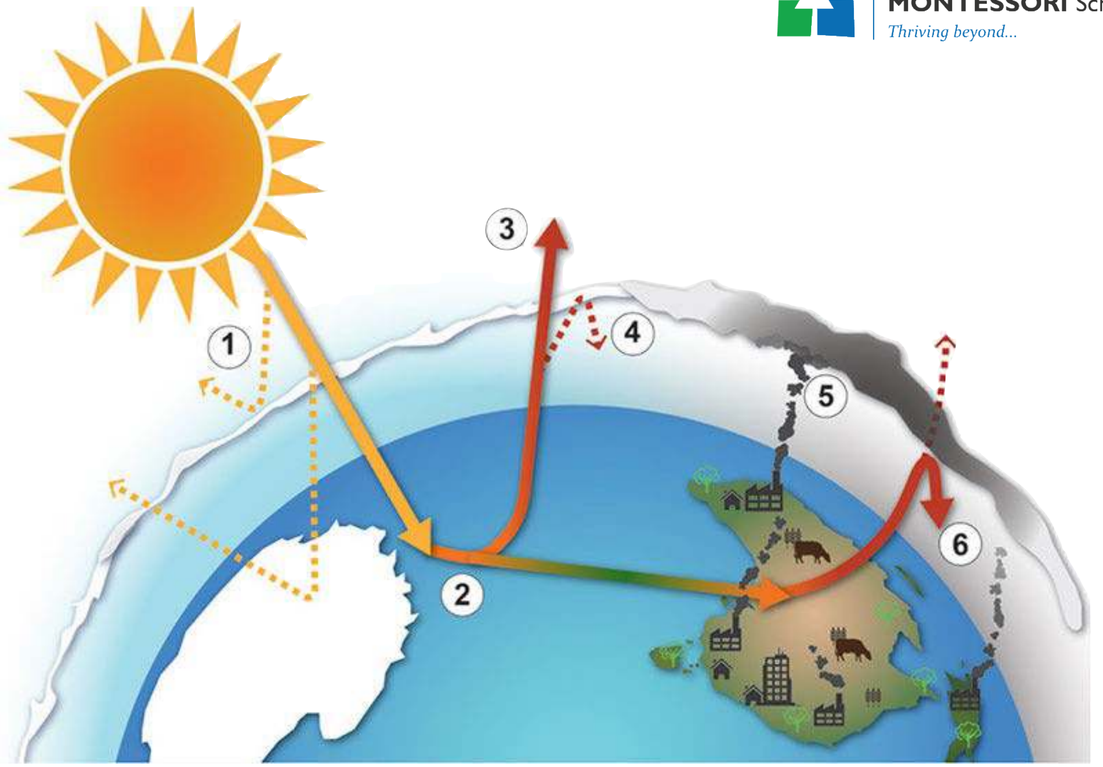
1. Read the focus text below

The atmosphere

The atmosphere is a relatively thin layer of air that surrounds the Earth. It provides a habitable climate for all living things in two ways. First, it regulates the temperatures on Earth. Second, the gases in the upper atmosphere protect the Earth from the majority of harmful ultraviolet rays from the sun.

The greenhouse effect

The greenhouse effect is a natural process that warms the Earth's surface. For over 800,000 years greenhouse gases in our atmosphere have helped to keep temperatures on Earth relatively stable.



The enhanced greenhouse effect. Source: M Goldsmith

The main greenhouse gases are carbon dioxide, methane, nitrous oxide, and water vapour. Although they only make up about 1% of the Earth's atmosphere, they have a big influence on keeping the Earth's surface at a liveable temperature.

They trap heat in the atmosphere instead of letting it escape into space, ensuring the Earth is warm enough for life to thrive. (see steps 1 to 4 above). However, this natural process has been affected by human activity.

The enhanced greenhouse effect

Concentrations of greenhouse gases in the atmosphere are increasing due to human activities, including energy production, agriculture and land clearing. This is called the enhanced greenhouse effect, which is contributing to the warming of the Earth (steps 5 and 6).

Humans continue to burn fossil fuels: coal, oil, and gas. These are stored in different states: coal as a solid, oil as a liquid, and gas as a gas. However, when burnt to produce electricity and power transport, they all release large amounts of carbon dioxide into the atmosphere, trapping more heat and reflecting it back to the Earth, instead of allowing it to pass through to space. Much of this heat is absorbed in the land and the oceans.

The effects of enhanced greenhouse gases

Enhanced greenhouse gases have resulted in an average global temperature increase of approximately 1OC (NASA 2020a). Even one degree of warming is enough to change long-term weather patterns across the globe. This is known as climate change. The CSIRO reports, for example, that the south-eastern part of Australia continues to have longer, hotter, drier summers than in previous decades (BOM and CSIRO 2020).

What we can do

All over the globe, life is affected by climate change. Here in Australia the 2019/20 fires have shown how devastating those effects can be. It is up to all humans to pay attention to the scientific reports and to do all we can to reduce greenhouse gas emissions by reducing our dependence on fossil fuels.

Be a scientist: investigative report – the greenhouse effect

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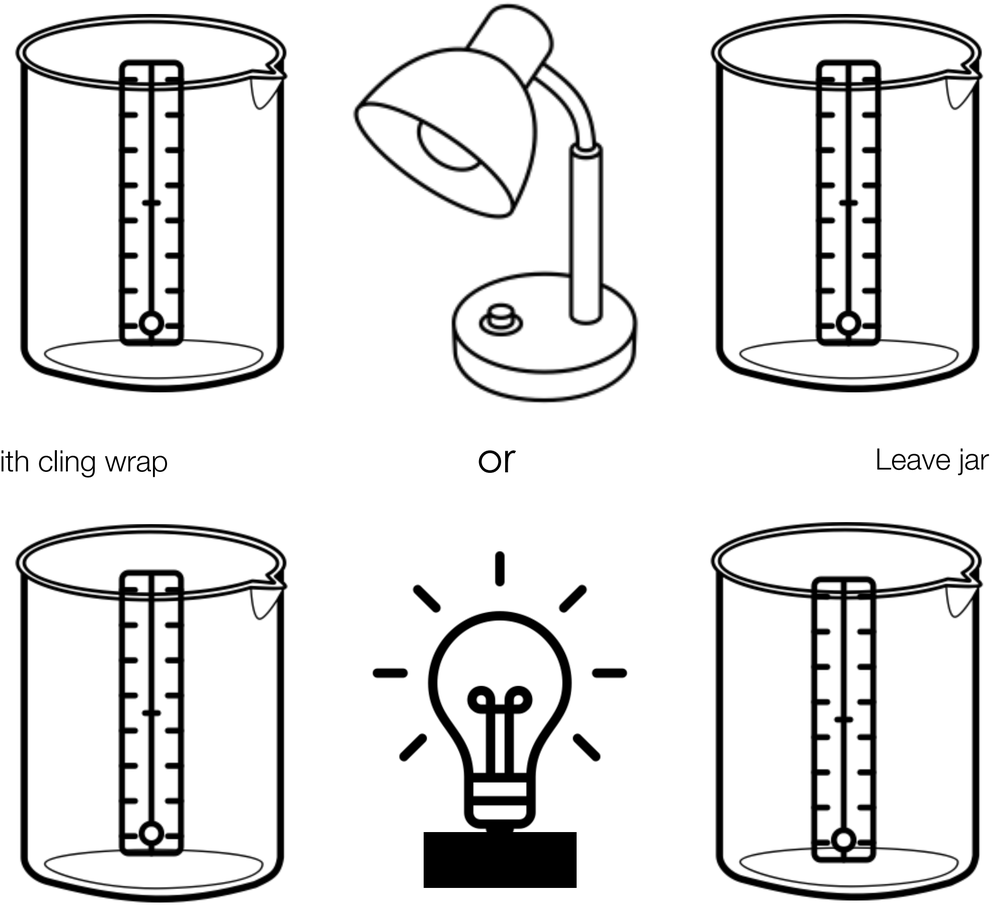
2. Experiment: To test the effect of 'greenhouse' gases on temperature

