



Baking soda volcano

Guiding question: why does the mixture rise and overflow on its own?

Name: _____ Date: ____ / ____ / ____

MATERIALS

- ☐ 3 spoons of baking soda
- ☐ 1 cup of vinegar
- ☐ food colouring or beetroot juice
- ☐ 1 drop of dish soap
- ☐ small bottle or tall glass
- ☐ a tray for the mess

MY HYPOTHESIS

Before mixing: what do you think will happen?

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.....

.....

.....

STEP BY STEP

1. Put the baking soda in the bottom of the bottle.
2. Add the colouring and the dish soap.
3. Pour the vinegar in all at once and pull your hand back.
4. Count out loud how many seconds the foam lasts.

The foam lasted _____ seconds.

DRAW WHAT YOU SAW

TEST AGAIN, CHANGING ONE THING ONLY

What I changed	What changed in the foam

Bean diary: 10 days

Guiding question: what does a seed need to become a plant?

Name: _____ Started on: ____ / ____ / ____

Set up three cups: ① damp cotton wool in the sun • ② damp cotton wool in a dark cupboard • ③ dry cotton wool in the sun. Measure cup ① every day and note what you see in the other two.

Day	Height (cm)	What I saw in cup ①	② dark / ③ dry
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			

ON DAY 10, WHICH CUP GREW MOST? WHY?

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Sink or float?

Guiding question: does the heaviest object always sink?

Name: _____ Date: ____ / ____ / ____

Fill a bowl with water. Before dropping each object, circle your guess. Then test it and circle the result. **F = floats • S = sinks**

Object	My guess	Result	Was I right?
Coin	F S	F S	☐
Cork or bottle cap	F S	F S	☐
Small stone	F S	F S	☐
Tree leaf	F S	F S	☐
Whole orange	F S	F S	☐
Peeled orange	F S	F S	☐
Metal spoon	F S	F S	☐
Paper ball	F S	F S	☐
_____	F S	F S	☐
_____	F S	F S	☐

DID THE ORANGE BEHAVE DIFFERENTLY WITHOUT ITS PEEL? WHAT DOES THAT TEACH YOU?

Nature scavenger hunt

Guiding question: how many different things fit in one backyard?

Name: _____ Where I looked: _____

A leaf bigger than your hand

☐

Something that makes shade

☐

A really smooth stone

☐

Three different seeds

☐

A creature with more than 4 legs

☐

Something that makes a sound in the wind

☐

A closed flower

☐

Something rough and something soft

☐

An animal home (nest, web, burrow)

☐

Two leaves, same colour, different shapes

☐

Something the rain changed

☐

Your choice:

☐

THE STRANGEST FIND OF THE DAY WAS...

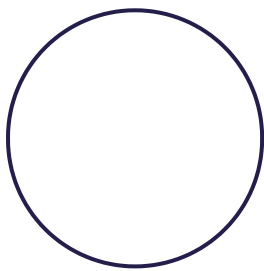
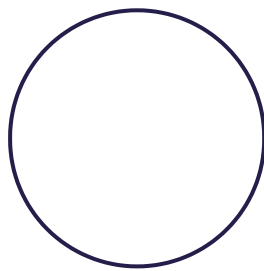
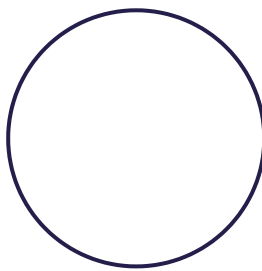
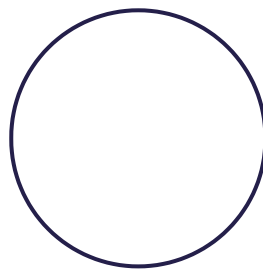
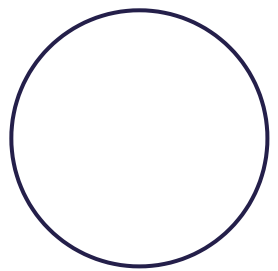


The water cycle

Guiding question: how many times has the water you drank today already been rain?

Name: _____ Date: ____ / ____ / ____

Write the name of each stage on the line, colour the bubbles and draw arrows showing where the water goes. Words: **evaporation • condensation • precipitation • infiltration • run-off**

**1****2****3****4****5**

DRAW THE WHOLE CYCLE YOUR OWN WAY: SUN, CLOUD, RAIN, RIVER AND SEA

ONE-HOUR EXPERIMENT

Put a pot with a finger of water in the sun, covered with cling film. Come back in an hour: what appeared under the plastic? Which stage of the cycle did you just see?

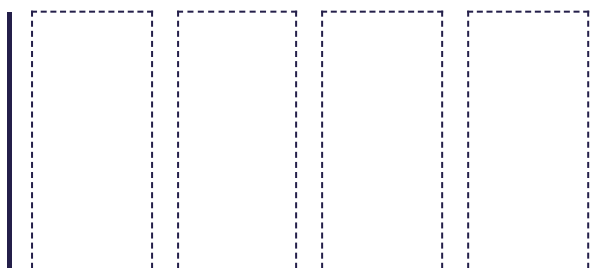
Weather log: one week

Guiding question: can you predict tomorrow from your own data?

Name: _____ Week of: ____ / ____ to ____ / ____

Day	Circle the weather	Temperature	Clothes I needed to wear
Monday	sun · cloud · rain · wind	____ °C	
Tuesday	sun · cloud · rain · wind	____ °C	
Wednesday	sun · cloud · rain · wind	____ °C	
Thursday	sun · cloud · rain · wind	____ °C	
Friday	sun · cloud · rain · wind	____ °C	
Saturday	sun · cloud · rain · wind	____ °C	
Sunday	sun · cloud · rain · wind	____ °C	

CHART OF SUNNY AND RAINY DAYS



sun · cloud · rain · wind

MY FORECAST FOR TOMORROW

Write it today and check tomorrow.



Plant parts: cut and paste

Guiding question: which part of a plant have you eaten today?

