Film List

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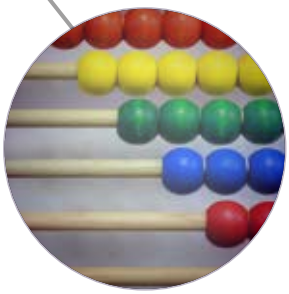
Maths

- History of Maths
- Accuracy and Proof
- Statistics and Probability
- Shape
- Space
- Measurement
- Number
- Algebra



3D Shapes	
Polyhedra: Platonic Solids	Discover the properties of the Platonic Solids, and why they are considered special.
Cylinders: Fuelling Saturn V	Revealing the size of the giant cylinders that fuelled the most powerful machine ever.
The Power of the Sun	How to calculate the power of the Sun, without leaving Earth.
The Pacific Flyer	How big did this hot-air balloon have to be to break the world record?
Why Are Eggs Egg-Shaped?	Discover why a fragile egg is the ideal shape to protect the life within.
Cubist Art	How artists used geometry to depict the world.

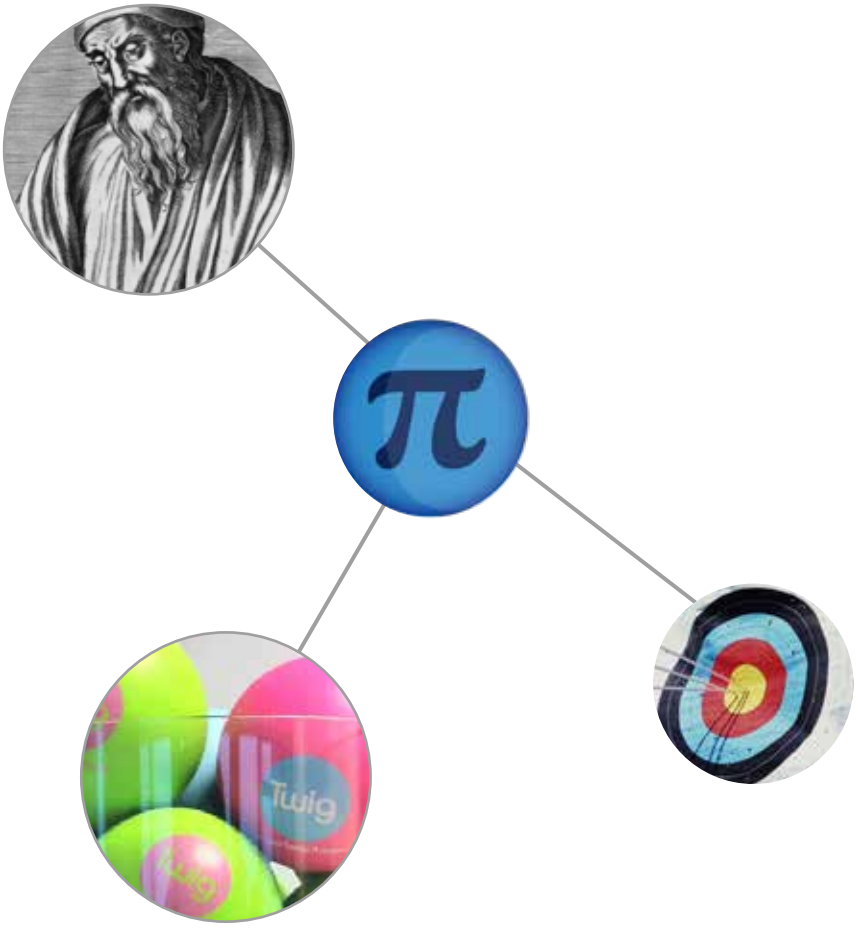
Circles	
Beating the U-Boats	Find out why Churchill's Navy relied on geometry to protect supplies during World War II.
Designing Chartres	Explore circle theorems through the geometric design of Chartres Cathedral.
Pi: Reciting Pi	How many digits of Pi can one man memorise?
Calculating Pi: Archimedes	How was Pi first accurately calculated?

Similarity and Transformations	
Transformations: Skateboarding	See how a skateboard transforms as a skater performs tricks.
The Mirror Lines of the Taj Mahal	Discover how the beauty of the Taj Mahal is created using reflection.
Tessellated Designs	The beautiful patterns that can be created using shapes which fit together exactly.
Bees and Their Hives	Why are beehives made up of hexagons?
Fractals: The Koch Snowflake	Discover the rules that create an infinitely reducing pattern.
Fractals: The Menger Sponge	Introducing the shape that gets bigger the more you take away.
The Tunnel of Samos	Find out how the ancient Greeks ensured a tunnel's ends would meet inside a mountain.

