



CTYI Autumn
2023

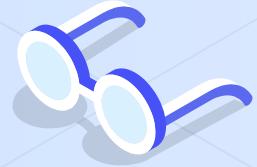
SUPERHERO SCIENCE

Where knowledge is our superpower!

Casey (Cas) Farren-Colloty

CLASS CHARTER





What is Superhero Science?

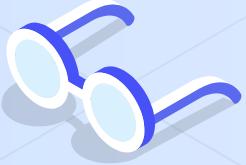
What we'll do

Here's what you can expect to learn about over the course of these 8 weeks:

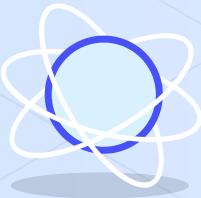
1. Magnetism
2. Evolution
3. Technology
4. Quantum Physics
5. Radiation
6. Material Science
7. Thermodynamics

I get pretty bored only doing slides everyday - so we won't. We'll do experiments and quizzes. With one *GIANT* quiz at the very end. But because of all the things we can be doing it's very important that **everyone** is cool and nice to each other and us.





BINGO



01

Magnetism





What is Magnetism?

Magnetism is an effect that causes certain materials to attract or repel each other.

It depends on loads of things like the material you have, the temperature, and much more.





Magneto

Does anyone know who Magneto is?

SUPERHERO PROFILE

- **Name:** Magneto (Real name: Erik Lehnsher)
- **Power:** Can control metal with his mind.
- **Background:**
 - He's a mutant.
 - Faced discrimination because of his powers.
- **Goal:** Wants to protect mutants from harm.
- **Conflict:** Often clashes with the X-Men, who believe in peaceful coexistence.
- **Complex Character:** Sometimes a villain, sometimes works with the X-Men.



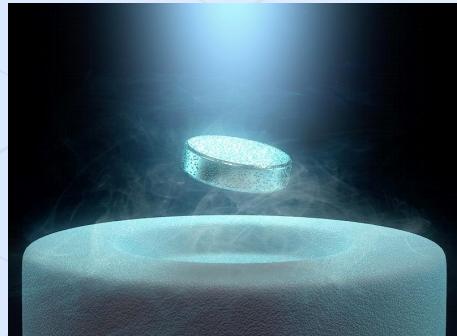


The Marvel-ous World of Magnets

Magnets are used **EVERYWHERE** in our world. They power all of our electricity.

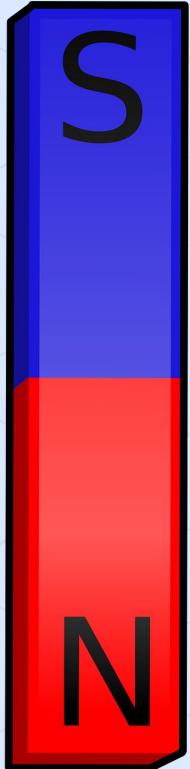
Magnets generally have a North Pole (usually coloured red) and a South Pole (usually coloured black).

Sometimes they can have more than just 2 poles but they can **never** have 1.





MAGNETIC POLES



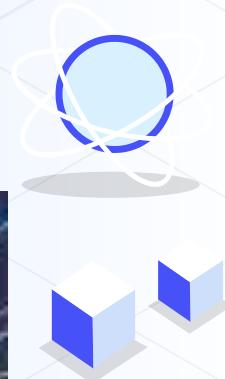
Think of magnets as special sticks with multiple ends. These ends are called poles. We usually encounter magnets in the form of bar magnets like this one. Which only have 2 poles.

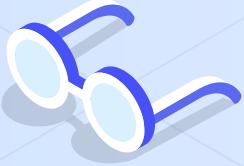
One end of the magnet is called the **North** pole and the other end is called the **South** pole.

Opposite poles love each other, they can't help but come together. But the same poles hate each other and can't stand being together.



Magnetic Fields





Which of these magnetic fields aren't real?

MAGNETIC MATERIALS



1

FERROMAGNETIC

These are like magnet superheroes! They become magnets when you bring a magnet close to them.

E.g. Iron and Nickel



2

PARAMAGNETIC

These materials are like magnet fans. They're attracted to magnets but don't become magnets on their own.

E.g. Aluminium

3

DIAMAGNETIC

These are like magnet opposites. They're actually a little bit repelled by magnets.