Name: _____ Date: ____ / ____ / ____

1. DRAW A PLANT FROM THE GARDEN

Draw the root below the line and everything else above it.



2. GLUE EACH NAME IN THE RIGHT PLACE

holds the plant in the ground

carries water upwards

makes food from sunlight

attracts the bees

holds the seed

becomes a new plant

✂ CUT OUT THE LABELS

root

stem

leaf

flower

fruit

seed



Layered density tower

Guiding question: why do the liquids not mix even in the same glass?

Name: _____ Date: ____ / ____ / ____

1. PREDICT THE ORDER (1 = BOTTOM)

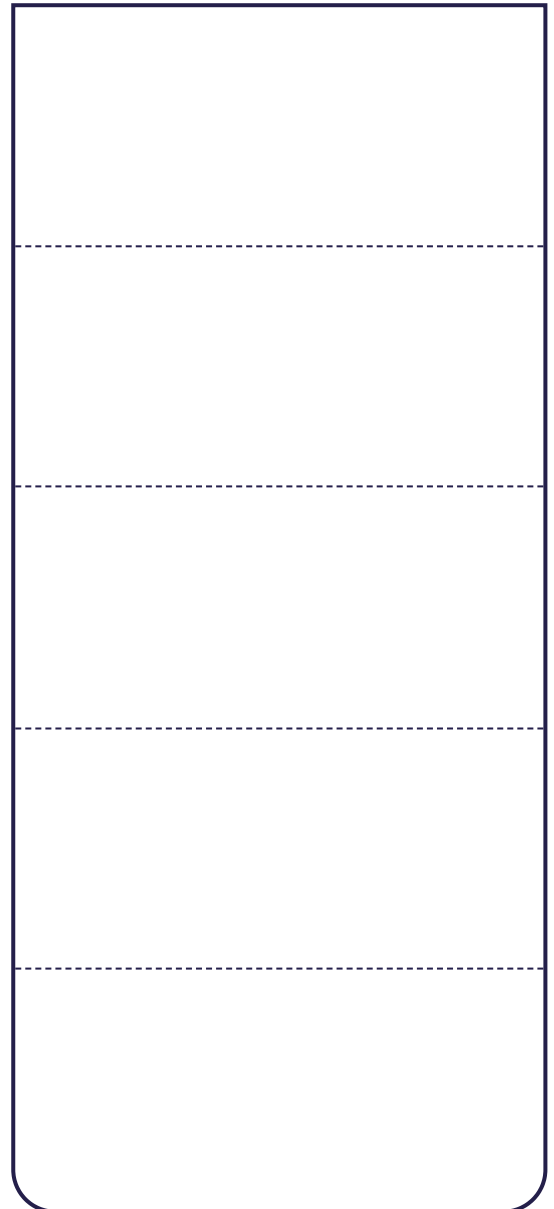
Liquid	Prediction	Actual
Honey		
Dish soap		
Coloured water		
Oil		
Coloured alcohol		

2. NOW TEST SMALL OBJECTS

Drop in a grape, a bottle cap and a paper clip. Which layer did each one stop in?

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.....
.....

3. DRAW AND NAME THE LAYERS



CONCLUSION IN ONE SENTENCE

Use the word *density*.

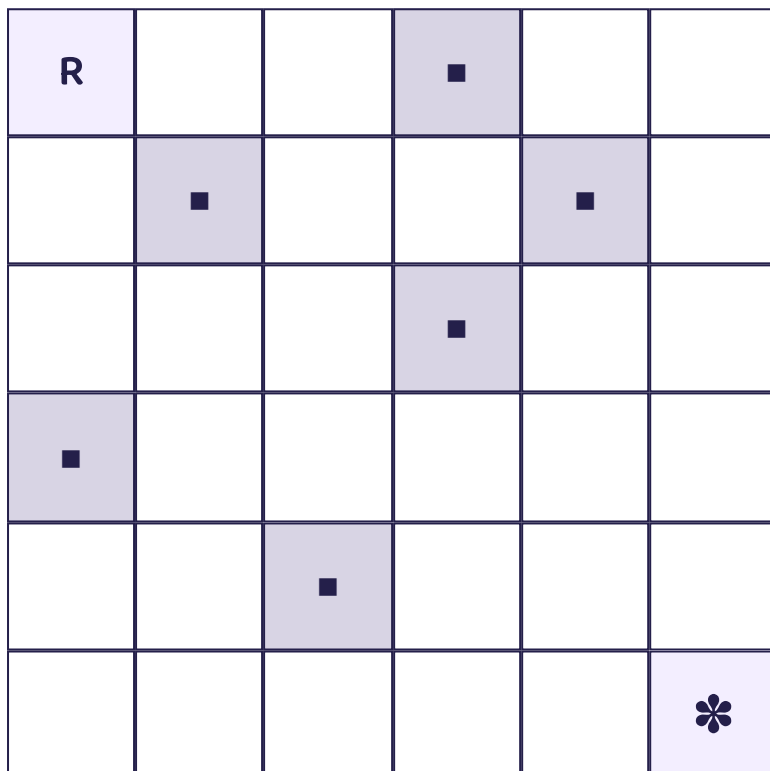
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Screen-free code: the arrow grid

Guiding question: can you reach the flower with fewer arrows than your first try?

Name: _____ Date: ____ / ____ / ____

The robot starts at **R** and has to reach the **✿**. It moves one square per arrow and cannot cross the rocks (■). Write the sequence in the boxes below, then test it with your finger.



ATTEMPT 1 — ONE ARROW PER BOX

I used _____ arrows. Did it work?

☐ yes ☐ no

ATTEMPT 2 — THE SHORTEST PATH

This time I used _____ arrows.

CHALLENGE

Draw two new rocks on the grid and ask a grown-up to solve it.



My first algorithm

Guiding question: what happens if you swap two steps around?