Triangles	
Proving Pythagoras	What is Pythagoras's Theorem, how can it be proved, and why is it useful?
Building the Pyramids	Discover how Egyptian builders used triangles to create perfectly symmetrical pyramids.
Stengthening the Bank of China	Find out why the world's tallest building was constructed from triangles.
Where is the Centre of a Triangle?	Discover the many centres of a triangle.

Topology	
Topology	Can you make a different shape wihtout tearing, cutting or gluing?
The Seven Bridges of Konigsberg	Try this ancient puzzle that tested some of the brightest mathematical minds.
Networks: Labyrinths and Mazes	Learn how to create – and find your way out of – these ancient networks.
Degrees of Separation: Erdös	What's your Erdös number?

Trigonometry	
Distance to the Sun and Moon	Find out how astronomers calculated these distances using the sine function.
Measuring the Earth	Discover how maths enabled the first calculation of the Earth's circumference in Ancient times.
Hyperbolic Geometry	Explore how our understanding of the space we live in has advanced since Euclid's time.
What Do Sine Waves Sound Like?	Hear the sound created by sine wave equations, and how their variables affect this.



Coordinates	
Cartesian Coordinates	Learn how coordinates describe a point in space in one, two, three, or even four dimensions!
Vectors: Air Traffic Control	What are vectors and how do they make air travel safe?
Coordinate Geometry: Descartes	Discover how Descartes developed the (x,y) coordinates so familiar today.

Lines and Curves	
Straight Lines: Bee Lines	Why do bees fly in straight lines?
Gradients: Fold Mountains	How small hills under the ocean 'grow' to become the highest peaks on Earth.
Spirals in Nature	What are the different types of spiral, and where are they found in nature?
Arches	Exploring the shape that gets stronger as more force is applied.
Geometry: Euclid	What were the simple rules Euclid set out that form the basis of Geometry?
Calculus: Newton	Discover how Newton's study of movement led to a revolutionary new branch of mathematics.

Scale and Perspective	
Painting By Numbers	Find out how artists began to turn flat drawings into three-dimensional worlds.
Perspective: Parallax	Find out why closing each eye seems to cause objects to move – and how this can help measure extreme distances.
Escher and the Endless Staircase	See how Penrose and Escher played with perspective to create impossible shapes.
Perspective: Dazzle Camouflage	See how some warships 'hid' behind bright geometric designs.
Modelling the Spitfire	See how length, area and volume scale factors affect the size of model planes.
Queen Hatshepsut's Ship	Can a team of archaeologists use scale to recreate this ancient ship?

Ratio and Proportion	
The History of the Golden Ratio	Introducing the beginnings of the Golden Ratio, and how it has endured throughout time.
Maths and the Mona Lisa	Discover how Da Vinci used this ancient ratio to enhance his famous portrait.
The Beauty Formula	Can mathematics explain what we find beautiful?
Proportion: The Vitruvian Man	Learn how Da Vinci used geometry to create the 'perfect' human.
Ratios: The Maths of Baking	Learn how to bake a cake as big as you like!
Ratios: Currency Exchange	Learn how to convert currencies – and make a profit!
Aiming for the Outer Planets	Discover the maths that helped send a spacecraft deeper into space than ever before.

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Accuracy and Estimation	
How Long is a Metre?	Who decided how long a metre is, and how did it become the standard metric measure?
Jai Singh	Why did the Maharaja build the biggest observatories in the world?
Volume: Counting Stars	Revealing how astronomers count the number of stars in the sky.
Speed of the Earth	Calculate how fast Earth is speeding through space.
Rounding: Snails vs Rockets	Discover why rounding numbers is both useful and necessary, by looking at two extreme cases.
Counting Crowds	1.8 million people watched Obama's inauguration speech – but who counted them?

Proof	
How Origami Changed the World	Discover the surprising applications of the paper-folding art of Origami.
The Greeks and Proof	Witness how the Ancient Greeks managed to prove mathematical reasoning beyond doubt.
Proofs: Million-Dollar Maths	Learn how proving a famous hypothesis could net you $1,000,000.

Decimals and Fractions

Why Do We Count in Tens?	Number systems can be based on any number – why is ten so popular?
Decimals: Decimal Day	Discover what happened when the United Kingdom changed to a decimal currency.
Decimal Places: Photofinish	Why decimal places are needed for the world's fastest sprint.
Fractions: Slow Motion	How videos use fractions to slow or speed up moving images.
The Egyptians and Unit Fractions	The legend that led the Egyptians to use a complex system of fractions.
Fractions: Pythagorean Tuning	Discover how music is created using fractions.
Fractional Reserve Banking	Discover the banking system that means your bank can lend out the money you deposit.

