

WEDNESDAY WEEKS

and the Tower of Shadows



DENIS KNIGHT  CRISTY BURNE
TEACHERS RESOURCES

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Teachers Resources by Robyn Sheahan-Bright

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WEDNESDAY WEEKS

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INTRODUCTION

'You have followed your heart down a difficult road. No master could ask for more.' Then he smiles. 'Nor any grandfather.' (p 221)

Wednesday Weeks is 'technologically challenged' as her best friend Alfie puts it. For whatever she tries to do in class turns into a disaster involving fireballs and other dangerous developments. To add to her problems, her grandfather Abraham Mordecai Weeks has a habit of appearing whenever trouble strikes and he is hard to ignore with his hood, shadowy cloak and jewelled finger: 'I am Abraham Mordecai Weeks, Protector of the Realms, Master of the Seven Transformations, Custodian of the Five Ungovernable Charms, ArchExcellency Order Enchanter, Wonder Warlock, and Black Belt Magician to the Queen's Royal Order.' (p 12) And, to top off these embarrassments, he insists on calling her his 'Apprentice Protector'. The thing is that his appearances have happened many times before, although nobody at her school remembers them. But when he mysteriously disappears after encountering the evil Gorgomoth, the Goblin King, leaving her with his Ruby Ring, Wednesday is determined to rescue him, and her best friend Alfie won't let her go alone. Their quest leads them to several perilous realms and into encounters with frightening figures and seemingly impassable challenges. Their erstwhile sidekick Bruce, a snarky disembodied skull, adds to their adventures!

The novel is littered with fantasy concepts and devices and the world described is cunningly detailed. The Tower of Shadows in the Goblin Realm, the Tower of Unbearable Brightness in the Faery Realm, the Curtain of Forbidding, the Luminating Globe of Lost Tarimos, the Seven Stones of Saranon, the Sword of Reckoning, the pit of Extreme Discomfort, and an Invisibility Cloak (the Unseeable Robe of Malazar) all play their parts in this magical and hilarious work.

In this fast-paced fantasy adventure, Wednesday and Alfie are really 'up against it', but in a world of magic, can science actually save the day?

BEFORE & AFTER READING THE NOVEL

- Examine the cover of the novel. What does it suggest about the novel's themes?
- After you have read the novel, examine the cover again: what does it suggest to you now?
- After you have read the novel, read about it in reviews and articles and use the notes below to examine the text more closely.

THEMES & CURRICULUM TOPICS

Several themes relevant to curriculum topics (Studies of Society and Environment, Science and English Language and Literacy) might be identified in this novel:

STUDIES OF SOCIETY AND ENVIRONMENT (SOSE)

MAGIC/SCIENCE

This novel plays with the concepts of magic and science and the interplay between them, in an intriguing and often ironic way, for example:

I roll my eyes. 'It's not magic, Grandpa. It's science.'

'Nonsense.' Grandpa shakes his head. 'I'm sure there's a perfectly rational explanation. Something in his horoscope, perhaps.' (p 26)

OR

'According to Grandpa, all magic works the same way. You draw it in, focus your intention, then say a word to release the spell. Grandpa says the word doesn't matter. He says it's the sorcerer's intention that's important. That you draw the magic with your heart, but you shape it with your mind.' (p 37)

OR

'Wednesday,' Alfie says, and now I know my maths isn't as good as I thought it was, because he's giving me the flat-puppy look again. 'It's not fifteen kilometres. It's fifteen hundred kilometres.' (p 110)

OR

'Of course!' Alfie shouts. 'Trémaux's algorithm!' (p 141) (See also: STEM ACTIVITIES: **Mission: Trémaux's a-maze-ing algorithm**)

OR

On p 10, Wednesday refers to bicarb and vinegar for putting out fires. Then later in the novel that experiment stands them in good stead: 'Thank goodness for science! And pickles. Bicarb and vinegar make carbon dioxide gas. The same gas they use in fire extinguishers. And the same stuff that's bubbling all over the floor. Perfect for putting out fires – and fireballs.' (p 205)

DISCUSSION POINT: Discuss any of these quotes and what they suggest about magic and science.

COMING OF AGE & RITE OF PASSAGE

DISCUSSION POINT: 'If I don't pass robotics, I'll flunk science. And that means I'll flunk Year Six. And no way am I repeating the whole "weird girl tires to fit in" with a new year group.' (p 3) Wednesday and Alfie are unique in their class – she because

she causes mayhem when she is presenting any assignment, and he because he loves nerdy scientific things. How difficult is it to 'fit in' when you are different from the others around you?

DISCUSSION POINT: Both Wednesday and Alfie grow up in this novel. They realise that they each have qualities which are important; that they are friends despite their differences. What do they each learn in the course of his narrative?

BATTLE BETWEEN GOOD AND EVIL

DISCUSSION POINT: Fantasies rely on the conflict between forces of good and evil, just as Alfie's computer games do! Gorgomoth is the nemesis to Abraham and his sorcery. What does Wednesday learn from her grandfather about defeating evil powers?

SCIENCE

DISCUSSION POINT: This book is as much about science as it is about magic. Topics covered include robotics, mathematics, and quantum physics. Discuss with students any aspect of science which the novel explores. Have you done any experiments in class similar to those which Wednesday and Alfie have done (robotics programming; discussing maze-solving methods; chemical reactions)? Are there any experiments in the book that you would like to do?