Name: _____ Date: ____ / ____ / ____

An algorithm is a recipe: steps in the right order. Write or draw how to brush your teeth, one step per box. Then a grown-up does **exactly** what is written — nothing more.

1

2

3

4

5

6

WHICH STEP WAS MISSING?

.....
.....

I SWAPPED 2 AND 4. WHAT WENT WRONG?

.....
.....

Your name in binary

Guiding question: how does a computer write everything with only two symbols?

Name: _____ Date: ____ / ____ / ____

Every letter has a number: A = 1, B = 2, C = 3... Z = 26. To write it in binary, add up the places **16, 8, 4, 2, 1** and mark ● where you used the place and ○ where you did not. Example: C = 3 = 2 + 1
→ ○ ○ ○ ● ●

Letter	Number	16	8	4	2	1

DECODE

○ ● ○ ○ ● ○ ○ ● ○ ●
○ ● ○ ○ ○

The word is: _____

Write a message in binary for someone at home to decode:

THINK

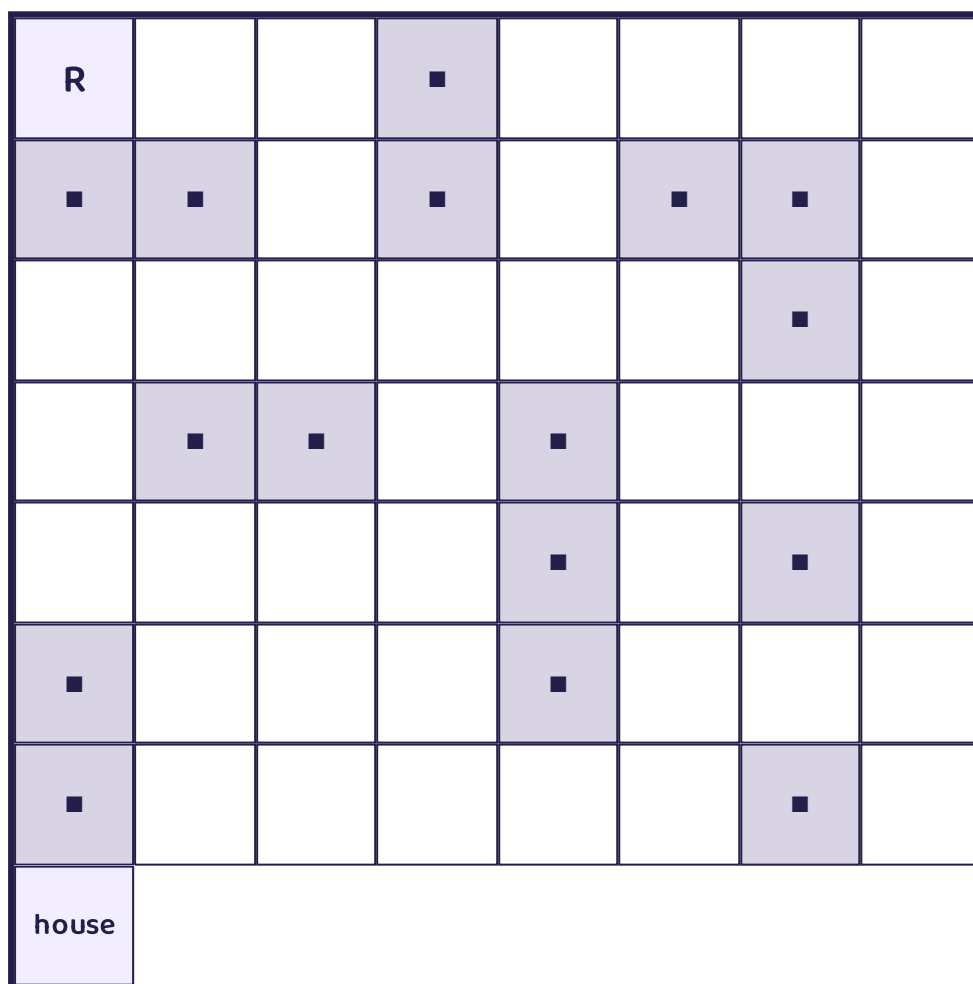
With 5 places, what is the biggest number you can write? And how many different letters would fit?

Robot maze

Guiding question: is there more than one path to the exit?

Name: _____ Date: ____ / ____ / ____

Trace the path in pencil from **R** to the **house** without crossing the rocks (■). Then trace a second, different path in another colour and count the squares in each.



Path 1: _____ squares

Path 2: _____ squares

The shortest was _____



Find the bug: debugging cards

Guiding question: is the bug in the step itself or in the order of the steps?

Name: _____ Date: ____ / ____ / ____

Each recipe below has **um** problem. Read it, run it in your head, circle the wrong step and write the fix. That is debugging: finding the error without deleting everything.

1. Make a sandwich

1. Take two slices of bread
2. Eat the sandwich
3. Spread the butter
4. Put the slices together

Fix: _____

2. Robot to the door

↑ ↑ → → ↑ ↑ ↑ ↑ ↑ →

The room is only 4 squares tall. The robot hits the wall.

Fix: _____

3. Water the plants

1. Fill the watering can
2. Water the plant in the living room
3. Repeat forever

A stopping condition is missing.

Fix: _____

4. Brush your teeth

1. Put toothpaste on the brush
2. Brush for 2 minutes
3. Put the brush away
4. Rinse your mouth

Fix: _____

NOW YOU WRITE A RECIPE WITH A HIDDEN BUG



Build-it paper keyboard

Guiding question: *why are the letters not in alphabetical order?*

Name: _____ Date: ____ / ____ / ____

Copy your keyboard at home to fill in the blank keys, cut the rectangle along the dashed line and fold on the marks so the keyboard stands up. Then practise typing your name without looking.

Q	W	E							
A	S								
Z									
SPACE									

— — — — fold here — — — —

HOW LONG TO TYPE YOUR NAME?

1st try: _____ s • 5th try: _____ s

WHY QWERTY?

.....

