

# How are we connected to Antarctica?

Teaching pack

Photography by Trenton Branson

Reboot   
the Future

 The  
Harmony  
Project

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Explore the principle of interdependence with this teacher pack, created by The Harmony Project in collaboration with Reboot the Future and their [We Are Antarctica](#) campaign.

As we become more focused on the need to reduce energy costs and work with ever-stretched budgets in our own homes and schools, it can be easy to forget that our actions not only impact ourselves and our communities but ripple all the way to the southernmost point of our planet.

Aimed at upper KS2, this pack brings the wonders of Antarctica to life through English, Maths, Art, Science, PSHE and more. Packed with activities for a half term of enquiry, explore the ways we are all connected to the Antarctic ecosystem, and investigate the impact our own actions have on this frozen habitat as well as actions we can take to protect our shared future.

# *How are we connected to Antarctica?*

**The Harmony Project** aims to transform education to ensure it is fit for purpose in preparing young people for the 21st century, not just to pass exams. We work with teachers and other educators to re-frame learning around natural laws and principles which show the world as an interdependent whole. These principles guide and inform the way a 'Harmony curriculum' is structured, providing a coherent and meaningful framework through which National Curriculum learning objectives can be delivered.

We believe this approach can help young people understand the world in which they find themselves and develop the skills they need to take action from this place of understanding.

**Reboot the Future's** mission is to foster a world where we treat others and the planet as we'd wish to be treated. We approach this through campaigns, conversations and education. We host an education platform called **Global Dimension**, which brings together a calendar of events and a vast library of free sustainable development resources exploring issues from climate breakdown, to migration and democracy. We also release a monthly newsletter, *The Globe*, which goes out to over 17,000 subscribers - offering themed class activities, featured resources, global days and event opportunities.

This year, Reboot the Future launched the **We Are Antarctica campaign** in partnership with Earthrise Studio, to inspire connection with Antarctica and empower action for our shared future. Earthrise's original film **We Are Antarctica** has been abridged for a school audience and included in the English Unit.







# 1. PSHE

## *What would make me a great team member on an Antarctic expedition?*

HARMONY  
PRINCIPLE

*Diversity*

NO. OF  
LESSONS

1

In this activity, children consider their own positive attributes and those of their peers. They reflect on the attributes that help them to work collaboratively and the importance of having a diversity of attributes in any team.

All of this is explored in the context of preparing for an Antarctic expedition. In groups, the children read quotes from the writing of Robert Swan, the polar explorer and environmental leader, and founder of the 2041 Foundation. He was the first man in history to walk to both the North and South Poles and has dedicated his life to the preservation of Antarctica through the promotion of recycling, renewable energy and sustainable choices to combat the effects of climate change.

By the end of this activity, children will have been challenged to think carefully about the partners they choose to work with and to recognise the strengths they bring to collaborations in different contexts.

Further information about Robert Swan and the 2041 Foundation can be found at [robertswan.com](http://robertswan.com) and [2041foundation.org](http://2041foundation.org).



# Learning question

## What would make me a great team member on an Antarctic expedition?

### LINKS TO PSHE ASSOCIATION PROGRAMME OF STUDY (KS2)

Pupils learn:

- L7. to value the different contributions that people and groups make to the community
- L8. about diversity: what it means; the benefits of living in a diverse community; about valuing diversity within communities
- L25. to recognise positive things about themselves

### RESOURCES



- Copies of the quotes on Resource 1A (enough for one cut-out quote per small group)
- Copies of the ID card templates on Resource 1B (enough for one template per child)

### STARTER ACTIVITY

Introduce to the children the idea that people work in teams in lots of different situations. For example: sports teams, pop groups, small groups in lessons and teams in the workplace.

Ask the children: *What teams are you part of? Do you enjoy being part of that team/those teams? Why is this? When does that team/do those teams work really well together? Why?*

Allow the children time to discuss these questions in their groups before sharing some of their ideas as a class. Draw out

the idea that in a team it's important that different team members fulfil different roles and that they might use different skills or aspects of their personalities to help them do this. Discuss the word 'attributes' and its meaning. Ask the children: *What are the attributes that make someone a good team member? What are the attributes that would make someone a good team member on an Antarctic expedition?*

Draw out the importance of things such as compassion, patience, commitment, resilience, adaptability, determination, courage, positivity and calmness.

## MAIN ACTIVITY: TEACHER INPUT

Explain to the children that each group will be given a quote (see Resource 1A) to discuss. These are all quotes from the Antarctic explorer, environmental leader and founder of the 2041 Foundation, **Robert Swan** (see information in the introduction to this activity).

Before beginning the group discussions, read through the following prompts to help the children structure their conversation (display these on the interactive whiteboard throughout the discussion part of the lesson):

1. Read the quote out loud.
2. What do you think the quote means?
3. How is the quote relevant to a team going on an expedition to Antarctica?
4. How could the quote help you in the different teams you're part of? Can you think of specific examples of things you might do differently as a result of reading your team's quote – what are they?



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## MAIN ACTIVITIES: INDEPENDENT LEARNING

### ACTIVITY 1

Children discuss in groups the quote they have been given using the prompts outlined above.

Ask some of the groups to share with the class the quote they were focussing on, the ideas they had about its meaning and how it might apply to their own lives.

### ACTIVITY 2

Move the learning on by asking the children: *What positive attributes does each of you bring to the teams you are a part of? What would make you a great team member on an expedition to Antarctica?* Allow them time to discuss in their groups what they think their own positive attributes are, and what positive attributes others see in them.

Model how the children can use the template for an Antarctic expedition team member ID card (see Resource 1B) to record their personal details and personal attributes.

The children create their own ID cards, recording their personal attributes that will help them to make a positive contribution to an expedition team.

#### IDEAS FOR DIFFERENTIATION

##### SUPPORT

Children work in mixed ability groups.

##### EXTENSION

Children add a quote or motto to their ID card that sums up how to be an effective team member.



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## PLENARY

Sitting in a circle, if space allows, ask each child to share one positive attribute they possess that helps them to work effectively as part of a team.

Ask the children: *Were all our positive attributes the same? Why is it important that the personal attributes of team members aren't the same? Draw out the idea that diversity gives a team its strength.*

Move on to ask them: *Are there any common themes we can identify about the attributes that make teamwork effective?*

Discuss their ideas as a class to finish the session.



'Have the courage  
to choose people  
different from you.'

**Robert Swan**, Antarctic explorer, environmental leader  
and founder of the 2041 Foundation

'On a team, you  
have to be kind.'

**Robert Swan**, Antarctic explorer, environmental leader  
and founder of the 2041 Foundation

'One of the greatest things you can give anyone is credibility.'

**Robert Swan**, Antarctic explorer, environmental leader  
and founder of the 2041 Foundation

FIRST NAME	AGE	PORTRAIT
LAST NAME		
MY PERSONAL ATTRIBUTES		

FIRST NAME	AGE	PORTRAIT
LAST NAME		
MY PERSONAL ATTRIBUTES		



## 2. ENGLISH

### *How can I describe a journey to Antarctica?*

HARMONY  
PRINCIPLE

*Oneness*

NO. OF  
LESSONS

5

Explorers have been travelling to Antarctica for centuries; it is believed that Māori explorers may have reached this frozen continent many centuries before their European counterparts. The earliest expeditions to Antarctica were feats of endurance which many did not survive. Even with modern advances in technology and travel, those who travel to Antarctica today for scientific and geographical exploration with the goal of protecting the continent do so in the knowledge that their journey requires profound respect for the power of the natural world.

In this unit of five English lessons, children immerse themselves in the experiences of a modern-day Antarctic explorer, Shivi Dwivedi, who travelled to Antarctica as part of the *2041 ClimateForce Antarctic Expedition*. You can find out more about Shivi and how she came to be part of this expedition in the biography on page 13 .

Drawing on Shivi's diary entries from her time in Antarctica, as well as film footage and photographic stimuli, the children plan, draft and edit their own diary entries over the course of five lessons, relating what they imagine they would experience on an expedition to Antarctica.

Shivi has recorded an audio journey, describing her journey to Antarctica.

You may wish to play extracts from it in one of the English lessons, or find 10 minutes during this unit of enquiry to play it to the class.

You can listen to it at [bit.ly/WAA\\_audio](https://bit.ly/WAA_audio)

# Learning question

*How will I describe my journey to Antarctica in an email?*

### NATIONAL CURRICULUM LINKS

- Plan by noting and developing initial ideas, drawing on reading and research where necessary
- Draft and write by selecting appropriate grammar and vocabulary
- Evaluate and edit by assessing the effectiveness of own writing and others' writing
- Draft and write narratives, describing settings and atmosphere

### RESOURCES

- Copies of Resource 2A: *Shivi's journey to Antarctica - Day 1* (enough for one between two)
- 'We are Antarctica' short film by Earthise
- Copies of bank of sentence starters (Resource 2B) for those children requiring support



### STARTER ACTIVITY

Before beginning this unit, ask the children what they imagine Antarctica to be like. *What is the climate like? What will they see? Will they see people there? What animals might they see there? What might they hear?* As the week unfolds, children need to be given opportunities to have conversations about what they will and will not experience there so that any misconceptions can be cleared up.

Explain to the children that they are going to imagine themselves as explorers who are going on a journey to Antarctica.

Ask them to close their eyes and to think about where they are sitting right now. Guide them on a journey all the way from their school to the Port of Ushuaia (known as The End of World) in South America which is where they will catch the boat to the Southern Peninsula. This can be done using a map or globe as a reference.

Ask the children: *Why do people travel to Antarctica?* Take ideas and discuss as a class some of the explorers who have travelled to Antarctica and why they have gone there.

For example:

**Roald Amundsen** was the first explorer to reach both the North and South Poles. In the race to reach the South Pole, Amundsen was competing against Robert Falcon Scott. Amundsen used sled dogs and took a different route. Amundsen and his crew planted their flag at the South Pole on 14th December 1911.

**Ernest Shackleton** led two significant Antarctic expeditions (1907–1909 and 1914–1917). Shackleton's second mission made history books, even though the expedition was a failure. The South Pole had already been conquered, so Shackleton set his sights on being the first man to cross the continent from shore to shore. Unfortunately, his ship – the HMS Endurance – got stuck in ice. Amazingly, Shackleton and his crew survived and returned home after a year, having never completed their journey.

**Women** have been exploring Antarctica alongside men for centuries, according to Maori stories passed down through the generations by word of mouth. Although there is no written evidence of these expeditions, it is believed that female Maori explorers travelled to Antarctica as early as 650 AD. Much later, in 1937, **Ingrid Christensen** became the first woman to fly over Antarctica and see it from the air. She then landed on the mainland on 30th January 1937, making her the first woman recorded to set foot on Antarctica.

**Robert Swan** is known for being the first person to walk to both the North and South Poles. In 1991 Jacques Cousteau gave Robert Swan a 50-year mission to save Antarctica from the realities of climate change. The 2041 Foundation was founded and he has since dedicated his life to the preservation of Antarctica. On 15th January 2018' at the South Geographic Pole, **Barney Swan** (his son), became the first person in history to journey to the South Pole powered entirely by renewable energy.

Introduce Earthrise Studio's film 'We Are Antarctica' as an account of filmmaker and activist Jack Harries' journey to Antarctica. The film can be viewed at:

<https://globaldimension.org.uk/we-are-antarctica-schools-film/>

Ask the children to discuss with a partner what they saw or heard in the film. Take feedback and ask:



*What do you think you might feel when you see these scenes for the first time?*  
Watch the clip for a second time and take further ideas.

## MAIN ACTIVITY: TEACHER INPUT

Introduce Shivi Dwivedi as someone who has recently journeyed to Antarctica (see p.13 for a short biography to share with the children).

Give the children a copy of Resource 2A Shivi's journey to Antarctica - Day 1 (p.14) to share with their learning partner. This describes Shivi's journey by boat from Ushuaia in Argentina across the Drake Passage to the Antarctic Peninsula on the north-eastern coast of Antarctica. Read the diary together and discuss any challenging vocabulary or unfamiliar concepts.

*What different aspects of the journey has Shivi described? What words and*

*phrases has she used to create a picture in your mind? Draw out examples of:*

- expanded noun phrases
- cohesive devices

Explain to the children that in this lesson, they will be imagining they have journeyed across the Drake Passage just like Shivi did and writing an email home describing the experience. Give them time to work in pairs to highlight any language they would like to use in their writing and consider how they might start their letter.

Take feedback from the children about what they might include in their letter.





## MAIN ACTIVITY: INDEPENDENT LEARNING

Children to complete a 'cold write' activity. They will write home to say they have arrived safely and to share their journey and first impressions of Antarctica, drawing on Shivi's experiences and perceptions as explored in her diary.

### MINI-PLenary

Towards the end of the 'cold write' activity, discuss with the children how they might end their email.

### Plenary

Children work with a partner to peer assess their writing, with a particular focus on their use of expanded noun phrases and cohesive devices.

#### IDEAS FOR DIFFERENTIATION



##### SUPPORT

Provide a bank of sentence starters to help organise ideas in their email (Resource 2B).

##### EXTENSION

What cohesive devices can you use to ensure your email flows from one part of the journey to the next?

### SHIVI'S BIOGRAPHY

Shivi Dwivedi, born on 5th June 1989, grew up in Lucknow, India where her family still live. As a child, she always felt very close to nature and animals, and developed a strong desire to protect and fight for these animals' rights. Shivi is passionate about protecting the planet and helping others to live more sustainably.

She applied to be part of the 2041 ClimateForce Antarctic Expedition, which gives young leaders the opportunity to observe the changes that are happening in Antarctica first-hand, so that they can advocate for the last great wilderness on Earth. Shivi was delighted to be selected by Robert Swan O.B.E as one of 150 expedition members in 2022.

Shivi has lived in Mumbai for the last 15 years. She loves travelling and dreams of opening an animal shelter with her husband one day.



## SHIVI'S JOURNEY TO ANTARCTICA – DAY 1

Leaving the port of Ushuaia, I felt a sense of calm, which was mirrored by the stillness of the glass-smooth sea. Soon, the ship was accompanied on its swift passage by pods of sleek, streamlined dolphins jumping in and out of the glistening water. This was my first sighting of these playful animals and I was not disappointed. I couldn't believe what I was seeing. For several hours, the Patagonian shoreline was constantly visible, its vibrant, red rocks punctuated here and there with bursts of green foliage amongst autumnal hues of red and yellow. The receding land seemed to light up in the afternoon sun as it disappeared from view.

After six hours, we approached the Drake Passage and braced ourselves for what was ahead. We had been warned of its dangerous and tempestuous waters and it did not fail to deliver. The churning of the waves began as darkness descended on the ship. The angry sea came alive and we knew we had to respect and obey our orders to stay in our cabins. The awesome power of nature was putting us in our place.

During the day, we were able to enjoy the icy cold views outside from the cosy comfort of our rooms. This helped ease the constant feeling of nausea created by the ever-moving horizon. I thought back to the original polar explorers, who made this perilous journey in their wooden ships. I fell asleep in the velvet blackness of the Antarctic night, reflecting on how grateful I was for my warm bed and the chance to travel to my destination in safety.

When morning broke the next day, the sun was hidden by hazy, grey clouds. The bright reds and oranges we had seen at the start of our voyage had now been replaced by beautiful shades of deep blues and light aquamarine on the crest of the waves. The once-threatening sea was now at peace. Suddenly we heard shouts of 'land ahoy!'. The excitement was contagious as people rushed around to put on gloves and boots. Shortly after 6am, we were treated to our first sighting of an iceberg. We had finally arrived! Slowly, a larger land mass emerged from the mist. Silence fell and I tried to fully absorb what I was seeing. It had been an arduous journey to get there but the reward was arriving in the most awe-inspiring place in the world.

## SENTENCE STARTERS

After we arrived,

As we set off from Ushuaia,

Within ten minutes of the start of the journey,

For several hours,

As we approached the entrance to the Drake Passage,

As I lay on my bed,

When the sun rose,

Excitement built, as

Tomorrow, we plan to

After we arrived,

As we set off from Ushuaia,

Within ten minutes of the start of the journey,

For several hours,

As we approached the entrance to the Drake Passage,

As I lay on my bed,

When the sun rose,

Excitement built, as

Tomorrow, we plan to

# Learning question

## *What makes an effective diary entry?*

### NATIONAL CURRICULUM LINKS

- Plan by noting and developing initial ideas, drawing on reading and research where necessary
- Draft and write by selecting appropriate grammar and vocabulary
- Evaluate and edit by assessing the effectiveness of own writing and others' writing
- Draft and write narratives, describing settings and atmosphere

### RESOURCES



- Copies of Resource 2C: *Shivi's Journey to Antarctica - Day 2* (enough for one between two)
- Copies of images of Antarctica (Resources 2D-2G) for children to stick in books
- Copies of word bank (Resource 2H) for those children requiring support

### STARTER ACTIVITY

Recap yesterday's session: you arrived in Antarctica and wrote an email home describing your journey from Ushuaia across the Drake Passage and your first impressions of Antarctica on arrival.

Explain the purpose of their writing for the remainder of the week: you have woken up to explore this icy continent and will be writing a diary entry to describe what you have seen and experienced during a day in Antarctica.

Give children a copy of Shivi's second diary entry (Resource 2C), and read it together as a class. Ask the children: *What descriptive techniques does Shivi use to describe her day?* Give children time to highlight examples of the following in Shivi's diary:

- expanded noun phrases
- cohesive devices

There may also be questions to address at this stage about unknown language or meanings the children are unsure of to support their comprehension.

## MAIN ACTIVITY: TEACHER INPUT

On the interactive whiteboard, display the image Resource 2D. Explain to the children that this could be a scene from the window of the ship Shivi sailed on. Allow time for the children to work with a partner to generate ideas using their senses, drawing on the descriptive techniques explored in the starter activity. Using the children's ideas, model how to develop them into descriptive words and phrases. Encourage children to adapt the expanded noun phrases highlighted in the starter activity with their own ideas.

