Kip McGrath™

Est. 1976

ENGLISH AND MATHS TUTORING

Aldridge Centre

RESOURCE PACK

A mixture of Primary and Secondary English & Maths Resources

30 YEARS OF TUTORING IN THE UK

Ofsted Registered

CELEBRATING OVER 45 YEARS TUTORING YOUR CHILDREN EST. 1976

Claim Your
FREE Assessment Today!

Scan or Visit:
tutoringaldridge.co.uk

“Education is the bridge that transforms potential into achievement, unlocking the doors to a brighter future”

Welcome to Kip McGrath Aldridge

Hello, I'm **Sally**, the Centre Director and owner of Kip McGrath Aldridge. Thank you for taking the time to read this guide — I hope it gives you a helpful insight into who we are, what we do, and how we can support your child.

At Kip McGrath Aldridge, our mission is simple: **to help children grow in confidence and ability in maths and English, so they can achieve their full academic potential**. Since opening the centre in 2017, my team and I have supported more than a thousand families, and we continue to build strong, trusted relationships with several local schools.

Before opening the centre, I spent **nine years teaching maths in local secondary schools**, following an earlier career in the retail sector where my passion for excellent customer service began. After graduating from the University of Birmingham in 2001, I realised I wanted to make a difference in young people's lives, and returned to university in 2005 to complete a two-year maths PGCE.

I started tutoring from home in 2016, but quickly realised that I wanted to create something bigger — a professional, well-resourced learning environment where students could flourish. That led me to Kip McGrath, and I've never looked back.

I truly love both running the business and working directly with students. **Teaching maths is my passion**, and what matters most to me is getting to know each child personally, understanding what they find challenging, and helping them break through the barriers holding them back. Sometimes it's about unlocking understanding; sometimes it's simply about building belief and confidence.

I value the opportunity to get to know our parents, too — offering the kind of regular, meaningful feedback that isn't always possible in school settings. Many of our families have stayed with us since the day we opened, and it has been a privilege to watch their children grow.

In 2023, we fully renovated the space to create a **safe, warm and welcoming learning environment** equipped for today's learners. Alongside our in-centre lessons, we also teach a large number of students online, offering flexibility for busy families.

English Resources

"Alice: Would you tell me, please, which way I ought to go from here?

The Cheshire Cat: That depends a good deal on where you want to get to.

Alice: I don't much care where.

The Cheshire Cat: Then it doesn't much matter which way you go.

Alice: ...So long as I get somewhere.

The Cheshire Cat: Oh, you're sure to do that, if only you walk long enough."

— Lewis Carroll, Alice in Wonderland

KipMcGrath™ EDUCATIONCENTRES

Alphabet

Aa


Astronaut

Bb

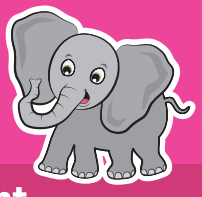
Balloon

Cc

Carrot

Dd

Dinosaur

Ee

Elephant

Ff

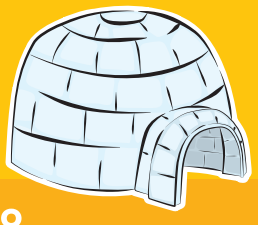
Frog

Gg

Goat

Hh

House

Ii

Igloo

Jj

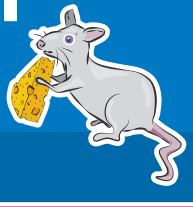
Jacket

Kk

King

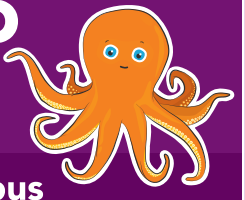
Ll

Lollipop

Mm

Mouse

Nn

Necklace

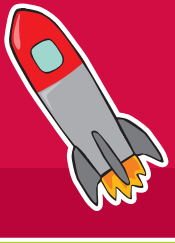
Oo

Octopus

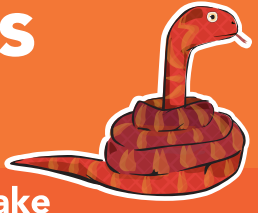
Pp

Parrot

Qq

Queen

Rr

Rocket

Ss

Snake

Tt

Turtle

Uu

Umbrella

Vv

Violin

Ww

Watermelon

Xx

foX

Yy

Yawn

Zz

Zebra

KipMcGrath™ EDUCATIONCENTRES

Parts of Speech

Every name is called a noun,
As field and fountain, street and town.

In place of noun the pronoun stands,
As he and she can clap their hands.

The adjective describes a thing,
As magic wand or bridal ring.

The verb means action, something done,
To read and write, to jump and run.

How things are done the adverbs tell,
As quickly, slowly, badly, well.

The preposition shows relation,
As in the street or at the station.

Conjunctions join, in many ways,
Sentences, words, or phrase and phrase.

The interjection cries out, "Hark!
I need an exclamation mark!"

KipMcGrath™ EDUCATIONCENTRES

Five Spelling Rules

The Floss Rule

The Rule for Doubling the Last Consonant

If a one-syllable word ends in f, l, or s after a short vowel, the final **f**, **l**, or **s** is **doubled**.

thri**ll**	cli**ff**	gla**ss**	ye**ll**
hu**ff**	hi**ll**	cla**ss**	sni**ff**

The Rabbit Rule

The Rule for Doubling The Middle Consonant

If there is one middle consonant sound after a short vowel in a two-syllable word, **the middle consonant** is **doubled**.

cot**t**on	rib**b**on	ten**n**is	pup**p**et
muf**f**in	but**t**on	hap**p**en	kit**t**en

The Doubling Rule

The Rule for Doubling the Final Consonant

If a base word ends in one short vowel followed by one consonant, the **final consonant** is **doubled** before adding a vowel suffix.

win**n**er	sit**t**ing	stop**p**ed	thin**n**est
bat**t**er	hug**g**ed	hot**t**er	begin**n**er

The Dropping Rule

If a base word ends in **final e**, the **e** is **dropped** before adding a vowel suffix.

engaging	excitable	having	becoming
hoped	sensible	stony	writing

The Changing Rule

If a base word ends in **one consonant before a final y**, the **y is changed to i** before adding a suffix that does not begin with i.

happ**i**ness	bab**i**es	plenti**f**ul	penni**l**ess
beauti**f**ul	mysteri**o**us	lazi**l**y	buri**e**d

KipMcGrath™ EDUCATIONCENTRES

Plural Nouns

Most nouns
Just add s

flower → flowers
bee → bees

Nouns ending in s, x, z, ch and sh
Add es

class → classes
box → boxes

Nouns ending in consonant – y
Change y to i and add es

cherry → cherries
library → libraries

Nouns ending in vowel – y
Add s

monkey → monkeys
toy → toys

Nouns ending in consonant – o
Add es

hero → heroes
volcano → volcanoes

Exceptions
photo → photos
piano → pianos

Nouns ending in vowel – o
Add s

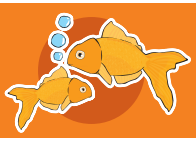
video → videos
kangaroo → kangaroos

Some nouns change spelling when made plural

mouse → **mice**
child → **children**

Some nouns <u>do not</u> change spelling when made plural

reindeer → **reindeer**
fish → **fish**



Nouns ending in f or fe
Change f to v and add es

elf → elves
wife → wives

Exceptions
chef → chefs
belief → beliefs

KipMcGrath EDUCATIONCENTRES

Conjunctions

Coordinating conjunctions

Connect words, phrases or clauses of equal importance (such as complete sentences).

(FANBOYS)

- **F** is for "for"
- **A** is for "and"
- **N** is for "nor"
- **B** is for "but"
- **O** is for "or"
- **Y** is for "yet"
- **S** is for "so"

Example:
It was raining **so** I took my umbrella.

Example:
We wanted to swim **but** it was too cold.

Subordinating conjunctions

Link dependent clauses to independent clauses. A subordinate clause will not make sense on its own and is dependent on the main clause.

after	however	because
although	meanwhile	whose
as	now	whoever
therefore	even if	unless
as long as	even	while
as much as	neither	before
as soon as	provided	why
as far as	except	so that
that	if	until
by the time	if then	how
either	if only	than
consequently	just as	till
unlike	where	whenever
despite	wherever	supposing
in case	whereas	when
nonetheless	hence	or not
though	whether	what
ultimately	since	still

Example:
I was late to school **because** there was traffic.

Example:
I need to make my lunch **before** I leave for work.

Correlative conjunctions

Always come in pairs to link two similar elements within a sentence.

- both / and
- whether / or
- not only / but also
- either / or
- neither / nor
- just / so
- the / the
- as / as
- if / then
- rather / than
- no sooner / than
- such / that
- so / that

Example:
Not only did they block the road **but** they **also** kept the onlookers back.

Example:
The kids would **rather** eat pancakes **than** scrambled eggs.