You will need:

- 2 jars of equal height and volume
- 2 thermometers that will fit inside the jars
- a heat source e.g. a bed lamp or incandescent globe on a block
- cling film.

Your task:

- Place a thermometer in each jar.
- Cover the top of one jar with cling film.
- Set up the jars close to, and equidistant from, the heat source.
- Record the temperature inside each jar.
- Switch on the heat source.
- Every 15 minutes, record the temperature inside each jar.



Cover jar A with cling wrap

or

Leave jar B uncovered

If you don't have 2 thermometers, do the experiment with jar A first and record the temperatures, then repeat the experiment with jar B on another day.

Greenhouse effect temperature data (Degrees Celsius)

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Time	Jar A (with cling film)	Jar B (with no cling film)
8.45 am		
9.00 am		
9.15 am		
9.30 am		
9.45 am		
10.00 am		
10.15 am		
10.30 am		
10.45 am		
11.00 am		

Time	Jar A (with cling film)	Jar B (with no cling film)
11.15 am		
11.30 am		
11.45 am		
12.00 noon		
12.15 pm		
12.30 pm		
12.45 pm		
1.00 pm		
1.15 pm		
1.30 pm		

Greenhouse effect temperature data (Degrees Celsius)

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3. Experiment Results: Your task

On a new page in your workbook write the title:

Investigative Report - The Greenhouse Effect.

- Write the list of items you needed for the experiment under the heading: **You will need**
- Write the method, step by step, under the heading: **Method**
- Draw and label a diagram of the experiment set up.
- Copy and complete the following text based on your investigation:

The jar with the cling film represents the planet Earth with greenhouse gases (cling film) surrounding it. The jar without the cling film represents the planet Earth with no greenhouse gases to protect it. The heat source represents the _____. Light from the sun changes to heat _____ when it reaches the Earth. Some of the _____ is absorbed, and some is _____ back towards space. However, the cling film (that is, the _____ _____) prevents some of the heat from _____.

The air in both containers was the same temperature at the beginning. The _____ change in the container with cling film on the top _____ more over the same period of time (a faster rate of _____ increase). This shows the _____ of the greenhouse gases in _____ heat inside the atmosphere, and making it a _____ temperature.

The enhanced greenhouse effect

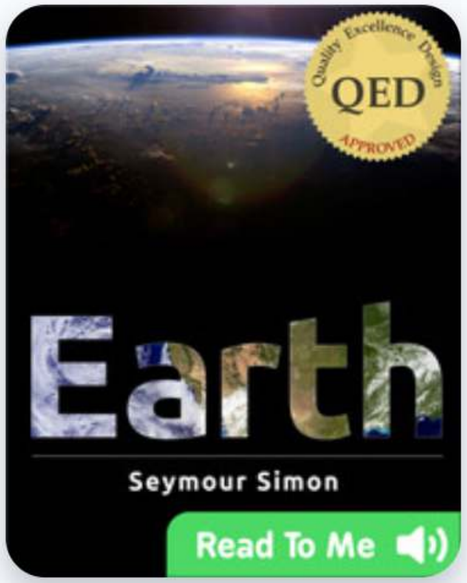
Our learning goals for this section are:

- to learn more about the effect of burning three different fossil fuels, one in a solid state and one in a gaseous state,
- to understand that they produce carbon dioxide, which is one of several greenhouse gases,
- and to learn about their effect on the atmosphere, and on living things.

4. The atmosphere

The book ‘Earth’ has been assigned to you. Read it on Epic. Use the Class Code: zym2499 to access the book.

Turn to pages 24 – 33 and read about the layers of the atmosphere. Take bullet point notes using the following charts:



Facts about the troposphere

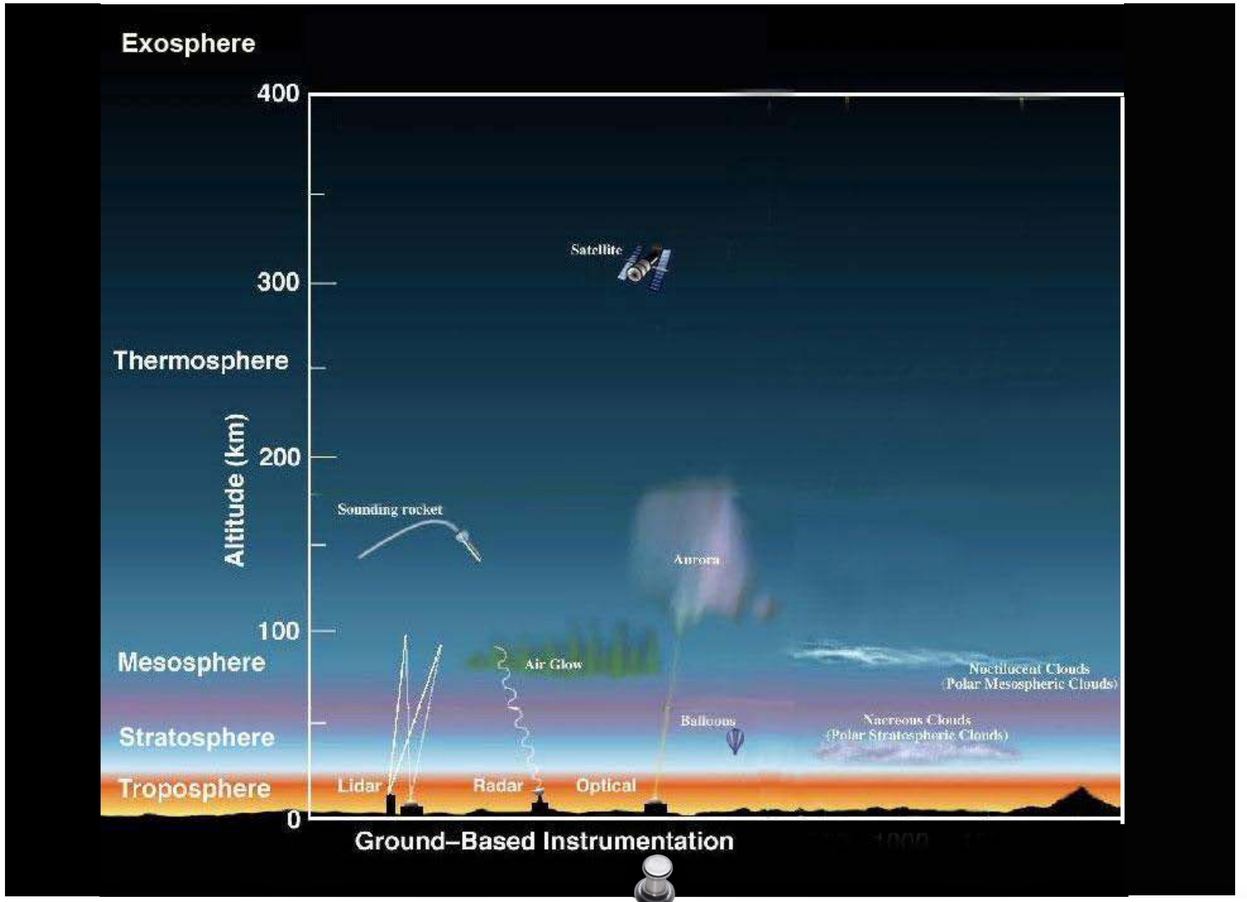
Facts about the stratosphere

Facts about the mesosphere

Facts about the thermosphere

Facts about the ionosphere

Facts about the exosphere



5. The atmosphere

Here is a graphic produced by NASA showing the layers of the atmosphere. Follow this link to explore and find out more about the atmosphere:
https://spaceplace.nasa.gov/atmosphere/en/

Add any new facts that you find out about the atmosphere to your charts.

6. The layers of the atmosphere

On A4 paper create your own poster showing the layers of the atmosphere. You must include each of these terms and explain what they mean:

- troposphere
- stratosphere
- mesosphere
- thermosphere
- Ionosphere

Then complete the following sentence stems:

The atmosphere has two functions. Firstly it regulates the _____ of the Earth to make it habitable, so _____ . The second function is to block most of the _____ harmful _____ rays, so _____ .

Add this information to your poster.

Write like a scientist

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7. Write like a scientist - Your task:

Now that you have collected information about the atmosphere it is time to write like a scientist. Over the next few weeks, we will write an information report on the enhanced greenhouse effect. We will use our notes to shape the following paragraphs:

- Section 1 – The atmosphere
- Section 2 – The greenhouse effect
- Section 3 – The enhanced greenhouse effect
- Section 4 – The effects of enhanced greenhouse gases

Let's start with Section 1 – The Atmosphere

This is the opening to our information report. We can use two paragraphs to give an explanation about the atmosphere.

In paragraph 1 we want to state what the atmosphere is, where it is located and its connection to the Earth and space. We also want to mention the two functions of the atmosphere.

In paragraph 2 we want to explain the layers of the atmosphere.

Do you remember how to write a 'Sizzling Start'? We can use a Sizzling Start to create an engaging introduction to our information report.

A great way to do this is to team up a fascinating fact with a Sizzling Start.

Find an opening fact about the Earth. Then use one or more of the following Sizzling Start techniques to start your first paragraph:

- start with a sound
- start with an action
- use a question
- paint a word picture.

Write a draft of your first paragraph now.

You can also start your second paragraph with another but different Sizzling Start.

Write your second paragraph now.

Proofread and Edit:

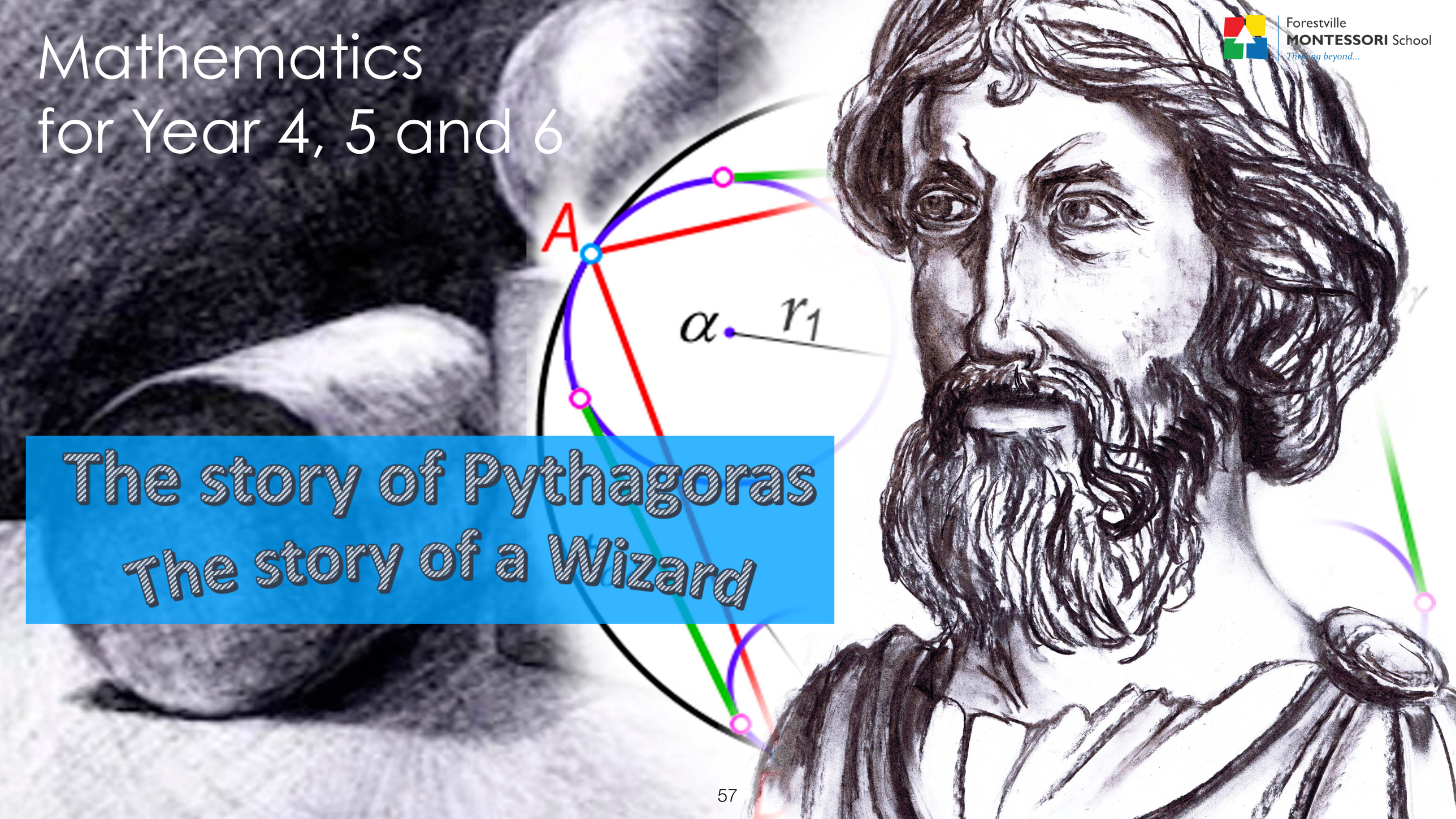
Read your draft out aloud. Does it make sense? Make changes as necessary. Check spelling, punctuation, and grammar. Use the writing proofreading and editing charts.