Ask the children: *What do you see? What might you hear in the setting in the image? What might you smell? What could you taste? How might you feel?*

## MAIN ACTIVITY: INDEPENDENT LEARNING

In pairs, children choose an image from the selection on Resources 2D–2G and use this as a stimulus to develop a bank of ideas to describe the different parts of the day. Encourage the children to take time to identify the different elements in each image that they could describe in detail (e.g. sky, iceberg, water, weather, penguin, atmosphere).

### IDEAS FOR DIFFERENTIATION

#### SUPPORT

Children annotate each image with language provided in word bank (Resource 2H).

#### EXTENSION

Children use a thesaurus to improve the language in their bank of ideas and discuss the effectiveness of their word choices.



## PLENARY

Using some of the children's ideas, model how to use cohesive devices to link the ideas about one image. Allow time for children to try combining their own ideas with a learning partner and feed some of their ideas back to the class.

## SHIVI'S JOURNEY TO ANTARCTICA – DAY 2

This morning, we woke up to blue skies over a vast and uninhabited landscape of ice and mountains; the still Southern Ocean looked as smooth as silk. On deck, the icy cold wind stung my face and I could feel the mist and cloud surrounding us. The silence was so overpowering I felt as if I could almost touch it. Something above me caught my eye. I was mesmerised by the sight of a magnificent petrel with its distinctive yellow bill as it glided past on updraughts of air. I wondered where was it heading. How did it not tire?

An abundance of species graced us with their presence throughout the day, the first of which was also the largest: a humpback whale and her calf. The captain had spotted the pair in the icy waters not far from the ship, so we all rushed to the railings to catch a glimpse of them for ourselves. Our group gave a collective sigh of wonder as a spurt of mist shot from the magnificent mother's blowhole as they swam around us before disappearing under the surface. Nobody dared speak in anticipation of a reappearance. Just as we had given up hope of seeing them again, the most beautiful rhythmic sound of their breathing filled the air, followed by the whoosh of the mother's tail as it hit the ocean's surface. This was just the beginning of a phenomenal day.

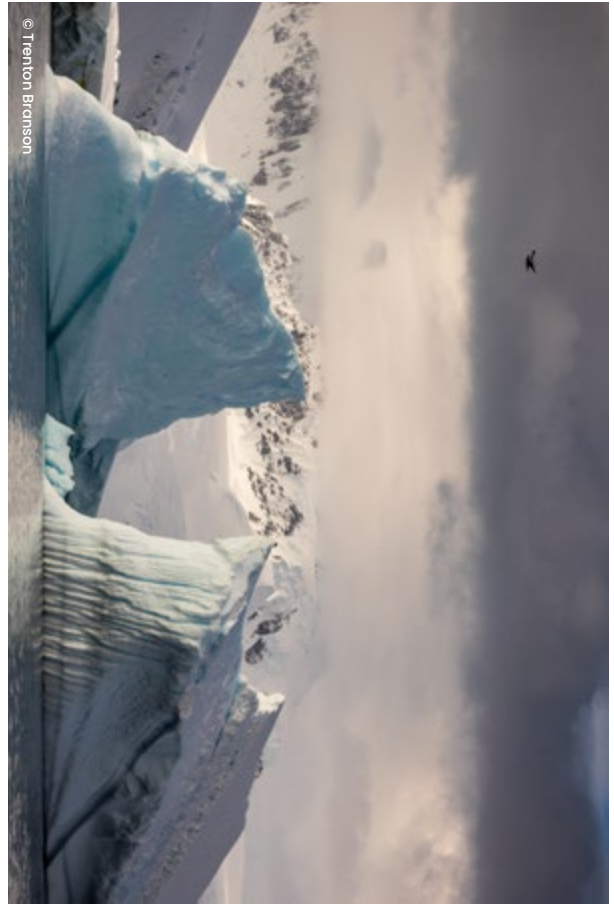
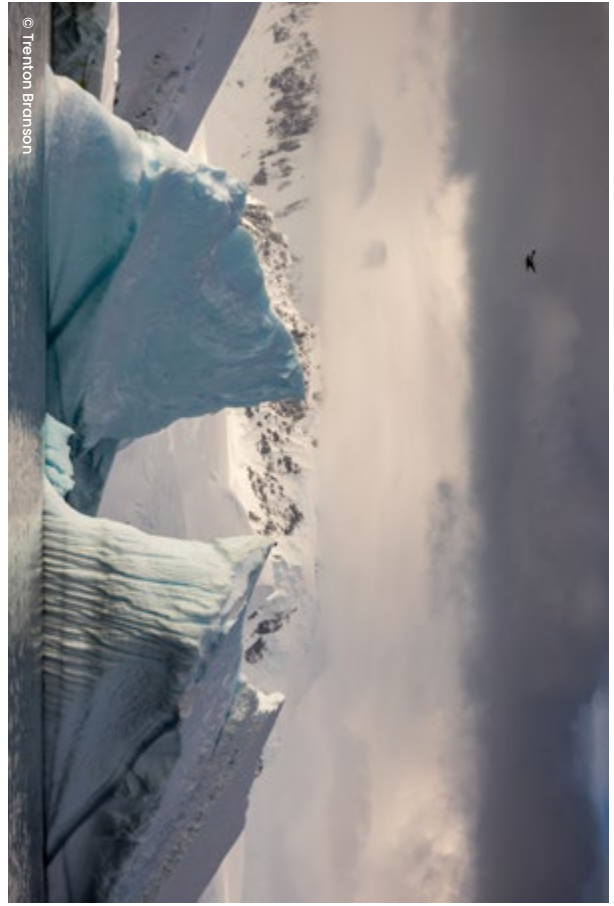
As the morning progressed, the skies turned grey; gathering clouds seemed to hug the horizon and the growing wind moved with strength and purpose. Our next encounter was with a Weddell seal, (quite different to the sleepy crabeater seals, who spend most of the day dozing). This particularly angry seal huffed and honked to warn us off and we were reminded that the natural world is not always calm and gentle. It's important to know when to respect the other creatures that share our world and when to step back.

In the afternoon, we set off on smaller boats to explore the coves of the surrounding coast. Each time we disembarked to explore a new location, a loud crunch could be heard with each footstep that landed on the untouched snow. We soon discovered that we were not alone; the unmistakable odour of penguin reached our nostrils before we saw them! A strong stench of regurgitated krill stung our nostrils as we approached a colony of gentoos. These inquisitive and comical characters greeted us with such confidence, waddling about in braying, gurgling conversation with each other; they didn't seem at all fazed by our presence.

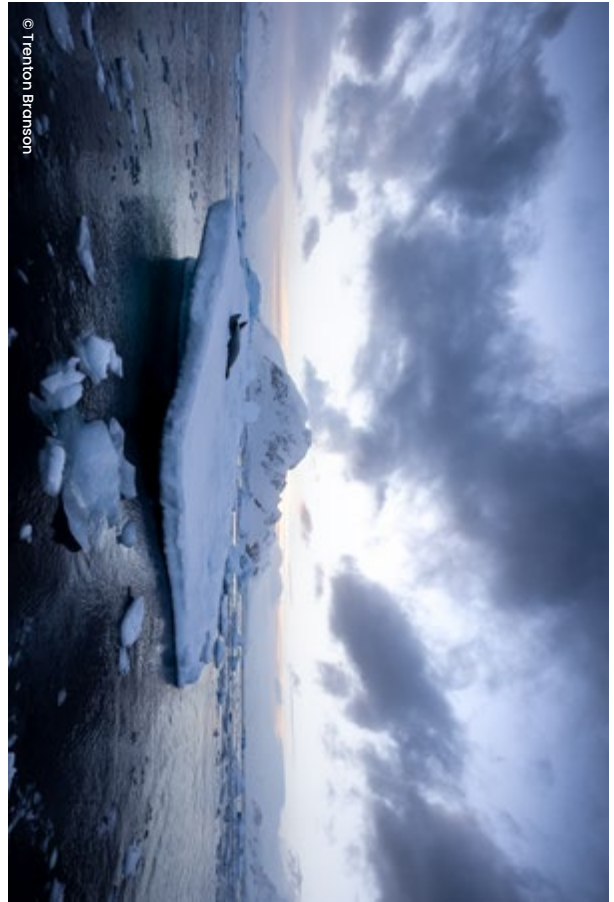
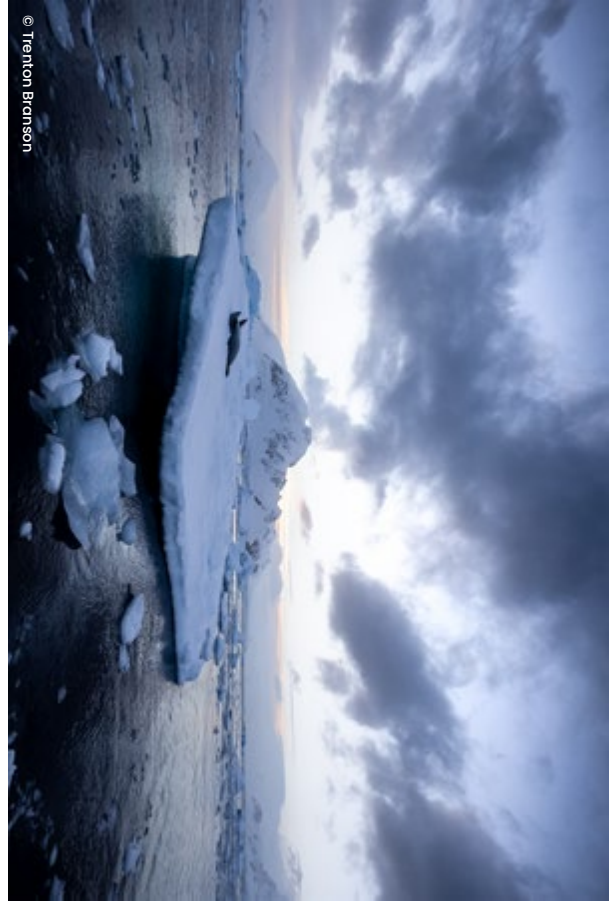
As our small boat navigated its way through the iceberg field, our ears were greeted with the same crackling sound you hear when you add ice cubes to a drink and, occasionally, the splashing sound of a small iceberg turning suddenly in the water.

It is impossible not to be moved by the sheer beauty and power of this stunningly brutal continent. Even now, as I write, I recall listening to the breath of the humpback whale and sensing her wisdom. What had she witnessed in her long life? I realised then how privileged I was to be a guest in Antarctica, a place which is her home but which is also, as I have come to realise, such an important part of our shared home on Earth. What can I do to help preserve these majestic beings and their habitat?











**WORD BANK**

petrel	iceberg	Weddell seal	overcast	majestic	horizon
albatross	humpback whale	gentoo penguin	uninhabited	ocean	glistening
sky	calf	waddling	honking	icy	silent

petrel	iceberg	Weddell seal	overcast	majestic	horizon
albatross	humpback whale	gentoo penguin	uninhabited	ocean	glistening
sky	calf	waddling	honking	icy	silent

# Learning question

## How will I group my ideas to plan paragraphs for a diary entry?

### NATIONAL CURRICULUM LINKS

- Plan by noting and developing initial ideas, drawing on reading and research where necessary
- Draft and write by selecting appropriate grammar and vocabulary
- Evaluate and edit by assessing the effectiveness of own writing and others' writing
- Draft and write narratives, describing settings and atmosphere

### RESOURCES



- Copies of Resource 2C: *Shivi's Journey to Antarctica - Day 2'* (enough for one between two)
- Copies of planning template (Resource 2I) for those children requiring support

### STARTER ACTIVITY

Remind the children of what made the diary entry they explored in the previous lesson so effective (rich descriptive language, detail relating to the senses...). Explain that choosing the right words is important to engage the reader and to bring a setting or narrative to life.

Explain to the children that when you include details in a piece of writing of what the narrator could hear, see, smell, feel or even taste, there are more creative ways of expressing this than simply stating 'I could smell'. For example:

'the sweet scent of ... filled my nose'

'a strong odour of ... made my eyes water'

'an overwhelming smell of ... took my breath away'

'I became aware of the scent of ...'

The children work in pairs to read through *Shivi's Journey to Antarctica - Day 2* (Resource 2C) and identify phrases used instead of 'I saw', 'I heard' and 'I could smell'.

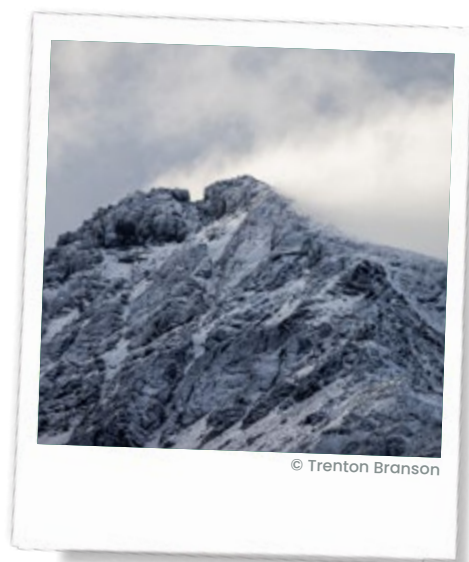
As a class, share ideas and allow some time for the children to add some of these phrases to their ideas recorded in the previous lesson.

## MAIN ACTIVITY: TEACHER INPUT

On the interactive whiteboard, display *Shivi's Journey to Antarctica - Day 2* (Resource 2C). Ask the children:  
*How has Shivi organised her thoughts?*  
*What is the theme of each paragraph?*

Read the first paragraph together and model how to highlight keywords or phrases that tell us what the theme of the paragraph is (the landscape).

With a partner, the children continue to read the remaining paragraphs, highlighting keywords or phrases and using these to determine the theme of each paragraph. Encourage them to add any phrases they particularly like to the ideas they started to collate in the previous lesson.



Give children time to share their ideas with the class.

Model using subheadings or a table to plan a series of paragraphs, each with a clear theme, adding key phrases and ideas they want to include in each section, drawing on their ideas from the previous lesson.

## MAIN ACTIVITY: INDEPENDENT LEARNING

Children plan three or four paragraphs, each around a specific theme, describing a day's experience in Antarctica. Children consider how they will include the following:

- Expanded noun phrases
- Cohesive devices
- Different ways of expressing senses to describe your day

## PLENARY

Children begin to orally rehearse linking their ideas together with a partner. Ask children to share what they have rehearsed so far with a focus on adventurous language and the use of cohesive devices to link ideas.

### IDEAS FOR DIFFERENTIATION



#### SUPPORT

Provide children with a planning template (Resource 2I) to add their ideas to.

#### EXTENSION

Develop cohesion between paragraphs by introducing an idea at the end of one paragraph and developing it further at the beginning of the next. For example: 'The air was filled with an almighty cracking sound as loud as thunder. I turned around just in time to see the source of the sound: an enormous chunk of ice sliding into the frigid sea.'

# Planning template

LANDSCAPE
WEATHER
ICEBERGS
ANIMALS
SUNSET

# Learning question

*What cohesive devices will I use to link ideas in my writing?*

### NATIONAL CURRICULUM LINKS

- Plan by noting and developing initial ideas, drawing on reading and research where necessary
- Draft and write by selecting appropriate grammar and vocabulary
- Evaluate and edit by assessing the effectiveness of own writing and others' writing
- Draft and write narratives, describing settings and atmosphere

### RESOURCES

- Copies of bank of sentence starters (Resource 2B) for those children requiring support
- Copies of word bank (Resource 2H) for those children requiring support



### STARTER ACTIVITY

Remind the children of the focus of their diary writing: to use expanded noun phrases and cohesive devices in a diary entry that draws on the senses to describe the experience of being in Antarctica.

As a class, decide on a simple starting point for a sentence-building activity (for example: 'The cold wind stung my face:') and write this at the top of a sheet of flipchart paper or on the interactive whiteboard. Children work with a partner to improve the sentence, focusing on one of the elements below at a time:

**Add a fronted adverbial** e.g. *As an iceberg emerged from the mist, the cold wind stung my face.*

**Add an expanded noun phrase (or phrases)**  
e.g. *As a majestic iceberg with a crown of snow emerged from the mist, the biting cold Antarctic wind stung my face.*

**Add a related sentence to build cohesion**  
e.g. *As a majestic iceberg with a crown of snow emerged from the mist, the biting cold Antarctic wind stung my face. I pulled my jacket tightly around me and buried my face in the fleece lining of the hood.*

Take feedback about each improvement from the children.

## MAIN ACTIVITY: TEACHER INPUT

Prepare a paragraph inspired by the ideas in Shivi's diary. For example:

*Standing on the deck of the ship, I was struck by the calming silence that surrounded me. As a majestic iceberg with a crown of snow emerged from the mist, the biting cold Antarctic wind stung my face. I pulled my jacket tightly around me and buried my face in the fleece lining of the hood. Hovering above the ship, an albatross deftly navigated the air currents and I wondered how long this feathered traveller could stay airborne.*

Explain to the children that you are going to build cohesion between paragraphs by introducing a sound at the end of this paragraph that you will explore more fully at the start of the next one. Use shared writing to show how you will do this, drawing on ideas from the children to write a final sentence along the lines of:

*Suddenly, the silence was shattered by a distant sound which brought me out of my trance.*

Ask the children how we might start the next paragraph with a sentence, or the first part of a sentence, that explains what this sound was to build cohesion between the two paragraphs. Allow some time for them to briefly discuss their ideas with a partner. Drawing on the children's suggestions, use shared writing to start the next paragraph. For example, with:

*I turned around just in time to see what had caused the thunderous cracking noise. I could not believe my eyes as...*

Encourage the children to use this technique to link paragraphs and build cohesion in their extended writing time.





## MAIN ACTIVITY: INDEPENDENT LEARNING

Children write a first draft of their own diary entry describing the experience of being in Antarctica, using the plans they created in previous session.

### IDEAS FOR DIFFERENTIATION



#### SUPPORT

Draw on the word bank and bank of sentence starters used in previous lessons to help them with their writing.

#### EXTENSION

Include a range of adventurous language and cohesive devices in their writing.