KipMcGrath™ EDUCATIONCENTRES

Grammatical Terms

Prefix	A **prefix** is added to the **beginning** of a word to change its meaning.
Examples	dis**a**ppear, in**f**ormal, re**p**aint, mis**i**nterpret, i**l**legible, im**p**olite, un**e**qual, pre**v**iew, ex**c**ommunicate

Suffix	A **suffix** is added to the **end** of a word to change its meaning.
Examples	wonder**f**ul, sens**i**ble, mysteri**o**us, fear**l**ess, reason**a**ble, child**i**sh, fit**n**ess, develop**m**ent, laugh**i**ng

Synonym	A **synonym** is a word **similar** in meaning to another word.
Examples	turn – rotate, enquire – question, peaceful – tranquil, fast – speedy, dwelling – house, sad – unhappy, eat – dine, big – large, frequent – often

Antonym	An **antonym** is a word **opposite** in meaning to another word.
Examples	big – small, love – hate, follow – lead, common – rare, rough – smooth, before – after, fast – slow, less – more, ugly – pretty

Homophone	A **homophone** is a word that **sounds the same** as another word but is spelt differently and has a different meaning.
Examples	would – wood, whole – hole, knew – new, tow – toe, hoarse – horse, mail – male, sun – son, maid – made, steal – steel

Compound Word	A **compound word** is formed when **two or more words** come together to form a new word.
Examples	after + noon – afternoon, good + bye – goodbye, table + spoon – tablespoon, to + get + her – together, moon + light – moonlight, bath + tub – bathtub

KipMcGrath™ EDUCATIONCENTRES

Language Techniques

Alliteration	**When words that begin with the same consonant sound are placed close to one another in a sentence.** *e.g. He is a **c**apable, **c**areful **c**arpenter.*
Allusion	**A brief and indirect reference to a person, place, thing or significant idea.** *e.g. She felt like she had won the golden ticket.*
Ambiguity	**A word or phrase that could have more than one meaning, or could be interpreted in more than one way.** *e.g. The duck was ready for dinner.*
Assonance	**When words that have the same vowel sound are repeated and placed close to one another in a text.** *e.g. The r**ai**n in Sp**ai**n falls m**ai**nly on the pl**ai**n.*
Cliché	**A phrase or expression that is used so much in everyday life, it is overused and no longer interesting.** *e.g. in the nick of time*
Colloquial	**Language in the form of everyday speech. Casual and relaxed, like a conversation.**
Connotation	**An implied meaning and association of a word, rather than the exact meaning.** *e.g. 'aroma' has a positive connotation, even though its exact meaning is 'smell'.*
Denotation	**The dictionary definition of a word.**
Emotive language	**Words or phrases that have been chosen to evoke an emotional response.**
Euphemism	**A word or phrase used to avoid saying an offensive or unpleasant word.** *e.g. saying 'passed away' instead of 'died'.*
Figurative / literal	**Figurative language uses words that do not mean exactly what they say. This can involve a range of language devices, such as using metaphor, simile, personification or hyperbole. Literal language uses words that mean exactly what is written.** *e.g. Younger generations are creating mountains of debt with plastic money.* *Vs. Young people are accruing large amounts of debt on credit cards.*
Formal	**Language used in professional or academic texts. Generally does not use contractions (don't), colloquial language or first person pronouns (I, we).**
Hyperbole	**A statement using deliberate exaggeration for expressive or comic effect.** *e.g. I've told you that a million times.*
Idiom	**A phrase combining two or more words that is understood to mean something very different from the actual meaning of these words.** *e.g. Play your cards right.*
Imperative	**A command or instruction, where the mood of the verb is important.** *e.g. Listen!*
Irony	**Saying one thing while really meaning another, contradictory thing.** *e.g. Great! Now it's broken!*

KipMcGrath™ EDUCATIONCENTRES

Language Techniques

Jargon	**Particular words or expressions used by a profession or group, that outsiders find difficult to understand.**
Juxtaposition	**Two things placed close to each other in order to be seen in contrast. Used to compare, emphasise or highlight a particular aspect.**
Litotes	**Using negative language to express a positive statement.** *e.g. You're not wrong.*
Metaphor	**A word or phrase that is used to make a comparison between unlike things.** *e.g. He is a shining star.*
Neologism	**A newly created word or term.** *e.g. chillax*
Onomatopoeia	**A word that imitates the sound it makes.** *e.g. tick tock*
Oxymoron	**A figure of speech in which two opposites are combined to create an effect.** *e.g. open secret*
Personification	**Giving human traits *(qualities, feelings, actions, or characteristics)* to animals, objects or ideas to create an image.** *e.g. The stars winked at me.*
Prose / poetry	**Language with a natural flow, following spoken grammatical structures. Different to poetry, where language follows a distinct style and rhythm.**
Pun	**Using words in a humorous way that suggests two or more of its meanings.** *e.g. We got the ball rolling at the bowling alley.*
Rhetorical questions	**Asking a question for a purpose other than getting an answer.** *e.g. Is this some kind of joke?*
Rhyme	**The repetition of similar sounding words, often at the end of lines in poems or songs.**
Sarcasm	**Language that means the opposite of what it seems to say, in a way intended to mock or insult someone.**
Simile	**Compares one thing directly to another. You can quickly identify these when you see the words like or as.** *e.g. I was as cold as ice.*
Stereotype	**Where a character type fits a particular template. Individuals or groups are defined in narrow, oversimplified, terms.**
Superlative	**An adjective or adverb indicates that something has more of a certain quality than anything else.** *e.g. the **tallest** tree*
Symbolism	**An object used to represent an idea, quality or meaning, which is different from its literal meaning.** *e.g. a rainbow symbolises hope.*

KipMcGrath EDUCATIONCENTRES

Five Part Story Mountain

3. Problem

Now you're at the peak of the story, referred to as the problem, and our characters have come across a great event or an obstacle.

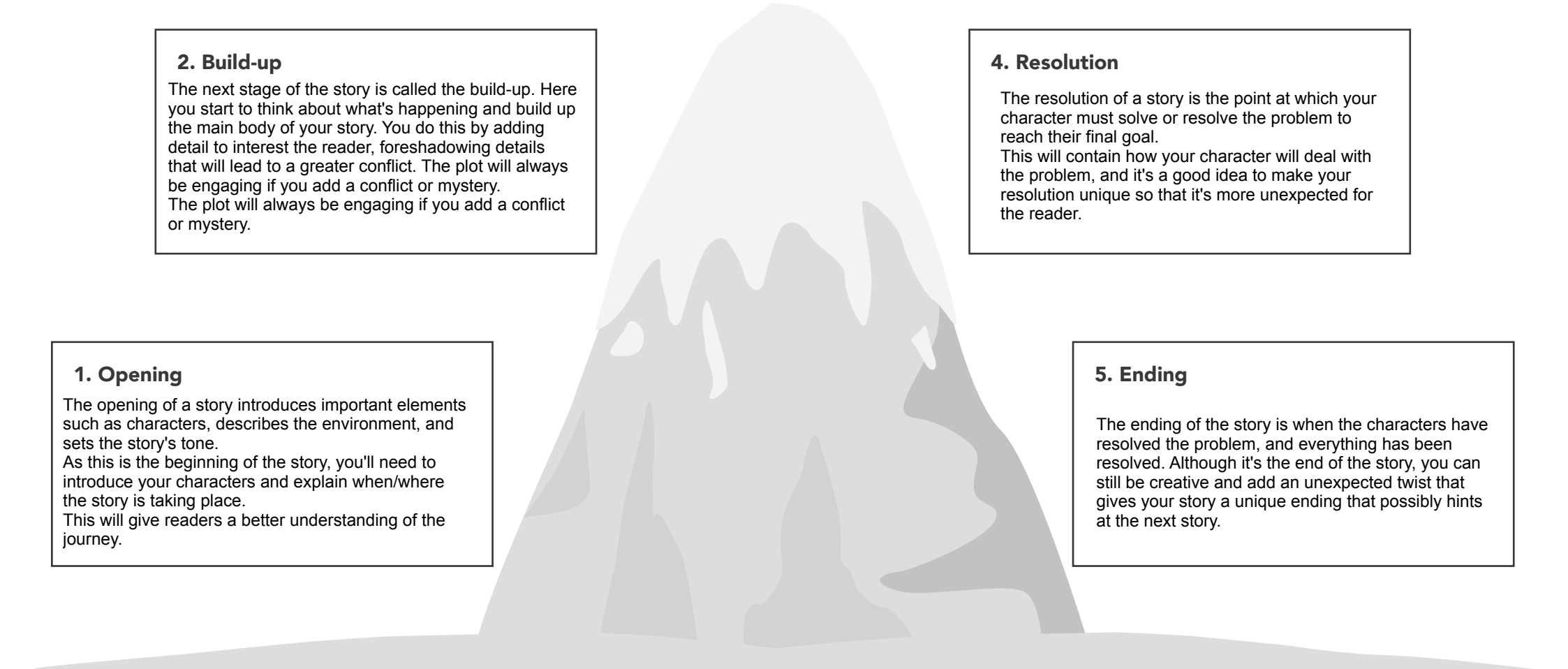
This is the most exciting aspect of the story, but make sure to keep your readers guessing.

2. Build-up

The next stage of the story is called the build-up. Here you start to think about what's happening and build up the main body of your story. You do this by adding detail to interest the reader, foreshadowing details that will lead to a greater conflict. The plot will always be engaging if you add a conflict or mystery.
The plot will always be engaging if you add a conflict or mystery.

4. Resolution

The resolution of a story is the point at which your character must solve or resolve the problem to reach their final goal.
This will contain how your character will deal with the problem, and it's a good idea to make your resolution unique so that it's more unexpected for the reader.



1. Opening

The opening of a story introduces important elements such as characters, describes the environment, and sets the story's tone.
As this is the beginning of the story, you'll need to introduce your characters and explain when/where the story is taking place.
This will give readers a better understanding of the journey.

5. Ending

The ending of the story is when the characters have resolved the problem, and everything has been resolved. Although it's the end of the story, you can still be creative and add an unexpected twist that gives your story a unique ending that possibly hints at the next story.

