

WEDNESDAY WEEKS

ACTIVITY PACK



DENIS KNIGHT  CRISTY BURNE

WEDNESDAY WEEKS

WORD SEARCH

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WEDNESDAY • TOWER • SHADOWS • CROWN • DESTINY
DUNGEON • FIRE • ROBOT • SKULL • STEM • MAGIC • SCIENCE

Solution on page 13.



WEDNESDAY WEEKS

STEM ACTIVITIES

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 principles.

STEM stands for Science, Technology, Engineering and Maths. There are many STEM concepts in this series you can explore. Check out these fun STEM activities you can try at home or in the classroom.

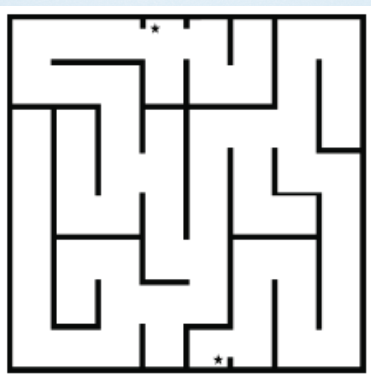
MISSION: GET PRIMED FOR PRIME NUMBERS

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? Can you recite all the prime numbers below 50 in under 20 seconds?

MISSION: YOUR A-MAZE-ING HOUSE

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

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



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

MISSION: UNBELIEVA-BUBBLE

Wednesday, Alfie and Bruce use 'the oldest trick in the book' to quench Gorgomoth's Unquenchable Fire. They mix vinegar (which is an acid) with bicarb soda (which is a carbonate). When the two combine, they react to produce bubbles of carbon dioxide gas – the same gas that's used in some fire extinguishers.

You will need:

- vinegar (acetic acid)
- bicarb soda (sodium bicarbonate)
- a plastic container
- safety glasses
- adult supervision

(Note: This experiment can be messy, so do it outdoors or in a laundry sink.)

What to do:

1. Put on the safety glasses.
2. Pour half a cup (125ml) of vinegar into the plastic container.
3. Drop in one tablespoon of baking soda.
4. Stand back!

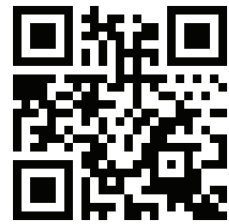
Extension: What happens if you use cold vinegar from the fridge? What happens if you use frozen vinegar?

MISSION: JUG CHALLENGE OF DOOM

To escape from Certain Doom in the Fullonica vault, Wednesday and Alfie had to measure volumes of liquid from 1 to 8 units, using only a 5-unit and a 3-unit jug. You can recreate this jug problem with just a few items.

You will need:

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



Scan the QR code for a video demonstration of this activity!



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.

MISSION: MAKE YOUR OWN SCYTALE

Saranon encoded a secret message using a two-part code. To crack the first part of the code, Wednesday and Alfie needed not only the coded message, but also an object to wrap the message around. This is an ancient form of code called a scytale.

You will need:

- a cylindrical object (like a toilet roll or a rolling pin)
- a long strip of paper
- a pen



Scan the QR code for a video demonstration of this activity!

What to do:

1. Starting from one end, carefully and evenly roll your piece of paper around the cylinder.
2. Write your message along the length of the cylinder.
3. Unroll the piece of paper. Your message is unreadable!
4. To decode your message, your friend will need the strip of paper and a cylinder of the same diameter.

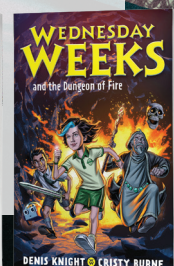
MISSION: SUBSTITUTION CIPHER

Saranon's message about the Troll Bridge is encoded using a type of secret code called a substitution cipher. In Saranon's cipher, each letter of the alphabet is represented by a prime number, as shown on page 165 of *Wednesday Weeks and the Crown of Destiny*.