## PLENARY

Children identify a section of their first draft that they would like help improving. They work in pairs to assess the section they and their partner have identified and suggest improvements. To guide their assessment, remind the children that

they have been focusing on the use of expanded noun phrases and cohesive devices, and that these things should be the focus of their peer assessment. It might be useful to display these two elements on the interactive whiteboard.

## CHECKLIST

I have used expanded noun phrases to add detail.	
I have used my senses to describe my experience.	
I have linked ideas using cohesive devices.	
I have started sentences in different ways.	
I have used adventurous vocabulary related to the topic.	

# Learning question

## How will I edit and improve my writing to engage a reader?

### NATIONAL CURRICULUM LINKS

- Plan by noting and developing initial ideas, drawing on reading and research where necessary
- Draft and write by selecting appropriate grammar and vocabulary
- Evaluate and edit by assessing the effectiveness of own writing and others' writing
- Draft and write narratives, describing settings and atmosphere

### STARTER ACTIVITY

Provide an example paragraphs for the end of the diary entry. For example:

*Our small boat made its way through the water and we heard the boat hitting the small pieces of ice floating in the water. We also heard icebergs turning suddenly in the water.*

*My favourite part of the day was seeing and listening to the humpback whale. I wonder what she has seen. I know that I need to protect her beautiful home.*

Model how to improve the paragraph step by step. You could:

- Read through the paragraph as a class to ensure that there is cohesion between ideas and that the sentences flow. Make improvements based on what the children notice.
- Highlight any nouns that could be turned into expanded noun phrases and improve these, using ideas from the children.
- Identify areas where the writer could have included descriptions that appeal to the senses e.g. what they could hear, feel, smell or see. Develop these, using ideas from the children.

Read through the edited version of the paragraph as a class and discuss its effectiveness.

## MAIN ACTIVITY: TEACHER INPUT

Introduce the idea of using rhetorical questions at the end of the final paragraph. Explain how these can be used to encourage the reader to reflect on the actions they could take to protect Antarctica as a result of reading the piece of writing.

Point out the use of rhetorical questions in Shivi's diary entry.  
*Ask: How did they make you feel?*

Allow the children time to discuss briefly with a partner the rhetorical questions they could use at the end of their own diary entry and take feedback. Model how we might add one or two of these to the final paragraph that the class improved in the starter activity.

For example:

What must the humpback whale have witnessed in her long life?

Surely it is our responsibility to protect these majestic beings?

It is impossible not to be moved by this beautiful, icy continent – why wouldn't we want to save it?

## MAIN ACTIVITY: INDEPENDENT LEARNING

Children edit and improve their first draft from the previous lesson to create a final draft of their diary entry. Encourage them to use the same approach used at the start of the lesson to break this down into steps (it would be helpful to display these steps on the interactive whiteboard as prompts). Include the use of rhetorical questions in this list.

### IDEAS FOR DIFFERENTIATION



#### SUPPORT

Direct adults in the class to work with this group of children, focusing on one point on the list of improvements to make to their writing at a time.

#### EXTENSION

Children ensure they have included the narrator's response to some of their experiences of being in Antarctica, drawing on Shivi's diary for examples.

## PLENARY

Ask children to swap their diary entry with someone else in the room – perhaps a partner they haven't worked with before in this unit. Share with them two things you liked about their diary and one thing they could do to improve. Allow the children some time to make any suggested improvements.





# 3. MATHS

*What is the relationship between temperatures in Antarctica and our use of fossil fuels?*

HARMONY  
PRINCIPLE

*Adaptation*

NO. OF  
LESSONS

2

An ever-growing body of scientific evidence confirms that our climate is changing. The UK alone has experienced its ten hottest years on record since 2002\* and all around the world a greater number of extreme weather events are occurring. In certain locations on our planet, temperatures are rising faster than in others and this is particularly evident in the polar regions.

We now know that our reliance on fossil fuels (coal, oil and gas) is a major contributor to climate change, which is why it is so important that we reduce the amount of energy we consume and move towards cleaner forms of energy generation. The first step in cutting our use of gas and electricity is to understand how much of it we currently use.

The two maths lessons in this pack give children opportunities to work with real data about rising temperatures in Antarctica and data about a school's electricity use.

In the first lesson, children work with data about surface temperature change in Antarctica over a 50-year period, using this to draw conclusions. In the second lesson, they work with graphs showing electricity consumption in a primary school over a single day and over a six-week period, using what they learn to suggest ways they can reduce electricity consumption in their own school and at home. The school data was collected using the Eco-Driver ([ecodriver.co.uk](http://ecodriver.co.uk)) energy management system.

These two activities provide a valuable 'way in' to discussions with children about how we must adapt our own behaviours to ensure the future health of our planet.

\* Met Office

## Learning question

*How has the surface temperature in Antarctica changed over time?*

### NATIONAL CURRICULUM LINKS

Number and place value

- Use negative numbers in context, and calculate intervals across zero

Statistics

- Calculate and interpret the mean as an average

### RESOURCES

- Copies of Resource 3A: Table showing land surface temperature in Antarctica with supporting number line (enough for one between two)



- Calculators

### STARTER ACTIVITY

Display a number line showing both positive and negative whole numbers (like the one below) on the interactive whiteboard. Model what happens when we subtract one number from another to give a negative number as the answer. For example:  $5 - 9 = ?$

-10 -9 -8 -7 -6 -5 -4 -3 -2 -1 0 1 2 3 4 5 6 7 8 9 10

Using number cards from 1 to 10, children work in pairs to pick two cards to generate and record subtraction calculations that cross zero and find the answers (they may need to be reminded to start with the smaller number each time). How many can they complete in a minute?

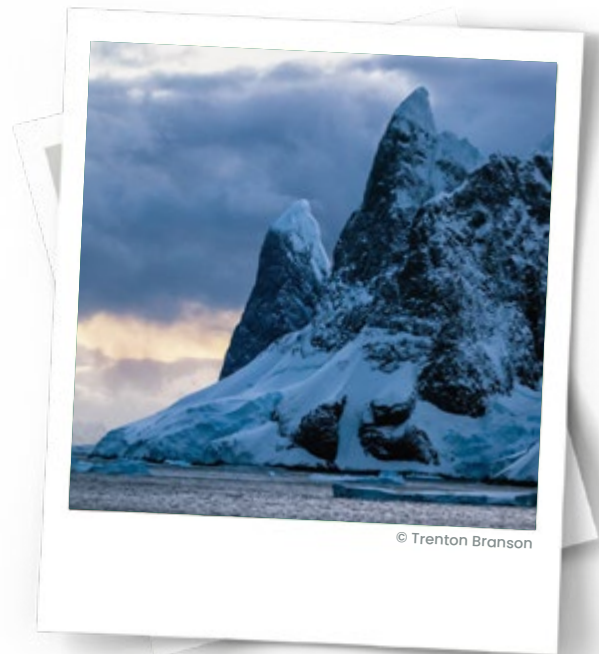
Move on to model what happens when we add a number to a negative starting number to give a positive number as the answer. For example:  $-3 + 10 = ?$

Repeat the number card activity generating addition calculations that cross zero (the children will need to be reminded to start with the smaller number this time and to make this a negative number).

In pairs, children discuss the following questions before sharing their ideas with the class:

*How could you find the difference between a positive and negative number?  
Can you think of more than one method?  
What strategies can help you calculate across zero?*

Extend the children's understanding by moving on to look at adding and subtracting decimal numbers across zero.



Display a range of addition and subtraction calculations on the interactive whiteboard. For example:

$$1.5 - 5.5 =$$

$$0.3 - 0.9 =$$

$$-2.4 + 4.1 =$$

$$-3 + 5.5 =$$

Allow some time for the children to work through as many of these calculations as they can, with a partner.

## MAIN ACTIVITY: TEACHER INPUT

Display the table of average surface temperature readings taken at the Faraday/Vernadsky Station on the Antarctic peninsula in 1970 and 2020 (Resource 3A). Ask the children questions to help familiarise them with the data in the table, and to assess how confidently they are interpreting it. For example:

*What does each row in the table show?*

*What was the temperature in March 1970? What was the temperature in March 2020? What is the difference?*

*What do you notice about most of the temperatures in 1970 compared to 2020?*

*Which month shows the least difference in temperature between 1970 and 2020?*

Recap what the mean of a set of data is and how we calculate it. Ask the children:

*How do you find the mean temperature in June, July and August 1970?*

Repeat with other combinations of months, if necessary, until they are confident calculating the mean.

## PLENARY

Go through the answers to the questions posed in the independent learning activity and discuss the strategies used to answer them as a class. Ask the children:

*What is the data telling us about the change in temperature in Antarctica between 1970 and 2020?*

*Why is this a problem?*

*What can we do about it?*

## IDEAS FOR DIFFERENTIATION



### SUPPORT

Children use number lines to help them with their calculations.

### CHALLENGE

Children pose further questions about the data for a partner to answer (and make sure they know the answers themselves!).

### EXTRA CHALLENGE

Children use a calculator to find mean temperatures (questions 4–6).

## ANSWERS

1. Fill in the blanks in the table above, using your knowledge of adding and subtracting decimals.

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1970	-0.4	0.0	-1.4	-4.4	-5.1	-6.3	-4.5	-10.2	-2.1	-3.5	-0.5	0.3
2020	1.7	1.9	0.4	-1.1	-3.2	-3.5	-5.6	-4.6	-5.5	-3.2	-0.7	-0.6
Diff	2.1	1.9	1.8	3.3	1.9	2.8	-1.1	5.6	-3.4	0.3	-0.2	-0.9

2. In which months was the surface temperature hotter in 2020 than it was in 1970? **Jan, Feb, Mar, Apr, May, June, Aug and Oct**
3. In which month was there the greatest difference in temperature between 1970 and 2020? **August**

## CHALLENGE

4. What is the mean average surface temperature in 1970? **-3.2 rounded to 1dp**
5. What is the mean average surface temperature in 2020? **-1.7 rounded to 1dp**
6. What is the mean average change in temperature since 1970? **1.2 rounded to 1dp**



## HOW HAS THE SURFACE TEMPERATURE IN ANTARCTICA CHANGED OVER TIME?

The table below shows the average surface temperature readings taken at the Faraday/Vernadsky Station on the Antarctic peninsula in 1970 and 2020.

Use the data in this table to answer the questions below, showing your working.

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1970	-0.4	0.0	-1.4	-4.4	-5.1	-6.3	-4.5	-10.2	-2.1	-3.5	-0.5	0.3
2020	1.7	1.9	0.4	-1.1	-3.2	-3.5	-5.6	-4.6	-5.5	-3.2	-0.7	-0.6
Diff		1.9		3.3	1.9		-1.1		-3.4	0.3	-0.2	



1. Fill in the blanks in the table above, using your knowledge of adding and subtracting decimals.
2. In which months was the surface temperature hotter in 2020 than it was in 1970?
3. In which month was there the greatest difference in temperature between 1970 and 2020?

### CHALLENGE

Think of three more questions about the data for your partner to answer (and make sure you've worked out the answer first yourself).

### EXTRA CHALLENGE

Use a calculator to help you work out the answers to the following questions but make sure you record your workings in your book. Give your answers to 1dp.

4. What is the mean average surface temperature in 1970?
5. What is the mean average surface temperature in 2020?
6. What is the mean average difference in temperature since 1970?



# Learning question

## How can data help us to reduce energy use?

### NATIONAL CURRICULUM LINKS

- Use estimation to check answers to calculations and determine, in the context of a problem, an appropriate degree of accuracy
- Multiply and divide multi-digit numbers up to 4 digits by a two-digit whole number using written formal methods
- Interpret data from a graph

### RESOURCES

- Copies of Resource 3B – Graphs showing school energy use



### STARTER ACTIVITY

Explain to the children that monitoring the amount of electricity we use every day – and, indeed, at regular points throughout the day – can really help us to understand our energy use and to take steps to reduce it. By reducing the amount of electricity we use, we are able to address the issue of climate change. Ask the children:

*What things use electricity at home?  
What things use electricity at school?*

Allow them to discuss this with a partner before sharing their ideas as a class.

Explain to the children that electricity is measured in kilowatt hours (kWh).



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The electricity bill we receive at home shows how much electricity (in kWh) we have used and how much we have to pay for it. Currently, the cost of electricity is 34p per kWh but a year ago, it was roughly half this. Ask the children:

*What will this mean for our energy bills in school and at home?*

*Leaving a lightbulb on for 20 hours a week will use 2kWh of electricity. How much will this cost?*

*An oven at home uses 3.3kWh of electricity to roast a chicken. How much will this cost?*

*A tumble dryer uses 4.5kWh of electricity to dry a load of washing. How much will this cost?*

Allow the children to work through these problems with a partner before sharing their workings and answers as a class. Ask the children:

*Using these examples, how could we reduce the amount of electricity we use and the amount of money we spend?*

## MAIN ACTIVITY: TEACHER INPUT

On the interactive whiteboard, display the graph in Activity 1 on Resource 3B. Ask the children: *What information is this graph showing us? What do the different coloured bars represent?* Allow them to discuss this with a partner before sharing their ideas with the class. Take a moment to discuss what the bars and axes show and to tackle any misconceptions.

---

## TEACHER'S NOTES

The graph shows the amount of electricity a school uses each day from 2nd December to 10th January. The turquoise bars represent weekend days, the dark blue bars represent weekdays and the green bars show days in the school holidays.

Ask the children questions to help them familiarise themselves with the data in the graph. For example:

*How much electricity did the school use on Wednesday 3rd December?*

*In the first week of the Spring term, which day has the highest electricity use? How many kWh were used?*

*What do you notice about the amount of electricity used on weekend days compared to week days? Why do you think this is? What do you notice about the amount of electricity used in the school holidays?*

Allow time for the children to discuss these questions in pairs before taking feedback as a class.

Explain to the children that they will use this graph to answer questions independently, before moving on to exploring a second graph.

## MAIN ACTIVITY: INDEPENDENT LEARNING

### ACTIVITY 1

Children answer questions 1-3, using the data in the graph to help them.

### ACTIVITY 2

Children answer questions 6-8, using the data in the graph to help them.

## PLENARY

Go through the answers to some of the questions the children answered in the independent activities to spot-check their understanding and discuss the strategies they used to work out their answers (see Answer sheet below).

Ask the children:

*Did anything surprise you about the data in the graphs?*

*What have you learnt from this school's data that we could use to reduce electricity use in our own school or at home?*

In pairs, children discuss their ideas before feeding back to a class discussion.

Explain to the children that, unless it comes from renewable sources (wind, hydro or solar power, for example),

### IDEAS FOR DIFFERENTIATION



#### SUPPORT

Children pose questions orally for a partner to answer with reference to the data in the first graph only, using the format:

How much energy did the school use on [date]?

#### EXTENSION

Children complete 'Challenge' questions in ACTIVITY 1 and ACTIVITY 2.

the electricity we use is responsible for carbon emissions that contribute to climate change. Allow some time at the end of the session for the children to discuss with a partner how their own school could cut electricity use and harmful carbon emissions. For example, by reducing energy use, switching to a renewable energy supplier or generating some of its own energy by installing a wind turbine or solar panels. Discuss their ideas as a class and agree a plan of action about what they could realistically achieve and how they will communicate this to the rest of the school community.

### ANSWER SHEET

1. The school had its Christmas lunch on Weds 11 Dec. The greater use of ovens in the school kitchen explains the higher electricity use on this day.
2. The school's Christmas Fair was held in the school hall on Sat 14 Dec. The use of the lights in the hall and other electrical appliances on this day accounts for the higher use of electricity.
3. The last day of term on Fri 20 Dec was a half day, which explains why electricity use was lower.
4. 880kWh of electricity was used on Monday 2nd December.  $880 \text{ kWh} \times 34\text{p} = \text{£}299.20$

5.  $880\text{kWh} \times 34\text{p} = \text{£}299.20$ ;  
 $900\text{kWh} \times 34\text{p} = \text{£}306$ ;  $920\text{kWh} \times 34\text{p} = \text{£}312.80$ ;  
 $880\text{kWh} \times 34\text{p} = \text{£}299.20$ ;  $600\text{kWh} \times 34\text{p} = \text{£}204$ ;  
Total cost =  $\text{£}1421.20$

6. The school kitchen turns on its ovens to heat up at 10.30am and uses them until the end of the morning.

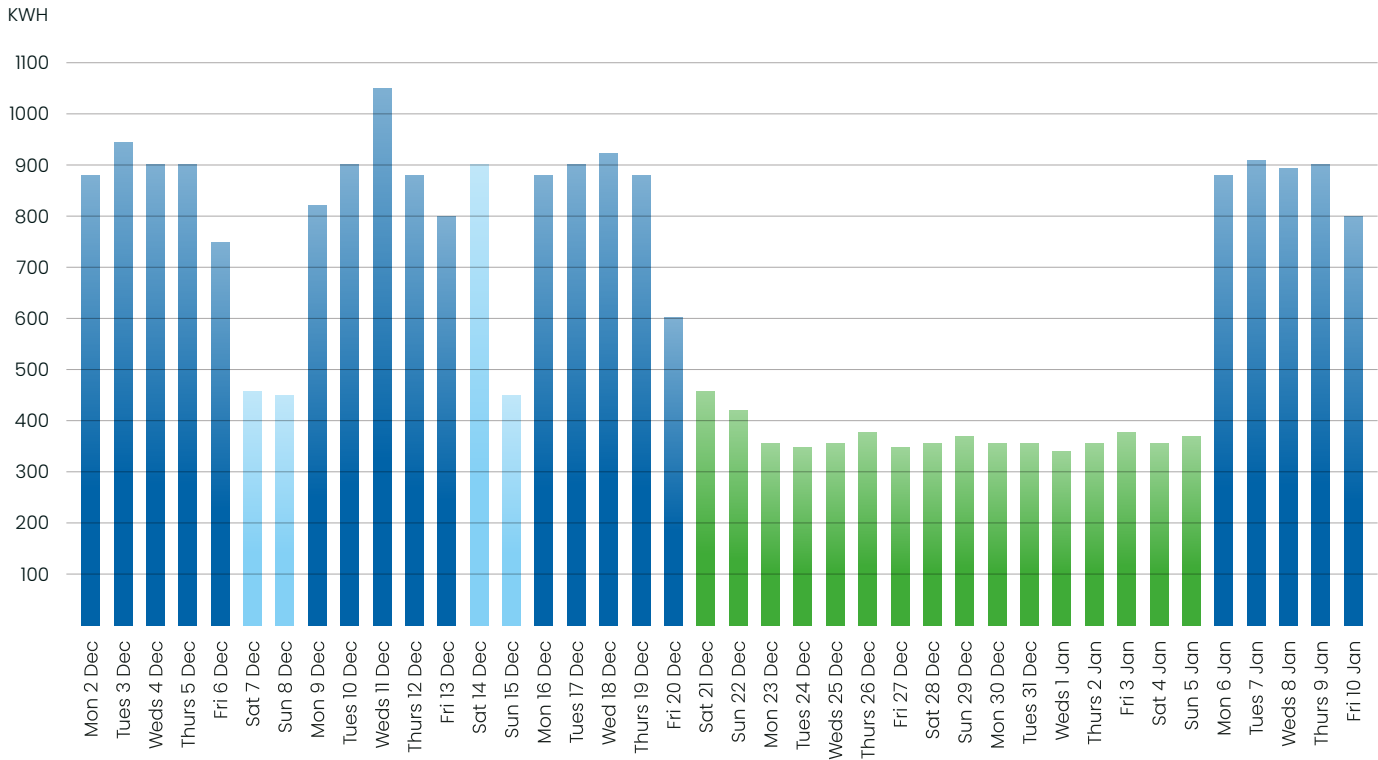
7. More lights in the school were turned on at the start of the day when the weather was overcast, accounting for the spike in electricity use around 9am.