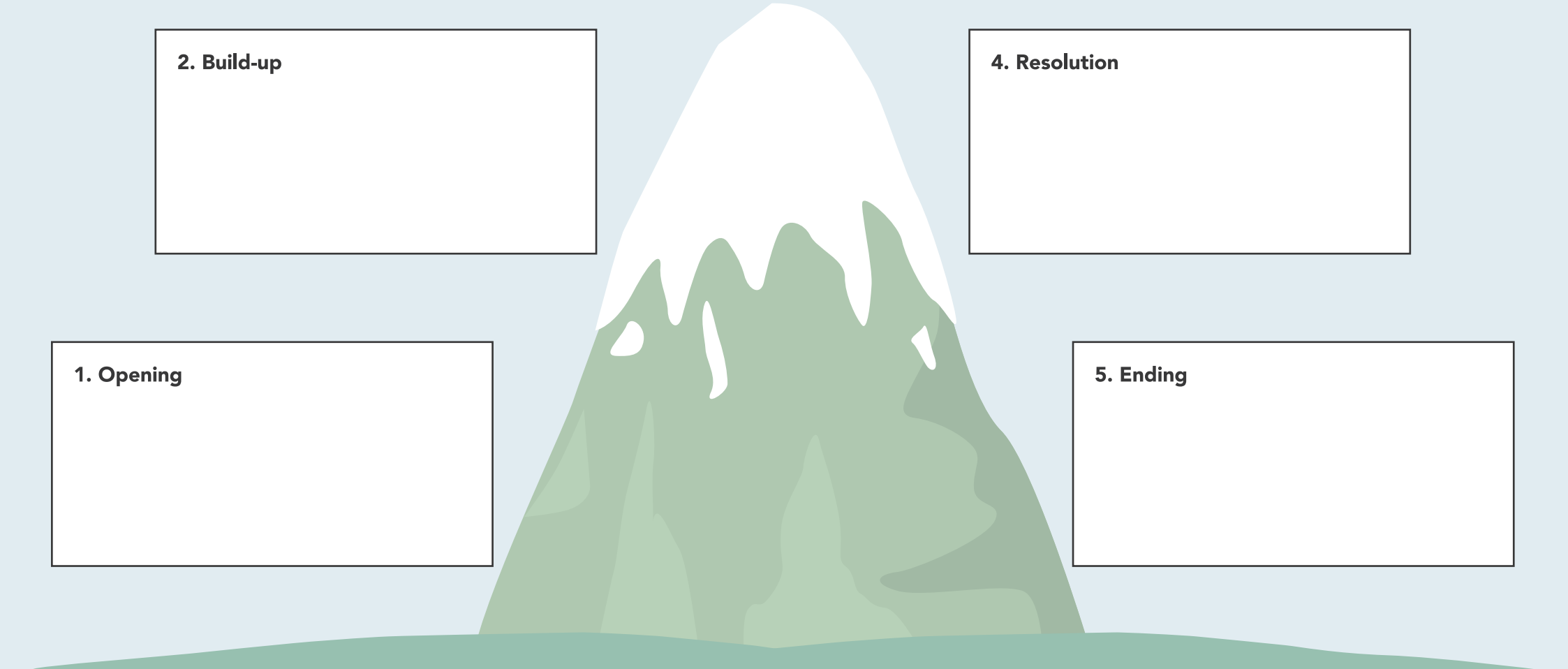
KipMcGrath EDUCATIONCENTRES

Five Part Story Mountain

3. Problem

2. Build-up

4. Resolution



1. Opening

5. Ending

Maths Resources

That is, like having a penny, doubling it every day. In a month, you'll be a millionaire.

— Sulu, Star Trek

KipMcGrath EDUCATIONCENTRES **Numbers**

HUNDREDS CHART

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

KipMcGrath EDUCATIONCENTRES

Times Tables

X	1	2	3	4	5	6	7	8	9	10	11	12
1	1	2	3	4	5	6	7	8	9	10	11	12
2	2	4	6	8	10	12	14	16	18	20	22	24
3	3	6	9	12	15	18	21	24	27	30	33	36
4	4	8	12	16	20	24	28	32	36	40	44	48
5	5	10	15	20	25	30	35	40	45	50	55	60
6	6	12	18	24	30	36	42	48	54	60	66	72
7	7	14	21	28	35	42	49	56	63	70	77	84
8	8	16	24	32	40	48	56	64	72	80	88	96
9	9	18	27	36	45	54	63	72	81	90	99	108
10	10	20	30	40	50	60	70	80	90	100	110	120
11	11	22	33	44	55	66	77	88	99	110	121	132
12	12	24	36	48	60	72	84	96	108	120	132	144

multiply ×
- duplicate
- product
- lots of
- times
- groups of

divide ÷
- distribute
- separate
- split up
- share
- quotient

add +
- reckon
- tally
- plus
- sum
- altogether

subtract −
- take away
- reduce
- minus
- less
- difference

KipMcGrath EDUCATIONCENTRES

Times Tables

1 TIMES TABLE

1 X 1 = 1
2 X 1 = 2
3 X 1 = 3
4 X 1 = 4
5 X 1 = 5
6 X 1 = 6
7 X 1 = 7
8 X 1 = 8
9 X 1 = 9
10 X 1 = 10
11 X 1 = 11
12 X 1 = 12

2 TIMES TABLE

1 X 2 = 2
2 X 2 = 4
3 X 2 = 6
4 X 2 = 8
5 X 2 = 10
6 X 2 = 12
7 X 2 = 14
8 X 2 = 16
9 X 2 = 18
10 X 2 = 20
11 X 2 = 22
12 X 2 = 24

3 TIMES TABLE

1 X 3 = 3
2 X 3 = 6
3 X 3 = 9
4 X 3 = 12
5 X 3 = 15
6 X 3 = 18
7 X 3 = 21
8 X 3 = 24
9 X 3 = 27
10 X 3 = 30
11 X 3 = 33
12 X 3 = 36

4 TIMES TABLE

1 X 4 = 4
2 X 4 = 8
3 X 4 = 12
4 X 4 = 16
5 X 4 = 20
6 X 4 = 24
7 X 4 = 28
8 X 4 = 32
9 X 4 = 36
10 X 4 = 40
11 X 4 = 44
12 X 4 = 48

5 TIMES TABLE

1 X 5 = 5
2 X 5 = 10
3 X 5 = 15
4 X 5 = 20
5 X 5 = 25
6 X 5 = 30
7 X 5 = 35
8 X 5 = 40
9 X 5 = 45
10 X 5 = 50
11 X 5 = 55
12 X 5 = 60

6 TIMES TABLE

1 X 6 = 6
2 X 6 = 12
3 X 6 = 18
4 X 6 = 24
5 X 6 = 30
6 X 6 = 36
7 X 6 = 42
8 X 6 = 48
9 X 6 = 54
10 X 6 = 60
11 X 6 = 66
12 X 6 = 72

7 TIMES TABLE

1 X 7 = 7
2 X 7 = 14
3 X 7 = 21
4 X 7 = 28
5 X 7 = 35
6 X 7 = 42
7 X 7 = 49
8 X 7 = 56
9 X 7 = 63
10 X 7 = 70
11 X 7 = 77
12 X 7 = 84

8 TIMES TABLE

1 X 8 = 8
2 X 8 = 16
3 X 8 = 24
4 X 8 = 32
5 X 8 = 40
6 X 8 = 48
7 X 8 = 56
8 X 8 = 64
9 X 8 = 72
10 X 8 = 80
11 X 8 = 88
12 X 8 = 96

9 TIMES TABLE

1 X 9 = 9
2 X 9 = 18
3 X 9 = 27
4 X 9 = 36
5 X 9 = 45
6 X 9 = 54
7 X 9 = 63
8 X 9 = 72
9 X 9 = 81
10 X 9 = 90
11 X 9 = 99
12 X 9 = 108

10 TIMES TABLE

1 X 10 = 10
2 X 10 = 20
3 X 10 = 30
4 X 10 = 40
5 X 10 = 50
6 X 10 = 60
7 X 10 = 70
8 X 10 = 80
9 X 10 = 90
10 X 10 = 100
11 X 10 = 110
12 X 10 = 120

