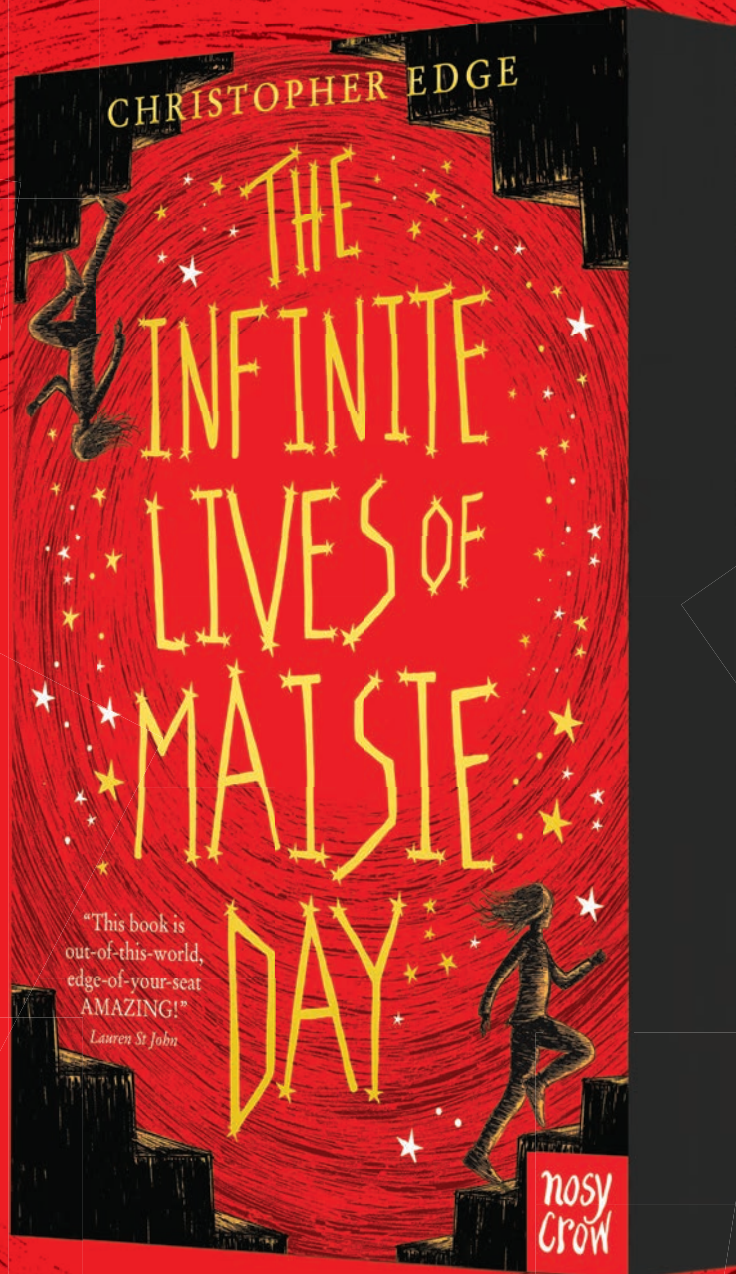


RESOURCE PACK

for KS2 & KS3



A mind-bending mystery
inspired by science from
CHRISTOPHER EDGE

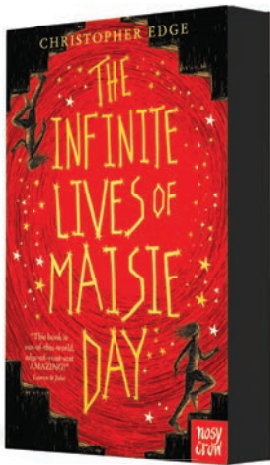
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FANTASTIC FICTION INSPIRED BY SCIENCE

Based on Christopher Edge's new novel *The Infinite Lives of Maisie Day*, the activities in this pack will ask students to consider the infinite questions of our universe: from the Big Bang Theory, to the science of Entropy, the never-ending loop of the Möbius strip and the existence of Black Holes.

About the resource pack

This resource pack can be used with all children from KS2 through to KS3, recommended ages 9+, giving teachers the flexibility to differentiate as needed. It has a dual Literacy and Science focus, the final objective being for students to use the mind-blowing and fascinating facts of the universe to inspire their own creative writing.