8. After the end of the school day, teachers are still working and clubs are taking place, which is why there isn't a dramatic and sustained drop in energy use beyond 3.30pm.

## GRAPHS SHOWING SCHOOL ENERGY USE

### ACTIVITY 1

This graph shows a school's electricity use over six weeks



Use the data in the graph to answer the following questions:

1. We know that ovens use a lot of electricity. Using this knowledge, on which day do you think the school had its Christmas lunch? Give a reason for your answer, based on the data in the graph.
2. On which weekend day do you think the school held its Christmas Fair? Give a reason for your answer, based on the data in the graph.
3. What could be the reason for the school's lower electricity use on Friday 20th December?

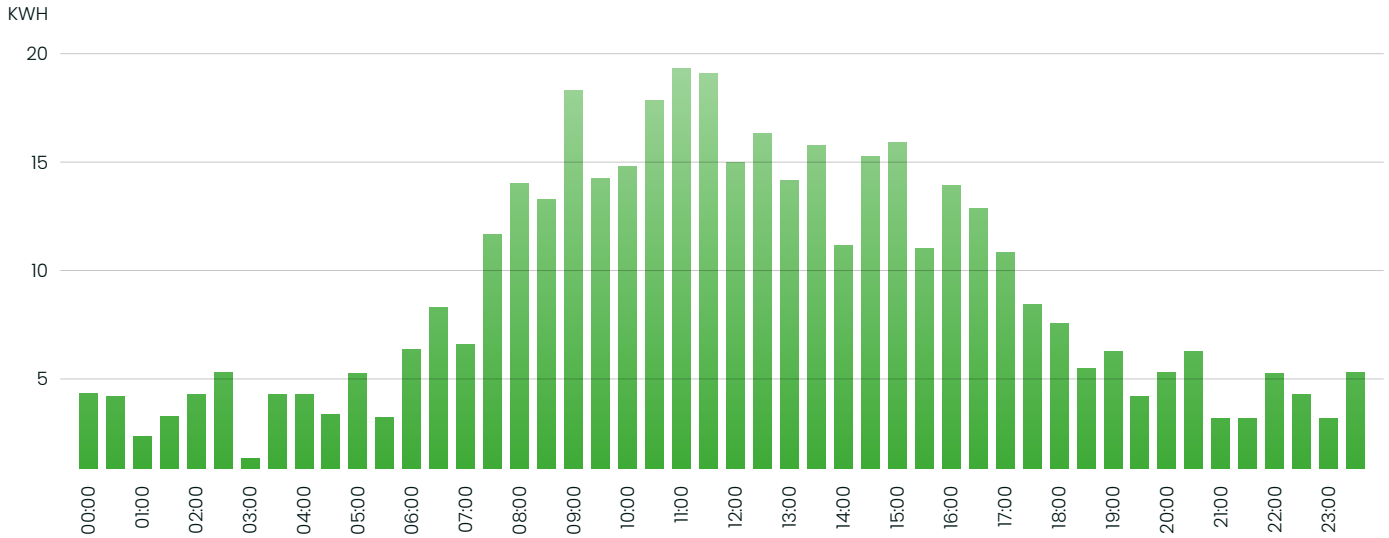
### CHALLENGE

1kWh of electricity costs 34p. Use this information to answer the following questions:

4. How much does the school pay for the electricity it uses on 2nd December? Show your workings.
5. How much does the school pay for the electricity it uses in the last week of the Autumn term? Show your workings.

## ACTIVITY 2

This graph shows a school's electricity use over one day in January.



Use the data in the graph to answer the following questions:

6. What is the school's electricity use at:

- a. 10.30am
- b. 11am
- c. 11.30am

Why might electricity use be high at these times?

7. On the day that this data was recorded, the weather was overcast at the start of the school day. How is this reflected in the school's electricity use at 9am and why might this be?

8. When the school day ends at 3.30pm, the school's electricity use dips. What is the electricity use at:

- a. 4pm
- b. 4.30pm
- c. 5pm

Why might the school's electricity use rise slightly after the end of the school day?

## CHALLENGE

9. Think of three more questions about the data for your partner to answer (and make sure you've worked out the answers first yourself).







# 4. SCIENCE

## *How are living things in Antarctica interdependent?*

HARMONY PRINCIPLE

*Interdependence*

NO. OF LESSONS

1

Throughout the natural world, living things depend on other living things to survive. In this Science lesson, children have the opportunity to explore this interdependence by revising their understanding of food chains and extending it to food webs.

By learning about the ways in which some of the species in an Antarctic food web rely on each other for their survival, children start to reflect on the impact our actions are having on these relationships and, ultimately, on the entire Antarctic ecosystem.

They are encouraged to reflect on the effects of retreating sea ice on the animal populations in Antarctica, and to link this to our own reliance on the fossil fuels that are contributing to global warming. This links directly to the focus of the two maths activities in this pack, in which children explore the increase in the Antarctic surface temperature over the last 50 years and the ways in which we can reduce the amount of energy we use.

## Learning question

### How are living things in Antarctica interdependent?

#### NATIONAL CURRICULUM LINKS

- Construct and interpret a variety of food chains, identifying producers, predators and prey
- Recognise that environments can change and that this can sometimes pose dangers to living things

#### RESOURCES

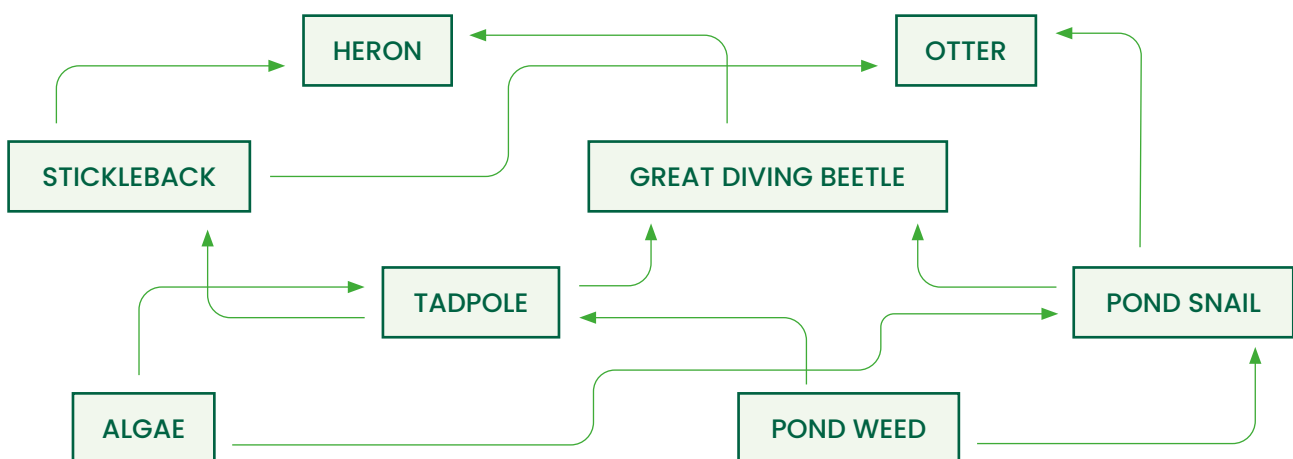
- Copies of Resource 4A – Table of information to show predators and prey (enough for one copy between two)



#### STARTER ACTIVITY

Start the lesson by reflecting on what the word 'interdependent' in the learning question means. Draw out the fact that within an ecosystem living things depend upon each other for food and remind the children that these relationships can be shown using a diagram called a food chain (link to Y4 learning).

Explain that we can show the relationships between the living things in several food chains using a more detailed diagram called a food web. On the interactive whiteboard, show the children the example of a food web for living things in a pond (see below). Remind them that when we 'read' the information in a food web, each arrow means 'is eaten by'.



Recap the language used to describe the different elements of the food web (e.g. producer, predator and prey). Explore how to interpret the information in the food web by asking:

*Which living things have no **predators**?*

*Which living thing has only one **predator**?*

*The tadpole is **prey** to which living things?*

*What are the **producers** in the pond food web?*

## MAIN ACTIVITY: TEACHER INPUT

On the interactive whiteboard, show the children a copy of the table (see Resource 4A), which shows which living things in Antarctica are dependent on which other living things for food.

In mixed ability pairs, give children time to read the information and prepare up to three questions like the ones they were asked in the starter activity to share during a class discussion.

Invite some of the children to pose their questions to test the understanding of the class and allow the whole class time to discuss the answers with a partner before feeding back.

Ask the children: *If we were going to use the information in the table to create an Antarctic food web, what living thing would we place at the bottom of the web?* Allow them to discuss with a partner before sharing their ideas. Model how to start drawing the food web.

## MAIN ACTIVITY: INDEPENDENT LEARNING

Using the example of the pond food web, the children work with a partner to use the information in the table in Resource 4A to create their own food web showing the interdependence of living things in Antarctica.

### IDEAS FOR DIFFERENTIATION

#### SUPPORT

Provide labels for the children to cut out and use in their food web.

#### EXTENSION

Children use their food web to provide written answers to the following questions to help lead the discussion in the plenary:

- What would be the effect on other species in the food web if the population of krill in the waters around Antarctica started to decrease?
- What would be the effect on other species in the food web if orca numbers started to fall?
- Emperor penguins breed on the sea ice around Antarctica. If the sea ice continues to melt, it will be harder for these penguins to breed. What effect will this have on the emperor penguin population? What effect could a change in the emperor penguin population have on the populations of orca and leopard seals in Antarctica?



## PLENARY

Put the questions in bold on the interactive whiteboard for children to discuss with their partner, using the food web they have created to guide their thinking:

- **What would be the effect on other species in the food web if the population of krill in the waters around Antarctica started to decrease?**

TEACHER'S NOTES: A decrease in krill would have a dramatic, negative impact on nearly all Antarctic species. This is because they are the main diet for most of the marine predators in the Southern Ocean. Krill are the major grazers (plant eaters) in the Antarctic, which means they play the important role of repackaging the nutrients in algae and phytoplankton to make them available for marine predators.

- **What would be the effect on other species in the food web if orca numbers started to fall?**

TEACHER'S NOTES: Orcas are the apex (top) predator in the Antarctic food web. When you remove an apex predator you remove regulation of lower members of the web – causing a change in the population numbers. Orcas' main prey species, e.g. seals, would boom at first, wiping out their prey species, e.g. fish. This would then affect other predators that depend on fish, and the seals themselves! Lack of prey would cause starvation and a decline in seals and other predator populations if they are unable to switch to another food source.



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- **Emperor penguins breed on the sea ice around Antarctica. If the sea ice continues to melt, it will be harder for these penguins to breed. What effect will this have on the emperor penguin population? What effect could a change in the emperor penguin population have on the populations of orca and leopard seals in Antarctica?**

TEACHER'S NOTES: If current rates of ice loss continue, then the areas of sea ice which are 'just right' for emperor penguins to breed on will disappear in most places on the Antarctic coastline. If there is too little sea ice, chicks can drown when sea ice breaks up early. If penguins head inland where there is too much sea ice, it becomes too long and difficult for the adults to find food, and the adults and chicks may starve. This means that, with the loss of sea ice, whole colonies of emperor penguins may fail to breed, which will cause a massive decrease in their species.

If emperor penguin populations decrease, this will impact the predators who eat them. If these predators are unable to find alternative sources of food, this could lead to starvation and a decline in seal and orca populations.

- **Why are warming temperatures in Antarctica a concern for us?**

TEACHER'S NOTES: Warming temperatures are causing the ice in Antarctica to melt more quickly. Ice caps are very good at reflecting radiation from the sun back out into space, so shrinking ice caps mean that less solar radiation is reflected out into space - causing a positive feedback loop of increased warming. Shrinking ice also means increased melt water which, when warmed, expands and raises sea levels. As global temperatures increase and sea levels rise, this results in more extreme weather events around the world like floods, hurricanes, forest fires and storms.

Revisit the learning question: How are living things in Antarctica interdependent? Give the children time to discuss their responses to this with a partner, before feeding back to the class.

**THIS TABLE SHOWS WHICH SPECIES ARE EATEN BY WHICH OTHER SPECIES IN ANTARCTICA**

	EATS	IS EATEN BY
ice algae	*	krill
phytoplankton	*	krill
krill	ice algae, phytoplankton	humpback whale, fish, emperor penguin, leopard seal
squid	fish	emperor penguin, elephant seal, leopard seal, orca, humpback whale
fish	krill	orca, leopard seal, elephant seal, emperor penguin, humpback whale
emperor penguin	krill, squid, fish	orca, leopard seal
elephant seal	squid, fish	orca
leopard seal	krill, squid, emperor penguin, elephant seal	orca
orca	fish, squid, emperor penguin, elephant seal, leopard seal	**
humpback whale	squid, fish, krill	**

\* the ice algae and phytoplankton don't eat anything as plants make their own food from sunlight

\*\* the orca and humpback whale have no predators

HUMPBACK WHALE

FISH

ICE ALGAE

EMPEROR PENGUIN

KRILL

LEOPARD SEAL

ORCA

ELEPHANT SEAL

SQUID

PHYTOPLANKTON







# 5. GEOMETRY

*How can geometry give us a different perspective on Antarctica?*

<b>HARMONY PRINCIPLE</b> <i>Geometry</i>	<b>NO. OF LESSONS</b> 2
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We find patterns everywhere in nature: around us and in us, on Earth and beyond, on a microscopic level and on an enormous scale. We find them in patterns of circles and spirals, in proportions and symmetries throughout the natural world.

Learning the geometry of nature provides students with a new way of looking at the world. The observational skills and careful drawing that are required to recreate this geometry can have a powerful impact on students' understanding of the natural world and their place in it. If we are to create a sustainable future, we need to see the world through a different lens, to understand the patterns of life that exist around us, and that exist in us. This way of seeing the world means we view everything from a place of connection, rather than separation.

In the first of the two geometry activities presented here, children explore the geometry of a six-pointed snowflake and create their own symmetrical snowflake designs. In the second activity, children use geometry to create equilateral triangles that then become the basis of an investigation into the proportions of icebergs above and below water.

For both of these activities, links to the Year 6 maths curriculum are provided to show how they could be used to introduce or to reinforce the children's understanding of key maths concepts. For each activity, there is an opportunity to take the learning further towards a more artistic outcome, probably over several sessions.

## GEOMETRY ACTIVITY 1

# Learning question

## How can I draw a 6-pointed snowflake?

We all know that Antarctica is one of the coldest places on Earth, but it may surprise you to learn that it is also one of the driest (it's classed as a desert). When snow does fall, it rarely melts, and eventually it is compressed enough that it becomes part of the ice that covers this frozen continent. In this activity, children explore the form of six-pointed snowflakes and use rotational symmetry to create their own geometric snowflake design.

We would suggest starting this activity by studying some of the fascinating close-up photography of snowflakes taken by the physicist Kenneth Libbrecht at [snowcrystals.com](http://snowcrystals.com).



### NATIONAL CURRICULUM LINKS (Y6 – MATHS)

- Illustrate and name parts of circles, including radius, diameter and circumference and know that the diameter is twice the radius

### LINK TO MATHS LEARNING

If the children are creating their own guidelines, (see EXTENSION, above, right) there is a good opportunity, once they have drawn the first circle, to discuss with them where the radius, diameter and circumference of a circle are located. Using a ruler, they can also explore in pairs the relationship between the radius and the diameter.

### YOU WILL NEED

- A ruler
- A pencil
- Tracing paper
- Handheld mirrors
- Printed templates (Resource 5A, p. 59)
- A4 paper (optional)
- A compass (optional)
- Masking tape (optional)

### TOP TIP

Many children find it much easier to use a compass accurately when they are standing up rather than sitting down.

## IDEAS FOR DIFFERENTIATION



### SUPPORT

If you are adapting this activity for students who need additional support, you could use dots to indicate the points of intersection that need to be joined to form the hexagon in Step 1, or you could draw it for them. Alternatively, you could draw half a simple snowflake design onto the template and ask the students to complete the design, paying close attention to reflective symmetry, using a hand held mirror to help them.

### EXTENSION

More confident learners can be given an additional level of challenge by creating the template in Resource 5A themselves. To do this, start by setting the arms of a compass to 4cm and drawing a circle in the centre of an A4 sheet of paper. Place the point of the compass anywhere on the edge of this circle and draw a second circle. Next, place the point of the compass on one of the points where the second circle intersects the first and draw a third circle. Carry on placing the point of the compass on points of intersection around the edge of the original circle to draw more circles until you have drawn six circles in total in addition to the first one.