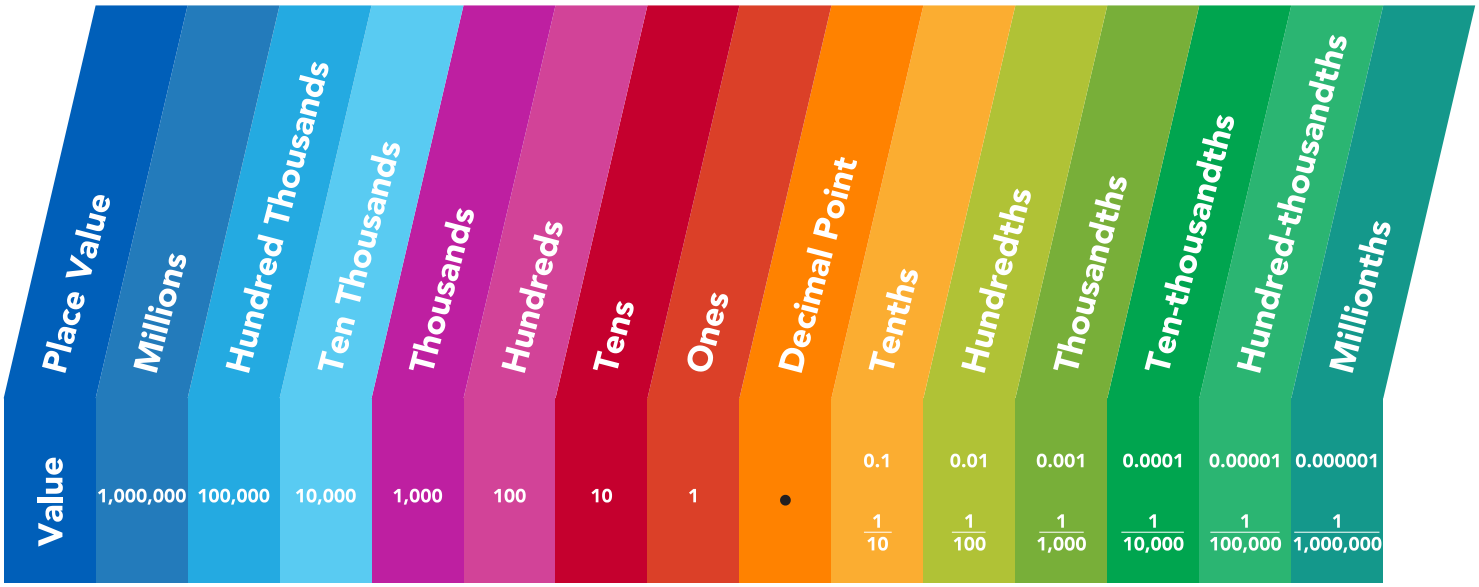
11 TIMES TABLE

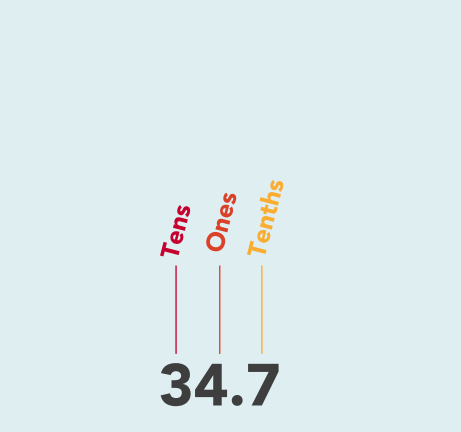
1 X 11 = 11
2 X 11 = 22
3 X 11 = 33
4 X 11 = 44
5 X 11 = 55
6 X 11 = 66
7 X 11 = 77
8 X 11 = 88
9 X 11 = 99
10 X 11 = 110
11 X 11 = 121
12 X 11 = 132

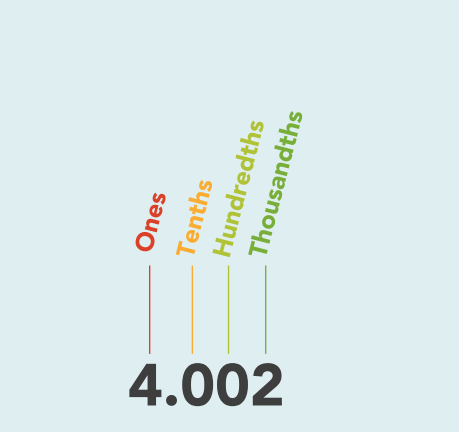
12 TIMES TABLE

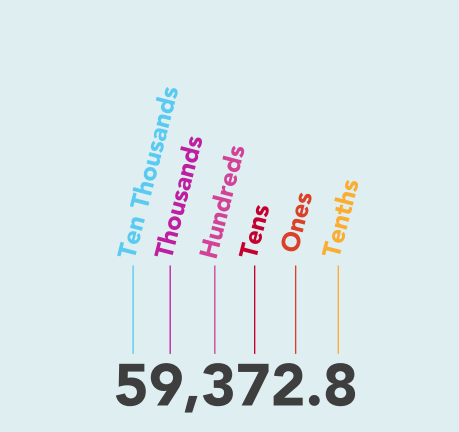
1 X 12 = 12
2 X 12 = 24
3 X 12 = 36
4 X 12 = 48
5 X 12 = 60
6 X 12 = 72
7 X 12 = 84
8 X 12 = 96
9 X 12 = 108
10 X 12 = 120
11 X 12 = 132
12 X 12 = 144

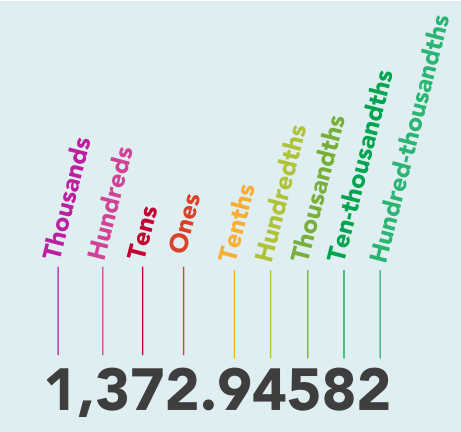
KipMcGrath EDUCATIONCENTRES — Place Value

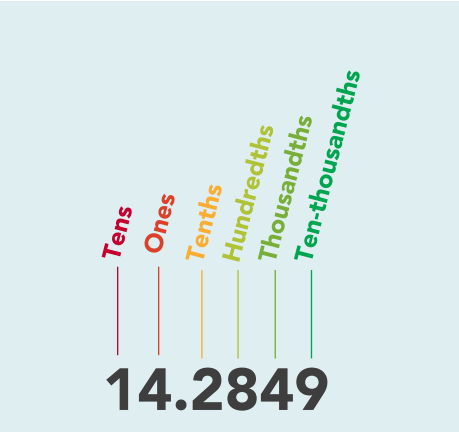


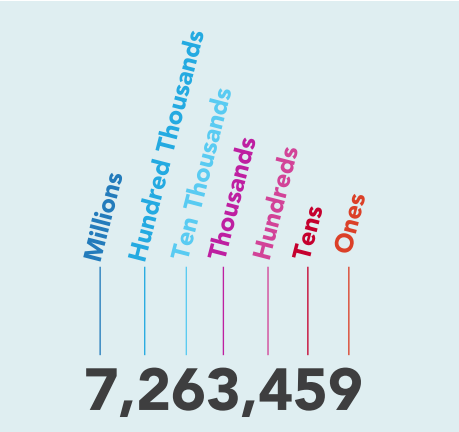










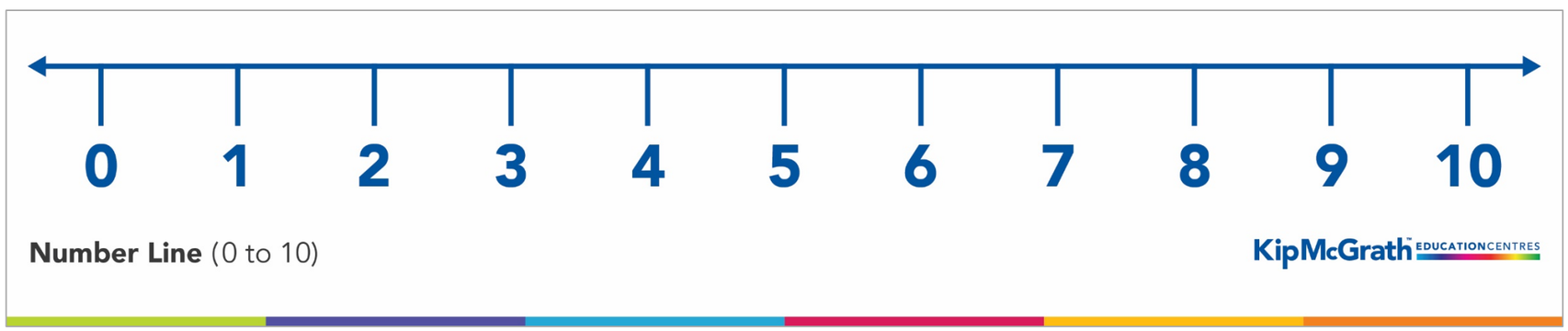


DIVIDING		MULTIPLYING	
÷ 10	Decimal moves 1 place LEFT	× 10	Decimal moves 1 place RIGHT
÷ 100	Decimal moves 2 places LEFT	× 100	Decimal moves 2 places RIGHT
÷ 1,000	Decimal moves 3 places LEFT	× 1,000	Decimal moves 3 places RIGHT
÷ 10,000	Decimal moves 4 places LEFT	× 10,000	Decimal moves 4 places RIGHT
÷ 100,000	Decimal moves 5 places LEFT	× 100,000	Decimal moves 5 places RIGHT
÷ 1,000,000	Decimal moves 6 places LEFT	× 1,000,000	Decimal moves 6 places RIGHT

Number Lines Summary

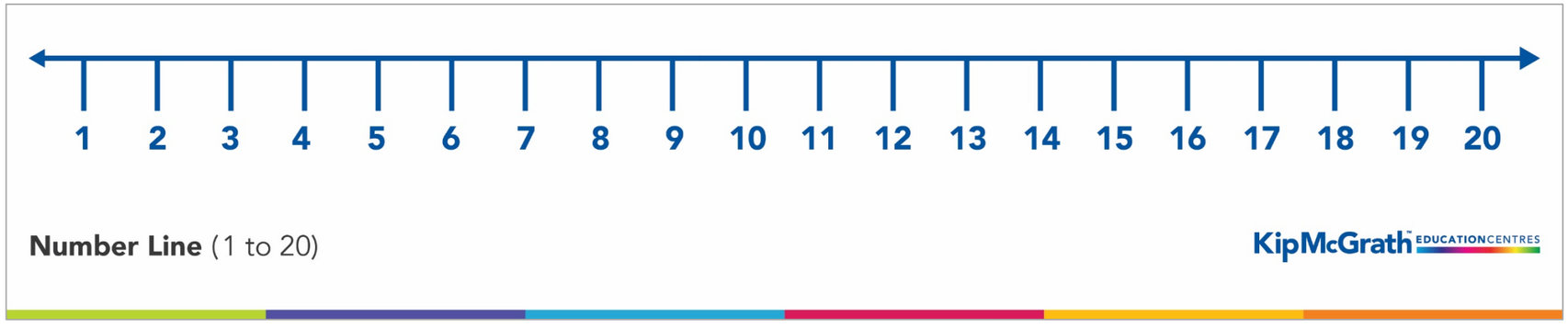
0 to 10

(297mm wide x 60mm high)