Spaghetti bridge: project log

Guiding question: which shape holds the most weight using the same amount of spaghetti?

Engineer: _____ Date: ____ / ____ / ____

Rules: a 25 cm free span between two books • 20 spaghetti strands and 1 m of masking tape • the load is tested with coins in a small cup hung from the middle.

1. MY DRAWING BEFORE BUILDING

Mark where the triangles go.

2. PREDICTION

It will hold _____ coins.

Why do you think that?

3. TESTS

Version	Coins	Where it broke
1		
2		
3		

4. WHAT I WOULD CHANGE IN VERSION 4

The tallest tower

Guiding question: is the tower steadier with a wide base or a narrow one?

Name: _____ Date: ____ / ____ / ____

You have **20 plastic cups**. The tower counts if it stands while you count to 10 out loud. Build three different towers and draw each base.

Tower 1



Cups in the base: _____

Height: _____ cups

Did it stand? ☐ yes ☐ no

Tower 2



Cups in the base: _____

Height: _____ cups

Did it stand? ☐ yes ☐ no

Tower 3



Cups in the base: _____

Height: _____ cups

Did it stand? ☐ yes ☐ no

THE WINNER WAS TOWER _____
BECAUSE...

.....
.....

WIND CHALLENGE

Blow at the winning tower from a distance.
Did it fall? Reinforce the base and try again.



Rubber band car

Guiding question: do more winds on the rubber band always mean more distance?

Name: _____ Date: ____ / ____ / ____

PARTS LIST

- ☐ 1 small cardboard box or bottle
- ☐ 2 barbecue skewers (axles)
- ☐ 4 bottle caps or cardboard discs
- ☐ 1 long rubber band
- ☐ masking tape and a hole punch

HOW IT WORKS

The rubber band tied to the rear axle stores energy when you wind the wheel backwards. When you let go, it gives that energy back and the car moves.

MY PLAN: TOP VIEW AND SIDE VIEW

DISTANCE TESTS

Winds	Prediction (cm)	Actual (cm)
5		
10		
20		
40		

After how many winds did it stop improving?



Napkin parachute

Guiding question: what holds the parachute up in the air?

Name: _____ Date: ____ / ____ / ____

Tie 4 equal strings to the corners of the napkin and hang a paper clip from them. Always drop from the same height and time the fall. Change **one thing only** per test.

Test	Time 1	Time 2	Average
Whole napkin, 1 clip			
Half a napkin, 1 clip			
Whole, 3 clips			
Whole, with a hole in the middle			
Shorter strings			

THE SLOWEST WAS...

.....
.....

SCIENCE SURPRISE

The hole in the middle usually makes the fall more **stable**, not faster. Why do you think that happens?

.....



Paper roll pulley

Guiding question: does a pulley make the weight lighter, or only change the direction of the force?

Name: _____ Date: ____ / ____ / ____

BUILD IT IN 4 STEPS

1. Push a pencil through the paper roll.
2. Rest the ends of the pencil on two identical cups.
3. Run the string over the top of the roll.
4. Tie a little bag with 10 coins to one end.

Draw your set-up:

COMPARE

How I lifted it	Easy / Hard
Pulling straight up by hand	
Pulling through the pulley	
With two pulleys	

SPOT PULLEYS ON YOUR STREET

Clothes line, well, curtain, lift, building crane.
Write three you really saw:

Design and build: the dream house

Guiding question: can what you drew be built with what you have?

Name: _____ Age: _____

Draw it first. Then build it with boxes, cushions or blocks — and see what you had to change along the way. Engineers change their plans too.

MY DRAWING

I WILL USE

- ☐ boxes
- ☐ cushions
- ☐ blocks
- ☐ a bedsheet

MY HOUSE HAS

_____ **doors**
_____ **windows**
_____ **rooms**

WHO FITS INSIDE?



Load test: paper bridge

Guiding question: can the same sheet get 10 times stronger just by folding?

Name: _____ Date: ____ / ____ / ____

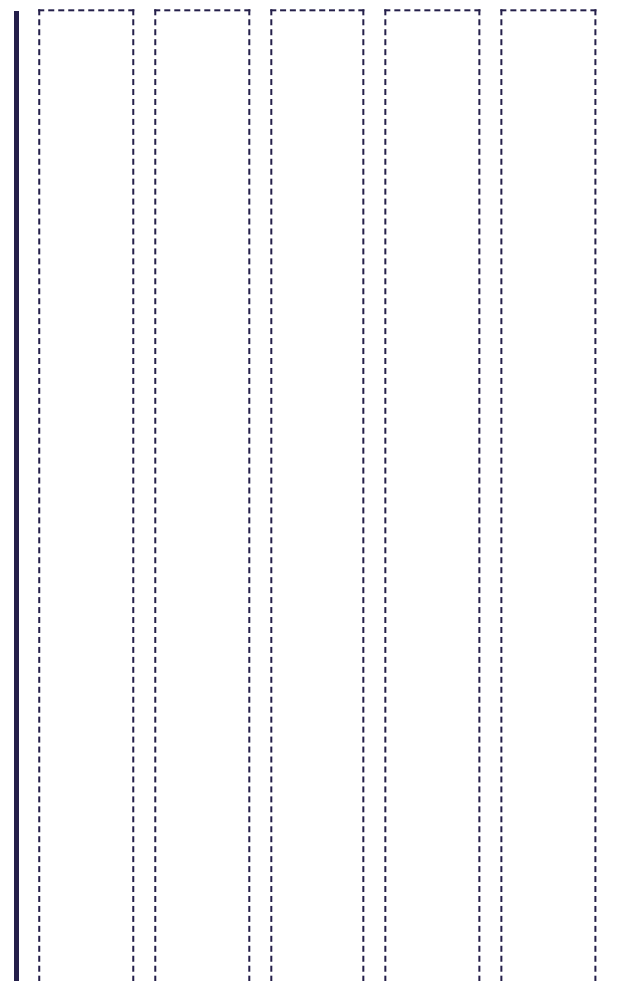
Always the same A4 sheet and the same 15 cm span between two books. Add coins in the middle until the bridge touches the table. Note how many it held.