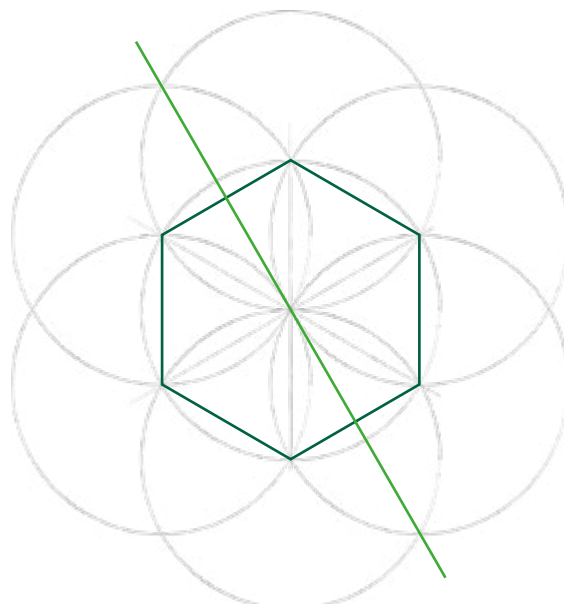
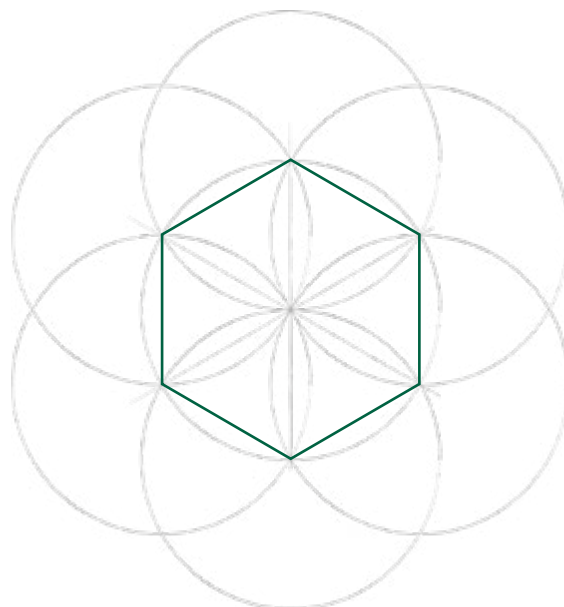


## STEP 1 – Join points on the central circle to create a hexagon

On the Resource 5A template, use a ruler and a pencil to draw lines that join the six points around the edge of the central circle, as shown. Discuss with the children the name and the properties of the shape they have drawn.

### DID YOU KNOW?

In Nature, snowflakes take a huge range of forms; some look like needles, some are triangular, and others are hollow! Probably the best-known shape, though (and the one that is likely to spring most readily to mind when we think about snowflakes) is the six-pointed form that is the focus of this activity.

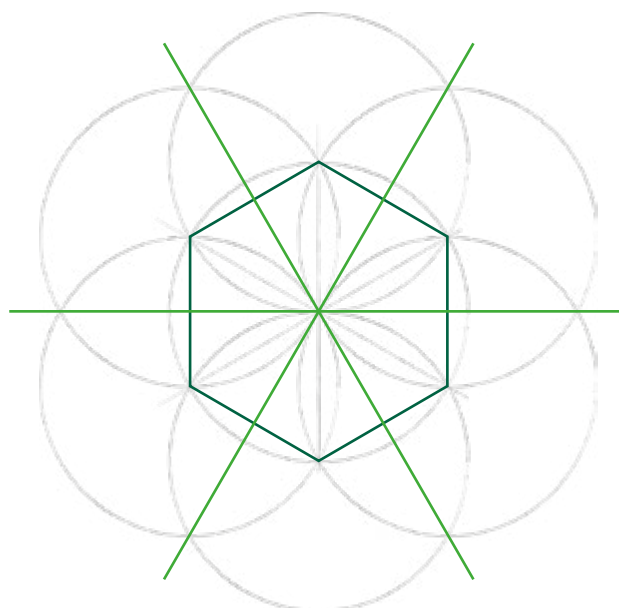


## STEP 2 – Draw a diagonal line across the hexagon

Next, use a pencil and ruler to draw a line that joins the point where two of the outer circles intersect to the centre point of the central circle. Extend this line to join up with the point where two of the outer circles intersect on the opposite side of the hexagon.

## STEP 3 – Repeat to join the remaining points

Repeat Step 2 to draw two further lines joining the points where two of the outer circles intersect, to the corresponding point opposite. Ensure each line passes through the centre point.



## STEP 4 - Create a symmetrical design for one point of the snowflake

Working in one of the six sections you have created inside the hexagon, create a symmetrical design for one of the points of your snowflake. Use the line on the template that connects each vertex of the hexagon to the centre point as a line of symmetry to help you. Encourage children to check the symmetry of their designs using a hand held mirror.

## STEP 5 - Trace the design onto tracing paper

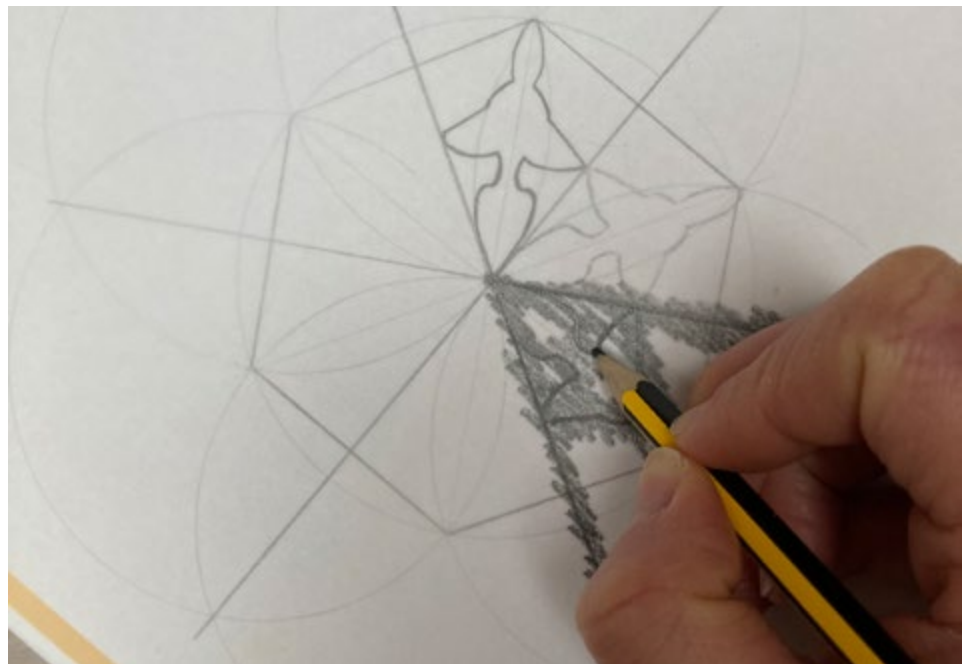
Lay a small piece of tracing paper over the design you have created and use a pencil to trace the design onto it. If you also trace the two straight lines on either side of your design, it will be much easier to position the design in the correct place in the next few steps.

### TOP TIP

If you find that the tracing paper moves while you're drawing on it, use a couple of small pieces of masking tape on two opposite corners of the sheet of tracing paper to stick it down. Peel them off carefully.

## STEP 6 - Turn the tracing paper over and scribble on the back of it

Next, turn the tracing paper over and use the side of your pencil lead to scribble lightly over the outlines of your design.



## STEP 7 – Trace the next section of the snowflake

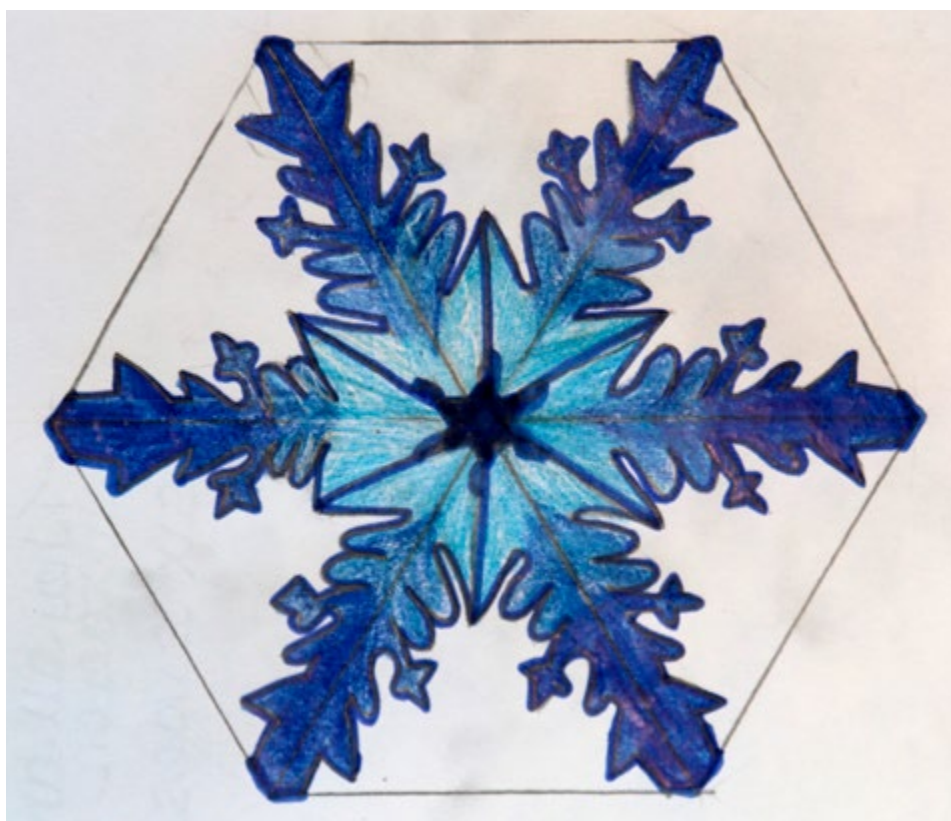
Turn the tracing paper back over, so that the side you drew on originally is facing up. Now rotate the design on the tracing paper through  $60^\circ$  from the original design you drew on the template. Line up one edge of the design on the tracing paper with one edge of the original design on the template. The two straight lines on the sides of the design will help you with this. The design on the tracing paper should now be positioned in a second section of the hexagon, next to the first one. Go over the design on the tracing paper with a pencil, pressing firmly.

## STEP 8 – Trace the remaining sections of the snowflake

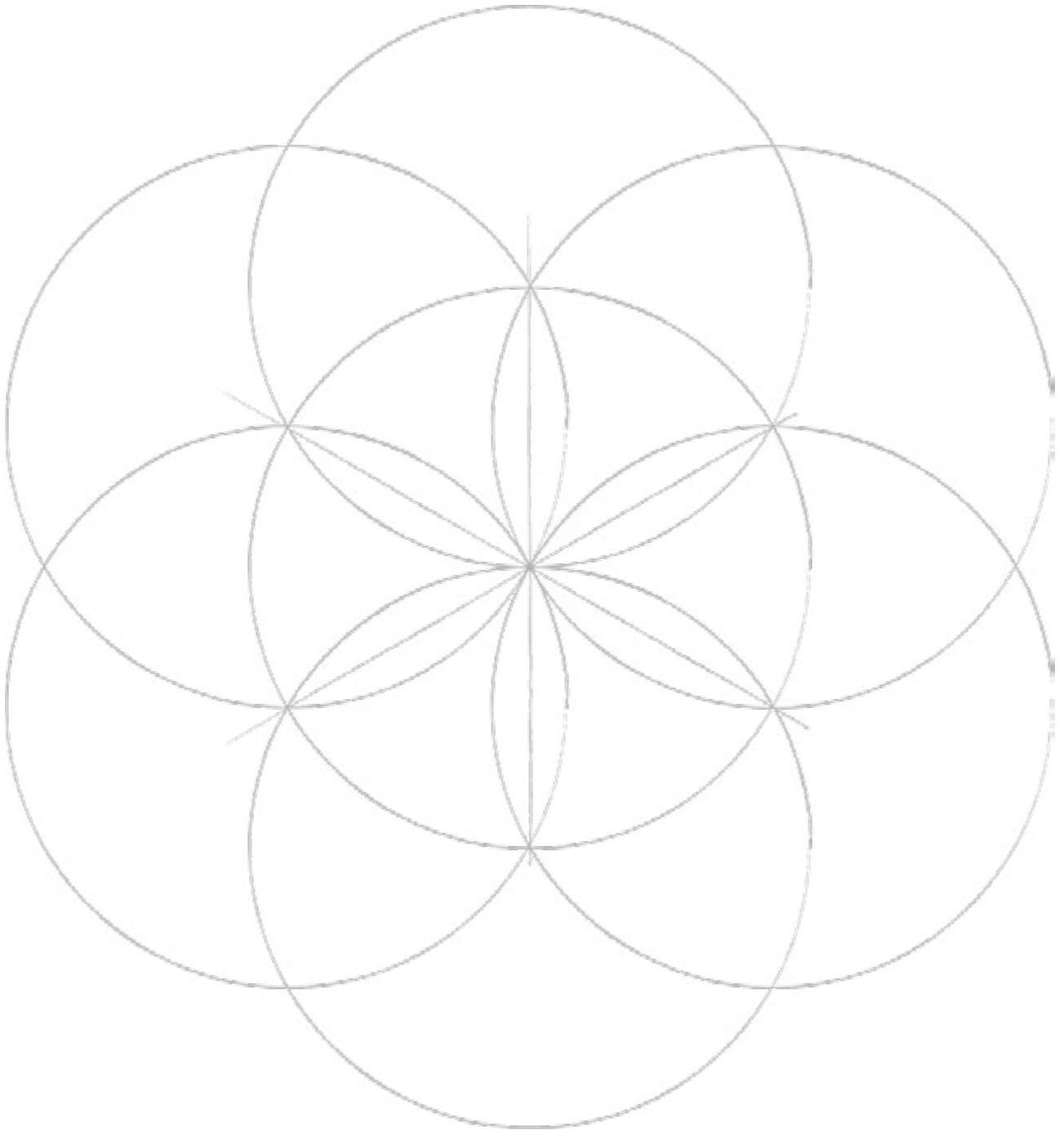
Repeat Step 7 to draw the remaining four sections of the snowflake on the template until the snowflake design is complete.

## STEP 9 – Transfer the design to a fresh sheet of paper

Students can now carefully go over the outline of their snowflake design in pen, then trace the entire snowflake design and transfer it to a fresh sheet of paper. They could then use watercolour paints or coloured pencils to colour it, if they wish, or go over the outline of the snowflake in a fine, metallic pen.



# PRINTABLE TEMPLATE







## GEOMETRY ACTIVITY 2

### Learning question

*How can tessellating triangles help me explore the proportions of an iceberg?*

The surface of Antarctica is almost entirely covered by two vast sheets of ice, which are, on average, just over 2km thick. In places, glaciers have formed in these ice sheets and these 'rivers of ice' flow slowly towards the edge of the continent, forming 'ice shelves' where they meet the sea. It is from these ice shelves that large pieces of ice break off, creating icebergs. In actual fact, the part of an iceberg that sits above water is only around a tenth of its entire size – the rest is underwater.

In this activity, children use tessellating triangles to explore the proportion of an iceberg that sits above and below water and create their own iceberg artwork.



#### NATIONAL CURRICULUM LINKS (Y6 – MATHS)

- Solve problems involving the relative sizes of two quantities where missing values can be found by using integer multiplication and division facts

#### YOU WILL NEED

- A pencil
- A ruler
- A compass
- A fine, black pen
- A4 paper
- A4 tracing paper
- Masking tape (optional)

#### IDEAS FOR DIFFERENTIATION

##### SUPPORT

Children who find using a compass to construct the first triangle too challenging could be given an equilateral triangle template to draw around to explore tessellation and proportion.

##### EXTENSION

More confident learners can be encouraged to investigate the statement 'If the ratio of the part of an iceberg above water to the part of an iceberg below water is always 1:9, the number of triangles below the waterline will always be a multiple of nine. Provide evidence to support your answer.'

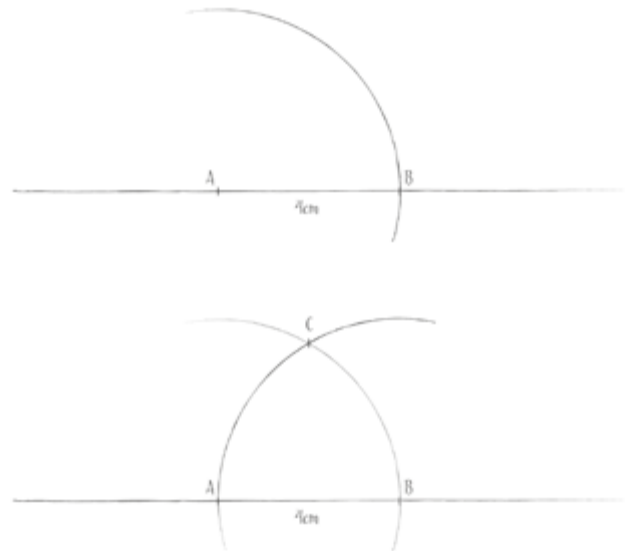


## STEP 1 - Draw the guidelines to create a triangle

Towards the top of a piece of A4 paper (in portrait orientation), use a ruler to draw a straight, horizontal line no shorter than 10cm long. This will be the waterline in your drawing. Make a small pencil mark on the line (this is labelled 'A' in the diagram), slightly to the left of the midpoint.

Set the point and the pencil point of the compass 4cm apart. Place the point of the compass at point A on the line and draw a large arc that crosses the line to the right of point A. The point where the arc crosses the line is labelled 'B' in the diagram.