DISCUSSION POINT: STEM stands for Science, Technology, Engineering and Maths. STEM discussions are essential to teach problem-solving skills. There are many concepts you can explore from the examples of STEM found in this book. Wednesday and Alfie's class have built a model Harbour Bridge from straws and paperclips. Students can design and build a model from materials found in the classroom.

For more STEM notes and activities, see the notes prepared by the authors at the end of this document.

ENGLISH LANGUAGE & LITERACY

Study the writing style employed in this narrative, and examine the following sub-topics:

NARRATIVE PERSON, NARRATIVE PERSPECTIVE & TENSE

DISCUSSION POINT: This is told in first person present tense from Wednesday Weeks' perspective. This gives the narrative immediate appeal. From her narration, what can you ascertain about her character?

GENRE

This novel contains several features of the **fantasy genre, which has several recurring features** [See Jane Mobley's 'Toward a Definition of Fantasy Fiction' in Bator, Robert, *Signposts to Criticism of Children's Literature*, Chicago, ALA, 1983, pp. 249–260]. Teachers might examine each of these features in relation to this novel, as below:

a) It relies on **creating convincing and entertaining detail in creating a 'secondary world', with details for example, such as the following:**

Over the years, Grandpa has taken me to loads of weird magical places where we've seen all kinds of crazy creatures, like fire snakes, frost spiders and self-combusting lava lizards. We even ran across an angry swarm of polymorphic apparition bees once. You don't want one of those things teleporting into your underpants, believe me. (p 35)

OR

All I see is Grandpa's workbench. Its wooden surface is carved with weird runes and sigils, and piled high with wands, cauldrons, alembics and crucibles, as well as strange herbs, fruits, and all the other hard-to-find and mostly disgusting ingredients that Grandpa uses in his potions. The wall behind the workbench is lined with shelves loaded with thick leather-bound volumes of ancient lore, interspersed with skulls, masks, idols, and other arcane souvenirs that Grandpa's accumulated over the years. (pp 38–9)

OR

'And there are nine?' he asks. 'Realms, I mean, not slugs.'
'Nine that we know of. There's the Human Realm, the Goblin Realm, the Faery Realm.' I tick them off on my fingers as I go. 'And the Realm of Slugs, of course. Then there's the Realm of Sea Things, the Realm of Unfriendly Cats—' (p 47)

OR

I shake my head. 'You're telling me Grandpa's ring is one of the Seven Stones of Saranon?' (p 66)

OR

'It's a Curtain of Forbidding. Invisible. Unbreakable. Impervious to magic. No living thing may pass.' (p 188)

DISCUSSION POINT: Discuss these details with students and invite them to comment on which fantasy details they found most enticing.

b) **Essential Extravagance** or spectacle is another aspect of the fantasy genre, for example:

The Globe of Tarimos cuts through the gloom and I stare, open-mouthed, at the

gigantic maze that stretches to the horizon in every direction. At first, I think we must be at the bottom of a valley, because I can see the ground rising in the distance, like a gently rolling maze-covered hillside. But then my eyes reach the horizon – or where the horizon ought to be – and I realise there is no horizon. There's just more maze. (p 106)

OR

We walk on. The clothes cluster more thickly on the walls, multiplying like coloured fungi. Now each hook has nine or ten items hanging from it instead of only one. The socks grow deeper underfoot and the dangling clothes close in overhead until we're picking our way through a dark, suffocating tunnel of laundry. (p 117)

OR

I stare blankly down the corridor. It's more of the same. More of the same endlessly intersecting melamine walls, the same chrome hooks, the same infinite selection of lost and abandoned laundry items. More, more, more of the same rotten, stinking, endless maze. (pp 130-1)

DISCUSSION POINT: What 'extravagant' details made this an exciting fantasy world for you?

c) **Poetic quality** is evinced in the language used in this novel, for example:

We step right up to the swirling madness. A warm wind ruffles my hair. It smells like lavender and ocean breeze and almost-certain death. (p 95)

DISCUSSION POINT: What other scenes were described poetically in this book?

d) **Multidimensionality where time and space overlap**, for example, Bruce speaks of events in 1622 as if they were yesterday:

'Naturally. Your grandfather and I went up against him during the Great Goblin War, back in '22. Of course, in those days, he was only a general, but—'

'1922?' Alfie asks incredulously. 'How old are you?'

'1622.' The skull cackles. 'And a lot older than I look.' Then his voice turns grim. 'The Great Goblin War lasted fifty years.' (p 55)

e) **A Spirit of carnival or ritual or dance** also enriches fantasy (Mobley, in Bator, 1983, p 257).

DISCUSSION POINT: What scenes in this second novel were particularly evocative of the 'Carnavalesque'?

f) **Mythic dimension** and the inclusion of archetypes, for example, the **quest** is referred to in these passages:

I frown. 'Quest?'

'Sure.' Alfie grins. 'Your heroic quest to rescue your grandpa from the giant burning dude. It'll be awesome! I'll be all like, "Hey Flame Brain! Give us back Wednesday's

grandpa!” And you’ll be like, “Prepare to meet your doom, burning guy!” It’ll be just like the boss battle in Quest of Heroes III.’ (p 36)

OR

‘What’d you say?’ Alfie asks. He straightens up, holding a long sword in a simple black leather sheath. My stomach does a backflip.