RESULTS

Shape of the sheet	Coins
Flat sheet	
Folded like a fan	
Rolled into tubes	
Bent into an arch	
Your shape: _____	

BAR CHART

Colour one bar for each shape.



flat · fan · tubes · arch · yours

WHERE DO YOU SEE THAT STRONG SHAPE IN YOUR CITY?

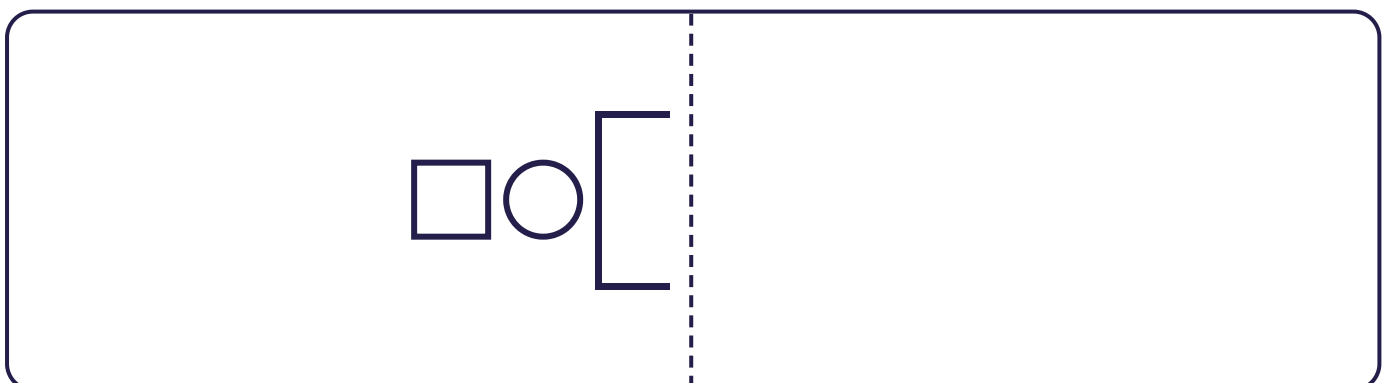
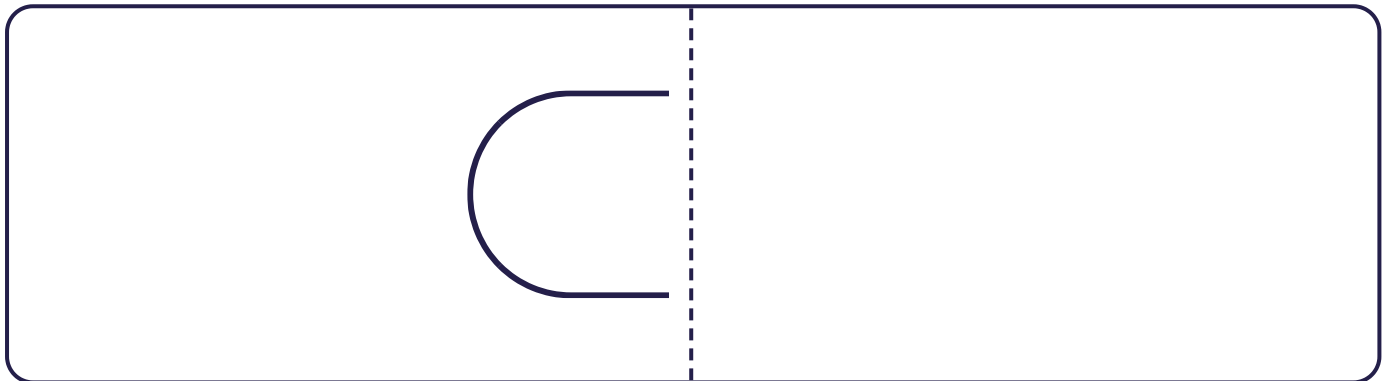
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Symmetry: complete the mirror

Guiding question: what does a mirror do to the right side of a drawing?

Name: _____ Date: ____ / ____ / ____

Each figure is only half drawn. Complete the other side of the dashed line so it matches. Check it by standing a small mirror on the line.