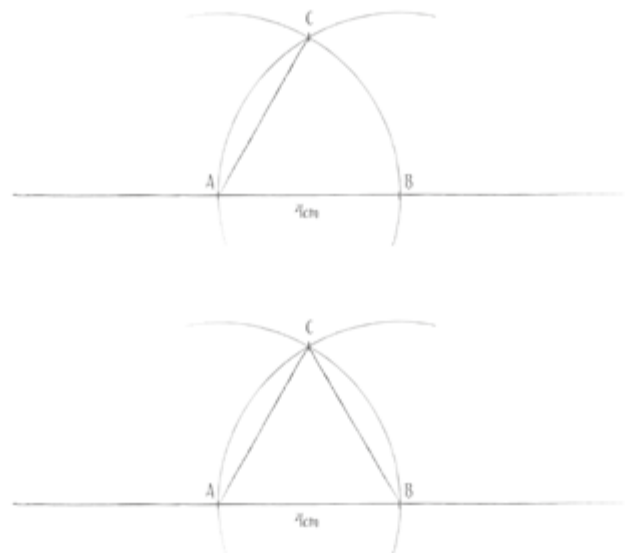
Next, place the point of the compass at point B and draw a second arc that crosses the horizontal line at point A. The point where the two arcs cross is labelled 'C' in the diagram.



STEP 1

## STEP 2 - Use the guidelines to draw a triangle

Using the ruler, join point A to point C. Then join point C to point B. Very carefully, rub out the arcs that you have used as guidelines to draw the triangle.

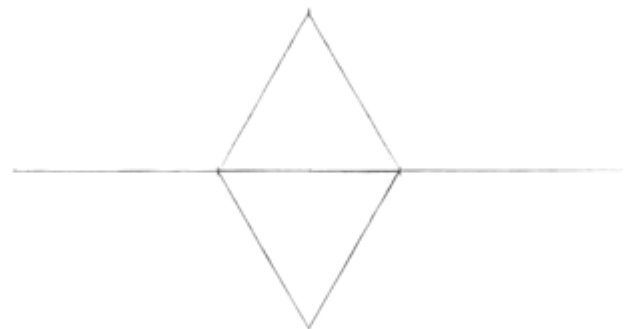


STEP 2

## STEP 3 - Trace the first triangle and draw the second

Place a piece of tracing paper over the first triangle and carefully trace it. You might find it easier to mark the three vertices of the first triangle with a small dot on the tracing paper, then use a ruler to join these up.

Once you've traced the first triangle onto the tracing paper, turn the tracing paper over and scribble over the edges of the triangle that you can see through the paper using a pencil.

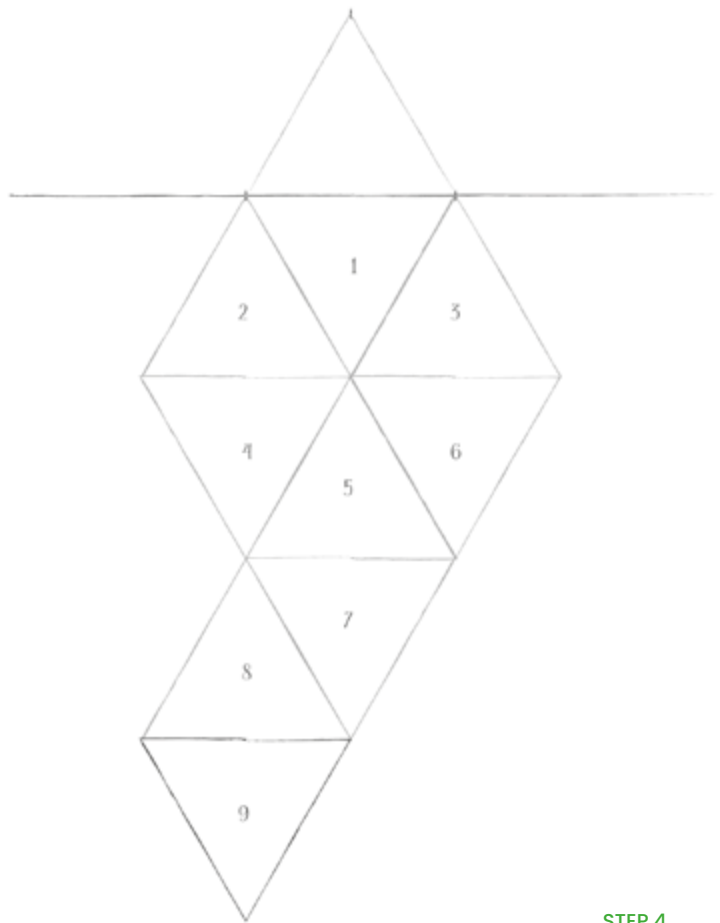


STEP 3

Turn the tracing paper back over, and line up one of the edges of the triangle on the tracing paper with the bottom edge of the first triangle you drew on the piece of A4 paper. Holding the tracing paper in place, go over each of the sides of the traced triangle, pressing firmly with a pencil. When you remove the tracing paper, you should be able to see the lines transferred onto the paper. You can use a ruler to neaten these up.

**TOP TIP**

If you find that the tracing paper moves while you're drawing on it, use a couple of small pieces of masking tape on two opposite corners of the sheet of tracing paper to stick it down. Peel them off carefully.



STEP 4

**STEP 4 - Continue adding tessellating triangles**

Repeat the processes outlined in Step 3 to add eight further tessellating triangles to build up the shape of the iceberg below the waterline.

The following steps will help to turn the iceberg you have created so far into an artwork.

**TOP TIP**

At this point, it is worth pausing to allow the children to compare the iceberg form they have created with those of others in the class. Encourage reflection by asking: 'Have we all arranged the triangles under the waterline in the same way?' and 'Is the proportion of all our icebergs the same, even if they look different?'

**LINK TO MATHS LEARNING**

Once the children have created their own iceberg form using a total of 10 tessellating triangles, discuss with them the proportion of their iceberg that is above the waterline and the proportion that is below it. Model how this can be written using ratio. There is then an opportunity to extend their thinking by asking, for example: 'I add another two triangles to my iceberg above the water line so there are three in total. How many triangles would I need to add below the waterline to keep the proportion the same?'

**STEP 5 - Draw a more natural waterline**

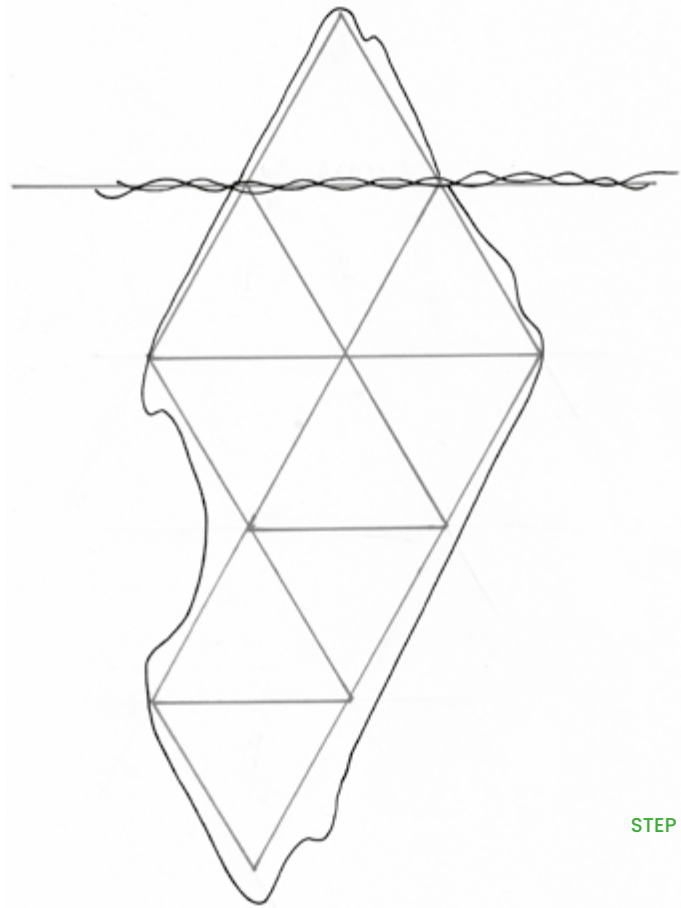
Using a pencil first, go over the waterline you drew with a ruler in Step 1, using a slightly more undulating line to suggest the movement of the sea. Go over this using a fine, black pen when you're happy with the way it looks.

## STEP 6 – Create a more natural iceberg outline

Using a pencil first, use the outline of the block of tessellating triangles you created in Steps 1 to 4 as a guide to draw a more natural-looking iceberg shape. Once you're happy with the shape you have created, go over it using a fine, black pen.

### TOP TIP

At this stage, it may be helpful to pause to explore with the children some images of icebergs, paying particular attention to any markings, patterns or textures on their surface, and to the colours in the photographs.



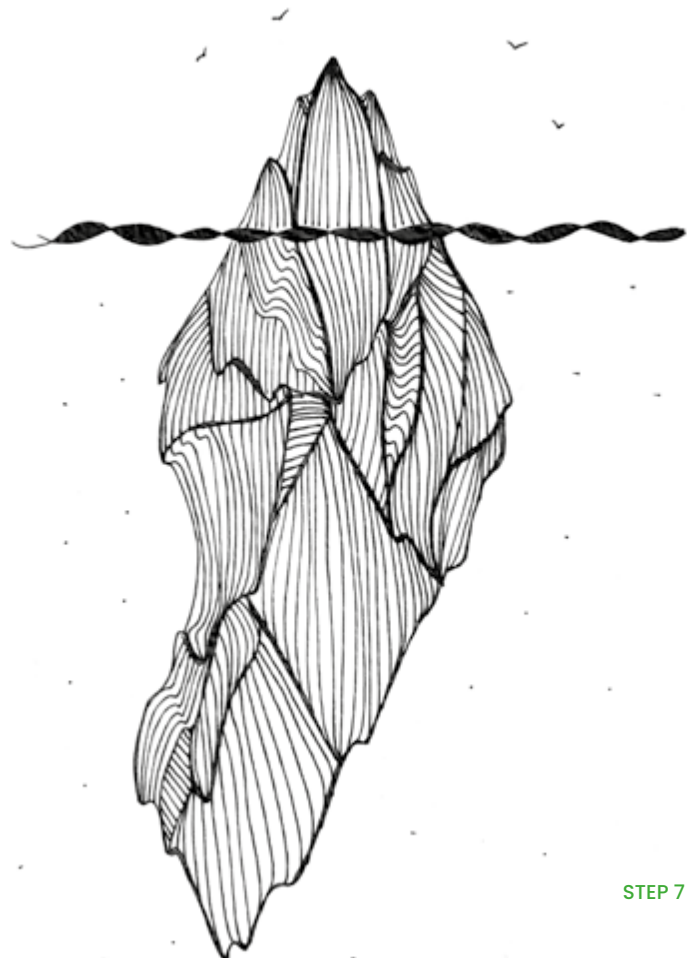
STEP 6

## STEP 7 – Add detail to your iceberg

Using images of icebergs as a stimulus, use a pencil to add detail to the surface of the iceberg you have drawn. Once you are happy with the detail you have added, go over the pencil lines using a fine, black pen.

### TOP TIP

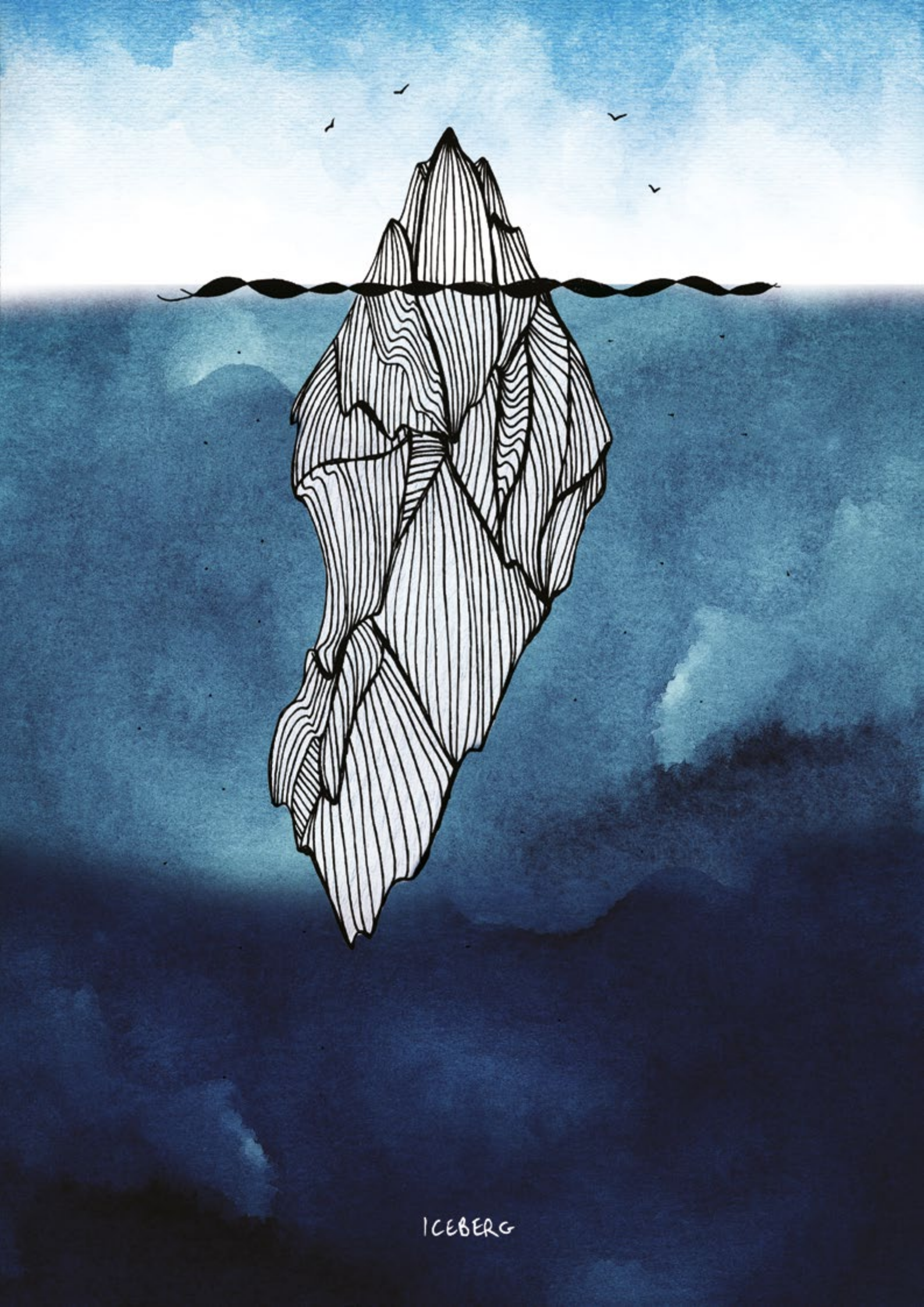
Once all the pen lines you have added in Steps 5 to 7 are completely dry, use a clean eraser to gently rub out the pencil lines.



STEP 7

## STEP 8 – Add colour to your iceberg artwork

Using the colours in the iceberg photographs for inspiration, use watercolour paints to add colour to the sea and sky in your artwork.



ICEBERG



# 6. ART

*How can I represent an Emperor penguin pair in an artwork?*

HARMONY  
PRINCIPLE

Cycle

NO. OF  
LESSONS

1

There are 18 species of penguin in the world today, and the Emperor penguin is the largest, standing at around 120cm tall. Emperor penguins are only found in Antarctica, where there are thought to be more than half a million adult birds. In the harsh Antarctic winter, when temperatures can drop to  $-50^{\circ}\text{C}$  and the wind can blow at speeds of up to 200mph, Emperor penguins huddle together to keep warm – they also have two layers of feathers to help them survive in these conditions. Penguins lay their eggs in the middle of winter; this is a challenging stage in the penguin's life cycle. When they are choosing a mate, the penguins bow their heads to one another. It is this pose that we will explore in this activity by creating a sketch of a single penguin, then reflecting it to create a symmetrical mirror image.



## ART LESSON 1

# Learning question

## *How can I represent an Emperor penguin pair in an artwork?*

### NATIONAL CURRICULUM LINKS

- To use sketch books to record their observations and use them to review and revisit ideas
- Pupils should be taught to develop their techniques, including their control and their use of materials, with creativity, experimentation and an increasing awareness of different kinds of art, craft and design.

### RESOURCES

- Copies of Resource 6A and Resource 6B (enough for one between two)
- Copies of Resource 6D (enough for one per student) or copies of Resource 6E (for each child requiring additional support)



Each child will also need:

- An HB pencil
- A soft (5B) pencil
- An eraser
- A fine, black pen
- A sheet of A4 paper
- A sheets of A4 tracing paper
- Masking tape (optional)

### STARTER ACTIVITY

Two sketchbook tasks are provided here, each of which could be used as a starter activity if this art project is to be continued across two or more sessions. Alternatively, if this project is to be completed in one session, Sketchbook Task 2 could be completed before the children start painting their artwork.





## Sketchbook Task 1

Display a selection of images of Emperor penguins on the interactive whiteboard. See Resource 6B for an example. Ask the children:

*What shapes can you see on the Emperor penguins' bodies that might help us draw them?*

Give them some time to discuss their ideas with a partner before sharing them with the class.

Children practise drawing an Emperor penguin in their sketchbooks. Draw their attention to the proportion of different parts of the penguins' bodies. For example:

*How far does the wing come down the body? How big is the beak compared to the head?*

## Sketchbook Task 2

Display a selection of images of Emperor penguins on the interactive whiteboard. Ask the children:

*Is the black of the penguin's feathers the same over its whole body?*

*How can you create different shades of black using water colour paints?*

The children practise creating different shades of black by varying the amount of water they use to dilute the paint. Allow them to share what they have discovered with the class and compare the effects they have created with a partner.