E.g. Water and Wood



Magnetism in Real Life



MRI Machine

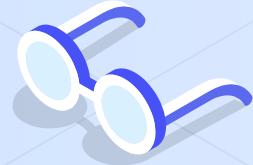
Stands for Magnetic Resonance Imaging.
Used in hospitals for body scans.

Mag-lev Trains

Transportation system that uses magnets to elevate and then move a train.



Fridge Magnets!



**IF YOU HAD
MAGNETO'S
POWERS,
WHAT WOULD
YOU DO?**





X-MEN & EVOLUTION



Well known X-Men



Cyclops

High Intensity Optic Blast



Professor X

World's most powerful telepath



Wolverine

Healing Factor,
Adamantium claws,
heightened senses



Jean Grey

Telekinesis and
Telepathy



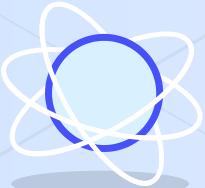
Storm

Near Total Control of
the Weather



Beast

Enhanced Strength
and Incredible agility





What are Genes?

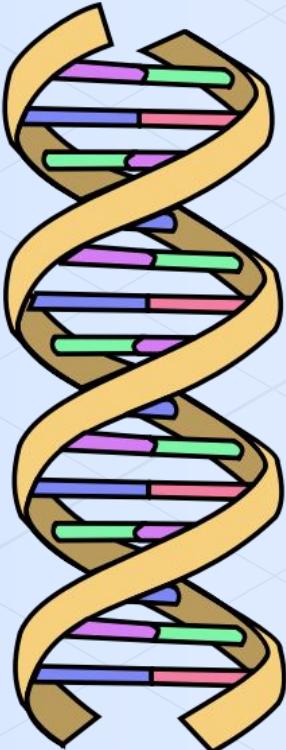


- Genes hold the instructions of how to build and maintain the the cells of a living thing (an organism)
- Genetic traits are passed to offspring
- E.g. blue eyes, red hair





Where are our genes?

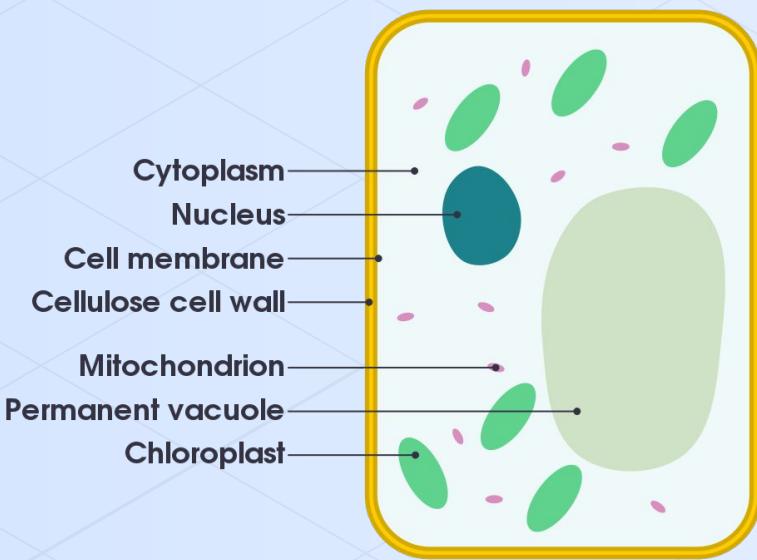


- Organisms are made of different types of cells e.g. skin cell, brain cell, etc.
- The nucleus of the cell controls its activities
 - Chromosomes are contained in the nucleus
 - These chromosomes consist of tightly coiled DNA
 - Genes are just sections of DNA
- Fun fact: All the DNA from your whole body would reach to Pluto and back

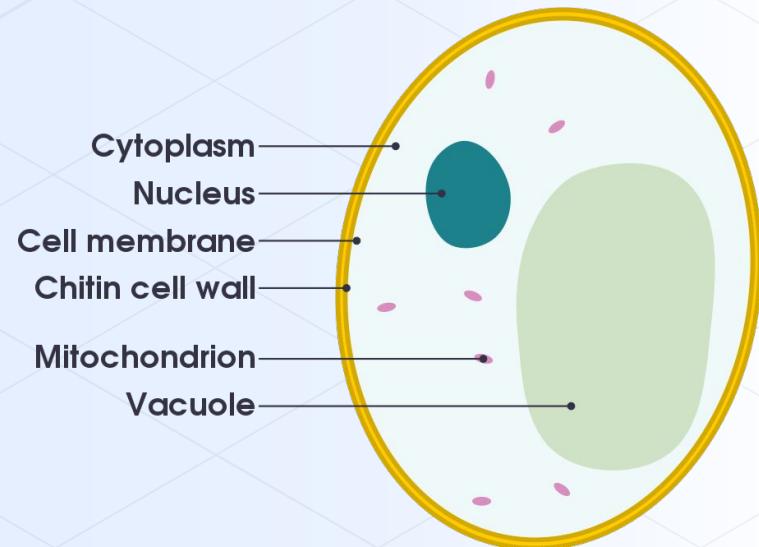


What do cells look like?