Publish: Type up a good copy of your first and second paragraph.

Year 4 and 5 Climate change science **Earth sciences** Use this checklist to review all content for Weeks 1 and 2.	To do	Underway	Completed
Week 1 & 2 Pack			
1. Brainstorm Earth Concept Map			
2. Read Focus text: The Earth			
3. Watch video: Rotation and revolution of the Earth. Fill in the facts boxes			
4. Rotation and facts graphics: 5 x A4 labeled diagrams			
5. Earth word web: Read 'Earth' on Epic. Link words and phrases on the word web			
6. Write like a scientist: The Earth 6a. Draft paragraphs 1 and 2			
6b. Publish paragraphs 1 and 2			

Year 6 Climate change science **Chemical sciences** Use this checklist to review all content for Weeks 1 and 2.	To do	Underway	Completed
Week 1 & 2 Pack			
1. Read focus text: The enhanced greenhouse effect			
2. Experiment: to test greenhouse gases - set up experiment and record temperature			
3. Experiment results write-up			
4a. Read 'Earth' on Epic, pages 23 to 33			
4b. Add bullet point facts to the facts boxes			
5. The atmosphere: visit the NASA web pages. Add more facts to the facts boxes			
6. The layers of the atmosphere: create a poster including sentence stems			
7. Write like a scientist: The atmosphere 7a. Draft paragraphs 1 and 2			
7b. Publish paragraphs 1 and 2			

Mathematics for Year 4, 5 and 6



The story of Pythagoras
The story of a Wizard

The story of Pythagoras

Over the next couple of weeks, we will investigate a famous mathematician called Pythagoras. Some people called him a wizard or even a magician! He created a secret society that studied music, astronomy, arithmetic and geometry. Pythagoras and his followers believed that numbers were magical and that the secrets of the universe could be unlocked by studying the relationship between numbers.

Focus text: The story of a Wizard

A long, long, long time ago, in 570 BC, Pythagoras was born in a city called Samos, in ancient Greece. Growing up he loved to explore and learn about things. He was drawn to patterns in nature and numbers and was a curious star gazer at night. As a young man he travelled within Greece and as far away to Egypt and Babylon (present day Iraq) where he studied with many different teachers in different places. Along with academics, he learned and loved poetry. And he could recite the poems of Homer (a Greek poet) and he played the lyre (a small harp) very well.

On his return to Samos in 518 BCE, Pythagoras opened a school called ‘The Semicircle’. However, his method of teaching was very different. He had many rules, including the admission rule. Today most universities will test the communication skills of prospective students, and expect a very high standard of speaking, understanding, and writing.

But his admission rule was completely opposite. Anyone who signed up for his school had to zip their lips for 5 years straight. Unbelievable right!

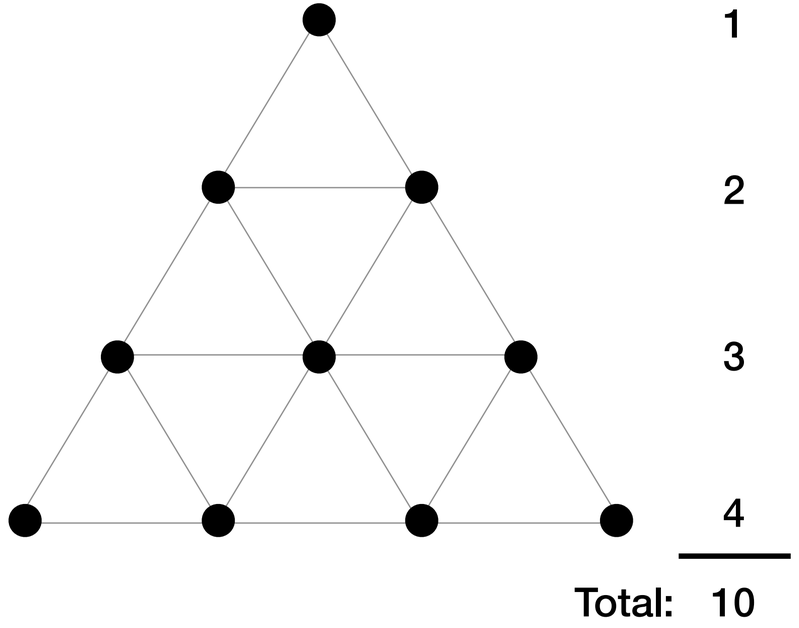
Pythagoras believed that ‘Silence is golden’ and staying silent was important to learn self-control. Despite the strange, absurd, and rigid admission rule, a whole group of mathematicians did sign up to be his students, to learn everything he knew, and to help him solve the great riddles of the universe. But it turned out that this was more than just a group of people who liked math. They were intelligently eccentric, different, and weird. And they did manage to seal their lips for 5 years straight to secure their place in the group, which came to be known as the Pythagoreans.

The Pythagoreans were a highly secretive group, keeping their work hidden from the ordinary citizens. Their interests lay not just in the study of math, nature, and the universe, but also in trying to understand why ‘things’ exist and the belief in superhuman gods. He and his followers believed that when a person died, their soul or life spirit moved into the bodies of other beings. They also thought that animals could contain human souls. As a result, they saw eating animals as cannibalism.

In 532 BCE Pythagoras and his followers fled Samos, as it was being ruled by the cruel and harsh Polycrates, and started a new life and school in Crotone, a city in southern Italy. Pythagoras and his followers didn't study mathematics for the same reasons as people do today. For them, numbers had a spiritual meaning. Pythagoras taught that all things are numbers and saw mathematical relationships in nature, art, and music.

Pythagoras, their guru, was known for his concept of numbers. He believed that everything could be reduced to numbers. And these numbers had their own characteristics, strengths, and weaknesses. To him, 10 was the most complete number because it was made up of the first 4 digits (1 + 2 + 3 + 4) and when written in dot notation (called Tetractys), they formed a triangle. The number 10 also showed unity. Every school has an emblem or a logo. Well, ‘Tetractys’ became the logo of his school.

Over a long period of time, Pythagoras became famous for Geometry. Do you remember our story about the Egyptians and how they used rope and the harpenodapta, the rope stretchers to mark out their fields after the flooding of the River Nile? The ancient Egyptians had a clever way to construct right angles. To start, they would put 12 knots into a long rope and then would pull the rope into a 3-4-5 right angle. Pythagoras was very interested in this discovery, and he wanted to see how it worked .



The tetractys above, is an equivalent triangular figure consisting of 10 points arranged in 4 rows of 1, 2, 3 and 4, was both a mathematical idea and symbol for the Pythagoreans to explain the nature of and relationships among things that exist.

It is also believed that Pythagoras was the first to establish that the sum of the angles of a triangle is equal to 2 right angles, 180 degrees. And in a right-angled triangle, the square of the hypotenuse is equal to the sum of the squares of the other 2 sides, which was called the Pythagoras Theorem.