‘Alfie, wait!’ Too late. Alfie draws the sword from its scabbard. (p 56)

OR

I think about navigating the Realm of Lost Things, battling the laundry kraken, sneaking through the goblin camp, tricking the gatekeeper . . . I really want to point out that getting this far wasn’t actually ‘so easy’. (p 199)

DISCUSSION POINT: What other fantasy archetypes or myths were referred to in this novel?

SYMBOLISM

DISCUSSION POINT: Grandpa’s ring is a symbol of power and strength, as is his sword. The maze is a metaphor for moral challenges. What other symbolism did you notice in this novel?

LITERARY DEVICES

ACTIVITY: Find examples of the use of literary devices in this novel, using the table below to identify examples.

| | |
|------------------------|---|
| Simile | ‘I spin, my heart pounding like a sackful of jazz drummers’ (p 159) |
| Metaphors | |
| Personification | |
| Other | |

HUMOUR

ACTIVITY: Some of the humour in this novel reminded me of the cult classic *The Hitchhiker’s Guide to the Galaxy* (1979) by Douglas Adams. The Realm of Lost Things for example is a hilarious joke – a huge laundry of lost things managed by faeries. And the department headed ‘SNARKY UNDEAD ENTITIES’ (p 154) where they finally locate Bruce the skull is another example.

ACTIVITY: Identify techniques by which humour is provoked. Add quotes to the following table:

| | |
|---------------------|--|
| Sarcasm | |
| Irony | 'Gorgomoth the Unclean looks down at me. His red eyes blaze through the skull-shaped faceplate of his helmet, and in a mock-jolly voice he says, 'My ears are burning!' Alfie screams.' (p 62) |
| Exaggeration | 'For your information,' Bruce says, 'I happen to be a veritable fount of knowledge, a receptacle of arcane wisdom. I have access to unlimited realms of learning beyond mere mortal comprehension.' (p 69) |
| Black Humour | |
| Bathos | 'With this ring and this cloak, I shall be invincible! My armies shall cover the Nine Realms with a new darkness. I may even start my own reality show.' The Goblin King does a grotesque happy dance. (p 223) |
| Other | 'It is my great pleasure to inform you that if you are foolish enough to enter the Realm of Lost Things, you will never get out. It's a one-way system. Once lost, items of laundry are never recovered. This is a basic rule of the universe, and your odds of discovering the ring if you do enter the vortex are approximately one in three million, four hundred thousand and twelve, which means that, frankly, even thinking about going in there is a ridiculous and illogical idea that no one in their right mind would ever condescend to call a plan.' (p 94) |
| | His panic-filled eyes lock onto mine. I've seen that look before, when he realised there was no way the Standard Model of Particle Physics could explain baryon asymmetry. (p 169) |

STRUCTURE

The structure of the story can be analysed in terms of key narrative features used to engage the reader's attention and to shape the work:

a) **Strong beginnings and endings to chapters** are one way of structuring a narrative, for example:

Beginning: 'We're in a dark, gloomy place. I'm sticky with slugs. And I can't see a thing.' (Ch 5, p 33)

Ending: 'We're out of time.' (Ch 23, p 185)

DISCUSSION POINT: Which other opening or closing sentence was particularly gripping, in your opinion?

b) **Suspense** is the key to any narrative's structure.

DISCUSSION POINT: What were the most intriguing and suspenseful elements of this work?

SETTING

DISCUSSION POINT: Description in setting can be evoked by appealing to a range of senses including sight, sound, taste, smell and touch. Read any passage in the novel and discuss which senses are appealed to in that passage.

DISCUSSION POINT: What aspects of setting were explored using literary devices such as simile or metaphor?

CHARACTERS

Major Characters: Wednesday Weeks; her best friend Alfie; her grandfather Abraham Mordecai Weeks; Gorgomoth, King of the Goblin Realm, who lives in the Tower of Shadows; Bruce, a talking skull, aka Chuckles.

Minor Characters: Colin Murphy; Allie Crenshaw; Mrs Glock; Falcon, the Tooth Fairy; Schnooky-pumpkin, Captain of the Winter Faeries; Adaline, the faery attendant at the ALL-POWERFUL MAGICAL ITEMS counter in the Realm of lost Things.

ACTIVITY: Draw up a character chart and find key quotes which give a clear picture of any of these characters, and isolate events that demonstrate their natures. Then write a brief character study of the person using the quotes and events to illustrate the points made in your summary.

QUESTION: Which character was most intriguing and why? Which character would you like to have heard more about?

WRITING TASKS

ACTIVITY: This novel was written collaboratively by two people – Denis Knight and Cristy Burne. Conduct a classroom exercise inviting one student to write a short incident and then to hand it on to another student to continue the story, repeating the exercise until the entire class has contributed.

ACTIVITY: Write a diary entry by Alfie describing their encounter with the kraken in the maze.

ACTIVITY: This novel ends with what seems to be the beginning of a new adventure. What might a second novel be called? Write a synopsis for what might happen in it.

VISUAL LITERACY

ACTIVITY: Create a graphic novel interpretation of an incident in the novel. [See **Bibliography**]

ACTIVITY: Design a new cover for this book.