Plant Cell



Animal Cell





A Mutant in the X-Men World

What is a mutant in the X-Men world?

- A Human that possesses the X-Gene.
- The X-Gene is like a specific “code” inside some people's bodies.
- It's what gives mutants their superpowers!
- Their superpowers develop completely naturally.
- Just like your hair color or eye color is determined by your genes, the X-Gene decides what special ability a mutant will have.
- So, when someone has the X-Gene, they might be able to do amazing things like control fire, read minds, or even fly!
- It's what makes the X-Men special and unique.





Genetic Mutations

Do genetic mutations exist in real life?

- Mutations are **permanent** changes to the DNA that makes up a gene
- For example
 - Blue eyes
 - Red hair
- Leads to species diversity

There are two types of mutations

- Hereditary
 - Mutations that are inherited from our parents
 - They're present in our bodies for our entire lives
- Acquired
 - These occur at a point during a person's life
 - Can be caused by external factors
 - Ultraviolet Radiation
 - Spider Bite???

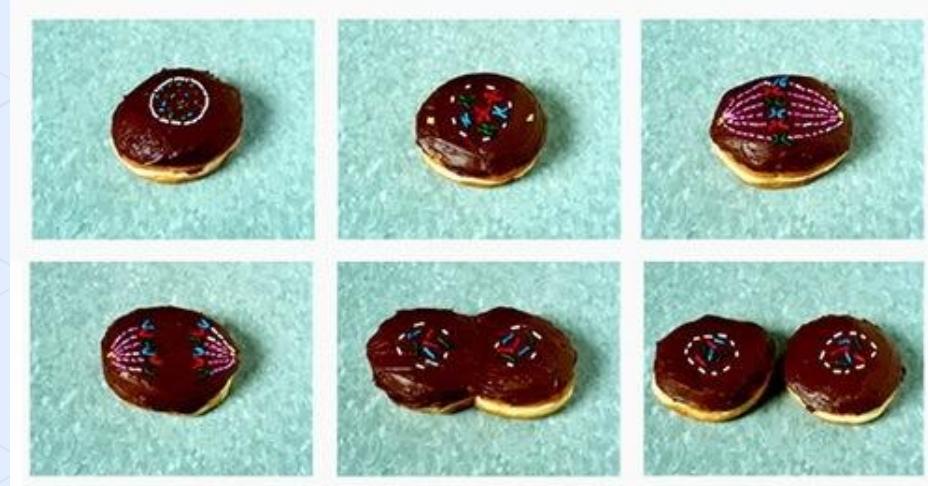




Genetic Mutations

How do we acquire mutations?

- DNA is contained in cells
- Cells replicate by dividing
 - Called Mitosis
- When they divide the cell copies its DNA
- Sometimes mistakes happen
 - This is a mutation





How do mutations affect us?

- In general, mutations do nothing
 - We wouldn't even notice them

Some examples of human mutations

- Colour Blindness
 - Damaged gene leads to the development of colour blindness
- Male pattern baldness
 - Acquired or inherited?
 - We actually don't understand what causes it
- Good mutations?
 - Resistance to disease





Evolution

- *Evolution* is when organisms adapt to their environment over time
- Genetic mutations lead to evolution

How does evolution happen?

- Mutations happen
- Their children generally also have the mutation
- If they survive -> they pass on the mutation too
- More and more change happens

EVOLUTION!