Besides his contributions to mathematics, Pythagoras' work was essential to astronomy. He felt that the sphere was the perfect shape. He also realised that the orbit of the Moon was inclined to Earth's equator and deduced that the evening star Venus was the same as the morning star.

We don't know how Pythagoras died for sure, though some say that he was caught in a conflict and was killed by the Syracusans in 495 BC. His life came to an end, but the 'Pythagoras Theorem' still bears his legacy – a theorem that changed the way we look at right-angled triangles. We can ask the question, was he a magician, a wizard, or a great mathematician?

2. Your task: Drawing the tetractys

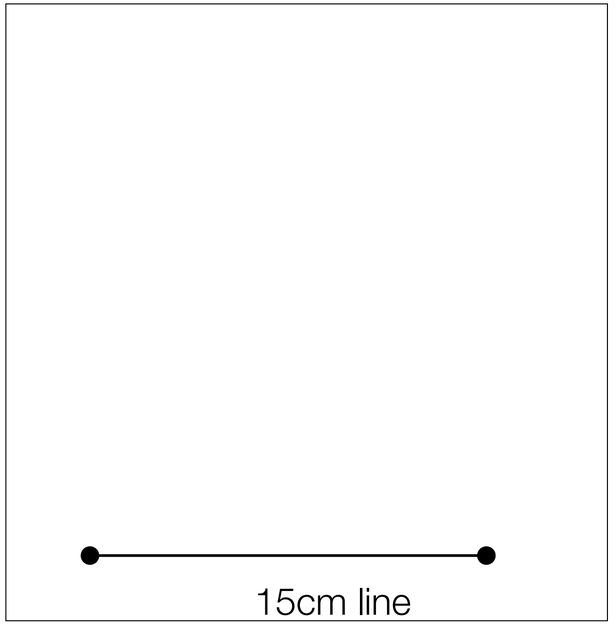
You will need:

- 4 sheets x A4 paper
- a ruler
- HB pencil
- sharpener
- eraser
- colour pencils and markers.

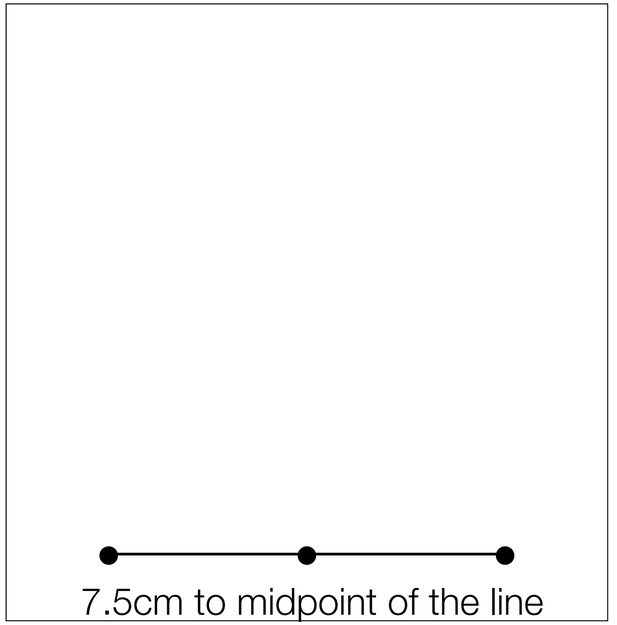
What to do:

1. Take 1 sheet of paper. We are going to draw a large equilateral triangle. Near the bottom of the paper we are going to draw a base line with a ruler and pencil 15cm in length (a).
2. Divide the length by two. This gives us a mid point of 7.5cm. Use your ruler and pencil to mark a dot at the midpoint on the base line (b).
3. Use your ruler and pencil to draw a line perpendicular to the base at the midpoint 13cm in length (c).
4. Align your ruler with the left side of the base line to the tip of the midpoint. Draw a line with your pencil to join the two points. This line should be 15cm in length (d).

a.



b.



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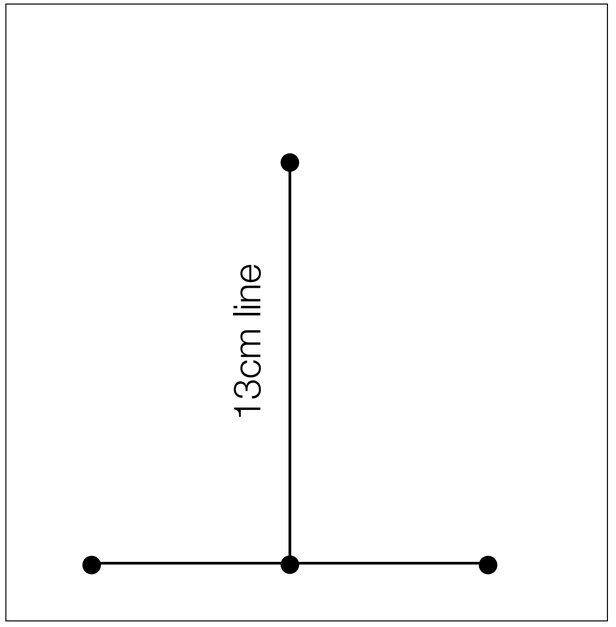
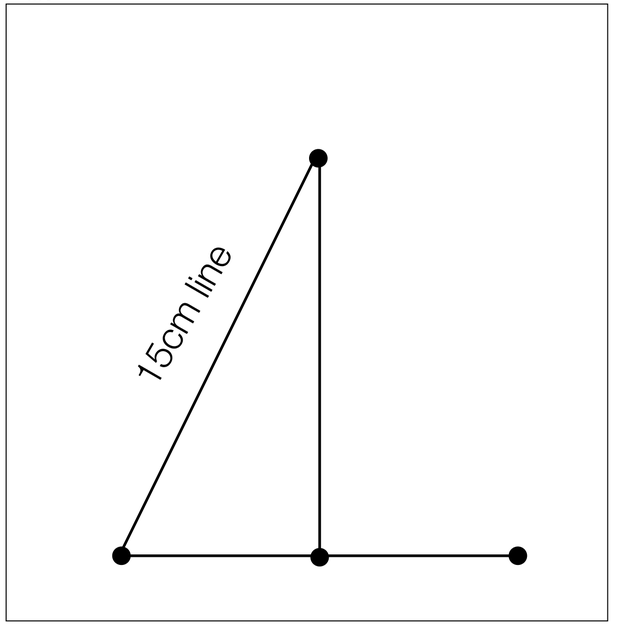


d.