About the book

It's Maisie's birthday and she can't wait to open her presents. She's hoping for the things she needs to build her own nuclear reactor. But she wakes to an empty house and outside the front door is nothing but a terrifying, all-consuming blackness. Trapped in an ever-shifting reality, Maisie knows that she will have to use the laws of the universe and the love of her family to survive. And even that might not be enough...



A mind-bending mystery for anyone who's ever asked questions about the world.

About the author

Christopher Edge is the acclaimed author of *The Many Worlds of Albie Bright*, *The Jamie Drake Equation* and, most recently, *The Infinite Lives of Maisie Day*. Before becoming a writer, he worked as an English teacher, editor and publisher – any job that let him keep a book close to hand. He is also the author of *How to Write Your Best Story Ever!* and *How To Be A Young #Writer*, inspirational creative writing guides for children and teenagers.. Find out more at www.christopheredge.co.uk / @edgechristopher



THE INFINITE LIVES OF MAISIE DAY

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CURRICULUM OBJECTIVES

Through the course of the activities in this pack, pupils will use the scientific facts to inspire characters, setting, dialogue, and plot in their creative writing. Curriculum objectives covered in the pack include but are not limited to:

English

Reading: comprehension (KS2–3)

- Develop and adapt active reading strategies by:
 - i. using a repertoire of reading techniques to analyse and explore different layers of meaning within a text
 - ii. building an interpretation of a whole text, recognising links between ideas, themes or characters and supporting points with precise evidence and explanation
- Analyse writers' use of organisation, structure, layout and presentation
- Analyse how writers' use of linguistic and literary features shapes and influences meaning by:
 - i. analysing in depth and detail writers' use of literary, rhetorical and grammatical features and their effects

Writing: composition (KS2–3)

- Plan their writing by: discussing writing similar to that which they are planning to write in order to understand and learn from its structure, vocabulary and grammar
- Draft and write by: in narratives, describing settings, characters and atmosphere and integrating dialogue to convey character and advance the action
- Evaluate and edit by: assessing the effectiveness of their own and others' writing and suggesting improvements

Drama, speaking and listening (KS2–3)

- Use a wide variety of dramatic approaches and conventions to analyse complex and challenging ideas, issues, themes and texts

Science

Earth and Space (KS2)

- Describe the movement of the Earth and other planets relative to the sun in our solar system
- Understand how the scientific ideas around the solar system have developed over time

Forces (KS2)

- Understand that unsupported objects fall towards the Earth because of the force of gravity

Matter (KS3)

- Develop awareness of the differences in arrangements, in motion, and in closeness of particles explaining changes of state, shape and density
- Understand the changes with temperature in motion and spacing of particles
- Understand the internal energy stored in particles

Space Physics (KS3)

- Be able to define the sun as a star as well as other stars in the galaxy, and other galaxies

Design technology & art (KS2–3)

- To use drawing, painting and sculpture to develop and share their ideas, experiences and imagination

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LESSON ONE: PRE-READING ACTIVITIES

Objective: To explore ideas and speculate about the themes in *The Infinite Lives of Maisie Day*

Outcome: A summary of first impressions of the novel and an opinion of the central character

This lesson is designed to help students explore ideas and themes in the novel. They should feel free to discuss anything that comes to mind. The worksheet overleaf has space for students to summarise their ideas.

Lead-in questions:

What does the title *The Infinite Lives of Maisie Day* make you think about?

In pairs, consider the separate words in the title – what are their connotations?

Task 1:

In groups, discuss the cover of *The Infinite Lives of Maisie Day*. What is happening in the image? What is the main character doing? What surrounds her? Together, brainstorm the words that best describe her actions and how she might be feeling.

Task 2:

Now look at the cover again. What themes does the image convey? Choose one of the following binaries to discuss in your groups in relation to the book cover:

LIGHT/DARK

INSIDE/OUTSIDE

UP/DOWN

LONELINESS/COMPANIONSHIP

EARTH/SKY

Task 3:

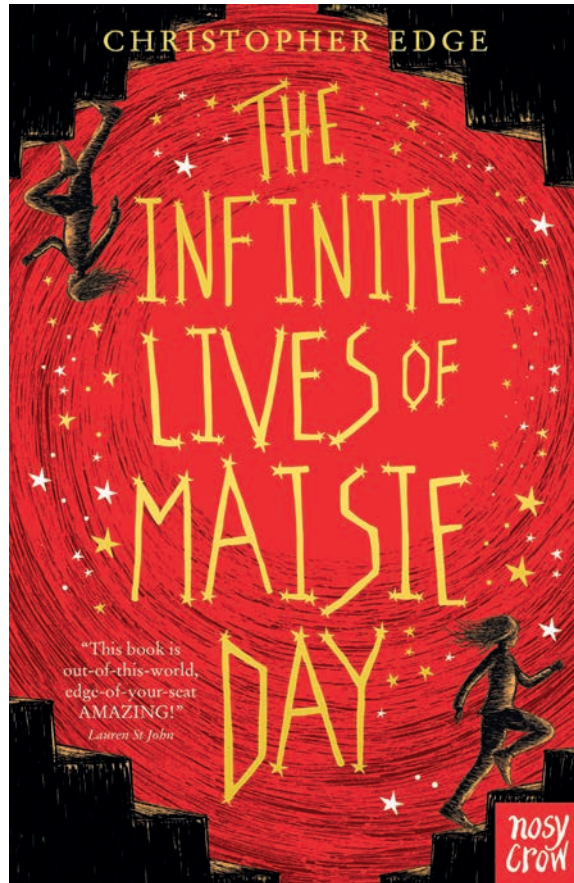
Now write a short paragraph to summarise your first impressions of the novel and its themes; conclude with an opinion about the character in the image and why she might be running up and down a set of stairs, simultaneously.

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WORKSHEET



SUMMARY

THE INFINITE LIVES OF MAISIE DAY

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LESSON TWO: LIGHT AND DARK

Some people say that everything began with a Big Bang, but for me, that's the last thing I really remember. A bang so loud it made me forget everything else. Everything except for a red balloon floating up into a clear blue sky. And then darkness.



Watch the video

Objective: To understand how writers create imagery using colour and sensory description

Outcome: A piece of creative writing describing a new setting

Lead-in questions:

What do you know about the universe?

What creates light in the universe?

What is the Big Bang Theory?

Task 1

Can you match the following things in our universe to their definition?

SUN

The name for roughly 80% of the mass of the universe, made up of things scientists cannot see

EARTH

The star around which the earth orbits

GRAVITY

A region in space having a gravitational field so strong that nothing can escape

DARK MATTER

A system of millions or billions of stars held together by gravity

BLACK HOLE

The planet on which we live (the world)

GALAXY

The force that attracts a body towards the centre of the earth

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LESSON TWO: LIGHT AND DARK

Task 2:

Read this extract from *The Infinite Lives of Maisie Day* and answer the questions below:

The sound of my cheery hello curdles in my throat as I look out in horror at the scene outside.

There's nobody there.

But worse than that, there's nothing there.

No Mum. No Dad. No car parked on the drive. No driveway. No street. No houses. Nothing at all. Just an empty black space that goes on forever.

I stare into the darkness, trying to make sense of the impossibility of what I can see.

It doesn't work. I slam the door shut before my brain explodes. Gasping for breath, I stand there swaying, my hand still gripping the door handle as I try to work out what's going on.

Looking down I see a rainbow stripe of colours dappling the polished floorboards, the sunlight streaming in through the tinted glass creating this shifting pattern. But when I opened the front door, there wasn't any Sun in the sky. There wasn't any Sun. There wasn't any sky. There wasn't anything.

1. Scientists describe the Big Bang Theory as the beginning of the universe: a huge explosion that changed the state of everything. How does the author convey a huge change to Maisie's setting?
2. Can you underline examples of where the author Christopher Edge uses imagery that creates 'light' and 'dark'?
3. Can you underline examples of use of colour or sensory description in the extract?

Task 3:

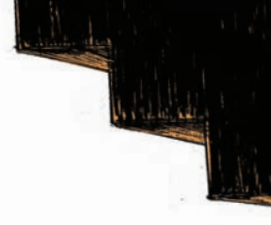
Imagine you are standing in your classroom when a Big Bang occurs; the universe changes in an instant. The Sun and the sky and everything suddenly disappear. Draw an image to imaginatively represent the 'before' and 'after' of this event in the boxes on the next page.

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LESSON TWO: LIGHT AND DARK



Before

After

A large, empty rectangular box with a black border, intended for writing a description of the 'Before' scene.