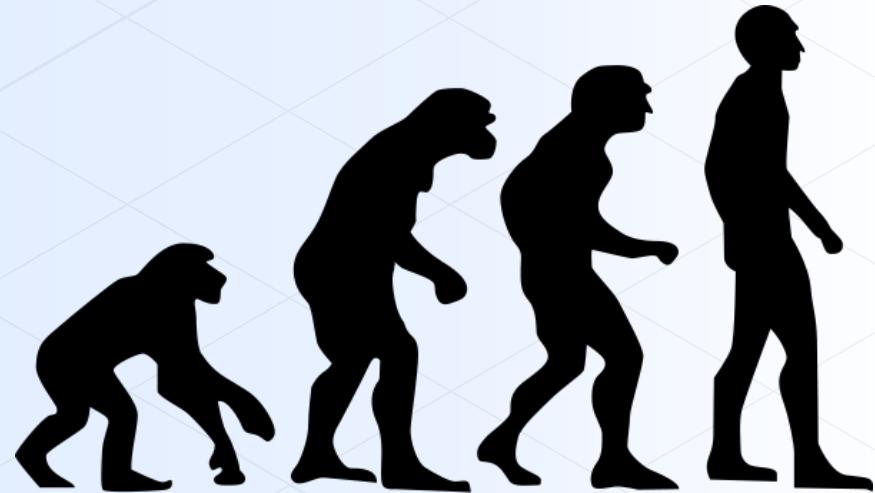


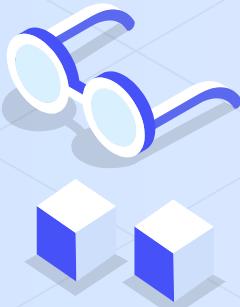


Evolution

Darwin's Theory of Evolution

- Slow change over generations
- Survival of the fittest
 - AKA Natural Selection
- Those that are best suited to their environment survive
 - Those who aren't die *if there is competition*





Examples of Evolution

Desert

Camels store food and water in their humps (fat).

Humans can last ~3 days without water.
Camels can last ~ 6 months



Mountains

Mountain goats have small hooves with two toes.

These spread out for more balance.



Camouflage

Which is easier to see?



03

Quantum Physics

Class Charter

1. Everybody respects everybody else
2. At least one fun fact per class (remember to raise your hand!)
3. Listen extra carefully in activities and experiments



Introduction to Quantum Mechanics

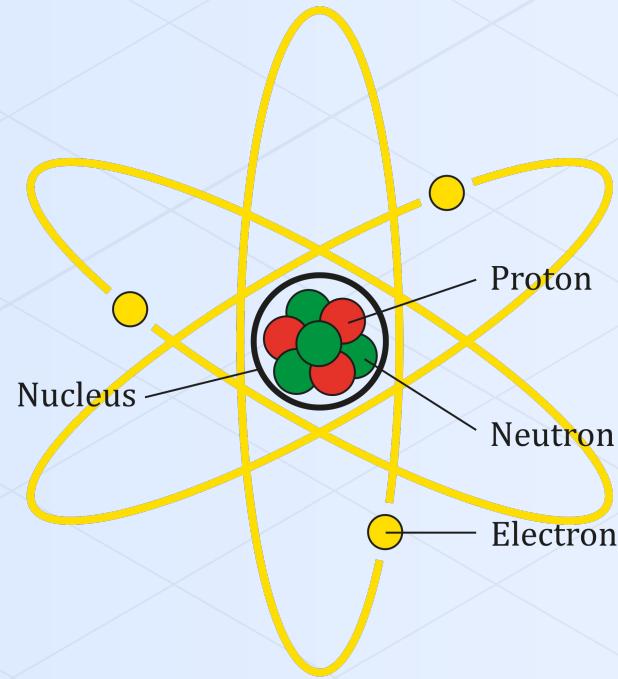
- Quantum Mechanics is a branch of science that helps us understand the really really **REALLY** tiny things in the universe
- Think of all the things that we can't see with our eyes. Then think of even smaller stuff
- Examples
 - Lasers
 - Nuclear Power