Here's a message encoded with Saranon's cipher:

83 73 89 19 53 7 29 37 13 13 61 53 19
79 23 73 61 53 83 31 19 31 19 7 73 83

Can you decode it? Can you use Saranon's cipher to write a message to a friend? You can even create your own secret code by substituting different numbers or letters.



MISSION: SILKWORM SURPRISE

This term, Mrs Glock's classroom is investigating the life cycle of silkworms. Keeping silkworms as pets can be fascinating, revolting and rewarding, all in one. Follow in Wednesday and Alfie's footsteps and try raising your own silkworm colony.

You will need:

- silkworm eggs
- a regular supply of fresh mulberry leaves
- a shoebox (with a lid)

What to do:

1. Silkworm eggs hatch in spring. Leave them in a warm place, but out of direct sunlight. Check them every day to see if they have hatched. This may take one to two weeks.
2. Move newly hatched silkworms into your shoebox and feed them with the soft tips of newly grown mulberry leaves, or with special silkworm food. Replace these leaves regularly.
3. As your silkworms grow larger, feed them regularly with fresh handfuls of mature mulberry leaves.
4. In a few weeks, your silkworms will begin searching for a place to spin their cocoons. To help them, add toilet rolls or egg cartons to your shoebox. Moths will emerge from the cocoons in around two weeks.

MISSION: SEEING SOUND

To break through the crystal door, Wednesday and Alfie used the sound of a bell to cause a cascade of vibrations. All sound is a vibration, but did you know you can actually see sound?

You will need:

- a mixing bowl
- plastic wrap
- a rubber band
- salt

What to do:

1. Using a rubber band, secure the plastic wrap tightly over the top of the bowl, like a drum.
2. Sprinkle some salt over the plastic.
3. Experiment with making different sounds near the bowl. Clap your hands, sing a song or say a magic word. What happens to the salt crystals when the air inside the bowl begins to vibrate too?

Hint: Try singing a long, loud note with your mouth just above the plastic wrap. Then try singing higher or lower notes. Can you find a note that makes the salt crystals dance?



Scan the QR code for a video demonstration of this activity!



MISSION: ACIDIC INK

In the Realm of Unfriendly Cats, Wednesday and the gang find a hidden message on a cave wall. You can use simple ingredients to write your own invisible messages.

You will need:

- two drinking glasses
- water
- baking soda (also called bicarb soda)
- cotton swabs
- paper
- rubbing alcohol (or methylated spirits)
- turmeric
- a small paintbrush

What to do:

1. In a drinking glass, combine $\frac{1}{4}$ cup water and 1 teaspoon baking soda and mix thoroughly.
2. Dip a cotton swab into the baking soda solution and use it to write a message or draw a picture on a sheet of paper.
3. Leave the message or picture to dry.
4. In a second drinking glass, combine $\frac{1}{4}$ cup of rubbing alcohol (or methylated spirits) with $\frac{1}{2}$ teaspoon of turmeric. CAUTION: This solution can stain.
5. Use a small paintbrush to paint the yellow turmeric solution onto the paper. Your message is revealed in bright red!

What happens? Turmeric contains a chemical called curcumin, which remains yellow in acidic or neutral conditions but turns red when it touches a base (like baking soda).



Scan the QR code for a video demonstration of this activity!

MISSION: GEYSER ALERT!

The Realm of Unfriendly Cats is beset with a gushing geyser of tomato sauce. Want to make your own super-messy geyser? Try this!

You will need:

- a two-litre bottle of room-temperature diet cola
- six Mentos mints
- half an A4 sheet of paper

What to do:

1. Go outside. (Do not skip this step! ☺)
2. Open the Diet Coke and place it on the ground.
3. Place the mints in a tight row on the paper, then roll the paper around the mints to form a loose funnel.
4. Carefully and quickly, use the funnel to drop the mints into the Diet Coke.
5. Stand back!
6. Clean up.

What happens? A big mess. Also, Diet Coke is full of



Scan the QR code for a video demonstration of this activity!



carbon dioxide gas. And Mentos mints have loads of microscopic pits on their surface, which allow bubbles of gas to quickly form. When too many bubbles form at the same time . . . Whoosh! You have your very own geyser.