1 to 20

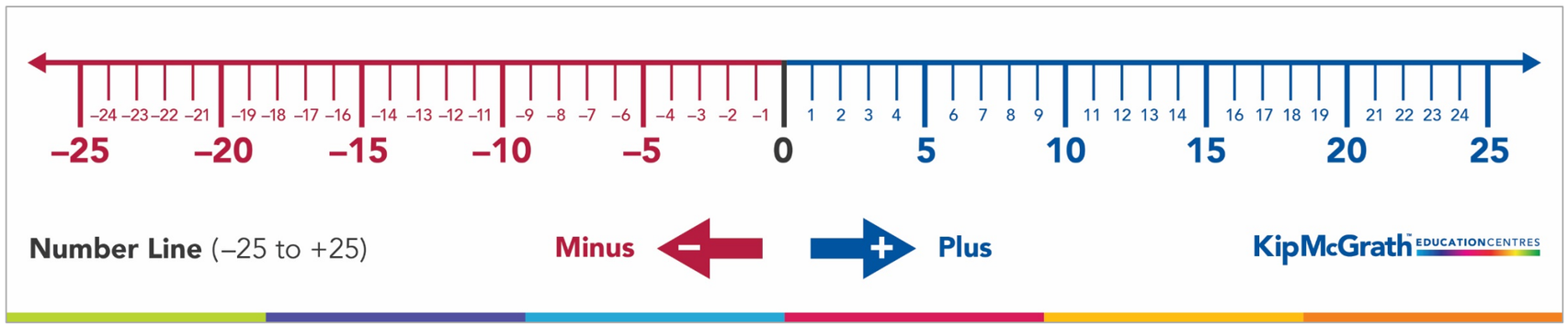
(297mm wide x 60mm high)



Number Lines Summary

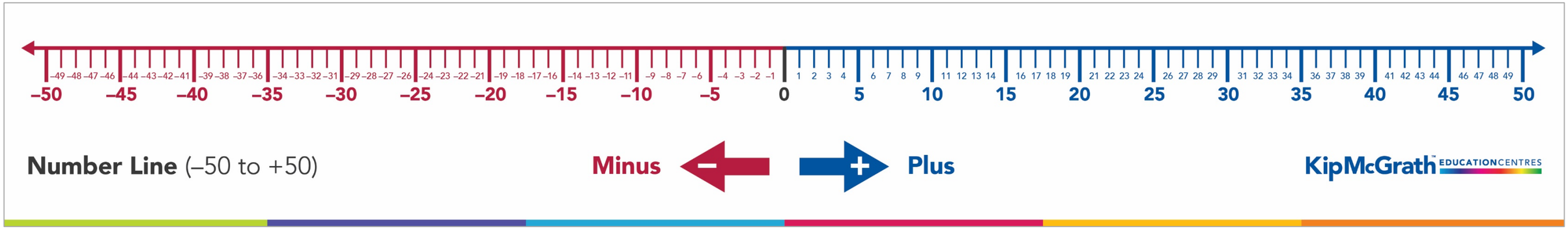
-25 to +25

(297mm wide x 60mm high)



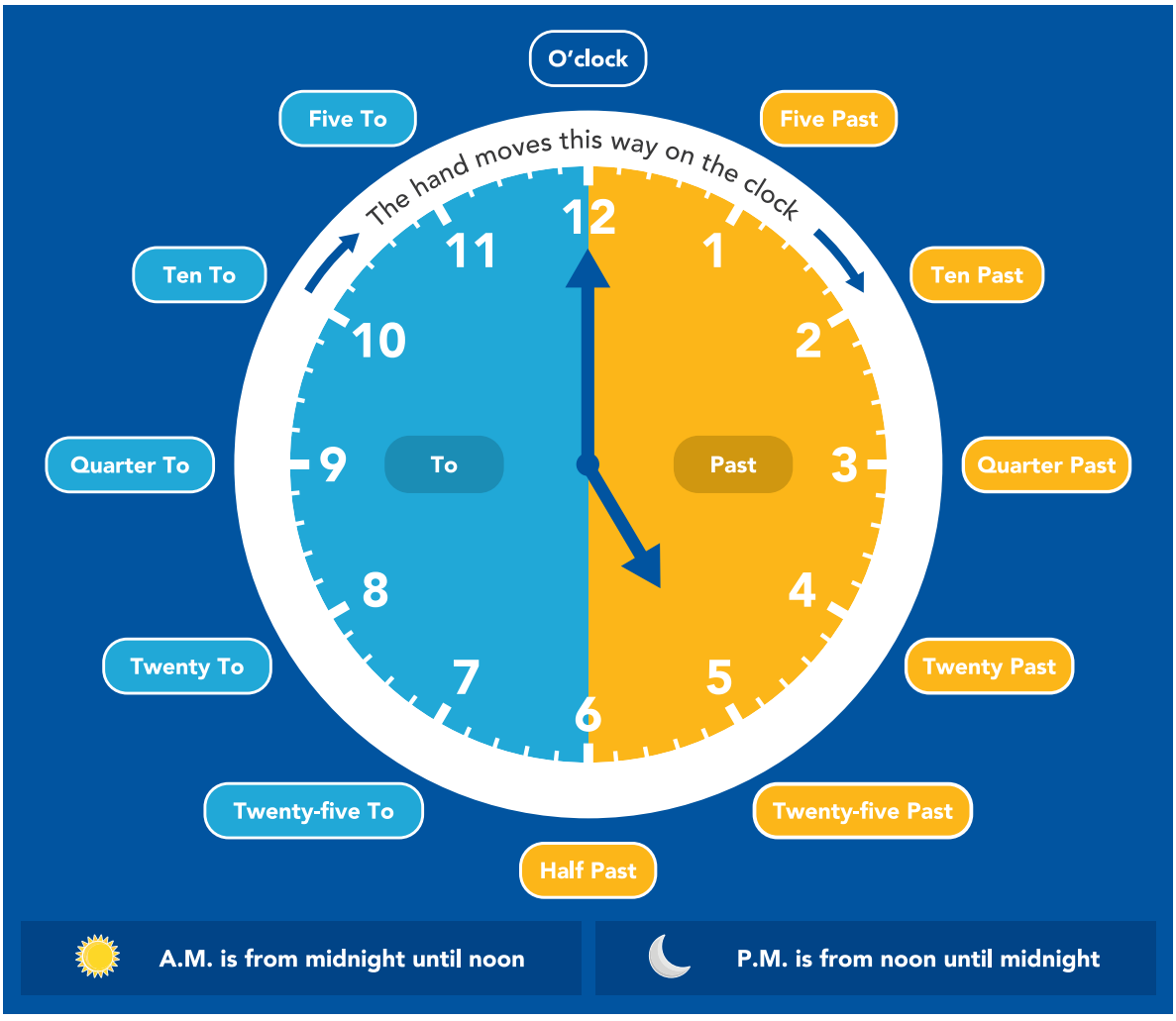
-50 to +50

(420mm wide x 60mm high)



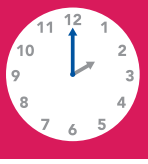
KipMcGrath EDUCATIONCENTRES

Telling The Time



The little hand shows the hour

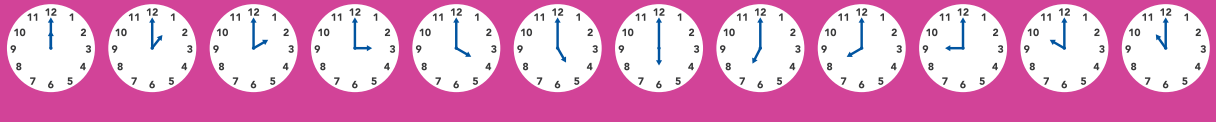
The big hand shows the minutes



Each line shows one minute

The number shows the hour

Analogue Time
A.M. and P.M



Digital Time A.M.	00:00	01:00	02:00	03:00	04:00	05:00	06:00	07:00	08:00	09:00	10:00	11:00

Digital Time P.M.	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00

Telling time after the hour

12:05	12:15	12:25
Five Past Twelve	Fifteen Past Twelve	Twenty-five Past Twelve

Telling time before the hour

12:35	12:45	12:55
Twenty-five To One	Quarter To One	Five To One

KipMcGrath™ EDUCATIONCENTRES

Units of Time

January	31 days
February	28/29 days
March	31 days
April	30 days
May	31 days
June	30 days
July	31 days
August	31 days
September	30 days
October	31 days
November	30 days
December	31 days