ACTIVITY: Create a book trailer for this novel. [See **Bibliography**]

FURTHER QUOTES FOR DISCUSSION

1. I shake my head. Grandpa's such a show-off. There was so little magic in the spells he just cast, I could barely feel them. A simple levitation charm, a disappearing spell, and a drop of winkleberry juice is all it took to have the whole class eating out of his hand. (p 14)

2. And it's not like I'm even good at it. I suck at magic. It would be cool if I could do even half of what Grandpa can do, like levitate or turn into a raven, but you know what? Protecting the realms from unimaginable evil doesn't seem all that important right now. I'd rather have friends, and a passing grade from Mrs Glock. (p 18)

3. 'That is my advice. The most evil sorcerer in the Nine Realms suddenly decides he needs the Ruby Ring? It's time to bunker down and wait for the world to end.' (p 44)

4. 'So there really is a Laundry Fairy,' Alfie breathes. 'Doubt it,' I say. 'Fairies are make-believe. It's faeries you have to watch out for. This is just a marketing gimmick.' (p 53)

5. The entire scene is totally unremarkable, except for the swirling vortex of terror, right behind the desk. (p 89)

6. 'I'm all for this rescue, even though the odds, mathematically speaking, aren't great.' He grins at me. 'Magically speaking, though, I think we're in good hands.' (p 94)

7. 'Please do not release the kraken.' (p 143)

8. Great. We're trapped in a pantry with a fireball-happy madman and a lifetime's supply of seaweed jam. I'm fairly sure we're all going to die. (p 198)

9. 'Do not underestimate her, Gorgomoth,' he says. 'She has always been blessed with the power to surprise. She has extinguished your Unquenchable Fire, and I warn you, she can defeat you with a single word.' (p 224)

10. I smile back. Because, you know what? He was right all along. You really do draw the magic with your heart and shape it with your mind. It just took me a while to get my heart and mind onto the same page. (p 236)

FURTHER ACTIVITIES

1. Compare this novel to other fantasy novels. [See **Bibliography**]
2. Design a poster to advertise this book.
3. What other title might this book have had?
4. Debate any of the topics covered in these notes, or suggested by the novel.
5. Locate and study **poetry** which explores fantasy themes. [See **Bibliography**]

CONCLUSION

This is an inventive and highly entertaining fantasy adventure which traverses the fine line between magic and science in a totally original way. Wednesday and Alfie make a formidable team, and as Protectors they will surely be called into action again!

ABOUT THE AUTHORS

Science fiction and fantasy author **Denis Knight** is a computer programmer who grew up geeking out about the works of J.R.R. Tolkien, Terry Pratchett and Douglas Adams. He has also worked as a technical writer, a delivery boy, a tutor, and, for one glorious summer, a tour guide on Rottnest Island. His favourite foods are lasagna and donuts, and his favourite Arnie movie is *Eraser*. He knows how to ride a motorbike and use a chainsaw, although not both at the same time. He lives in Western Australia with his wife, his two children, and his extensive collection of *The X-Files* DVDs. He has never been stalked by a laundry kraken, eaten by space wasps or abducted by aliens – as far as he knows.

Children's author **Cristy Burne** has worked as a science communicator for nearly 20 years across Australia, Japan, Switzerland, the UK, US, South Africa and beyond. She has performed in a science circus, worked as a garbage analyst, and was a reporter at CERN when they turned on the Large Hadron Collider, but her favourite job is working to embrace the intersection between science, technology and creativity. Her books include *To the Lighthouse* and *Off the Track, Zeroes and Ones* (a 2019 CBCA Notable Book), *Aussie STEM Stars: Fiona Wood* and *Beneath the Trees*. Cristy is a popular presenter and is passionate about empowering our next generation of creative, science-savvy citizens. She also loves chocolate.

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- Nix, Garth *The Keys to the Kingdom* (Series) Allen & Unwin.
- Rodda, Emily *Deltora Quest* (Series) Scholastic Press.
- Townsend, Jessica *Nevermoor* (Series) Hachette Australia.

WEBSITES:

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<https://teachers.yale.edu/curriculum/viewer/initiative_06.03.08_u>
- 'Welcome to the AustLit teaching with Fantasy Learning Resources' *AustLit*
<https://teachers.yale.edu/curriculum/viewer/initiative_06.03.08_u>
- 'Fantasy Poems by Famous Poets' *DLTK's Poems*
<<https://www.dltk-kids.com/poems/poems-fantasy.htm>>
- '10 Classic Children's Poems Everyone Should Read' by Dr Oliver Tearle *Interesting Literature*
<<https://www.dltk-kids.com/poems/poems-fantasy.htm>>

OTHER NON-FICTION AND WEBSITE TEACHING RESOURCES:

- 'Book Trailers' *Creating Multimodal Texts*
<<https://creatingmultimodalttexts.com/book-trailers/book-trailers/>>
- 'How to Make a Book Trailer' by Michelle Harclerode *Prezi*
<<https://prezi.com/9xvvonltejxn/how-to-make-a-book-trailer/>>
- 'Book Trailers - Resources: Ipswich District Teacher Librarian Network'
<<http://idtl.net.au/book-trailers.php>>
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ABOUT THE AUTHOR OF THE NOTES

Dr Robyn Sheahan-Bright AM operates *justified* text writing and publishing consultancy services, and is widely published on children's literature, publishing history and Australian fiction. Her publications include *Paper Empires: A History of the Book in Australia 1946-2005* (co-edited with Craig Munro) (UQP, 2006). In 2011 she was recipient of the CBCA (Qld) Dame Annabelle Rankin Award, in 2012, of the CBCA Nan Chauncy Award for Outstanding Services to Children's Literature, and in 2014, the QWC's Johnno Award. In 2021 she was appointed a Member of the Order of Australia (AM).