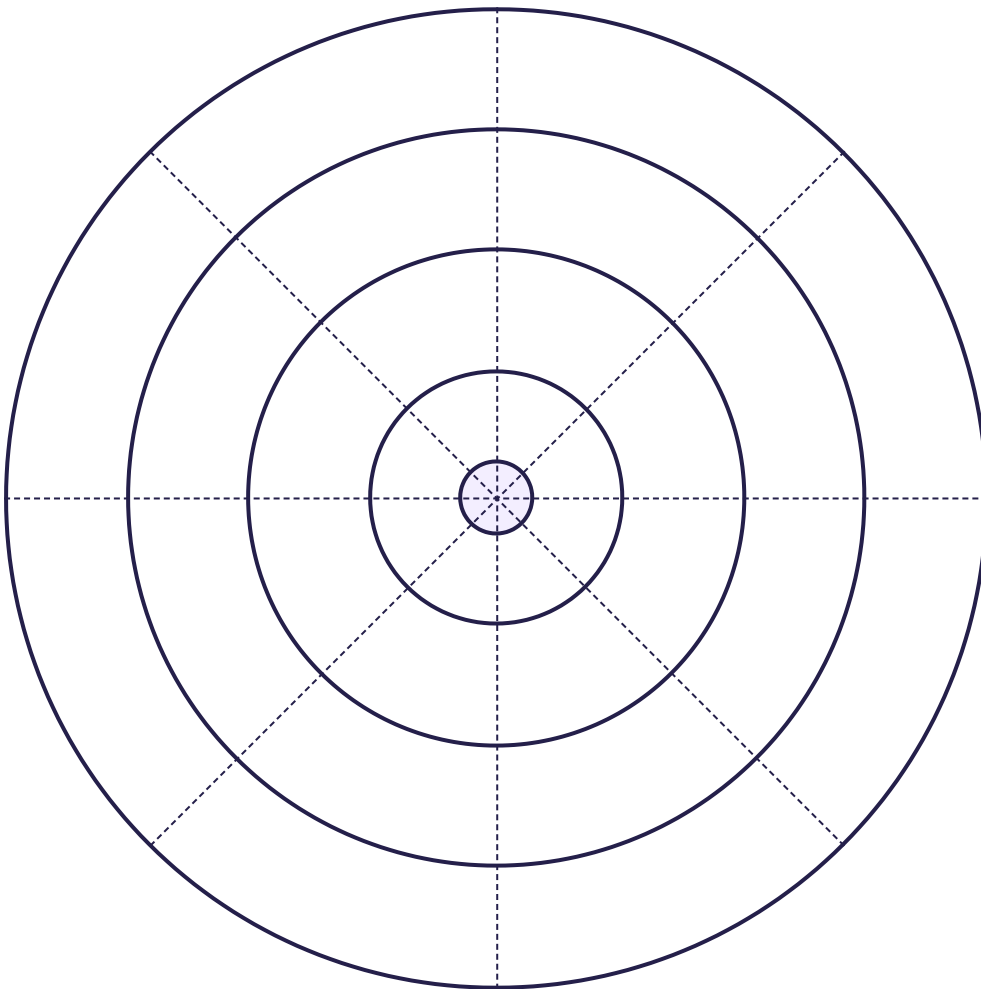
FIND 3 SYMMETRICAL THINGS IN YOUR HOME

Pattern mandala

Guiding question: does a pattern stay the same if you turn the paper?

Name: _____ Date: ____ / ____ / ____

Fill in one wedge of each ring and then **repeat the same drawing** in every wedge of that ring. Use no more than 3 colours.



HOW MANY TIMES DOES THE PATTERN REPEAT?

Outer ring: _____ Middle ring: _____

TURN THE PAPER

Turn it half a turn. Does the drawing look the same? That is rotational symmetry.

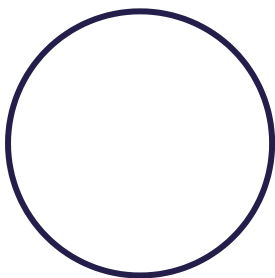


Colour mixing wheel

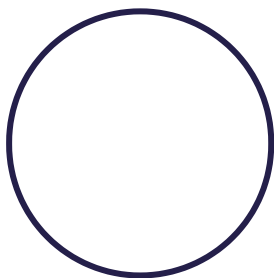
Guiding question: how many new colours can you get from only three paints?

Name: _____ Date: ____ / ____ / ____

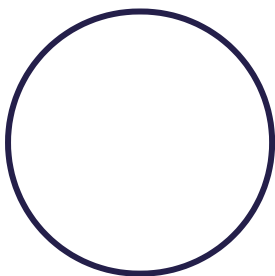
Paint the three big circles red, blue and yellow. In the small circles, paint the mix of the two neighbouring colours. Write the name you gave each mix.



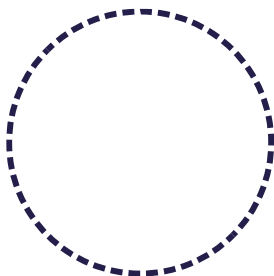
red



blue



yellow



free

MY MIXES

I mixed	Paint it here	Name I gave it
red + blue		
blue + yellow		
yellow + red		
all three together		
one colour + white		

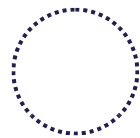
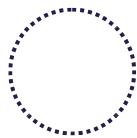
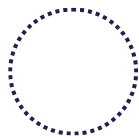
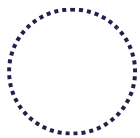
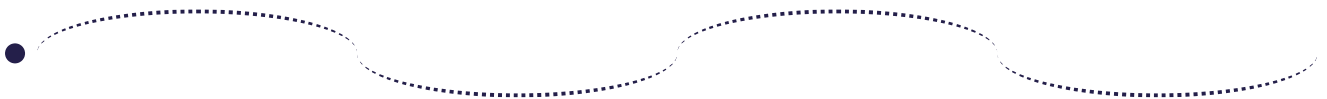
CAN YOU GO BACK? ONCE MIXED, CAN YOU SEPARATE THE COLOURS AGAIN?

Tracing lines and curves

Guiding question: can your hand go slowly all the way to the end of the line?

Name: _____ Age: _____

Run your finger along first, then the pencil. Always start at the filled dot ●. Tracing gets the hand ready for writing.



Now draw your own crazy line here



Grid self-portrait

Guiding question: why is it easier to draw one little square at a time?

Name: _____ Date: ____ / ____ / ____

Take a photo of yourself, print it or open it on a phone, and imagine a 4 × 5 grid over it. Draw **only what appears** in each little square, in the same position. Do not think about the whole face.

WHICH SQUARE WAS THE HARDEST?

.....

LEVEL 2

Do it again with the grid upside down. It gets easier — the brain stops “correcting” what it sees.