Want to experiment some more? What happens if you use regular soda instead of diet soda? Does the geyser only work with Mentos? What happens if you use a different sized bottle or a different number of Mentos? There are loads of experiments to try . . .

MISSION: MAGNETIC MAYHEM

The kids in Mrs Glock's class use magnetism to create their own games. Can you invent a magnetic fishing game, like Sasha Hammond's? Or a magnetic maze, like Allie Crenshaw's? How about a game like Colin's 'Pin the Eyebrows on Colin Murphy'? What other games can you make using magnets?

MISSION: BALANCING CARROT

During Saranon's first challenge, Wednesday and Alfie balance on a narrow beam by holding hands and leaning out over a bottomless pit. Use the laws of physics to make your own balancing sculpture.

You will need:

- a carrot (or modelling clay, which keeps better!)
- an adult to help you cut and skewer the carrot
- bamboo skewers

What to do:

1. With the help of an adult, cut a piece about 2 cm long from the narrow end of the carrot (or roll a 2 cm ball of modelling clay).
2. Carefully push a skewer vertically through the middle of the piece of carrot so the blunt end of the skewer sticks out about 2–3 cm.
3. Push two more skewers into the sides of the piece of carrot, so they extend downwards at 45 degrees.
4. Cut two more pieces of carrot about 3 cm long. Push these onto the ends of the downward-pointing skewers.
5. Place the blunt end of the first skewer on your finger to see if the sculpture balances. If it leans to one side, slide the carrot-counterweight on that side a little closer to the top.
6. Try balancing the sculpture on top of something tall and thin (like a water bottle – or another carrot!) and then giving it a spin. What else can you balance it on?

What happens? Every object has a centre of gravity, which is the point where the object's weight is evenly distributed and all sides of the object are balanced. The carrot counterweights lower the sculpture's centre of gravity and bring it underneath the end of the top skewer, allowing it to balance.



Scan the QR code for a video demonstration of this activity!



MISSION: BEWARE OF THE TROGS

During Saranon's second challenge, Wednesday, Alfie and Kevin must cross the river without getting eaten by hungry trogs. But the boat only holds two passengers, and the trogs will eat anyone they outnumber.

Can you recreate the problem using friends from your class (or squares of coloured paper) to safely float Wednesday, Alfie and Kevin across the river?

MISSION: FROG VS SLUG VS WINKLEBERRY

Saranon's challenge with the trogs is a variation on a classic river-crossing puzzle. Here's another one!

Wednesday is heading home from the Great Slug Swamp with a frog, a slug and a winkleberry. But the ruby ring only has enough power to transport Wednesday and one other item at a time.

If left unattended, the frog would eat the slug, and the slug would eat the winkleberry. How can Wednesday transport herself and all three items home without the slug or the winkleberry being eaten?

MISSION: POINTY PATHFINDER

Wednesday and Grandpa use magnetism to steer Saranon's giant needles. Did you know you can use a magnetised needle (AKA compass) to help you steer?

You will need:

- a needle
- a strong magnet
- a thumbnail-sized piece of polystyrene
- a large bowl of water

What to do:

1. Magnetise the needle by stroking the magnet along the length of the needle at least 53 times. (Why 53? It's a prime number, so Alfie would approve! 😊)
2. Thread the needle through the polystyrene.
3. Gently float the polystyrene in the bowl of water.

What happens? The floating needle should move around on the water until it lines up with the Earth's magnetic field, which runs from North to South.

Did it work? Compare the direction of your homemade compass to a real compass or smartphone app.



Scan the QR code for a video demonstration of this activity!



MISSION: PING-PONG BALL LAUNCHER

Wednesday and Alfie use their knowledge of energy transformation to escape from the Dungeon of Fire. This cool launcher also works by transforming energy.