SCIENCE, MATHEMATICS AND TECHNOLOGIES

This novel lends itself to the study of many areas of science, mathematics and technologies.

Wednesday and Alfie encounter many obstacles as they travel the Nine Realms. They must put their heads together to come up with clever solutions, combining what they know of the world of magic with real-world STEM (Science, Technology, Engineering and Maths) principals.

Curriculum concepts you can explore based on this book include:

SCIENCE INQUIRY SKILLS

Wednesday and Alfie often find themselves in unknown and unpredictable situations. To make sense of the challenges they face, they often use science inquiry skills, including questioning and predicting, problem solving and reasoning.

For example:

Hmm. There's something fishy going on here. The Goblin King's alight with Unquenchable Fire, but there's no heat. (p 63)

OR

'Can you make it brighter?' Alfie asks.
I frown. It's a good question. (p 104)

OR

If I can teach the Globe of Tarimos to Heel, and to Brighten, and to Rise, then maybe I can teach it to do something more complicated. (p 134)

OR

Here I am with a magical genius on one side and a scientific genius on the other, and what have I got? Zip. If only I could smooch them both together into a single super-genius. Wait a second . . . (p 192)

ACTIVITY: Imagine you find yourself in a situation where the parameters and future are unknown. Perhaps you're starting at a new school, learning a new skill, or joining a new sports team. Brainstorm questions that you may have about the unfamiliar situation. Can you think of ten questions? Twenty? Narrow your list down to the five questions you think will be the most useful to help you understand the situation.

DISCUSSION POINT: Sometimes past experiences can help us solve future problems. Other times, we need out-of-the-box thinking to find solutions. For example, cars weren't invented by making horses go faster. Lightbulbs weren't invented by building better candles. Cars and lightbulbs were innovative solutions.

What is innovation? How important do you think creative thinking is to become an innovator? What other skills would help you become better at innovation?

CHEMICAL SCIENCES

Sometimes when two or more materials are mixed a chemical reaction can occur. Wednesday, Alfie and Bruce use a chemical reaction they call 'the oldest trick in the book' to quench Gorgomoth's Unquenchable fire (p 202). They mix vinegar (which is an acid) with bicarb soda (which is a carbonate). When these two chemicals combine, they react to produce bubbles of carbon dioxide gas.

ACTIVITY: Experiment with mixing vinegar (acetic acid) and bicarb soda (sodium bicarbonate) in a plastic container in the classroom. Students should be able to see the bubbles of gas produced by the chemical reaction.

Please note: This experiment can be messy, so do it outdoors or in a sink and always use safety glasses.

ACTIVITY: What effect does temperature have on a chemical reaction? Design a fair test of whether temperature affects the speed of the vinegar-bicarb chemical reaction. What are the variables in your test? Which one variable will you change? Which variables do you need to keep the same?

One way to do this activity is to conduct three experiments in parallel, all identical except for the temperature of the vinegar. Try adding vinegar at three different temperatures: room temperature, cold vinegar from the fridge and cubes of frozen vinegar.

NUMBER SEQUENCES AND PATTERNS

Prime numbers are an example of a number sequence that continues on into infinity. Other examples include square numbers, cubed numbers and triangular numbers. Alfie loves prime numbers and uses them to test Bruce, crack jokes and keep himself calm in difficult times. For example:

'What's the seven hundred and fifty-third prime number?'

'Five thousand, seven hundred and seventeen,' Bruce replies without a second's hesitation. 'You'll have to try harder than that.' (p 70)

OR

'Five thousand, seven hundred and forty-three,' the voice says. 'Five thousand, seven hundred and forty-nine.'

It sounds like somebody's reciting prime numbers. (p 101)

OR

'Thank goodness you're here,' he calls down. 'I was nearly out of prime numbers.' I frown. 'What?'

'That was a joke.' He pauses. 'You know, because of Euclid's theorem?' (p 102)

ACTIVITY: A prime number is any positive number that is divisible only by itself and one. Alfie has memorised loads of prime numbers, but just how easy is that? What are the first ten prime numbers? Is 1 a prime number?

ACTIVITY: Can you recite all the prime numbers below 50 in under 20 seconds? Does concentrating on the numbers help keep you focused and calm? How does this change with more practise?

ACTIVITY: Number sequences are created by repeatedly applying a mathematical rule to determine the next number in the sequence. Can you work out the next number in these sequences? What rule has been applied?

- 1) 1, 6, 11, 16, 21...
- 2) 5, 10, 16, 23, 31...
- 3) 1, 4, 9, 16, 25....
- 4) 99, 98, 94, 85, 69...
- 5) 3, 6, 12, 24, 48...