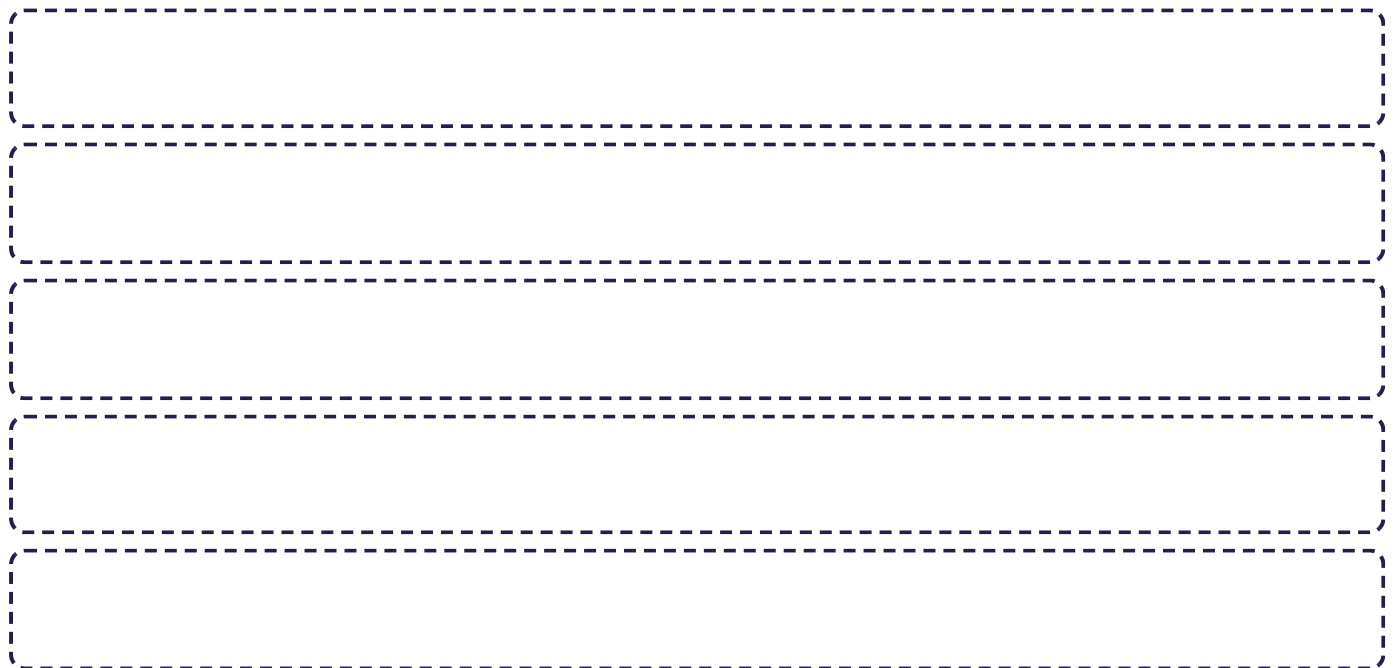


Folded paper sculpture

Guiding question: how does a flat sheet of paper stand up on its own?

Name: _____ Date: ____ / ____ / ____

Cut the five strips along the dashed lines. Turn each one into a different shape — ring, fan, spiral, tube, arch — and glue it to a cardboard base. No folding in half!



DRAW YOUR SCULPTURE

STRENGTH TEST

Which shape held a book on top?

☐ ring ☐ fan ☐ spiral

☐ tube ☐ arch

Height of my sculpture: _____ cm

Why is that shape the strongest?

.....
.....

Home texture collage

Guiding question: how would you explain “rough” without using your hands?

Name: _____ Age: _____

Search the house and glue a small piece of each texture in the right box. If you cannot find one, draw it. Use masking tape to keep it clean.

soft

rough

smooth

shiny

crinkled

full of holes

MY FAVOURITE TEXTURE WAS _____ BECAUSE...



Count and record: the button box

Guiding question: in how many different ways can you sort the same box?

Name: _____ Age: _____

Grab buttons, bottle caps, beans or coins. Sort them into groups, draw one tally mark per piece in the table and write the total. Then sort them **another way**.

Group	One tally mark per piece	Total
big ones		
small ones		
round ones		
colourful ones		
my group: _____		

COMPARE

The biggest group has _____ pieces.

The smallest has _____ pieces.

The difference is _____.

BOX TOTAL

Add it all up and count again together. Same number? Counting twice is what scientists do.

Total: _____

Measure the house with your feet

Guiding question: why does the same sofa measure differently for each person?

Name: _____ Date: ____ / ____ / ____

Walk heel to toe with no gaps and count. Then a grown-up measures the same thing with their feet. At the end, measure with a ruler to see who was closer.

What I measured	My feet	Grown-up feet	Ruler (cm)
The bed			
The sofa			
The table			
The hallway			
The door (height)			

WHO USED MORE FEET? WHY?

THAT IS WHY THE METRE EXISTS

So everyone measures the same, the world agreed on one unit. How many of **your** feet make 1 metre? _____

Patterns: what comes next?

Guiding question: can you say the rule of the pattern out loud?

Name: _____ Age: _____

Say the pattern out loud pointing at each shape (“square, circle, square, circle...”) and draw the two missing shapes in the dashed boxes.



Now invent your own pattern on this line and ask a grown-up to continue it



Fruit bar chart

Guiding question: what does the chart show faster than a list of names?

Name: _____ Date: ____ / ____ / ____

Ask at least 10 people for their favourite fruit — family, neighbours, classmates. Draw one tally mark per answer, then colour one square per answer on the chart.

DATA COLLECTION

Fruit	Tally marks	Total
banana		
apple		
orange		
mango		
grape		
other: _____		

CHART

ban apple ora man grape other

Winner: _____

People asked: _____

Gap 1st to 2nd: _____

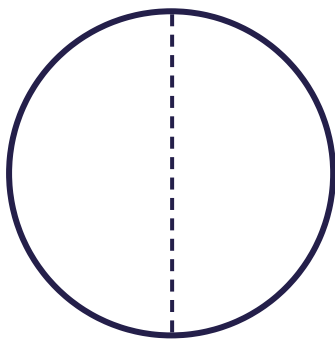


Pizza fractions to cut out

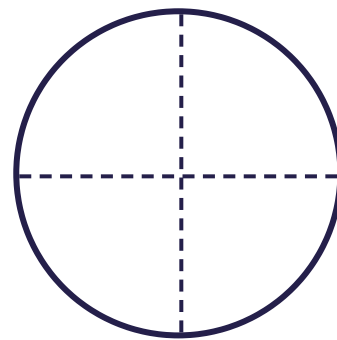
Guiding question: the more slices there are, is each slice bigger or smaller?