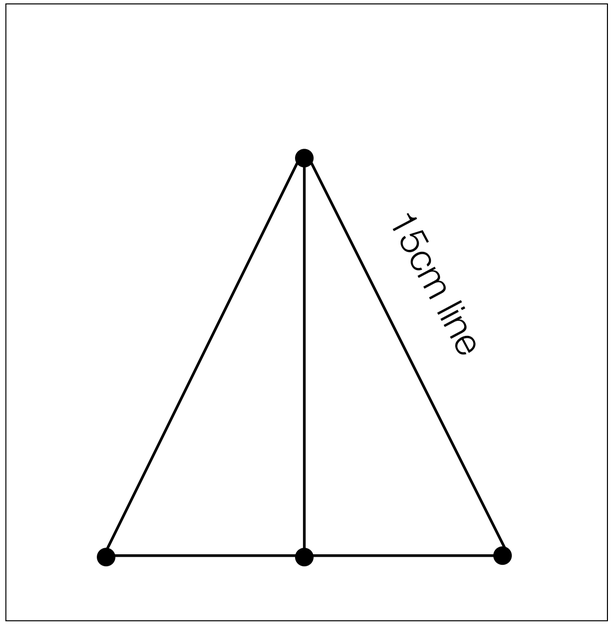
What to do (continued):

5. Align your ruler with the right side of the base line to the tip of the midpoint. Draw a line with your pencil to join the two points. This line should be 15cm in length (e).
6. Erase the midpoint line and bottom dot (f).
7. Take your ruler and place it on the base line. Measure and place a dot at 5cm and 10 cm. Do the same for the sides (g).
8. Take your ruler and join the dots make the inside smaller equilateral triangles. You will need a mid point dot on the second line from the base line (h).
9. Repeat these steps for sheets 2, 3 and 4.

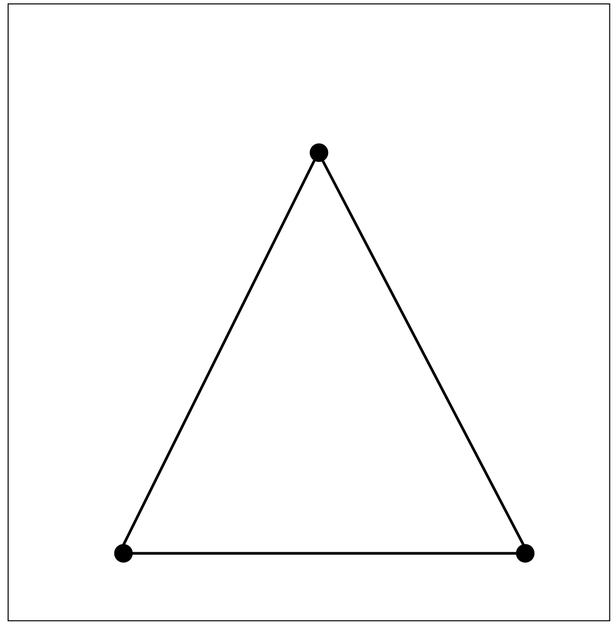
3. Your task: Finding patterns in the tetractys

- Take your first tetractys sheet. Using colour markers and a ruler outline all the small equilateral triangles. Use your colour pencils to shade and create a pattern.
- Take the second sheet. Can you find the hexagon? Using colour markers and a ruler outline the hexagon. Use your colour pencils to shade and create a pattern.
- Take the third sheet. Can you make a 6 pointed star within the tetractys? Add in 6 more lines and 6 more dots. Using colour markers and a ruler outline the star. Use your colour pencils to shade and create a pattern.
- Take the fourth sheet. Can you find another pattern within the tetractys? Identify the lines and dots. Using colour markers and a ruler outline the shape. Use your colour pencils to shade and create a pattern.

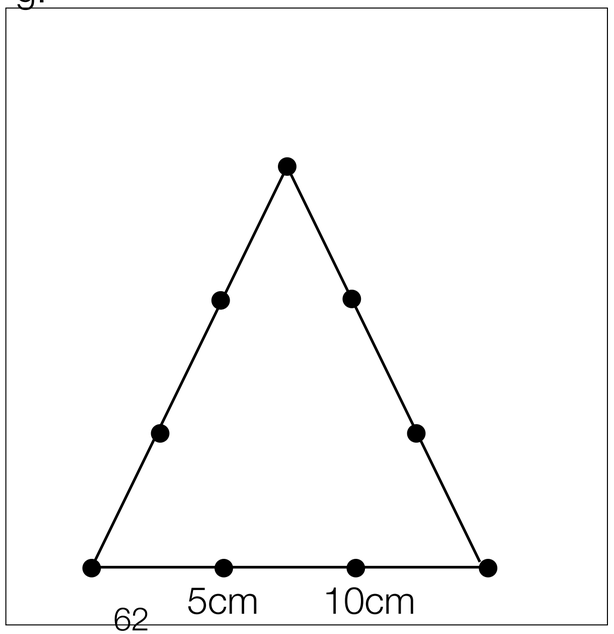
e.



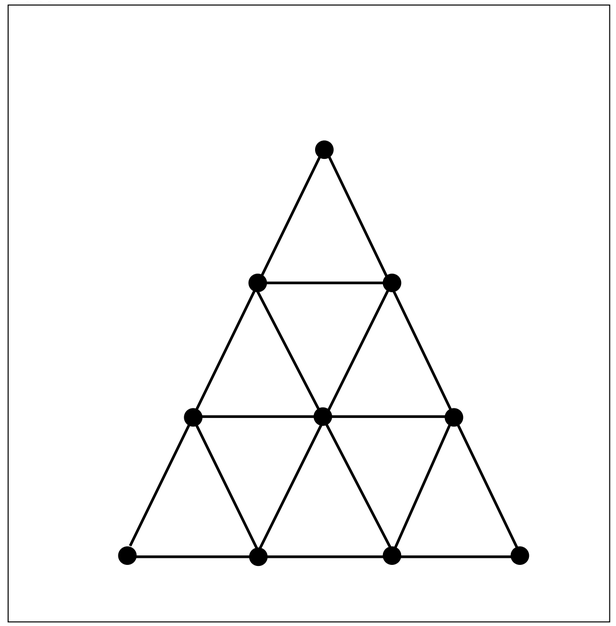
f.



g.



h.



As we heard in the story above Pythagoras was very interested in how the Egyptians had worked out a mathematical way to mark out their fields after the flooding of the River Nile. Pythagoras would use this knowledge to develop his ideas about the right-angled triangle.

Focus text: The story of geometry

This story begins in a time of very, very long time ago in the land of Egypt This land was - even is today - a vast dry sandy desert. The only place where life was possible was by the banks of a very great river. Without this river, it would have been impossible to live in Egypt. The river was so important for the people who lived there that they simply called it ‘The River’.

The waters of the Nile River - this is its name - run from south to north. The river has its source in some mountains quite far away. Every year, at springtime, it rains and rains in these far away mountains. All the water from the rains cannot be absorbed by the land and much of it flows into the river, which rises high within its banks. By the time the waters reach Egypt, the river overflows its banks and floods nearby fields.

You might think that these floods were a disaster for the Egyptians. No! This flooding was a real blessing for the people in Egypt in those times of long ago. When the river water came over the blanks, it carried debris and mud brought along from those far away mountains.

The waters spread the rich black mud, this humus, over the lands it flooded. This was a natural way to fertilise the farmlands. The mud from the River Nile made the land very fertile. This is why the river was called ‘The Gift of Egypt’.