Clues:

- 1) This sequence adds the same number to each previous number.
- 2) This sequence adds a regularly increasing number to each previous number.
- 3) This sequence uses square numbers.
- 4) This sequence subtracts square numbers from each previous number (first subtract 12, then subtract 22, then subtract 32, etc.).
- 5) This sequence doubles each previous number.

ACTIVITY: Make your own number sequence by inventing a rule and applying it to the first five numbers in your sequence. Swap sequences with a partner. Can you work out what rule your partner has used to create their number sequence?

ACTIVITY: Pascal's Triangle, named after French mathematician Blaise Pascal, is home to some of the most amazing number sequences ever – but what is it? Research Pascal's Triangle, then see how many number sequences you can discover within it.

USING SCALED INSTRUMENTS

To escape from Certain Doom in the Fullonica vault in Chapters 21 and 22, Wednesday and Alfie had to measure volumes of liquid from 1 to 8 units, using only a 5-unit and a 3-unit jug. They unlocked the vault by placing each carefully measured volume onto its matching plinth.

DISCUSSION: To escape from the vault, was it important for Wednesday and Alfie to measure the correct volume or the correct weight? Or both? What's the difference between volume and weight? Which unit of measurement would be best for measuring these two things? Does it matter which unit the 5-unit and 3-unit jugs use?

ACTIVITY: Recreate Wednesday and Alfie's jug problem in the classroom with just a few items. Hint: You can work through their solution by following their thinking in Chapters 21 and 22.

You will need:

- 1 x empty 1-litre bottle (a milk bottle works well)
- 1 x empty 600ml bottle (we suggest a water bottle)
- plastic bowl (about 1-litre capacity)
- digital kitchen scale
- permanent marker
- water

What to do:

1. Use the kitchen scale to measure exactly 1000g of water into the 1-litre bottle (remember to zero the scale after you place the empty bottle onto it).
2. Use the permanent marker to carefully mark the level of the water on the outside of the bottle, then label the container with the number '5' - this is your 5-unit jug (each unit is 200g).
3. Now measure exactly 600g of water into the 600ml container.
4. Mark the level as before and label this bottle with the number '3' - this is your 3-unit jug.
5. Place the plastic bowl onto the kitchen scale.

Your challenge:

Using only the '5' and '3' jugs, can you measure exactly 4 units of water (800g) into the bowl? To avoid Certain Doom, your result needs to be between 750g and 850g.

CONDUCTORS AND INSULATORS

In Chapter 4 Alfie uses a metal wastepaper basket as a makeshift helmet to block the effect of Grandpa's spell. He says: 'If metal mesh can stop electromagnetic rays, maybe it can stop magic too.' (p 26) But what is he referring to?

ACTIVITY: Could a metal wastepaper basket actually be used to block electromagnetic rays? Research the uses and properties of a Faraday cage. Where does the name come from? And why are Faraday cages useful?

STATISTICS AND PROBABILITY

Wednesday and Alfie often consider probability when they're working out what to do. For example:

'My eyes fall on one of Grandpa's ornaments ... just a plain, ordinary skull. Probably human, although with Grandpa you never know.' (p 39)
OR

'I'm pretty sure it works by weight. Some kind of balance mechanism hidden under the floor, probably.' (p 162)

OR

'What did Grandpa say before? He said I can defeat Gorgomoth with a single word. Okay, that still seems pretty unlikely.' (p 226)

ACTIVITY: List three things that are highly likely to occur today. Now add three things that are reasonably likely to occur today. Add to your list three things that are reasonably unlikely to occur today, and finish with three things that are highly unlikely to occur today. Mix up the items on your list and swap them with a friend. Can you order their list from most likely to least likely to occur?

ESTIMATION

In Chapter 14, Wednesday and Alfie use maths to estimate how long it might take to escape the spherical insanity maze. Estimation is a useful way to gather information about an unknown situation. Estimation is also useful for double-checking how reasonable a solution is.

ACTIVITY: On page 109, Wednesday and Alfie estimate the surface area of the maze using the formula $4\pi r^2$, where r = radius (the distance from the centre of the sphere to the edge).

Using this formula, can you estimate the approximate surface area of a tennis ball? What about a basketball? What about the surface area of Earth?

ACTIVITY: Fill or half-fill some jars with lollies, beads or buttons, then ask your friends to estimate how many items are in the jar. What methods could you use to improve the accuracy of your estimate? How does your estimate change if the items aren't identical?