You will need:

- a paper cup
- a balloon
- scissors
- tape
- a ping-pong ball

What to do:

1. Cut the bottom out of the paper cup.
2. Tie a knot in the neck of the balloon, then cut about 2cm off the other (round) end of the balloon.
3. Stretch the balloon over the bottom of the cup, then tape it in place. Your launcher is complete!
4. Drop the ping-pong ball into the cup so it rests on top of the balloon.
5. Hold the cup in one hand and pull the balloon from under the knot with your other hand.
6. Let go of the balloon. We have lift-off!

What happens? Stretching the balloon adds potential energy (also called stored energy) to the system. When you let go, the potential energy is transformed into kinetic energy (movement energy) and the ball is launched into the air.

MISSION: MAKE YOUR OWN PARTY POPPER

You will need:

- vinegar (acetic acid)
- baking soda (sodium bicarbonate)
- a zip-lock bag
- safety glasses

What to do:

1. This experiment can be messy, so do it outdoors or in a laundry sink.
2. Put on the safety glasses.
3. Pour half a cup (125ml) of vinegar into the bottom of an empty zip lock bag.
4. Drop in one tablespoon of baking soda and quickly seal the bag tight.
5. Give the bag a quick shake, then stand back!

What happens? Vinegar is an acid; baking soda is a carbonate. When the two combine, they react to produce bubbles of carbon dioxide gas. This gas increases the pressure inside the sealed bag. When the pressure is too great, the bag pops open.



Scan the QR code for a video demonstration of this activity!



MISSION: ALL ABOARD THE PIZZA TRAIN!

The pizza train in the Dungeon of Fire is one of the tastiest inventions in the Nine Realms. But could it work in real life?

Using pencil and paper, design your own wild and wacky pizza train. Be sure to include all the pizza-making steps: you'll need to mix the dough, flatten the pizza bases, spread the sauce . . . and what else? Add labels for each stage of the process.

Please invent (and then prepare) your own signature Dungeon of Fire pizza flavour and post it online for us to drool over. Mmmm, delicious. Don't forget the pickled chicken! #WednesdayWeeks

MISSION: CABBAGE MAGIC

When Wednesday and Alfie are trapped by a highly acidic deathdew fungus, they need to work out which parts of the fungus will dissolve them, and which parts are safe to touch. They use purple bloodberry juice as an acid-base indicator, and many purple plants – including red cabbage – can be used in the same way. Can you use cabbage to work out which household chemicals are acids and which are bases?

You will need:

- red cabbage leaves
- boiling water
- several glass containers
- variety of household chemicals (cleaning ammonia, lemon juice, vinegar, baking soda, laundry soap)
- safety glasses

What to do:

1. Rip up a handful of red cabbage leaves and place them in a heat-proof bowl, then carefully cover them in boiling water from a kettle.
2. Leave the water to cool.
3. Throw out the soggy cabbage and keep the coloured water. It should be bright purple.
4. Pour a little of the coloured water into each of your glass containers.
5. Choose a household chemical and add a little to each container.

What happens? Purple plants contain a natural molecule called anthocyanin, which changes colour depending on whether it's acidic, basic or neutral. Acidic chemicals will turn the water pink or red. Basic chemicals will turn the water blue or sometimes even green.



Scan the QR code for a video demonstration of this activity!



MISSION: PROGRAM A SANDWICH-MAKING ROBOT

You will need:

- a loaf of bread
- a plastic plate
- a butter knife
- sandwich ingredients of your choice
- pen and paper



Scan the QR code for a video demonstration of this activity!

What to do:

1. Write down a detailed step-by-step program to teach your robot to make you a sandwich. Remember, your robot can't think for itself; it can only do exactly what you tell it to do... and it has no idea how to make a sandwich.
2. Test out your program by instructing your own real-life 'robot' (ask your best friend, your grandpa or even Mrs Glock to be your robot)

What happens? How did your robot perform? Did it make you the perfect sandwich? If there were unexpected problems with your program, how could you fix it?



WEDNESDAY WEEKS

WORD SEARCH

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