Name: _____ Date: ____ / ____ / ____

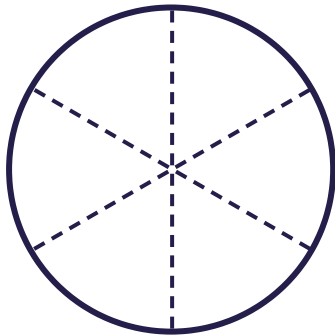
Cut out the four pizzas, then the slices along the dashed lines. Build combinations and check: is $\frac{2}{4}$ the same as $\frac{1}{2}$?



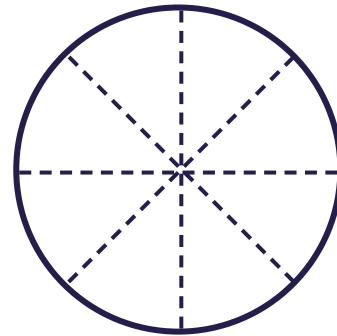
whole into 2 $\rightarrow$ $\frac{1}{2}$



into 4 $\rightarrow$ $\frac{1}{4}$



into 6 $\rightarrow$ $\frac{1}{6}$



into 8 $\rightarrow$ $\frac{1}{8}$

COMPLETE IT

$$\frac{1}{2} = \frac{\quad}{\quad} \quad \frac{1}{4} = \frac{\quad}{\quad} \quad \frac{1}{8}$$

$$\frac{1}{4} + \frac{1}{4} = \frac{\quad}{\quad}$$

$$\frac{1}{2} + \frac{1}{4} + \frac{1}{8} = \frac{\quad}{\quad}$$

WHICH SLICE IS BIGGER: $\frac{1}{6}$ OR $\frac{1}{8}$?
WHY?

.....

.....

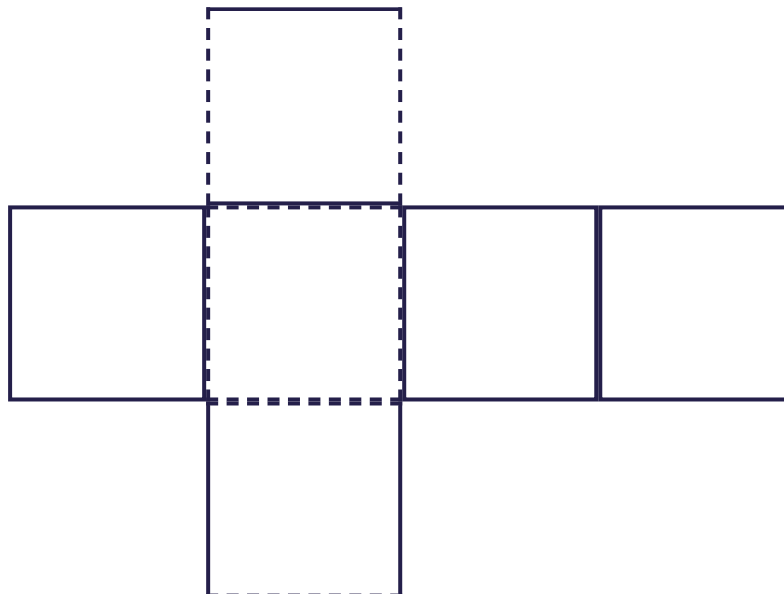


Build-it addition dice

Guiding question: which total comes up most often when you roll two dice?

Name: _____ Date: ____ / ____ / ____

Write a number from 1 to 6 on each face, cut out the cross along its border, fold on the dashed lines and glue the tabs. Build **two** dice (print this page twice).



ROLL 20 TIMES AND MARK THE TOTAL

2	3	4	5	6	7	8	9	10	11	12

WHY DOES 7 WIN SO OFTEN?

List every pair that adds up to 7:

.....



The hundred chart

Guiding question: do multiples draw patterns on the chart?

Name: _____ Date: ____ / ____ / ____

Write 1 to 100. Then circle the multiples of 3 and cross the multiples of 5 — and watch the picture that appears.

Numbers with both ○ and
X: _____

Multiples of 15 are:

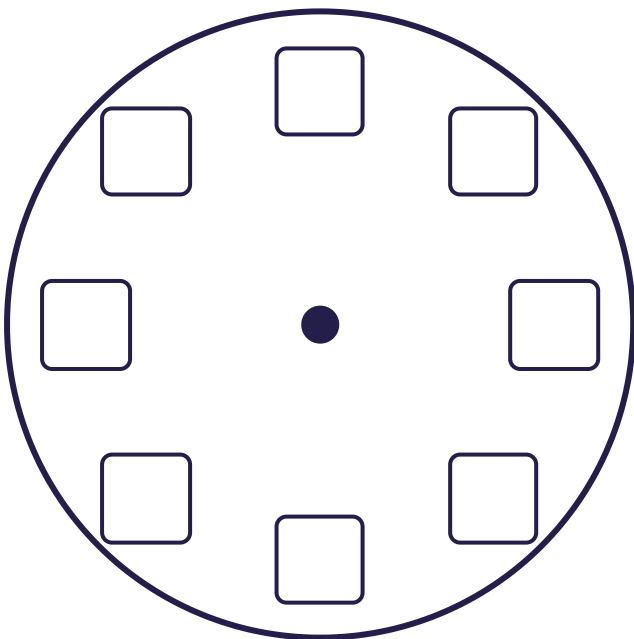
The pattern of the 5s is a

Paper clock with hands

Guiding question: how many turns does the short hand make in one day?

Name: _____ Date: ____ / ____ / ____

Write the numbers 1 to 12 in the little boxes on the clock, cut out the two hands and pin them at the centre with an opened paper clip or a split pin.



✂ HANDS TO CUT OUT

hours (short)

minutes (long)

SET IT AND WRITE IT

Wake-up time: _____

School time: _____

Lunch time: _____

Bedtime: _____

CHALLENGE

How many minutes between lunch and bedtime? _____