A large, empty rectangular box with a black border, intended for writing a description of the 'After' scene.

Task 4:

Now it is time to write a description of these two images: 'before' and 'after'. You can write two separate paragraphs if you want or, if you're feeling ambitious, try to describe both images in one paragraph.

Remember to use colour and sensory description to show the reader how the scene has changed. Share your descriptions with us on Twitter at @NosyCrowBooks #MaisieDay

THE INFINITE LIVES OF MAISIE DAY

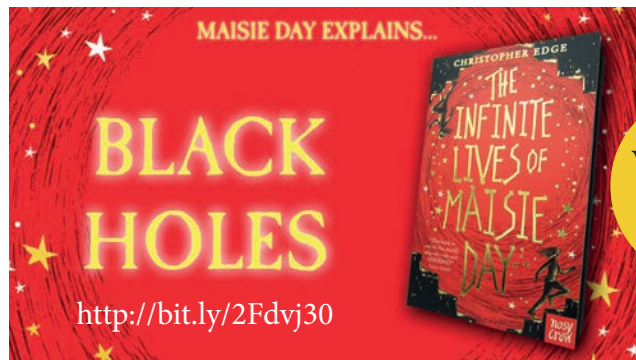
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LESSON THREE: BLACK HOLES

The gravity inside a black hole is so strong that nothing can escape. No light, no matter, not even information. And at the heart of a black hole is a point of infinite density – a tiny speck even smaller than an atom – where even the laws that describe how the universe work break down.



Watch the video

Objective: To understand and dramatise the concept of a Black Hole

Outcome: A dramatic piece conveying action and emotion

Lead-in questions:

What does the term 'Black Hole' make you feel or think about?

If the Black Hole was a person, what would it be like?

Why are we sometimes drawn to things we don't know or fully understand?

What is personification?

Task 1:

Read this extract from *The Infinite Lives of Maisie Day* and answer the questions below:

I shiver as I stand on the edge of the event horizon, a thin sliver of space-time separating me from the irresistible pull of the black hole. Just one step forward and I'm never coming back. I glance over my shoulder to see Lily, her hand still reaching out towards me, this action frozen in a single moment of time.

Then I turn back towards the black hole waiting for me outside the door.

Some scientists think that the singularity at the heart of a black hole might hold the answers to the mysteries of the universe. Maybe it's time somebody found out if this is true.

1. What is Maisie drawn to in this extract?
2. What can you infer about Maisie's personality from this extract?
3. Lily is Maisie's sister. How might you guess this? What is Lily's behaviour?
4. How does the author leave the reader on a cliffhanger here?

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LESSON THREE: BLACK HOLES

Task 2:

In groups of three, recreate the scene that is described in this extract by crafting a freeze-frame. One of you is Maisie, one of you is Lily, and one of you is personifying the Black Hole. How can you convey the feelings and attributes of each character in the scene? How can you show the relationship between Maisie and Lily? You should consider the following success criteria:

- Use body language and facial expressions to express emotion
- Use props in the classroom to recreate the setting
- Use different levels to show any power dynamics between the characters

Task 3:

Now it's time to imagine what happens next in the scene. What does Maisie decide to do? Why? How does Lily react? Share your freeze-frames with the class. What do you learn from each other's interpretations?

Ask your teacher to send us photographs of your freeze-frames on Twitter
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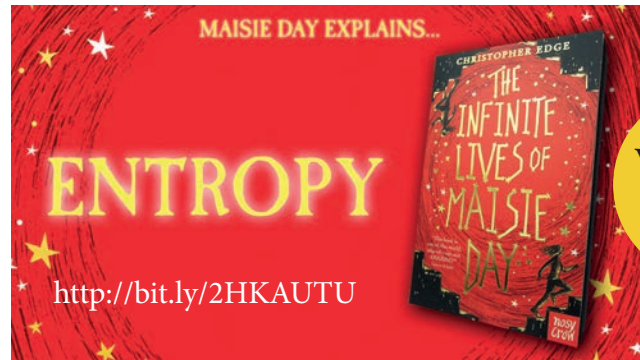
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LESSON FOUR: SMASHING ATOMS

“What’s this egg made of?” Lily looked at me like I was stupid.

“It’s an egg, Maisie. It’s made out of egg.”