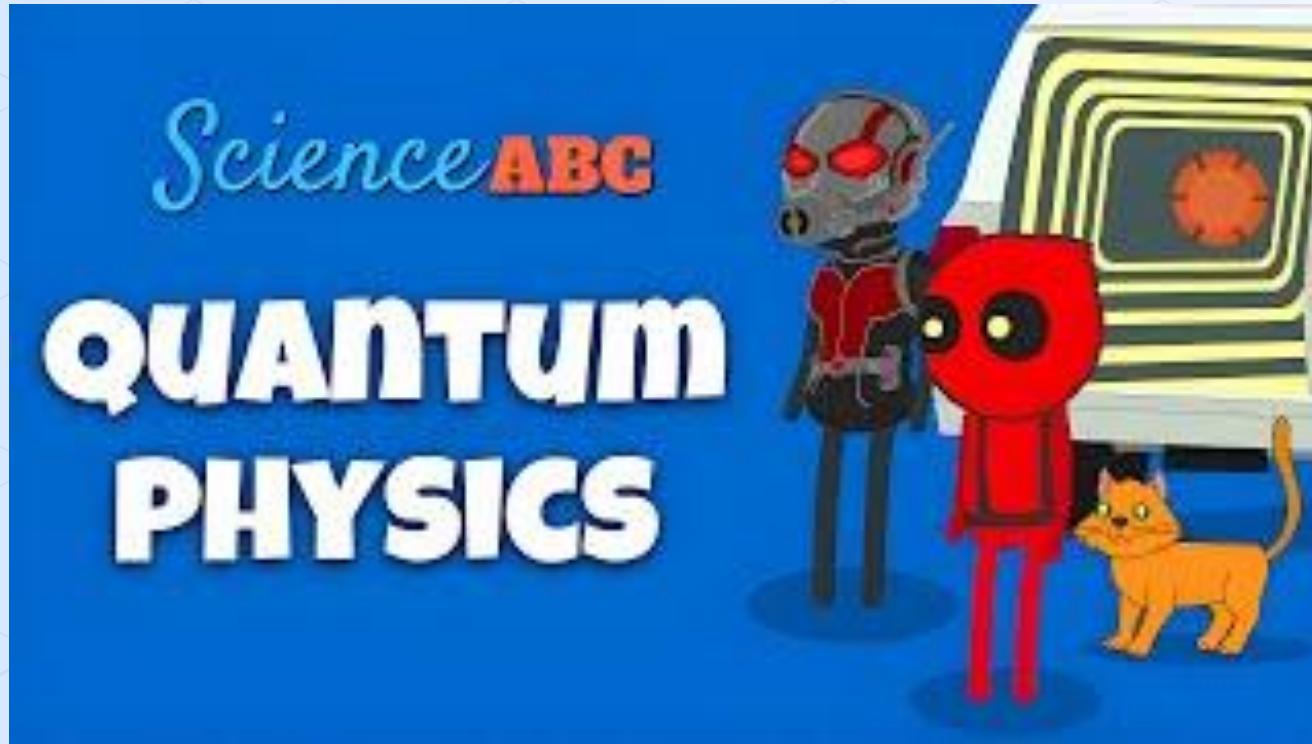




What actually is that small?

The Atom



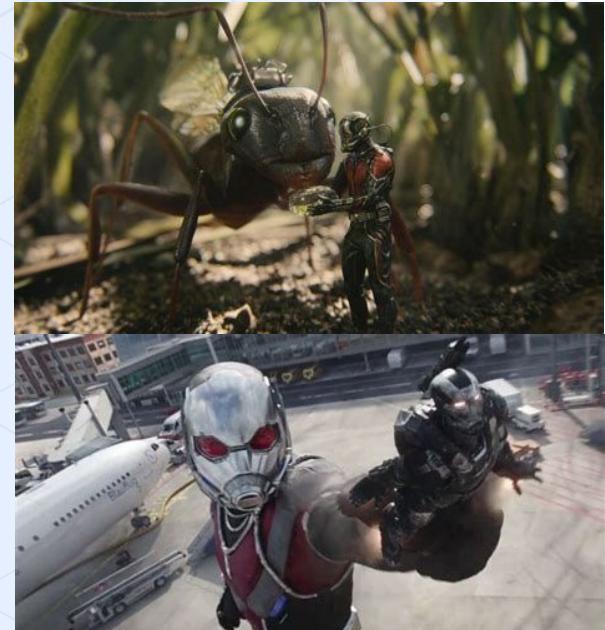




Ant-man & The Wasp

Quantum Superheros

- Ant-man can shrink down to an insanely small size
 - According to the MCU - even smaller than subatomic particles
 - According to the comics - generally the size of an ant
- Can also grow to the size of a building





Ant-man & The Wasp

How does the suit work?

- Pym Particles
 - Inside the suit they have these made-up particles that make everything change
- Shrinking / Growing
 - All their particles (atoms and more) are either squeezed together or pushed apart
 - This is how they stay strong
- Talking to insects
- Fun Fact: For antman to turn into a black hole he'd need to be about 10000000000 times smaller than a proton





The Quantum Realm

- When they shrink they go to this world where all normal rules cease to exist
 - Smaller than atoms
- Time and Space
 - How you perceive time gets all messed up (Any examples of this?)
- Secrets?
 - We don't know much about the quantum realm
 - What could it be useful for?





The Quantum Realm

What does it look like?