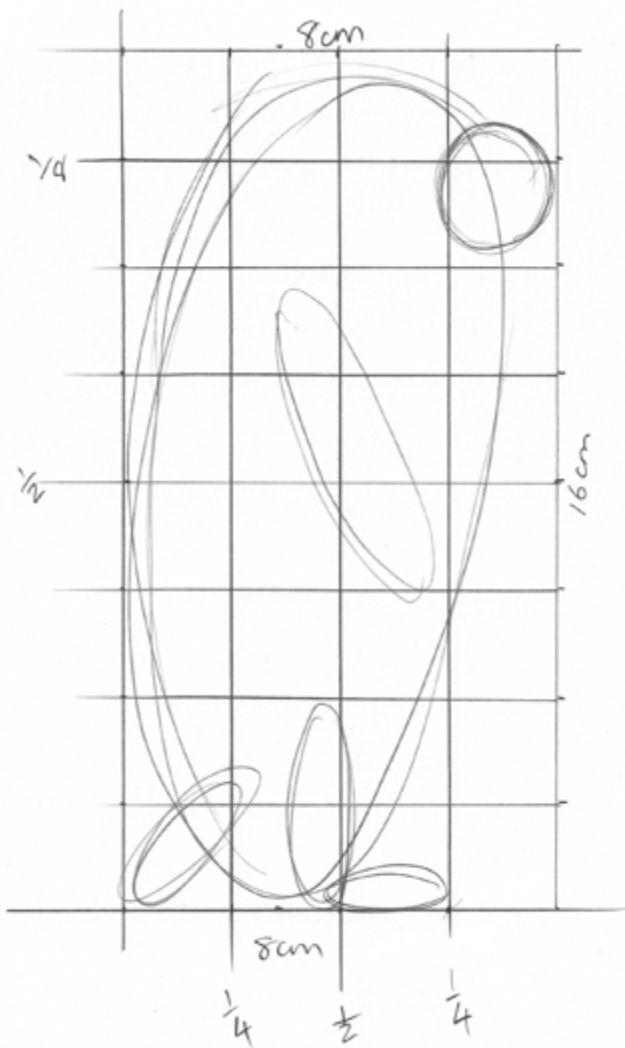
## MAIN ACTIVITY: TEACHER INPUT

Share with the children the example of the finished penguin artwork in Resource 6C and explain to them that this is what they will be working towards producing.

The following instructions can be used to model to the children the steps involved in creating their artwork. You could screen grab the grid in Resource 6D onto the interactive whiteboard and use this to model the steps or enlarge Resource 6D to A3 on a photocopier in order to model these steps on paper.

You may wish to model steps 1 to 3 at once and allow the children time to work through these steps in their own time, or model them one at a time, giving the children time to complete each step before moving on to the next.



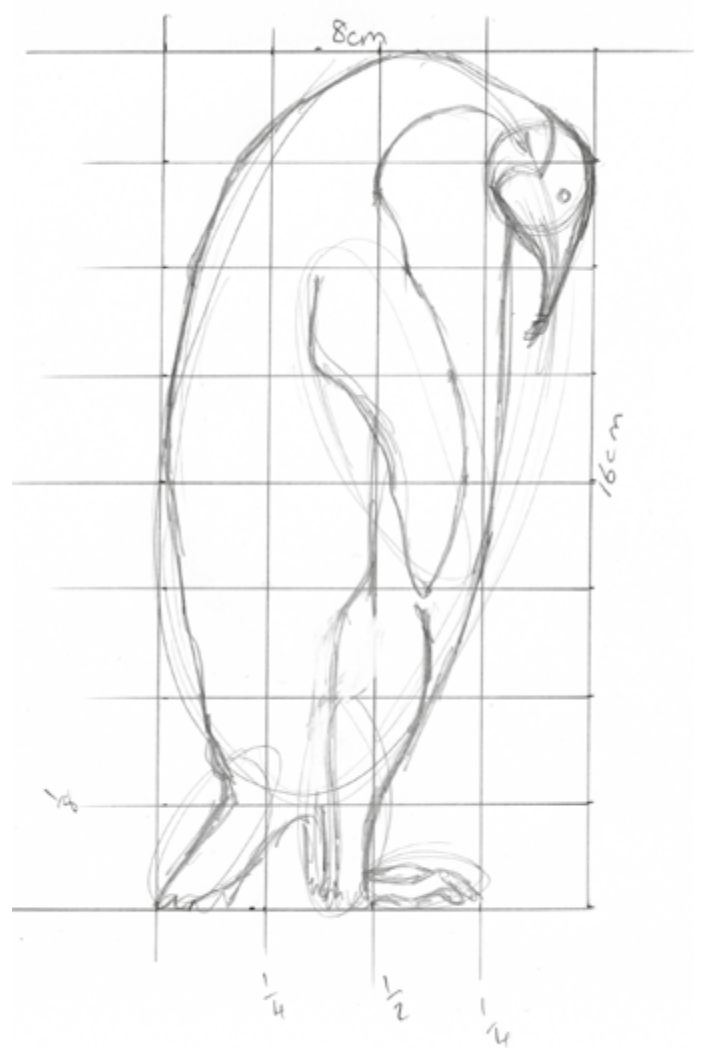


## STEP 1

Lightly sketch six ovals onto the grid to show the position of the penguin's body and head, then one wing, tail, leg and foot.

### TOP TIP

Modelling how to count the squares on the grid will help support children in placing ovals in the right section of the grid.



## STEP 2

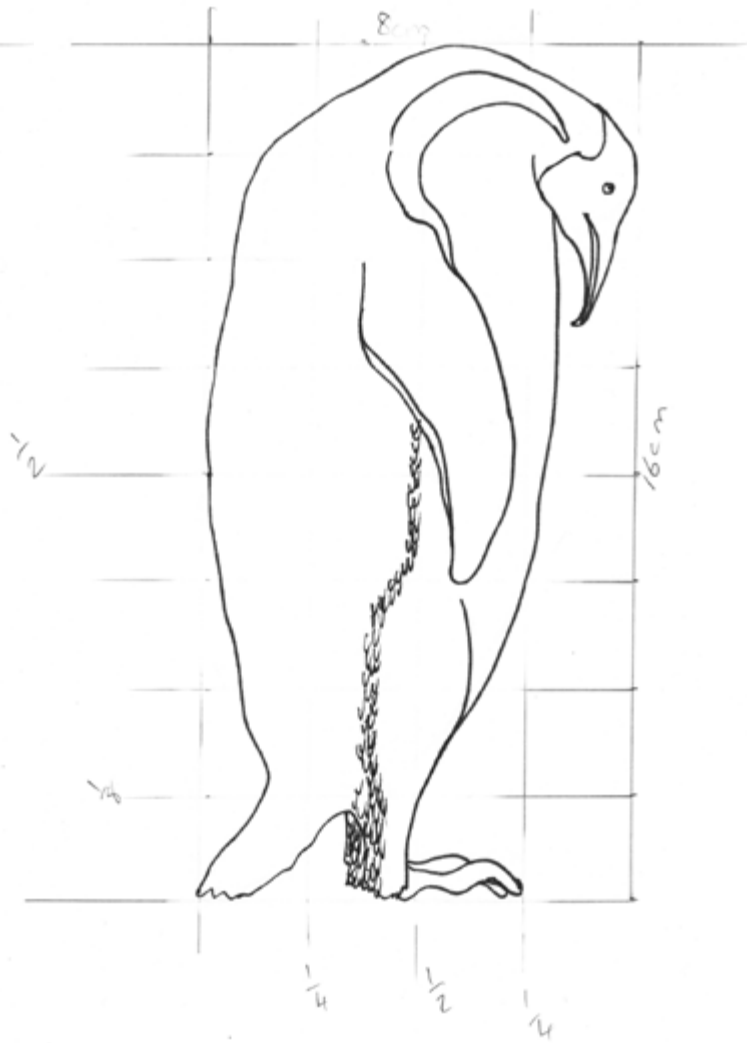
Using the outline of the ovals you drew to help you in Step 1, start adding more detailed outlines to the penguin. At this stage, referring back to the images of penguins shared at the start of the lesson, or making copies of Resource 6B available to the children to support their drawing, will help recreate the shapes and detail of these beautiful creatures.



### STEP 3

Using a fine, black pen, go over the pencil outlines of the entire design so far. Wait for a minute or two for the ink to dry, then use an eraser to rub out the pencil lines.

The following steps explain how to trace the penguin drawn in steps 1 to 3 to create the second penguin in the artwork as a mirror image of the first.

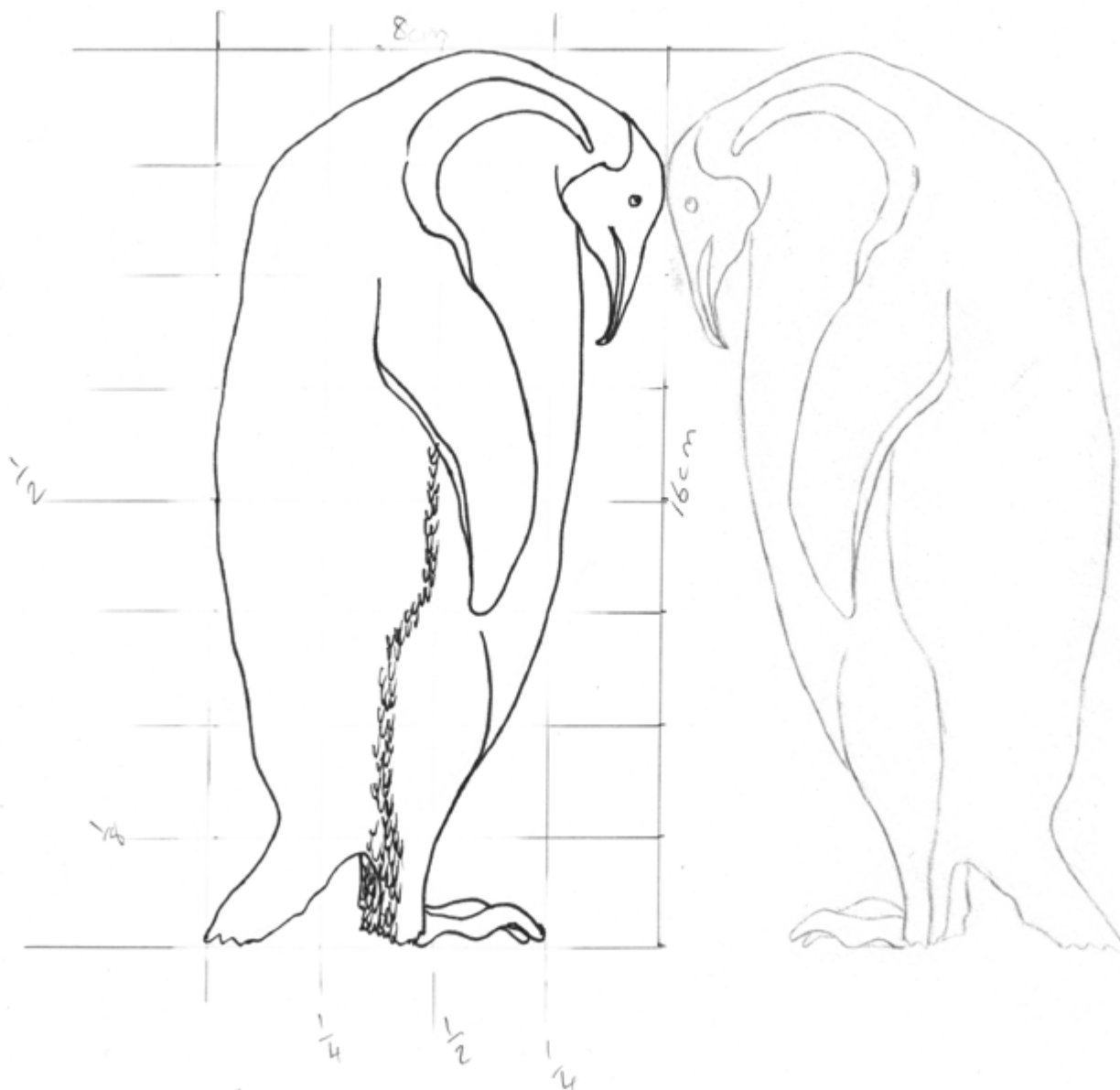


### STEP 4

Place a sheet of tracing paper over the sheet of paper you have been working on. You should be able to see the design you drew on the first sheet through the tracing paper. Carefully trace the outline of the design onto the tracing paper using a soft (5B) pencil.

#### TOP TIP

If you find that the tracing paper moves while you're drawing on it, use a couple of small pieces of masking tape on two opposite corners of the sheet of tracing paper to stick it to the surface you are working on. Peel them off carefully when you have completed the step.



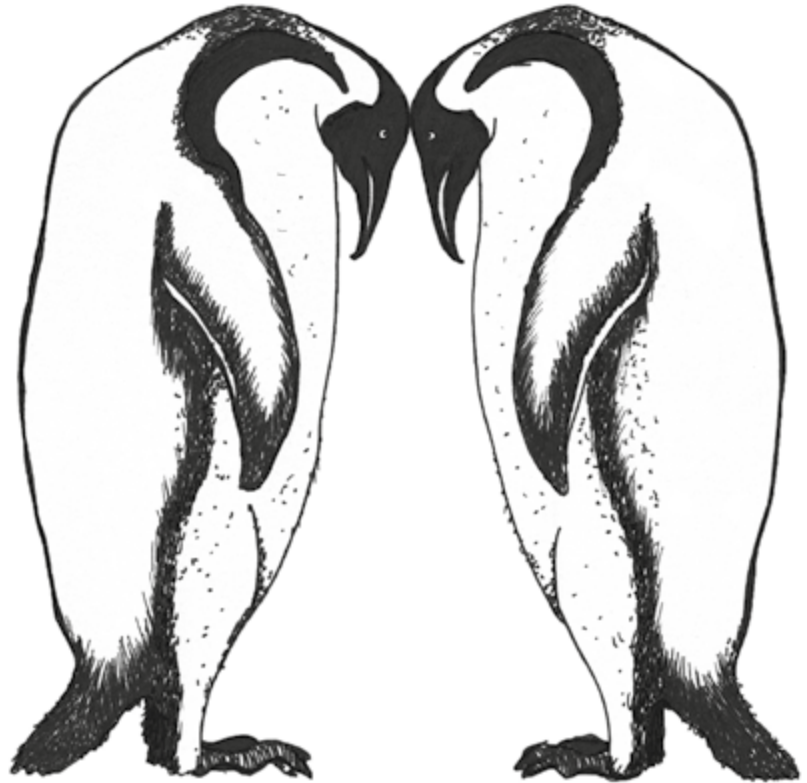
## STEP 5

Turn the tracing paper over and line up the penguin outline on the tracing paper with the penguin you drew on the paper so that the two penguins are facing each other and touching. Again, using some masking tape will help keep the tracing paper still and in the position you want it to be in.

Use an HB pencil to go over the entire outline of the penguin on the tracing paper, pressing fairly hard. Once you've gone over every line, you can remove the tracing paper. You should be able to see that the penguin design has been transferred, as a mirror image, from the tracing paper onto the A4 paper.

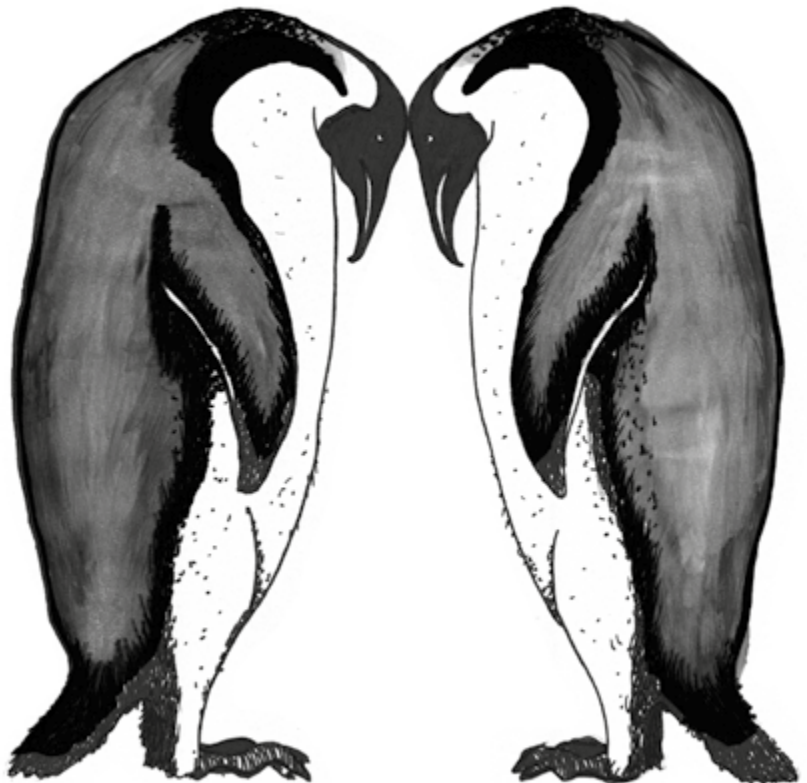
## STEP 6

Use a fine, black pen to add any other detail and shading you want to complete the two penguins.



## STEP 7

Paint the smooth backs of the penguins using black watercolour paint, varying the shade of black used using the skills explored in the Sketchbook Task 2. Add yellow watercolour paint to add the golden colouring to the head and neck that makes the Emperor penguin so distinctive.



## STEP 8

Once the paint used in the previous step has dried, use a light colour wash of icy blues or greys to add a background to the image around the penguin.

## MAIN ACTIVITY: INDEPENDENT LEARNING

Children to follow the instructions as modelled by the teacher. The children can use the simple prompts on Resource 6A to help them work at their own pace, if the steps in the process are not modelled one at a time.

## PLENARY

Set up a 'desktop gallery' with each child displaying their artwork in their workspace then moving around the room to explore and reflect on the artwork of others. Discuss what they feel is effective in each other's work, particularly with reference to the skills explored in the Sketchbook Tasks, and how children may have added their own interpretation to their artwork.

## IDEAS FOR DIFFERENTIATION



### SUPPORT

Children sketch the shape of the penguin over the guide shapes already sketched for them on Resource 6E.