But the flooding caused some problems as well. Every year the boundary lines that separated one farmer's fields from his neighbour’s fields were washed away. When the water withdrew and it was time to cultivate the land, the farmers argued about which land was whose. So, every year a certain group of people had to solve this problem all over again. These people were called the ‘harpenodapta’. It is a Greek word, and it means ‘the rope-stretchers’. This is what they did: they stretched ropes according to a pattern. The ropes they used were knotted at 13 regular intervals. The harpenodapta had slaves help them stretch the rope out in a triangular shape. One harpenodapta held the 2 ends, knots 1 and 13. Then 2 harpenodapta held the rope at knots 4 and 8.

When the rope was stretched out it made a special type of right-angled triangle, the right-angled scalene triangle. Now the ancient Egyptians did now know or did not seem to know that the shape they made was a right-angled scalene triangle. Maybe it had a different name in their language.

However, the harpenodapta could make a rectangle by reversing the original triangular shape after the vertices of the triangle were marked on the land. To be a rope stretcher in Egypt was a very honourable profession.

This is how geometry was begun: by measuring the earth. Indeed, geometry means in Greek: geo = earth and metron = measurement. Well, geometry can be said to have its beginnings with this experience of measuring the land after the yearly flooding of the Nile River.

Geometry grew from the discoveries the people made while working. Whatever a problem arose, they had to find a practical solution. So, whenever people needed things, for example how to build houses and temples, the palaces of their kings and pyramids, I am sure they used the same critical thinking. You and I know that there is more to geometry than a right-angled scalene triangle. But this is another story for another day.

Rope stretching was a very important profession in those days and these people were held in high regard. Measuring the earth thus started with the rope stretchers. The Greek word for measuring earth is Geometry. I wonder how Pythagoras would have used this information to explore and develop his own ideas?

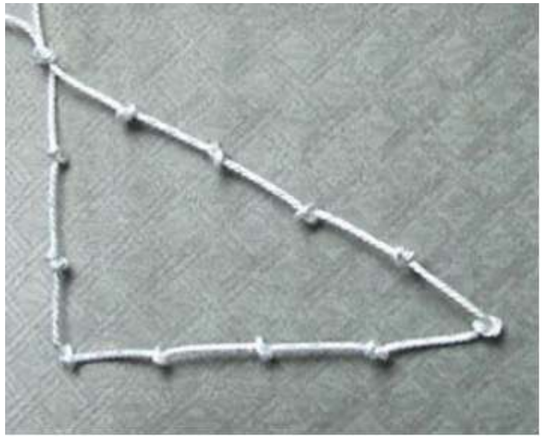
4. Your task: Be a rope stretcher

You will need:

- a piece of string or wool 70cm in length
- a marker
- grid paper
- pencil
- ruler
- A4 paper
- colour pencils
- water colour paints.

What to do:

1. Make a knot at the beginning of the string or wool. Call this knot ‘0’ when you count.
2. Then measure 5cm from the start. Make a mark with the marker. Tie the second knot. This is knot ‘1’.
3. Measure 5cm from the knot ‘1’. Make a mark with the marker and tie the third knot. This is knot ‘2’.
4. Continue until you have 13 knots. The 13th knot is knot ’12’.
5. Stretch out the string or wool until you have made a scalene right-angled triangle. One side will have 3 knots, the 2nd side will have 4 knots, and the 3rd side will 5 knots.
6. On grid paper put the heading ‘Right angled scalene triangle’. Draw the triangle and label the proportions 3, 4 and 5. Label the parts on the triangle: sides and hypotenuse.



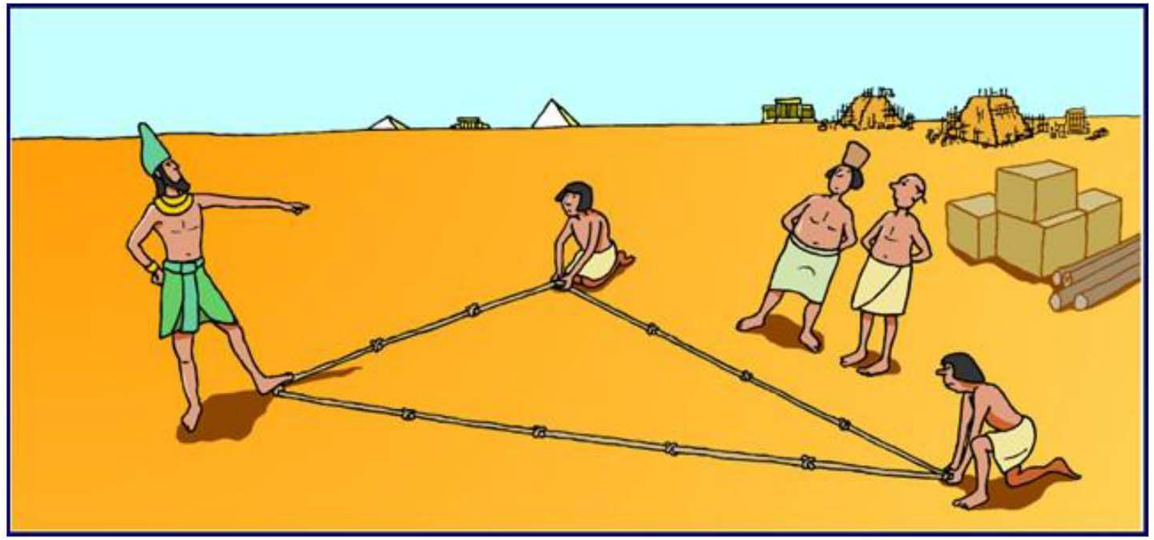
5. Your task: After the flood - “Hey, that’s my field!”

You will need:

- A4 paper
- colour pencils
- water colour paints.