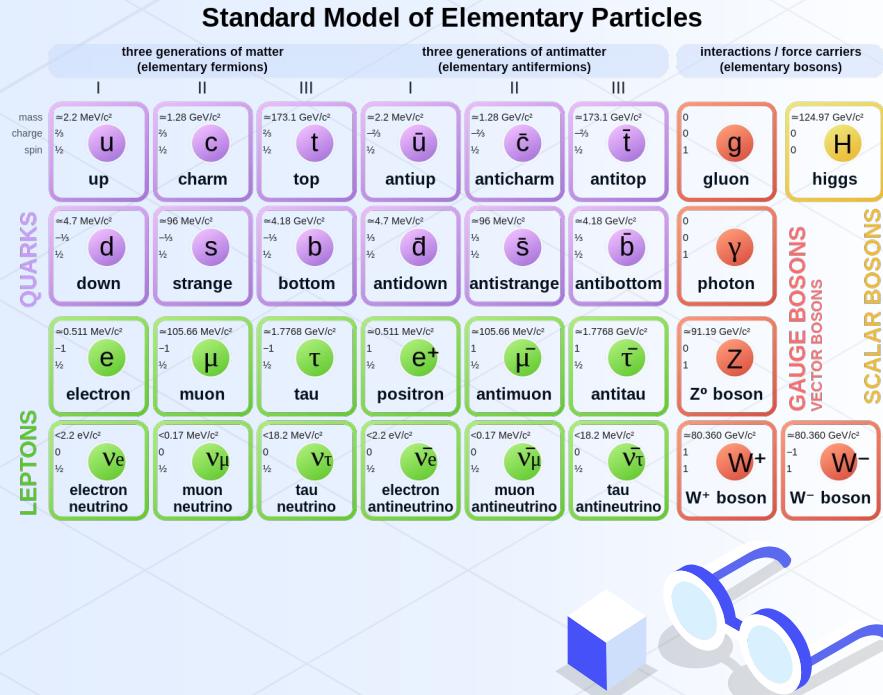




Modern Quantum Physics

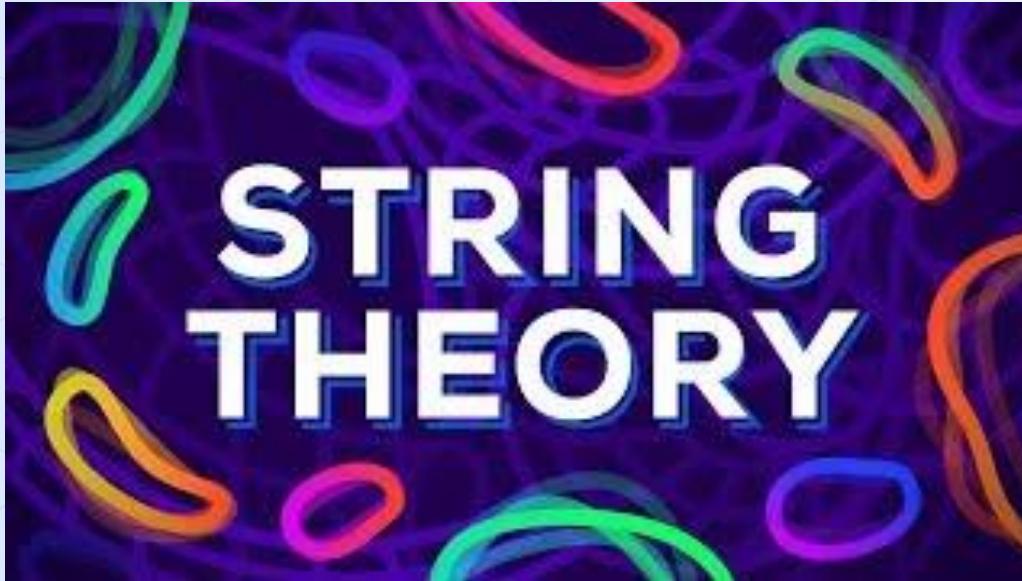
What are we up to these days?

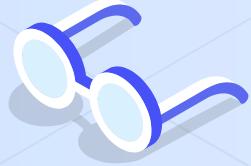
- CERN
 - Ireland just got involved in the biggest experiment in human history
 - Looking for new particles
- Materials
 - Scientists are making new cool materials to do things
 - E.g. Graphene
- Quantum Gravity
 - E.g. Loop Quantum Gravity
 - String Theory





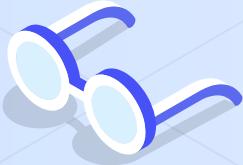
String Theory





Group Activity

What Quantum Powers would you have?