Sunday

Monday

Tuesday

Wednesday

Thursday

Friday

Saturday

Autumn

Winter

Summer

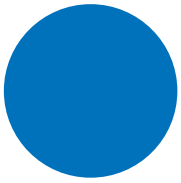
Spring

60 seconds	=	1 minute
60 minutes	=	1 hour
24 hours	=	1 day
7 days	=	1 week
52 weeks	=	1 year

365 days	=	1 year
12 months	=	1 year
Decade	=	10 years
Century	=	100 years
Millennium	=	1,000 years

KipMcGrath EDUCATIONCENTRES

Fractions

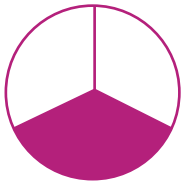


One Whole

1

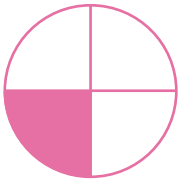
Halves

$\frac{1}{2}$	$\frac{1}{2}$



Thirds

$\frac{1}{3}$	$\frac{1}{3}$	$\frac{1}{3}$



Quarters

$\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{4}$

Fifths

$\frac{1}{5}$	$\frac{1}{5}$	$\frac{1}{5}$	$\frac{1}{5}$	$\frac{1}{5}$

Sixths

$\frac{1}{6}$	$\frac{1}{6}$	$\frac{1}{6}$	$\frac{1}{6}$	$\frac{1}{6}$	$\frac{1}{6}$

Eighths

$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$

Tenths

$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$

Twelfths

$\frac{1}{12}$	$\frac{1}{12}$	$\frac{1}{12}$	$\frac{1}{12}$	$\frac{1}{12}$	$\frac{1}{12}$	$\frac{1}{12}$	$\frac{1}{12}$	$\frac{1}{12}$	$\frac{1}{12}$	$\frac{1}{12}$	$\frac{1}{12}$

KipMcGrath™ EDUCATIONCENTRES

FRACTIONS
ADDITION AND SUBTRACTION

ADDITION +

FRACTIONS WITH LIKE DENOMINATORS

STEP 1 Keep denominators the same

$$\frac{4}{8} + \frac{2}{8}$$

STEP 2 Add numerators

$$\frac{4}{8} + \frac{2}{8} = \frac{6}{8}$$

STEP 3 Simplify

$$\frac{6}{8} = \frac{3}{4}$$

FRACTIONS WITH UNLIKE DENOMINATORS

STEP 1 Find the lowest common denominator and change to equivalent fractions

$$\frac{2}{4}\ {}^{\times 3}_{\times 3} + \frac{1}{6}\ {}^{\times 2}_{\times 2} = \frac{6}{12} + \frac{2}{12}$$

*The lowest common denominator of 4 and 6 is 12

STEP 2 Add numerators

$$\frac{6}{12} + \frac{2}{12} = \frac{8}{12}$$

STEP 3 Simplify

$$\frac{8}{12} = \frac{2}{3}$$

MIXED NUMBERS

STEP 1 Convert to improper fractions

$$2\frac{1}{2} + 1\frac{1}{5} = \frac{5}{2} + \frac{6}{5}$$

STEP 2 Find the lowest common denominator and change to equivalent fractions

$$\frac{5}{2}\ {}^{\times 5}_{\times 5} + \frac{6}{5}\ {}^{\times 2}_{\times 2} = \frac{25}{10} + \frac{12}{10}$$

*The lowest common denominator of 2 and 5 is 10

STEP 3 Add numerators

$$\frac{25}{10} + \frac{12}{10} = \frac{37}{10}$$

STEP 4 Simplify

$$\frac{37}{10} = 3\frac{7}{10}$$

SUBTRACTION −

FRACTIONS WITH LIKE DENOMINATORS

STEP 1 Keep denominators the same

$$\frac{5}{12} - \frac{2}{12}$$

STEP 2 Subtract the numerators

$$\frac{5}{12} - \frac{2}{12} = \frac{3}{12}$$

STEP 3 Simplify

$$\frac{3}{12} = \frac{1}{4}$$

FRACTIONS WITH UNLIKE DENOMINATORS

STEP 1 Find the lowest common denominator and change to equivalent fractions

$$\frac{2}{3}\ {}^{\times 2}_{\times 2} - \frac{1}{6} = \frac{4}{6} - \frac{1}{6}$$

*The lowest common denominator of 3 and 6 is 6

STEP 2 Subtract the numerators

$$\frac{4}{6} - \frac{1}{6} = \frac{3}{6}$$

STEP 3 Simplify

$$\frac{3}{6} = \frac{1}{2}$$

MIXED NUMBERS

STEP 1 Convert to improper fractions

$$2\frac{2}{3} - 1\frac{1}{2} = \frac{8}{3} - \frac{3}{2}$$

STEP 2 Find the lowest common denominator and change to equivalent fractions

$$\frac{8}{3}\ {}^{\times 2}_{\times 2} - \frac{3}{2}\ {}^{\times 3}_{\times 3} = \frac{16}{6} - \frac{9}{6}$$

*The lowest common denominator of 3 and 2 is 6

STEP 3 Subtract the numerators

$$\frac{16}{6} - \frac{9}{6} = \frac{7}{6}$$

STEP 4 Simplify

$$\frac{7}{6} = 1\frac{1}{6}$$

KipMcGrath™ EDUCATIONCENTRES

All About Fractions

Proper Fraction

$\frac{2}{3}$ ⟵ Numerator
$\frac{2}{3}$ ⟵ Denominator

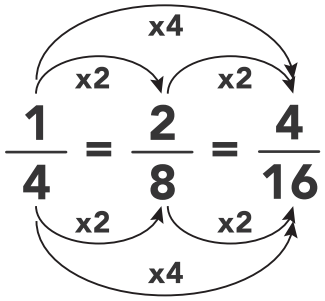
Mixed Number

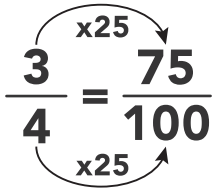
$4\frac{3}{5}$ Contains a whole number and a fraction

Improper Fraction

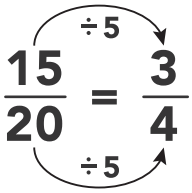
$\frac{12}{10}$ When the numerator is larger than the denominator

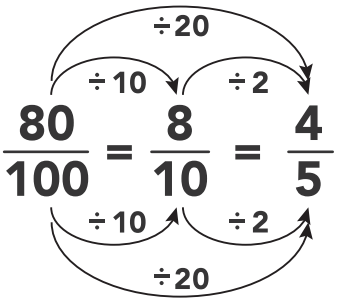
Equivalent Fractions



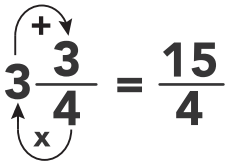


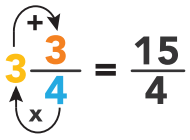
Simplifying Fractions





Converting a mixed number to an improper fraction



Step 1	Step 2	Step 3	Step 4
Identify the whole number, numerator and denominator 	Multiply the denominator by the whole number 4 x 3 = 12	Add the numerator 12 + 3 = 15	Keep the denominator the same $3\frac{3}{4} = \frac{15}{4}$

Converting an improper fraction to a mixed number

$\frac{15}{4} = 3\frac{3}{4}$

Step 1	Step 2	Step 3	Step 4
Divide the numerator by the denominator $\frac{15}{4} = 4\overline{)15}^{3r3}$	This becomes the whole number $\frac{15}{4} = 4\overline{)15}^{3r3}$	This becomes the numerator $\frac{15}{4} = 4\overline{)15}^{3r3}$	Keep the denominator the same $\frac{15}{4} = 3\frac{3}{4}$