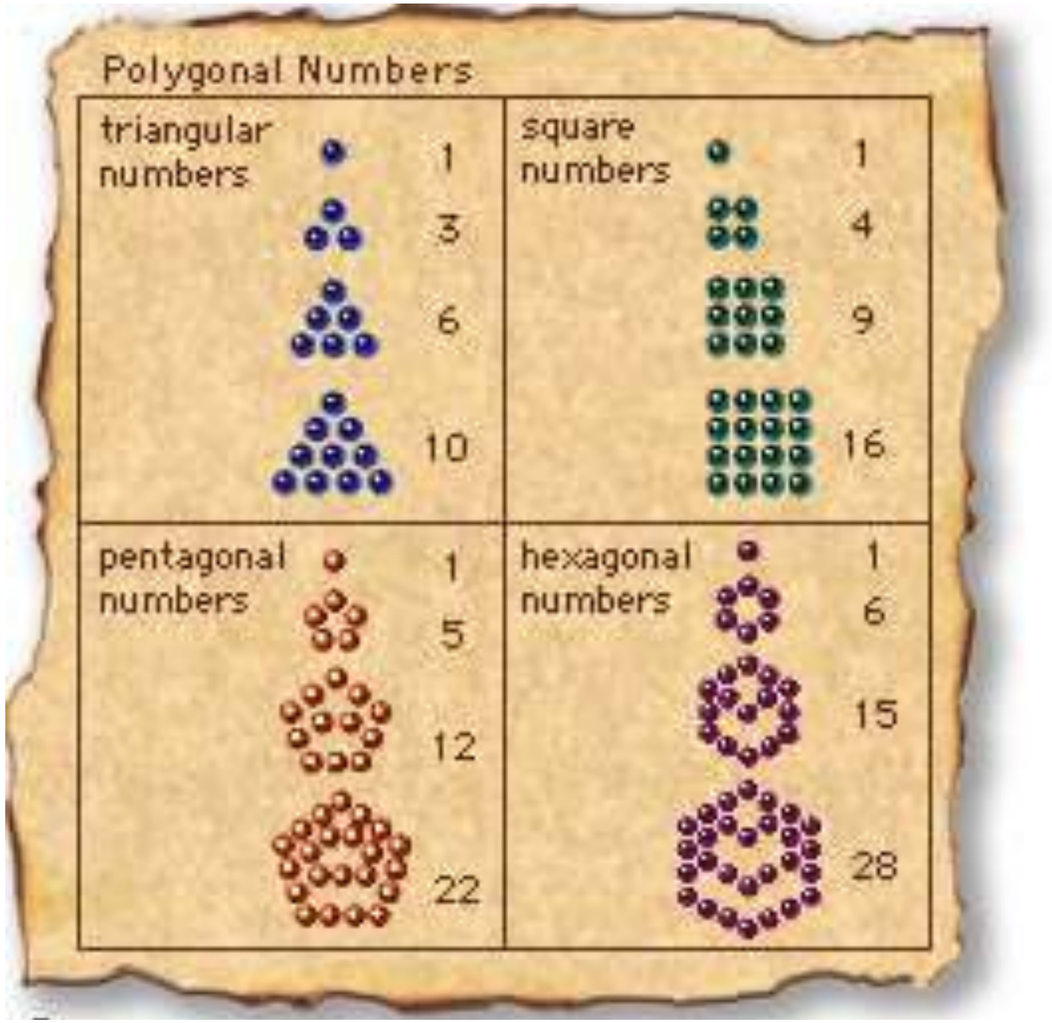
What to do:

1. Imagine you are a bird flying over the River Nile. The flood waters have receded, and the Egyptians are once again marking out their fields.
2. Draw the River Nile, the fields, the Egyptians and the harpenodapta marking out their fields using the special rope.
3. Show how they used the right-angled scale triangle to mark out rectangular fields. You must show 6 rectangular fields. You must also mark in the right angles.



Polygonal numbers

The ancient Greeks including Pythagoras generally thought of numbers in concrete terms, particularly as measurements and geometric dimensions. To show this they often arranged pebbles in various patterns to work out arithmetical, as well as mystical, relationships between numbers. Here are a few of these patterns:

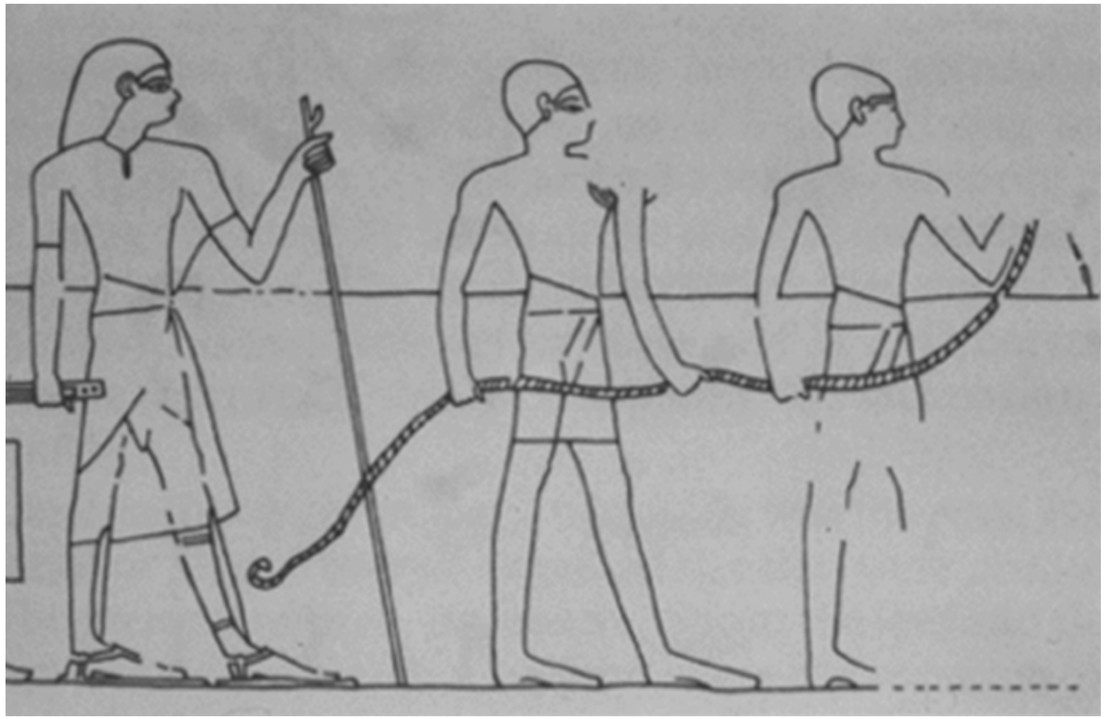


4. Your task: Explore polygonal numbers and continue the sequence

You will need:

- A4 paper x 6 sheets (to start)
- grid paper
- pencil
- ruler
- colour pencils
- Marbles, beads or pebbles

What to do:

1. Look at the Polygonal Numbers chart. You are going to make an individual chart for each of the polygonal numbers.
2. Take a sheet of A4 paper. At the top write the heading ‘Polygonal numbers – triangular numbers’.
3. On grid paper copy the patterns by drawing the beads in colour and marking in the number of beads next to it, ‘1, 3, 6, 10’. Cut them out and glue the patterns to your A4 sheet.
4. Your exploration is to continue the pattern. What is the next number of beads to form a triangle. If you have marbles, beads or pebbles make it before you draw it on grid paper.
5. Continue on for at least 5 more numbers in the sequence. Yes! You can do more.
6. Take the second sheet of A4 paper. At the top write the heading ‘Polygonal numbers - square numbers’. Copy and continue the sequence.
7. Do the same for the 3rd and 4th sheets, pentagonal (5) and hexagonal (6) numbers.
8. For the 5th and 6th sheets you will explore heptagonal (7) and octagonal (8), numbers using the same format.
9. Challenge: Can you go further? What about nonagonal (9) and decagonal numbers?

Year 4, 5 and 6 Mathematics **The Story of Pythagoras: The story of a wizard** Use this checklist to review all content for Weeks 1 and 2.	To do	Underway	Completed
Week 1 & 2 Pack			
1. Read the focus text: The Story of. Wizard			
2. Draw the tetractys x 4			
3. Finding patterns in the tetractys x 4			
4. Read the focus text: The story of geometry			
5. Be a rope stretcher: make the rope / draw and label the right-angled scalene triangle			
6. After the flood: Birds-eye view A4 poster showing the Egyptians marking their fields.			
7. Polygonal Numbers Chart: triangular, square, pentagonal and hexagonal numbers			
8. Polygonal Numbers Chart: heptagonal and octagonal numbers			
9. Challenge – Polygonal Numbers Chart: nonagonal and decagonal numbers