04

Technology

Class Charter

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2. At least one fun fact per class (remember to raise your hand!)
3. Listen extra carefully in activities and experiments



Superhero Technology

Superheroes like Iron Man and Batman are regular people who use amazing tech to become heroes.





Ironman's Suits

Ironman's "superpower" is his suits

- Who is Ironman?
 - Tony Stark
 - Genius billionaire
 - Avengers
- Abilities
 - Super strong
 - Flying
 - Repulsor Blasts
- Evolution of his suits
 - Mk. 1 - In a cave
 - Most of them are mechanically similar
 - Mk. L - Nanotech





Flying with Ironman

With his suit, Ironman can fly around the sky and even go to space

- Repulsor Beams
 - Ironman's repulsor beams aren't just used for combat
 - They provided enough energy to get him off the ground
 - And then keep him off the ground
- It's a giant metal suit
 - How easy is it to get off the ground?



Evolution of the Ironman Suits





Batman's Gadgets

Genius Billionaire - but in DC this time

- Batman doesn't have a “super suit”
 - His suit is important but not in the same way as Ironman
 - It's important to defend his body
- Gadgets
 - He uses gadgets more than anything else
 - Examples?
 - Batarangs
 - Grappling Hook
 - Gliding





Gliding like a bat

- Can Batman fly?
 - No
 - Unlike Ironman, Batman cannot fly
 - He can glide though
- Wing structure
 - Taping cloth to your back won't work
 - Rigid hi-tech fabrics
 - Sometimes turned rigid by electric pulse





Gliding like a bat II

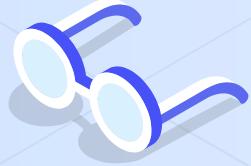
We've seen that Batman can't fly

- So how does he scale buildings / get into a position to glide from?
 - Any ideas?
- Grappling hooks
 - His grapple gun shoots a very strong hook attached by very strong wire to a point on a building
 - It then retracts, carrying Batman to the top

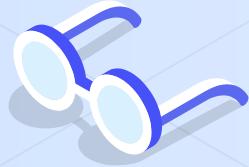


Batman's Grappling Hook





Group Activity



PARACHUTE BUILDING

05

Radiation & Mutations

Class Charter

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3. Listen extra carefully in activities and experiments



Radiation I

- What is radiation?
 - Radiation is a powerful phenomenon that can change the structure of things
 - E.g. DNA
 - These mutations can give people amazing abilities (in comics)
- Who discovered radiation?
 - There are different types of radiation
 - Different discoverers e.g. William Herschel, Ernest Rutherford
 - Notion of **radioactivity** discovered by Marie Curie