Percentages

Percentages: Feeding the Nutcracker	See how this tiny bird plays the percentage game to survive the winter.
Could You Owe More Than America?	Discover the staggering amount of money you could owe if you fail to pay off a high-interest loan.
Percentages: Tax Breaks	How progressive tax systems can help make tax payment fairer.
Hyperinflation: 1920s Germany	Find out what happens when interest rates spiral out of control.

Integers and Natural Numbers

Numbers: The Discovery of Zero	The number zero has not always existed. Why was it 'invented'?
The Sardine Run	Watch as predators from positive and negative altitudes threaten a sardine shoal.
Numbers: Animal Maths	Can animals really count?
Numbers: Life Without Numbers	Meet the Aboriginal tribe who manage with only numbers 1, 2 and 3.
The Babylonians and Plimpton 322	See the surprisingly familiar numbers that appear on this ancient tablet.
The Egyptians and Multiplication	Find out how the Egyptians tackled multiplication, using powers of two.
The Romans and Numerals	Discover why the Romans were such terrible mathematicians!
India and Negative Numbers	Find out why one of the most positive contributions of Indian mathematicians was, in fact, negative!

Powers	
The Emperor's Chess Board	Re-telling the legend of a simple request for a few grains of rice that threatened to bankrupt an Emperor.
How Much Does the Internet Weigh?	How to calculate the weight of all the information contained on the world wide web.
The Richter Scale	Discover how to read the Richter Scale, which reveals the true magnitude of earthquakes.
The Biggest Number Ever	Meet the 'inventor' of the biggest number ever used.
The Incredible Strength of Ants	Discover the mathematical law that means ants are the strongest creatures in the world.

Ratio and Proportion	
Ratios: The Maths of Baking	Learn how to bake a cake as big as you like!
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Special Numbers	
Irrational Numbers: Pythagoras	Find out why the discovery of irrational numbers is said to have led to murder.
Primed for Survival	Witness the mating behaviour that suggests insects use prime numbers.
The Prime Number Code	Discover why prime numbers hold the key to encryption.
A Pattern in Primes	Are prime numbers random, or is there a hidden pattern?
Imaginary Numbers	What caused mathematicians to dream up imaginary numbers?
Sets: Infinity	Revealing two different types of infinity.

Number Patterns	
The Most Populous Country	When will India's population exceed China's?
The Fibonnaci Sequence	Discover Fibonacci's sequence, which occurs throughout nature.
Enigma: Cracking the Code	Find out why the Nazi's message encoding mechanism proved so difficult to crack.
Chinese Development of Maths	A summary of the independent development of Chinese mathematics.
Number Theory: Gauss	The patterns that allowed a seven-year-old mathematician to perform amazing calculations.

Binary	
Binary: What Is Binary?	The number system that lets you to count to over a thousand using just ten fingers.
Binary: The Computer Language	Why is binary the computer-programmer's code of choice?
Binary: The Alien Language	Discover why Scientists use binary code to try to communicate with extra-terrestrial life.

"I also like that there is a movie about almost everything"

- Pupil

Algebraic Modelling	
How Algorithms Change the World	Find out how mathematical functions influence human behaviour.
Variables: Dating By Numbers	Could an algebraic formula get you a date?
Tank Wars	The amazing prediction made using algebra that helped to win World War II.
Algorithms: Turing	Learn how Alan Turing developed the simple mathematical foundation of computing science.
The Birthday Paradox	Explore the likelihood of you sharing your birthday with someone in the same room.

Coordinates	
Coordinate Geometry: Descartes	Discover how Descartes developed the (x,y) coordinates so familiar today.
Vectors: Air Traffic Control	What are vectors and how do they make air travel safe?
Cartesian Coordinates	Learn how coordinates describe a point in space in one, two, three, or even four dimensions!

Equations	
The Heartbeat Formula	Discover the formula that can predict how long a wild mammal will live.
Heptathlon	A demonstration of the complex scoring system used to place heptathletes.
The Chase	Can you calculate how long the zebra has to escape the pursuing lion?
The Arabic Science of Balancing	Discover the fundamental principle of algebra.
European Mathematical Symbols	Find out when and why mathematical symbols were invented.
Diophantine Equations: Fermat	Find out why a mathematician's scribbles became one of the world's most difficult maths problems.