KipMcGrath™ EDUCATIONCENTRES

FRACTIONS
MULTIPLY AND DIVIDE

MULTIPLY ×

2 FRACTIONS $\frac{2}{8} \times \frac{1}{2}$

STEP 1 Multiply numerators

$$\frac{2}{8} \times \frac{1}{2} = \frac{2}{}$$

STEP 2 Multiply denominators

$$\frac{2}{8} \times \frac{1}{2} = \frac{2}{16}$$

STEP 3 Simplify

$$\frac{2}{16} = \frac{1}{8}$$

FRACTION & WHOLE NUMBER $5 \times \frac{3}{4}$

STEP 1 Rewrite the whole number as an improper fraction

$$5 = \frac{5}{1}$$

STEP 2 Multiply across

$$\frac{5}{1} \times \frac{3}{4} = \frac{15}{4}$$

STEP 3 Simplify

$$\frac{15}{4} = 3\frac{3}{4}$$

MIXED NUMBERS $2\frac{1}{3} \times \frac{7}{8}$

STEP 1 Convert mixed numbers to improper fractions

$$2\frac{1}{3} = \frac{7}{3}$$

STEP 2 Multiply across

$$\frac{7}{3} \times \frac{7}{8} = \frac{49}{24}$$

STEP 3 Simplify

$$\frac{49}{24} = 2\frac{1}{24}$$

DIVIDE ÷

2 FRACTIONS $\frac{1}{2} \div \frac{3}{4}$

STEP 1 Find the reciprocal of the 2nd number

$$\frac{1}{2} \div \frac{3}{4} \quad \frac{4}{3}$$

STEP 2 Replace ÷ with ×

$$\frac{1}{2} \times \frac{4}{3}$$

STEP 3 Multiply across

$$\frac{1}{2} \times \frac{4}{3} = \frac{4}{6}$$

STEP 4 Simplify

$$\frac{4}{6} = \frac{2}{3}$$

WHOLE NUMBER BY A FRACTION $5 \div \frac{1}{2}$

STEP 1 Convert whole number to improper fraction

$$5 = \frac{5}{1}$$

STEP 2 Find the reciprocal of the 2nd number

$$\frac{5}{1} \div \frac{1}{2} \quad \frac{2}{1}$$

STEP 3 Replace ÷ with × now multiply across

$$\frac{5}{1} \times \frac{2}{1} = \frac{10}{1}$$

STEP 4 Simplify

$$\frac{10}{1} = 10$$

FRACTION BY A WHOLE NUMBER $\frac{2}{3} \div 4$

STEP 1 Convert whole number to improper fraction

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

STEP 2 Find the reciprocal of the 2nd number

$$\frac{2}{3} \div \frac{4}{1} \quad \frac{1}{4}$$

STEP 3 Replace ÷ with × now multiply across

$$\frac{2}{3} \times \frac{1}{4} = \frac{2}{12}$$

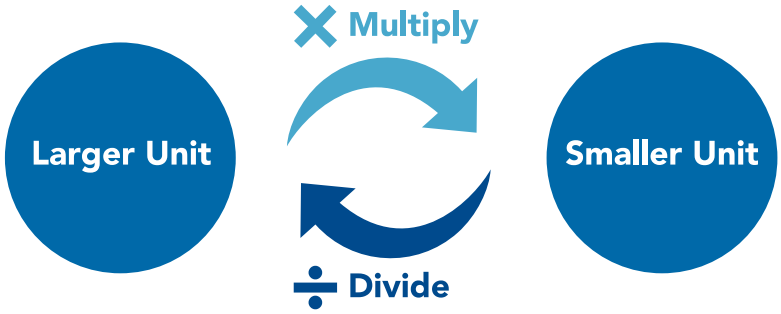
STEP 4 Simplify

$$\frac{2}{12} = \frac{1}{6}$$

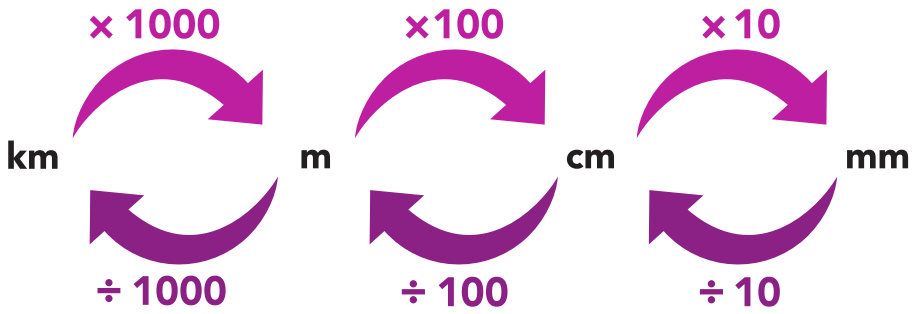
KipMcGrath EDUCATIONCENTRES

Converting Units of Measurement

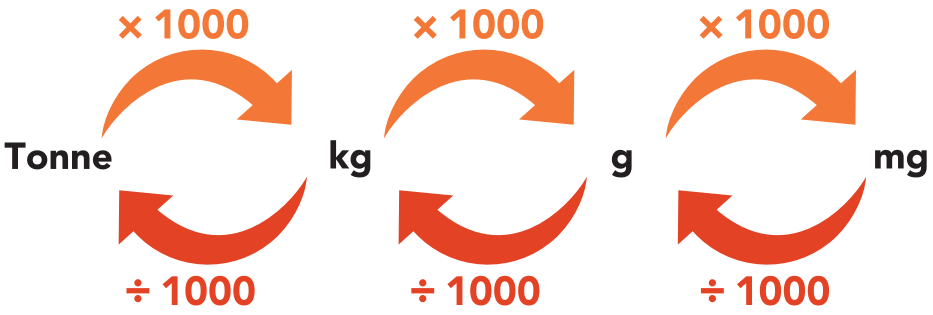
Rule



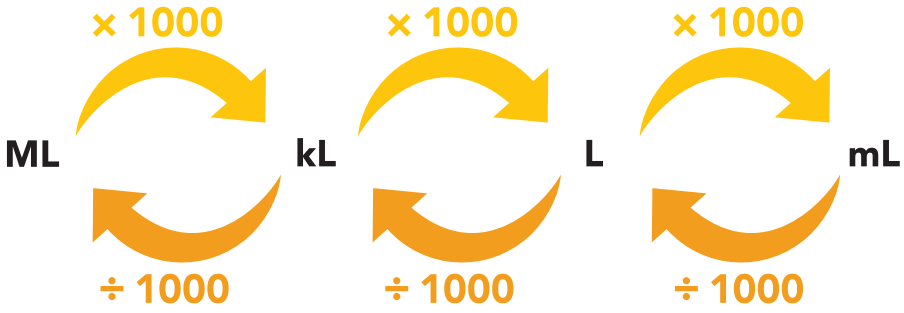
Length



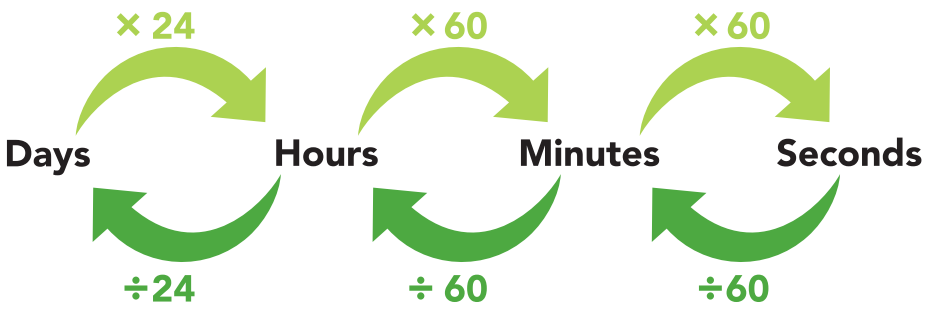
Mass



Capacity



Time



KipMcGrath™ EDUCATIONCENTRES

Units of Measurement

Mass

A measurement of how much matter an object has.

1 gram	=	1000 milligrams
1 kilogram	=	1000 grams
1 tonne	=	1000 kilograms

Length

A measurement of an object from one end to the other.

1 centimetre	=	10 millimetres
1 metre	=	100 centimetres
1 kilometre	=	1000 metres

Volume

A measurement of how much liquid a container can hold.

1 millilitre	=	0.001 litre
1 decilitre	=	0.1 litres
1 hectolitre	=	100 litres
1 kilolitre	=	1000 litres

Data

A measurement of the size of an information file on a computer.

1 byte	=	8 bits
1 kilobyte	=	1024 bytes
1 megabyte	=	1024 kilobytes
1 gigabyte	=	1024 megabytes

Temperature

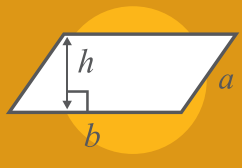
A measurement of how hot or cold an object is.

The metric system uses degrees Celsius to measure temperature.

The boiling point of water is 100°C.

The freezing point of water is 0°C.

Area



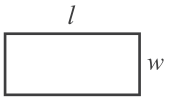
A measurement of the space inside a 2D shape.

Area is expressed in:
centimetres^2
metres^2
kilometres^2

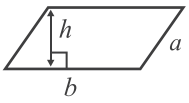
KipMcGrath™ EDUCATIONCENTRES Maths Formulae

Areas

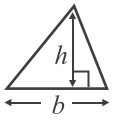
Rectangle = $l \times w$



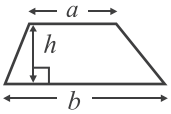
Parallelogram = $b \times h$



Triangle = $\frac{1}{2} b \times h$

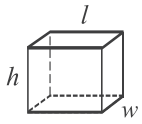


Trapezium = $\frac{1}{2} (a+b) h$

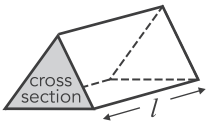


Volumes

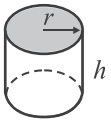
Cuboid = $l \times w \times h$



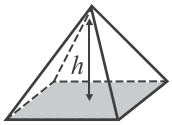
Prism = area of cross section × l



Cylinder = $\pi r^2 h$



Pyramid = $\frac{1}{3}$ x area of base × h



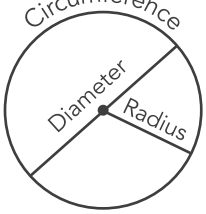
Circles

Circumference = $\pi \times$ diameter, $C = \pi d$

Or

Circumference = $2 \times \pi \times$ radius, $C = 2\pi r$

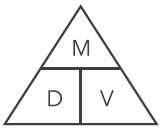
Area of a circle = $\pi \times$ radius squared, $A = \pi r^2$



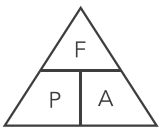
Compound Measures

Speed = $\frac{\text{distance}}{\text{time}}$

Density = $\frac{\text{mass}}{\text{volume}}$

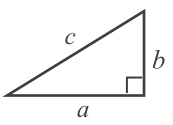


Pressure = $\frac{\text{force}}{\text{area}}$



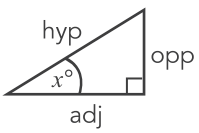
Pythagoras

Pythagoras' Theorem
For a right-angled triangle,
$a^2 + b^2 = c^2$



Trigonometric ratios (new to F)

$\sin x° = \frac{\text{opp}}{\text{hyp}}$, $\cos x° = \frac{\text{adj}}{\text{hyp}}$, $\tan x° = \frac{\text{opp}}{\text{adj}}$