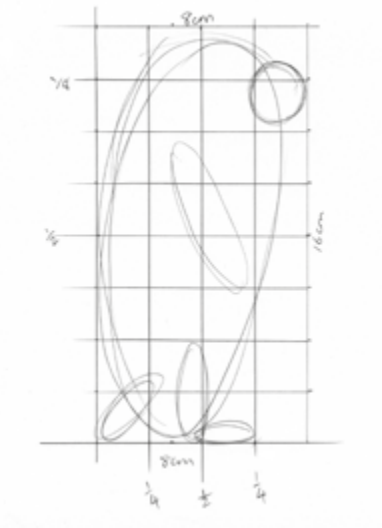
### EXTENSION

Some confident artists may choose to draw the penguin freehand without using the grid as a guide. Alternatively, they may wish to innovate their own symmetrical artwork featuring a different penguin species.



**USE THESE IMAGES TO REMIND YOU OF THE MAIN STEPS INVOLVED IN CREATING THE PENGUIN OUTLINES.**

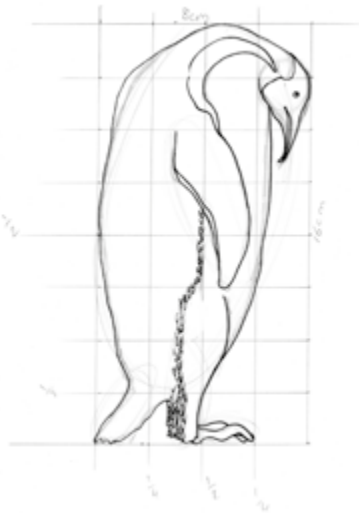
**1.** Use ovals to create a basic penguin shape.



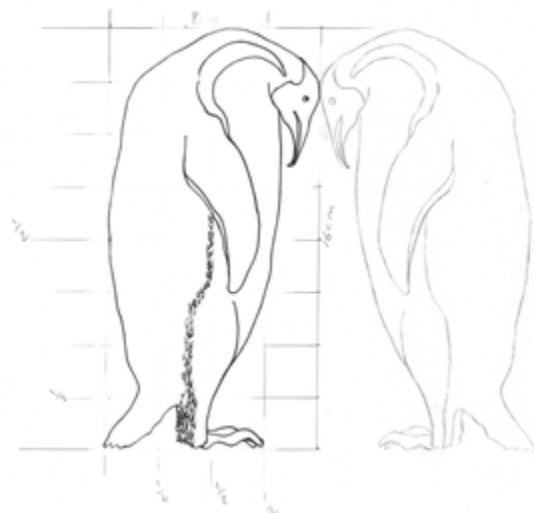
**2.** Add detailed outlines.



**3.** Go over the pencil lines in pen.



**4.** Trace the right-hand penguin.

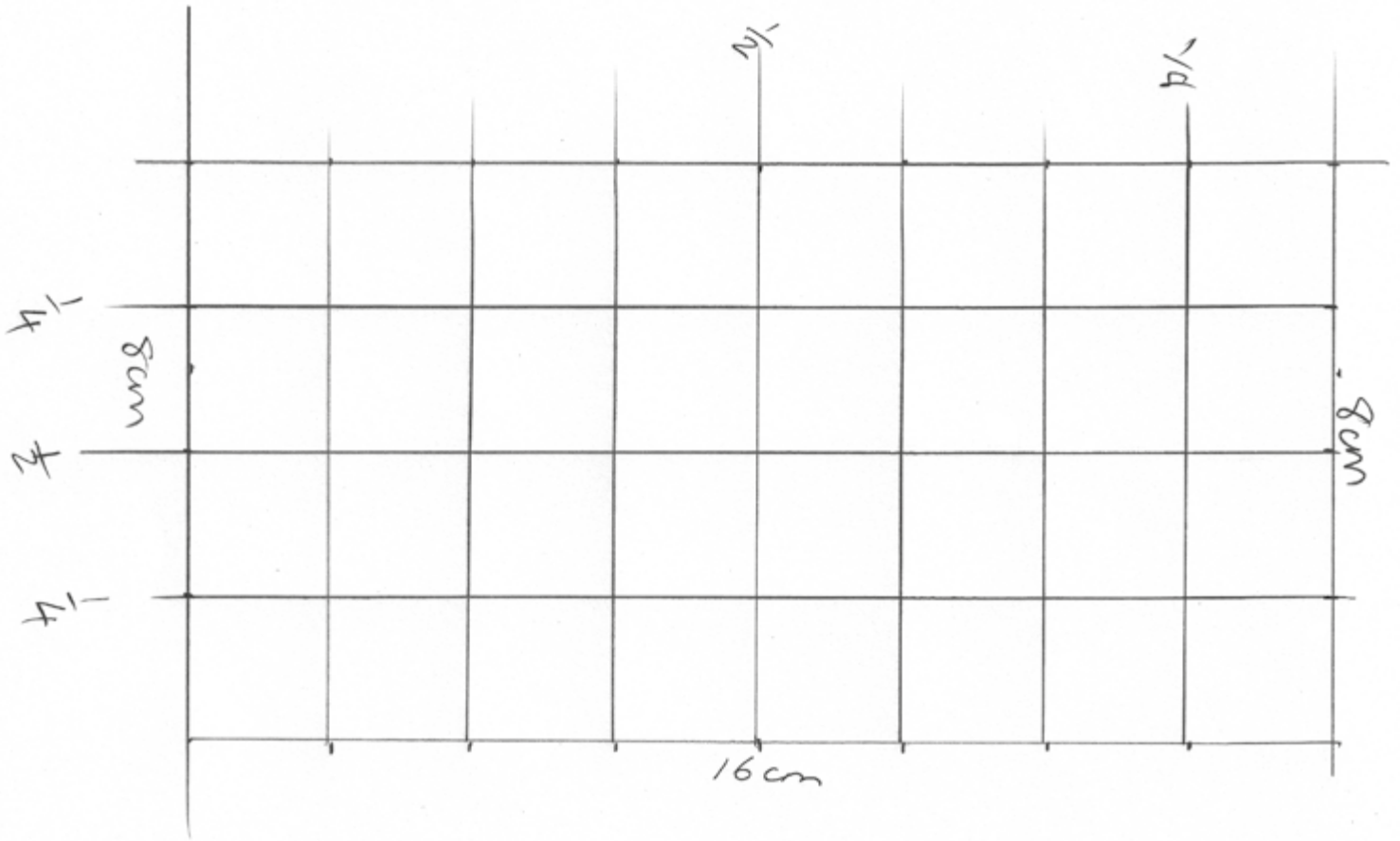


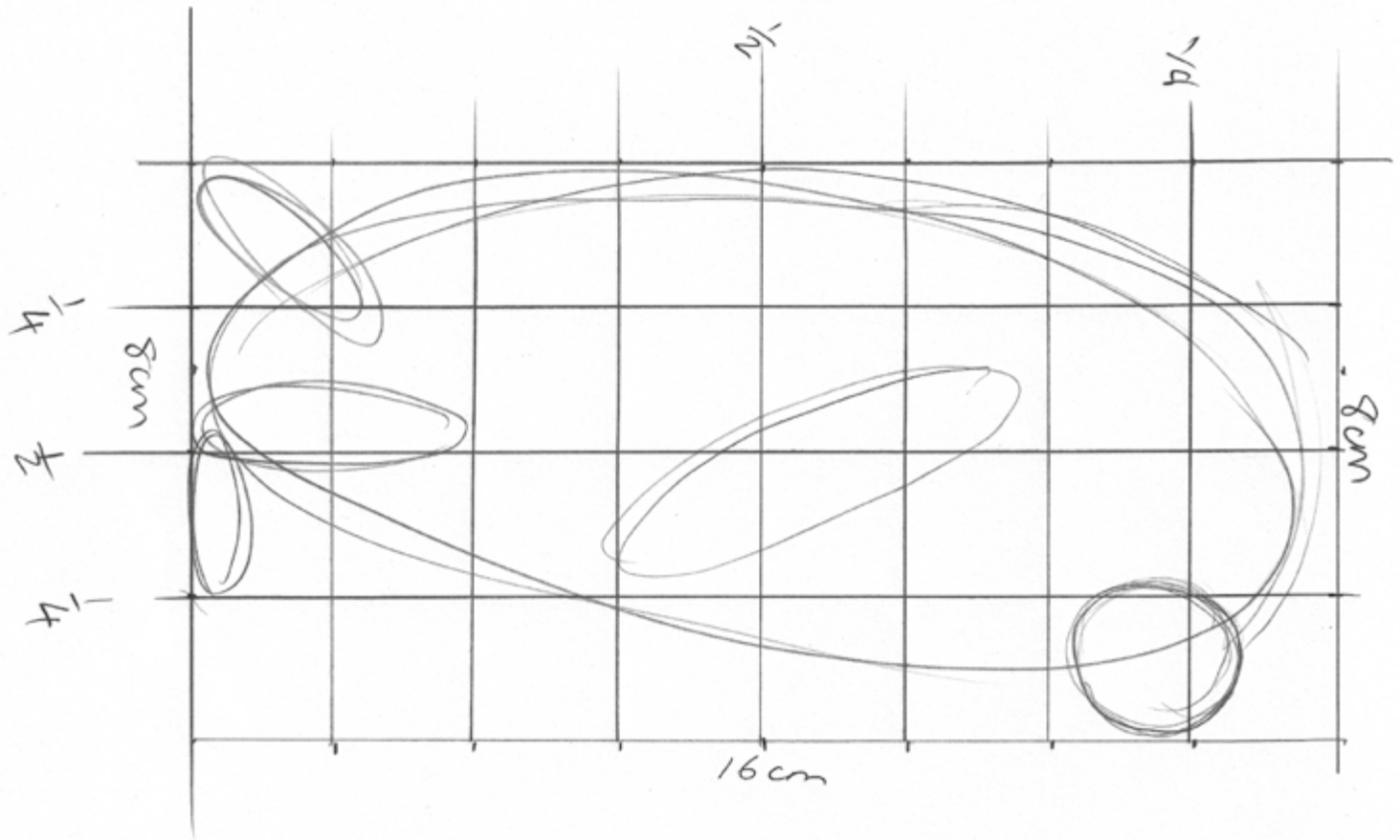


See more at [www.sblanc.com/phototheque-polaire/photos-dantarctique/photos-de-manchoi-emperur/](http://www.sblanc.com/phototheque-polaire/photos-dantarctique/photos-de-manchoi-emperur/)













# 7. GREAT WORK

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*How can we celebrate the work we have been doing?*

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**HARMONY PRINCIPLE** *Health*

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As children and their teachers explore the activities in this pack, they will have been on their own journey together – a journey of learning. This is a journey towards achieving a healthier future for our planet.

On their educational expedition to Antarctica, they will have considered their own personal skills and attributes and how these allow them to contribute to a team and to achieving a shared goal. They will have identified ways in which our own actions, through our use of energy, are changing the Antarctic landscape and ecosystem – and what we can do to tackle this so that we significantly reduce our use of fossil fuel energy. They will have immersed themselves in the sights and sounds of this awe-inspiring continent and learnt about some of the species that call it home, expressing their understanding through creative writing and art.

Celebrating this journey in a memorable way with a ‘Great Work’ event is a fitting culmination of all the learning that has taken place and is a great opportunity to share this learning with parents and carers, children in another year group or the wider school community.

# Learning question

## *How can we celebrate our work on Antarctica?*

A Great Work event can take many forms – in fact, the outcomes are endless. It could be a well-practised performance, as with the poem presented in Resource 7A, an exhibition of children’s artwork, a meal prepared and shared with others or even the planting of a school orchard. A Great Work is about achieving something meaningful and purposeful together and the feel-good factor of this cannot be underestimated.

### RESOURCES

- Copies of Resource 7A – if using for your Great Work



## ACTIVITY

One idea for a Great Work celebrating the learning presented in this pack is a choral performance of a poem that conveys a sense of our connection to Antarctica and the need to reverse the damage we are doing to it. Performing poetry aloud is a tradition from cultures all over the world that dates back thousands of years, and is a powerful way of building confidence, collaboration, and unity in a group.

A poem is included in Resource 7A, and could be performed as it is, or used as the basis for children to create their own poem to perform, perhaps as a dedicated English unit of learning. Students should decide who speaks which lines, and which are spoken in unison.

You may wish to invite parents and carers, children in another year group, or the wider school community to a performance of the poem, or record it to share with others.

### Ice sculptures

An alternative idea to celebrate the learning linked to Antarctica presented here could be to create an ice artwork as a class, or even an ice sculpture if a local sculptor can come into school to support this. There is something very poignant about working together to create something beautiful then watching it melting away, and this underscores much of the message behind the learning in this pack.



Penguin ice sculpture by Year 6 students

## We are Antarctica

We are Antarctica.  
We are truly connected.  
As guardians of our planet,  
We need her to be protected.

We share sunsets of vibrant colour,  
The same azure skies above,  
The same wave-crested, deep-blue oceans,  
The same Earth is the home we love.

Our lives affect Antarctica  
Although we're far away.  
Our survival is intertwined  
And it's time we had our say!

This great wilderness is changing.  
We've caused temperatures to rise,  
Icebergs calve and glaciers shatter,  
And creatures adapt their lives.

If only we shared the wisdom  
Of the majestic humpback whale,  
Or understood the gurgling  
Of the inquisitive penguin's tale.

She inspires in us a sense of awe,  
Her beauty and scale astound,  
She must be respected and nurtured,  
By keeping carbon in the ground.

We need to preserve this continent,  
It's time to act, not just discuss,  
Because we are Antarctica,  
And Antarctica is us.



# Half-termly planning overview Year 6 - Spring Term 1

**Enquiry question:** How are we connected to Antarctica?

**Harmony principle:** The principle of Interdependence

**Sustainability action:** Monitoring energy use to save money and reduce CO2

**Great Work:** 'We are Antarctica' poetry and posters; ice sculptures

**Partners in learning:** Reboot the Future; British Antarctic Survey; 2041 Foundation



## Weekly Questions

	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6
	Where is Antarctica and what is it like?	How are we changing the environment in Antarctica?	How are penguins adapted to survive in Antarctica?	What can we do to reduce our negative impact on Antarctica?	How will we celebrate the beauty of Antarctica?	How can we convey to others that Antarctica needs protecting?
GEOMETRY	What are the proportions of an iceberg above and below water? (1)	What are the proportions of an iceberg above and below water? (2)	How can the Fibonacci spiral help me draw krill? (1)	How can the Fibonacci spiral help me draw krill? (2)	How can I create a six-pointed snowflake design? (1)	How can I create a six-pointed snowflake design? (2)
SCIENCE	What happens when an iceberg melts? (observing ice cubes in salt water)	How are living things in Antarctica interdependent? (food webs)	How do penguins work together to survive?	How does electricity flow through a circuit? (scientific circuit diagrams)	How does the voltage of a circuit affect the brightness in a lamp?	What question about electricity do I want to investigate?
ENGLISH	What can I learn about Antarctica from Shivi's diary?	How did Shivi's expedition to Antarctica differ from Shackleton's?	What information will I include in a documentary voiceover about penguins?	How can I ensure my documentary voiceover has a positive impact?	How will I use my voice to ensure the meaning of a poem is clear?	What techniques can I use in a poetry performance to convey emotion?
GPS FOCUS	What descriptive devices help create mood and atmosphere?	How can I use a dash for emphasis and to add extra information?	How can I use cohesive devices to ensure my writing flows?	What effect on the reader do different word choices have?	How can I use punctuation as clues to help me read a poem aloud with expression?	How can I use hyphens to develop descriptive words and phrases?
MATHS	How has the surface temperature in Antarctica changed over time?	What does data tell us about melting ice and rising sea levels?	How can I solve and create number problems involving penguins?	What does our energy use cost? How can data help us to reduce energy use?	What can I find out about our use of energy in school and what we can do to reduce it?	How will we measure our progress towards meeting our energy reduction targets?
ART & DESIGN	How will I use Matisse's technique of paper 'cut outs' to create an Antarctic composition?	What different media will I use to create an artwork depicting <i>The Endurance</i> ?	How can I represent an emperor penguin pair in an artwork? (1)	How can I represent an emperor penguin pair in an artwork? (2)	What features of famous posters are effective in engaging an audience?	What features will I include in a poster promoting the protection of Antarctica?
COMPUTING	What can I find out about the Antarctic continent online?	How can I present data on rising sea levels?	How will I research a penguin documentary voiceover online?	How can I use technology to record my voiceover?	What images will work most effectively with my voiceover?	What criteria will we use to evaluate each other's projects?
PE (DANCE)	How can we move as if underwater?	What shapes and movements can we create in groups to represent icebergs?	How can we recreate the movement of a penguin and penguin huddles?	What symmetrical shapes can we recreate in pairs?	How can we combine movements to tell the story of Antarctica?	How can we work in groups to perform an Antarctic dance?
GEOGRAPHY	Why is Antarctica called a desert? What are the features of its climate?	What are the time zones in Antarctica? How many hours of daylight are there at different times of year?	What are scientists from the British Antarctic Survey exploring in Antarctica today? Why?	How can I use a map to show how the Antarctic landscape has changed over time?	What human and physical features will I include in a scale map of Antarctica?	What is the Antarctic Treaty and why should we support it?
MUSIC	What instruments can I use to represent elements of Antarctica?	How will we work together to create a group composition inspired by Antarctica?	How can we use musical notation to record our composition?	What do we need to adapt to improve our composition?	What will help us perform our composition with precision and confidence?	How can we evaluate the effectiveness of our composition and the compositions of others?
PSHE	What would make me a great team member on an Antarctic expedition?	What do I rely on others for?	What do I do for others?	How do members of a team rely on each other?	How can I communicate my needs to others?	How can I show compassion to others?
OUTDOOR LEARNING	Outdoor reflections on what it feels like to experience cold	Team-building challenges: bench balance tasks	Team-building challenges: penguin huddles	Team-building challenges: blindfold tasks	Creating snowflake designs using natural materials	Team building challenges: knots and hoops



## Reboot the Future

The Harmony Project  
[www.theharmonyproject.org.uk](http://www.theharmonyproject.org.uk)

Reboot the Future  
[www.rebootthefuture.org](http://www.rebootthefuture.org)

Reboot the Future host an education resource  
hub with hundreds of teaching resources at  
[www.globaldimension.org.uk](http://www.globaldimension.org.uk)

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