Sets	
Set Theory: Cantor	Find out how Cantor's work on set theory shaped his life.
Venn Diagrams: Global Habitats	Learn how to compare the relationships between rainforest and desert environments.
Sets: Infinity	Discover why there are two different types of infinity.

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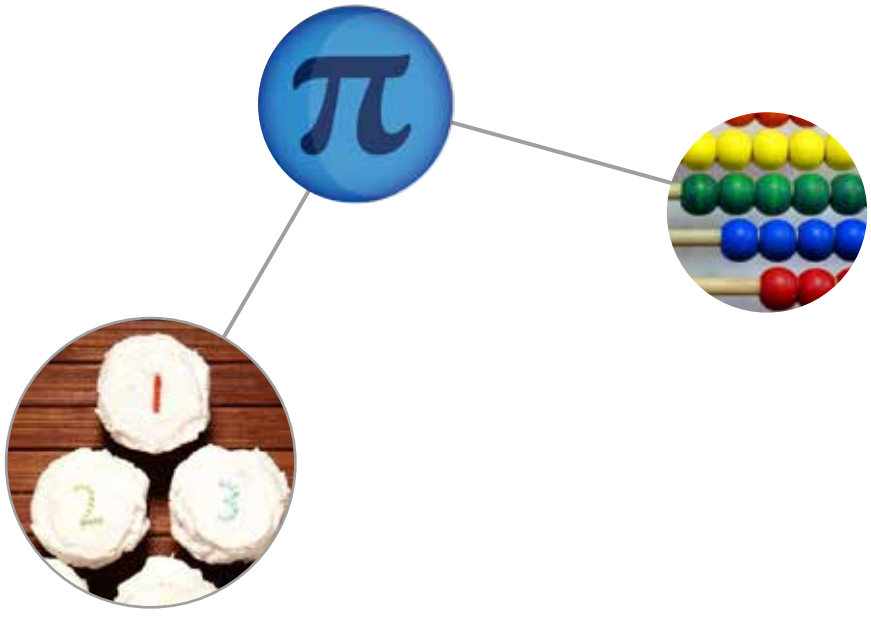

Probability Modelling	
The Odds Are Against You	Find out the mathematical reason that gambling on horse racing is unlikely to pay off.
The Card Counter	Learn how one mathematician came up with a formula for winning at Blackjack.
The Monty Hall Problem	In this famous game-show, should the contestant choose to switch?
Logic: Bayesian Robots	Discover how robots use logic to learn.
Why Do Shares Change Price?	Discover the economic and social factors that determine share value.
Beating the Stock Market	The story of three mathematicians who tried to eliminate risk from stock market trading.
The Prisoner's Dilemma	Would you choose to inform on your partner in crime?
Benford's Very Strange Law	Introducing the surprising discovery of a pattern in data, across both the man-made and natural worlds.

Extreme Events	
Probability: Irrational Fears	Discover why often the most common fears are the least rational.
Can Monkeys Write Shakespeare?	Discover why it is possible for monkeys to write Shakespeare – and how it can become a certainty.
Freak Waves	Why were sailors reporting giant freak waves, when statistical models showed them to be unlkely?
Chaos By Mistake	Discover why it is so difficult to predict the behaviour of complex systems, like the weather.
Insuring the Titanic	How did underwriters calculate insurance premiums for the Titanic and her cargo?

Sampling	
Can You Trust Your IQ?	Is it possible to create an unbiased measure of intelligence?
The Wrong Guy Won	Discover how a magazine's 'random' phone poll led to one of the most surprising election results in history.
Can Fish Oil Make You Smarter?	Find out how simply undertaking a study can jeopardise trial results and how to guard against this.
Mind Control	In the largest trial of human mind control ever, does size equal significance?

Statistical Measures	
Average Joe	How is it possible for the average American to live with one and a half other people?
Cumulative Frequency: You're Fired?	Find out how Enron employees could see where they rated, and whether they would be fired, on a cumulative frequency graph.
Can Eating Fish Prevent Murder?	Discover the real story behind the study that found a correlation between eating seafood and committing murder.

Charts	
Most Popular Pet	Are cats, dogs or fish the most popular pet? See how different types of graphs display the whole story.
Nightingale's Diagram	Explore how one nurse's visual representation of data saved thousands of lives.
Histograms: Snapshot	Explore how photographers use the unique properties of histograms to take the best photographs.
Distorted Graphs: Heatwave	Discover how graphs containing limited information can be misleading.

"It is a fun website that teaches you facts as well as entertains you"

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Maths Through the Ages 1	
The Babylonians and Plimpton 322	See the surprisingly familiar numbers that appear on this ancient tablet.
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