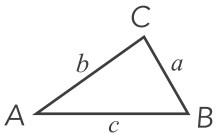


Trigonometric Formulae

Sine Rule $\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$

Cosine Rule $a^2 = b^2 + c^2 - 2bc \cos A$

Area of a triangle = $\frac{1}{2} ab \sin C$



Quadratic Equations

The solutions of $ax^2 + bx + c = 0$,
where $a \neq 0$, are given by $x = \frac{-b \pm \sqrt{(b^2-4ac)}}{2a}$

KipMcGrath™ EDUCATIONCENTRES

Formulae List

QUADRATIC FORMULA

$$ax^2 + bx + c = 0 \text{ are } x = \frac{-b \pm \sqrt{(b^2 - 4ac)}}{2a}$$

SINE RULE

$$\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$$

COSINE RULE

$$a^2 = b^2 + c^2 - 2bc\cos A \text{ or } \cos A = \frac{b^2 + c^2 - a^2}{2bc}$$

AREA OF A TRIANGLE

$$A = \frac{1}{2}ab\sin C$$

VOLUME OF A SPHERE

$$V = \frac{4}{3}\pi r^3$$

VOLUME OF A CONE

$$V = \frac{1}{3}\pi r^2 h$$

VOLUME OF A PYRAMID

$$V = \frac{1}{3}Ah$$

STANDARD DEVIATION

$$s = \sqrt{\frac{\Sigma(x - \bar{x})^2}{n - 1}}$$

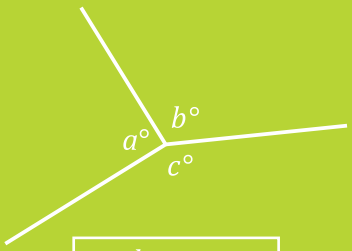
or $$s = \sqrt{\frac{\Sigma x^2 - \frac{(\Sigma x)^2}{n}}{n - 1}}$$, where n is the sample size.

KipMcGrath™ EDUCATIONCENTRES

Angle Properties

Angles at a Point

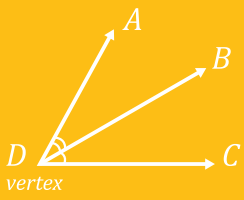
add to 360°



$a° + b° + c° = 360°$

Adjacent Angles

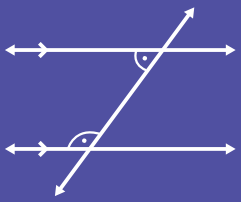
share a vertex and a side



∠ ADB is adjacent to ∠ BDC

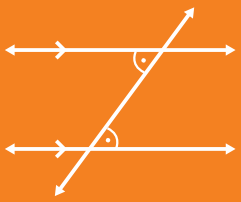
Co-interior Angles

add to 180°



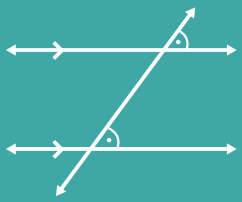
Alternate Angles

always equal



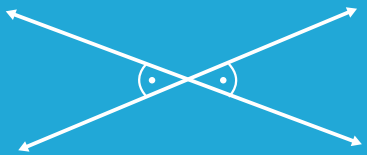
Corresponding Angles

always equal



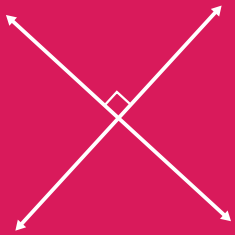
Vertically Opposite Angles

always equal



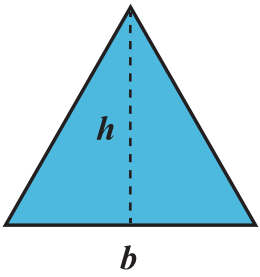
Perpendicular Lines

lines that meet at a right-angle (90°)

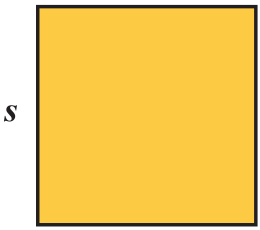


KipMcGrath™ EDUCATIONCENTRES

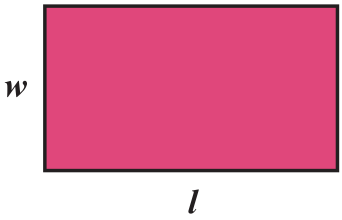
Area of 2D Shapes



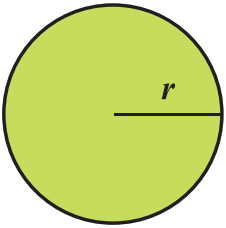
Triangle $= \frac{1}{2} \times b \times h$



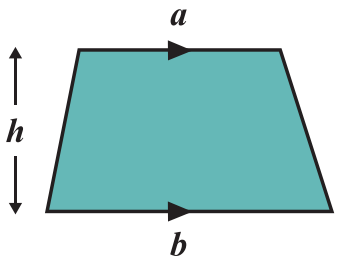
Square $= s^2$



Rectangle $= l \times w$

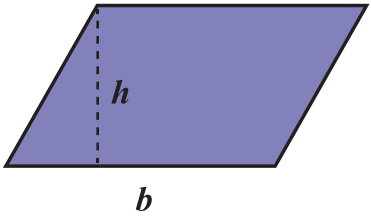


Circle $= \pi \times r^2$



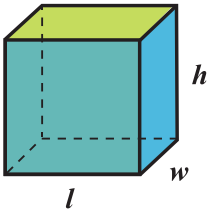
Trapezium $= \frac{1}{2} \times h \times (a + b)$

or $= \frac{(a + b)}{2} \times h$

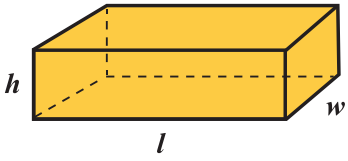


Parallelogram $= b \times h$

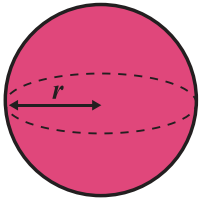
KipMcGrath™ EDUCATIONCENTRES — Volume of 3D Shapes



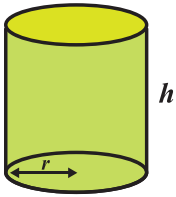
Cube = $l \times w \times h$



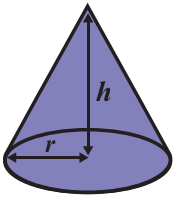
Rectangular Prism = $l \times w \times h$



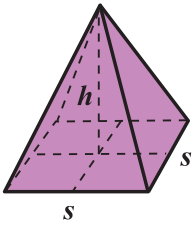
Sphere = $\frac{4}{3} \times \pi \times r^3$



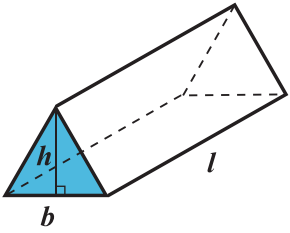
Cylinder = $\pi \times r^2 \times h$



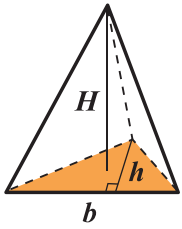
Cone = $\frac{1}{3} \times \pi \times r^2 \times h$



Square-based Pyramid = $\frac{1}{3} \times$ *area of base* $\times h$



Triangular Prism = $\frac{1}{2} \times b \times h \times l$



Triangular Pyramid = $\frac{1}{3} \times (\frac{1}{2} bh) \times H$

KipMcGrath™ EDUCATIONCENTRES

INDEX LAWS

MULTIPLICATION	$a^n \times a^m = a^{n+m}$	$2^6 \times 2^4 = 2^{6+4}$ $= 2^{10}$
MULTIPLICATION WITH BRACKETS	$(ab)^n = a^n b^n$	$(5 \times 2)^3 = 5^3 \times 2^3$ $= 125 \times 8$ $= 1000$
DIVISION	$\frac{a^m}{a^n} = a^{m-n}$	$\frac{9^5}{9^3} = 9^{5-3}$ $= 9^2$
POWER OF A POWER	$(a^n)^m = a^{n \times m}$	$(4^3)^4 = 4^{3 \times 4}$ $= 4^{12}$
NEGATIVE POWER	$a^{-n} = \frac{1}{a^n}$	$5^{-4} = \frac{1}{5^4}$ $= \frac{1}{625}$
	$\frac{1}{a^{-n}} = a^n$	$\frac{1}{3^{-2}} = 3^2$
ZERO INDEX / ZERO POWER	$a^0 = 1$	$3^0 = 1$
	$(ax)^0 = 1$	$(3x)^0 = 1$
	$ax^0 = a$	$3x^0 = 3 \times 1$ $= 3$
POWER OF A QUOTIENT	$\left(\frac{a}{b}\right)^n = \frac{a^n}{b^n}$	$\left(\frac{2}{3}\right)^2 = \frac{2^2}{3^2}$ $= \frac{4}{9}$
POWER AS A FRACTION	$a^{1/n} = \sqrt[n]{a}$	$8^{1/3} = \sqrt[3]{8}$ $= 2$

Claim Your
FREE Assessment Today!

Scan or Visit:
tutoringaldridge.co.uk

Kip McGrath™

Est. 1976

ENGLISH AND MATHS TUTORING

07400436050

aldridge@kipmcgrath.co.uk

36 High Street, Aldridge,
Walsall, WS9 8LZ

tutoringaldridge.co.uk