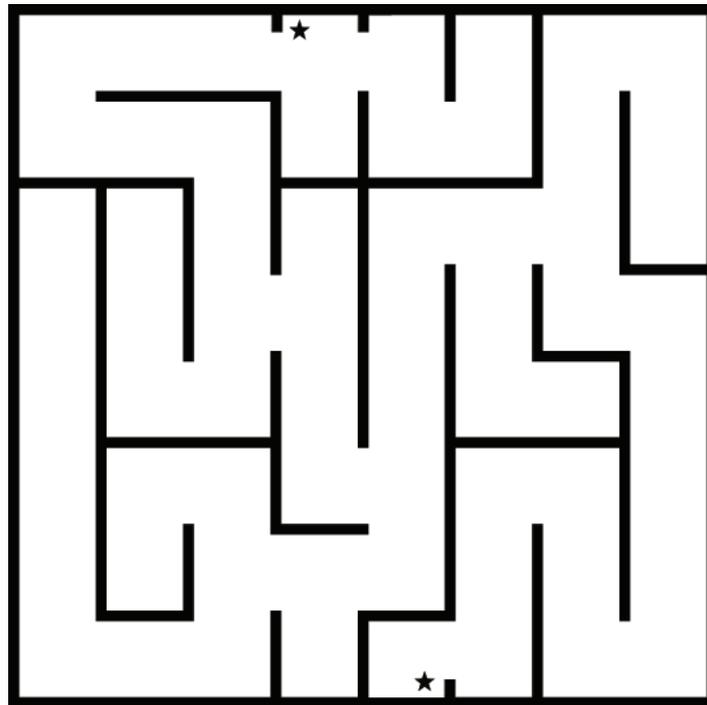
Afterwards, count the items in one of the jars, and use this information to improve your estimates. Which estimation method led to the most accurate answer?

SIMPLE ALGORITHMS AND INSTRUCTIONS

While trapped in the laundry maze in the Realm of Lost Things, Wednesday uses the wall follower method of maze navigation to try to find her way out (p 101). For lots

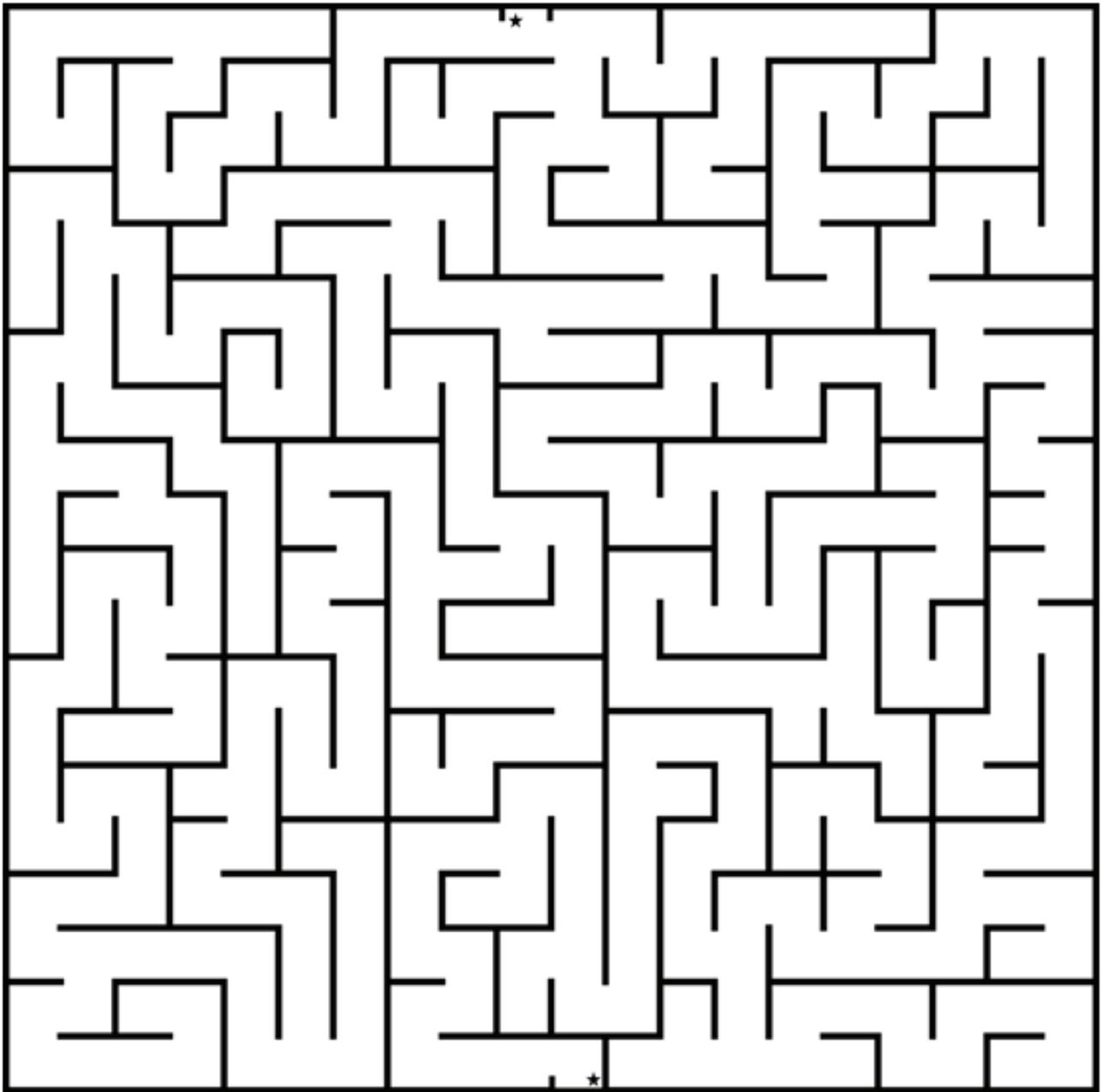
of mazes (but not all of them) wall following is a simple way to explore every part of the maze.