I shook my head. “No, you don’t understand,” I said, ignoring the look of irritation on Lily’s face. “It’s made out of atoms. Everything’s made out of atoms. But in this egg all the atoms are arranged in a particular way.”



Objective: To be able to understand and explain the concept of entropy

Outcome: A diagram showing the different entropies of a substance in two different states

Lead-in questions:

An egg is made of atoms all arranged together in a particular way.

What happens when you drop an egg?

What do you think happens to the atoms when you drop an egg?

Task 1:

Entropy is a measure of how much atoms can spread out, move around, and arrange themselves in random ways. For instance, when a substance changes from a solid to a liquid, such as ice to water, the atoms in the substance get more freedom to move around. You can see this by the way that water can slosh around, but ice is a solid object.

Read the definition of Entropy above. As a class, imagine each person in the room is an atom. Together, act out what happens when ice changes to water, or when entropy increases.

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LESSON FOUR: SMASHING ATOMS

Task 2:

Read the extract from *The Infinite Lives of Maisie Day* and complete the tasks below:

“Entropy is how random and disordered something is,” I said excitedly. “In the universe, entropy is always increasing. Eggs break, glasses smash, stars burn themselves out. We never see the broken bits of eggshell stick themselves together again to form a perfect egg. There’s nothing in the laws of science to say this can’t happen, but the chances that each atom could arrange itself in the exact same position as before are so infinitesimally small, you’d probably have to wait until the universe ends before you saw this happen.”

In the extract, Maisie uses three examples to explain Entropy: eggs breaking, glasses smashing and stars burning. Choose one of these three examples and draw two pictures to represent the two states of your chosen object using the worksheet overleaf.

EXAMPLES (FOR TEACHERS’ REFERENCE)

Whole egg



Broken egg



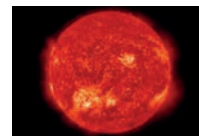
Whole glass



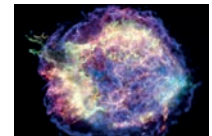
Broken glass



Red Giant Star



Supernova



Now annotate the pictures that you’ve drawn in order to show the following things:

1. What has happened to the atoms
2. What has happened to the entropy of the atoms

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WORKSHEET

State 1

State 2

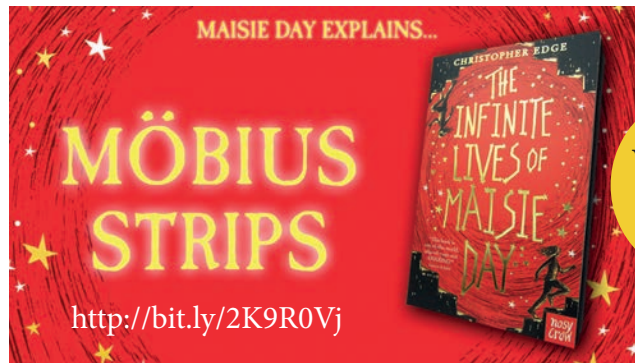
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LESSON FIVE: AN INFINITE LOOP

“It’s a Möbius strip,” I say. “What do you mean?” Lily asks, her forehead furrowing into a frown. “What’s a Möbius strip?” I remember asking Mrs Bradbury the same question when she was teaching me hyperbolic geometry. “It’s the scientific symbol for infinity,” I reply. “A Möbius strip is an infinite loop that you can never escape from.”



Watch the video

Objective: To empathise with Maisie Day and write from her perspective

Outcome: A letter written in-role as Maisie Day, to her sister Lily

Lead-in questions:

What is infinity?

How would you feel if you were to live forever, infinitely?

Task 1:

“A normal piece of paper has two sides,” Mrs Bradbury said, tearing a strip from the topmost sheet of her A4 pad. She turned this strip of paper over in her hands. “The front and the back. But if I take this strip of paper, give it a twist and then join the ends together I’ve created a Möbius strip.”

“What’s a Möbius strip?” I asked as I watched my tutor sellotape the two ends together.

“It’s the scientific symbol for infinity,” she replied.

Using a piece of A4 paper, can you create the Möbius Strip or an ‘infinite loop’, just like Maisie’s?

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LESSON FIVE: AN INFINITE LOOP

Task 2:

Read the extract from *The Infinite Lives of Maisie Day* in which Maisie is faced with an ‘Impossible Staircase’ – a staircase that seems to go on and on, infinitely:

My hand is shaking as I grab hold of the stair-rail. Closing my eyes, I start to climb again, slower this time, counting every step as I go. One, two, three, four... If I’m right, I just need to focus on what must be real, the worn fibres of the carpet under my bare feet, the polished stair-rail sliding beneath my hand as I climb. Eight, nine, ten, eleven... Only a few more steps until I make it to Lily’s room.

I remember her voice echoing on the other end of the line. “I’m so sorry. I’m going to put things ri—” Lily’s words were cut off mid-sentence, but if I can make it to the top then maybe I can find Lily and she can keep her promise to me.

But the steps keep on coming. Fourteen, fifteen, sixteen, seventeen... My footsteps start to falter, the sound of my heart thumping loudly in my chest as I realise what this means. Nineteen, twenty, twenty-one...

I can’t wait any longer.

I open my eyes and my heart breaks in two. All I can see is an endless sequence of steps rising up ahead of me. The stairs go on forever.

Letting go of the stair-rail, I sink to my knees. I can’t stop myself from sobbing as a fresh wave of despair overwhelms me.

This is my house. These are the stairs to Lily’s room. But I’m never going to get there.

Put yourself into Maisie’s shoes here. How does she feel? In pairs, discuss the emotions below in relation to the extract – pick out words and phrases as evidence.

DESPAIRING

FEARFUL

SAD

HEARTBROKEN

CONFUSED

OVERWHELMED

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LESSON FIVE: AN INFINITE LOOP

Task 3:

Imagine that you are Maisie, stuck on the infinite staircase. Write a letter to your sister Lily, explaining how you feel.

Dear Lily,

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LESSON SIX: INSPIRED BY SCIENCE

Objective: To create fiction based on a scientific fact

Outcome: A piece of creative writing

Lead-in questions:

What is your favourite topic in science?

Do you have any interesting scientific facts that you can share with the class?

Task 1:

In *The Infinite Lives of Maisie Day*, there are several scientific facts that inspire the story. Can you think of any from the lessons that you have already completed in this resource pack? Recap with your partner or in groups and share with the class.

Task 2:

Look at the following scientific facts:

1. The DNA in a person's body, when uncoiled, can stretch from Pluto to the Sun and back.
 2. A person's sneeze can travel at speeds of about 100 miles per hour.
 3. In Space it is completely silent, because there is no medium to allow sound to travel.
 4. The moon does not have an atmosphere, so there is no water or wind to erase the footprints made by the astronauts who landed on it. The footprints are likely to stay there for a 100 million years.
- Which is your favourite fact? Why? Share your ideas with the class!

Task 3:

Now that you've chosen your favourite fact, it's time to use it to create your very own short story based on science. Fill in the different parts of the worksheet overleaf before you start writing.

Task 4:

Once you have completed your Planning Page, it's time to get writing! You can take as long as you like (sometimes drafting and editing is the most important part of the process). Make sure that you show your stories to your teachers and classmates when you are finished, and don't forget to share your work with us on Twitter at @NosyCrowBooks #MaisieDay!

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MY STORY PLAN

MY SCIENTIFIC FACT

PLOT IDEAS

CHARACTERS

BEGINNING

MIDDLE

END

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CONGRATULATIONS!

You've completed the Maisie Day resource pack

Remember to keep everything that you've learned in these lessons – it might come in handy when you decide to become a world-famous scientist or bestselling author.

We can't wait to see the great things that you achieve, in this universe or a parallel one!

Further Activities

Here are some more ideas for cross-curricular activities you could use when teaching *The Infinite Lives of Maisie Day*

- In *The Infinite Lives of Maisie Day*, video games play an important role in the story. Ask children to discuss their favourite video games, and even to create one of their own inspired by the story of *The Infinite Lives of Maisie Day*!
- Pythagorean Theory features heavily in the novel – this could link back to what children are learning in the mathematics curriculum
- Find out more about Einstein's Theory of relativity and what this tells you about the concepts of space and time
- Show students an image of Escher's Impossible Staircase, to help them understand the concept of the infinite loop
- Challenge students to work out the meaning of the page of numbers that comes at the end of the book.
- Research the invention of Vantablack and ask students to discuss the different ways this invention could be used.
- How will the universe end? Ask students to research different theories and create a presentation to share these ideas.

This resource pack was created by



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