ACTIVITY: Using a pencil, try using the wall follower method on the maze below, starting at the top star:



Did you visit each area of the maze? Did you find the exit (marked by the second star)?

Try the wall follower method again on the next maze.



Did it take longer this time? Now imagine using this method to escape the laundry maze. It would have taken a very long time for Wednesday and Alfie!

If you want to practise this method some more, you can find maze generators online or draw your own mazes on a sheet of graph paper.

EXTENSION ACTIVITY: Alfie estimates that the average distance you'd need to travel to solve a square maze N metres across is $N^2 / 2$ when using the *wall follower* method. Is his estimate accurate? Can you design an experiment to find out?

ACTIVITY: You can also use the wall follower technique to explore your own house.

What to do:

1. Start in any room of your house and pick a wall.
2. Put your hand on the wall and start walking.
3. Follow the wall around your house. When you get to a doorway, go through it

and keep following the same wall. You don't have to touch the wall the whole time – if something's in the way, like a bed or a cupboard, just skip past it and keep following the wall.

4. Keep going until you end up where you started.

How did you go? Did you get to every room in your house? If there were some places you didn't get to, why was that? Does it matter if you use your left or right hand?

ACTIVITY: In Chapter 18, Wednesday and Alfie escape from the laundry maze in the Realm of Lost Things by 'programming' the Globe of Tarimos to find the shortest way out. While the simpler *wall follower* method would have found a way out eventually, the maze was too large to escape in time using that method.

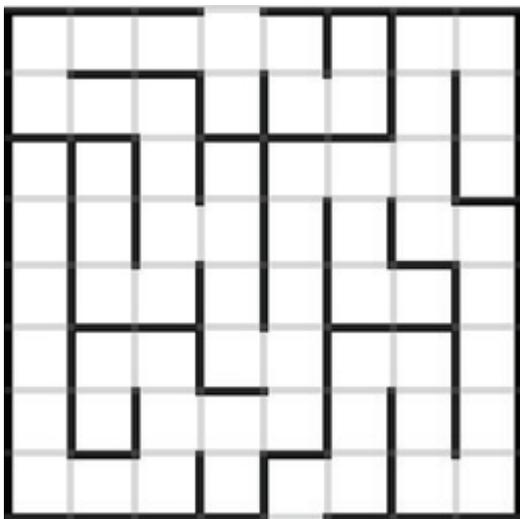
Trémaux's algorithm is a method of solving a maze by finding a direct path to the exit (a direct path is a path that doesn't include any backtracks).

You will need:

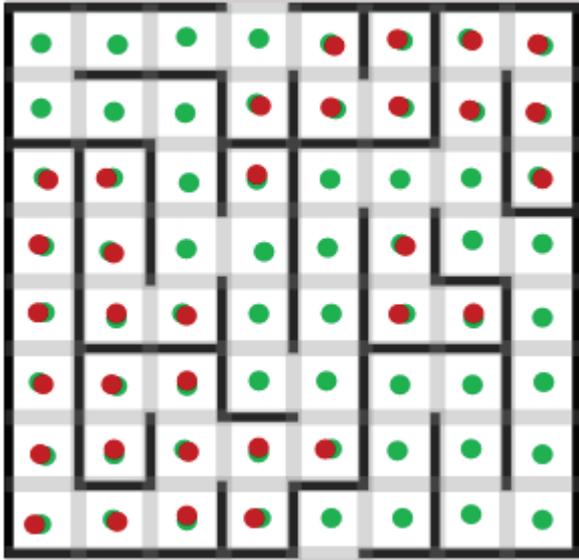
- two coloured textas (we've chosen red and green)
- a printer

What to do:

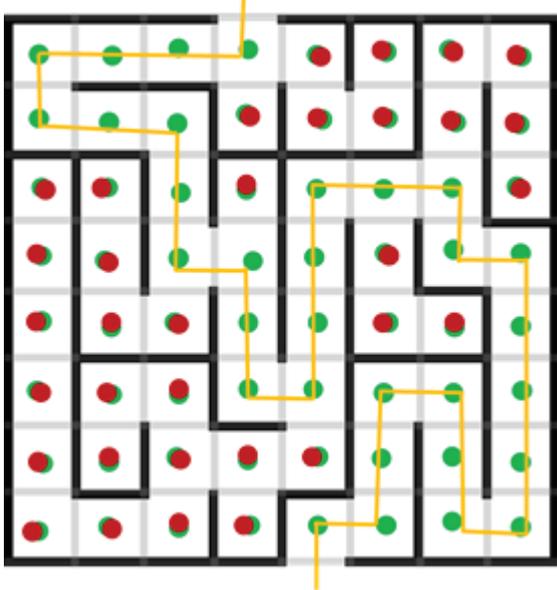
1. Print out our map from earlier or use an online maze generator to create a maze. (Note that we have added a grid to help with this method.)



2. Starting at the entrance, 'step' into the maze, then 'navigate' by following these rules:
 - a. Move to a white square if you can, leaving a green dot behind.
 - b. If you can't move to a white square, move to a green square, leaving a red dot behind (the red dot may cover up a green dot you made earlier)
 - c. Never move to a red square.
3. Keep going until you reach the exit. Your maze should now look a bit like this:



4. Now retrace your path joining up all the green dots as you go



5. Ta-da! You found a direct path through the maze with no backtracks!