Radiation II

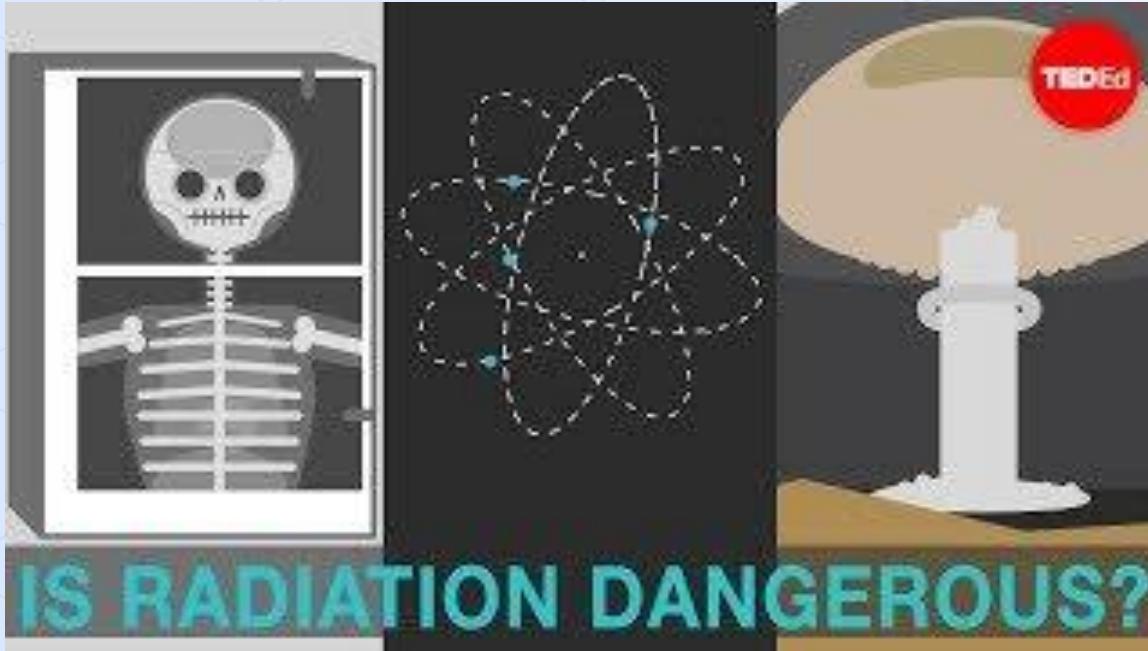
Types of radiation

- We can say that radiation is just “moving energy”
- Types of radiation
 - Heat
 - Electromagnetic
 - Visible light is electromagnetic radiation
 - Ultraviolet (UV)
 - Gamma
 - Nuclear
- Ionizing or non-ionizing?



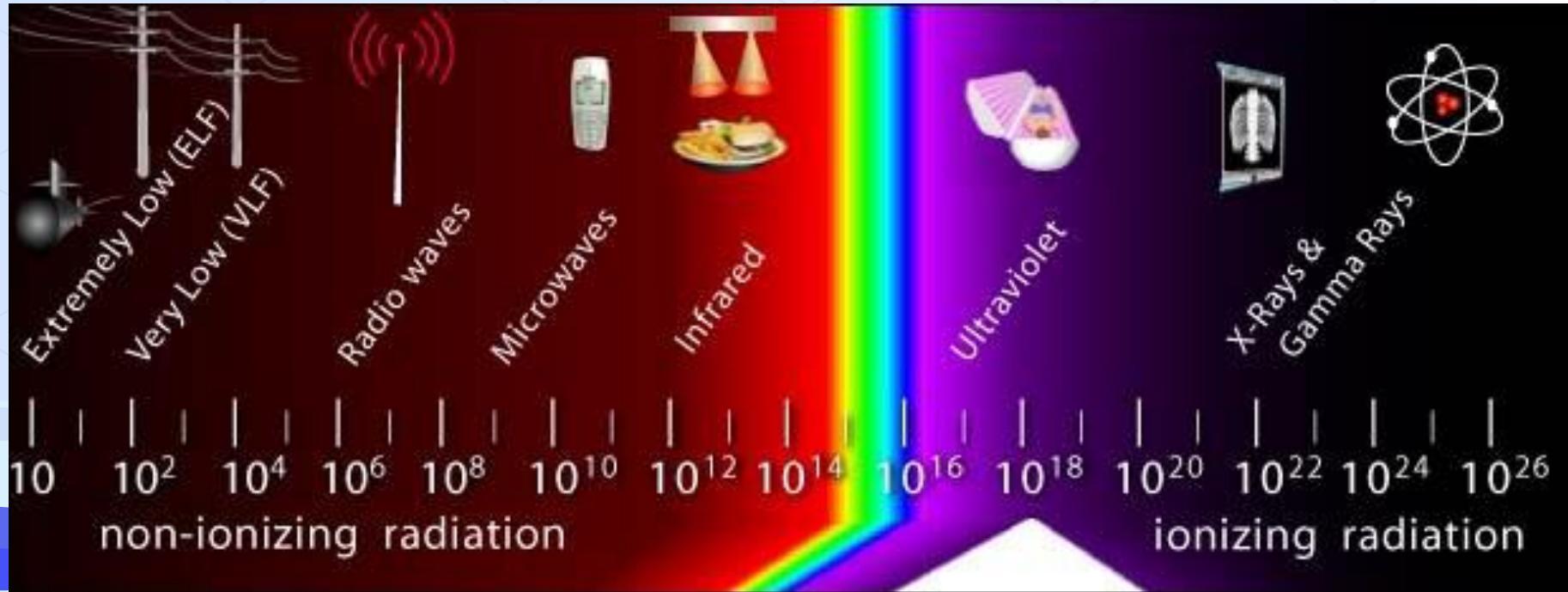


Is Radiation Dangerous?





Electromagnetic Radiation





The Hulk

It's not easy being green.

- Who is the Hulk?
 - Bruce Banner was the first Hulk
 - A scientist who was exposed to mass amounts of Gamma Radiation
 - Mutated his DNA so that he would turn into =====> every time he got angry





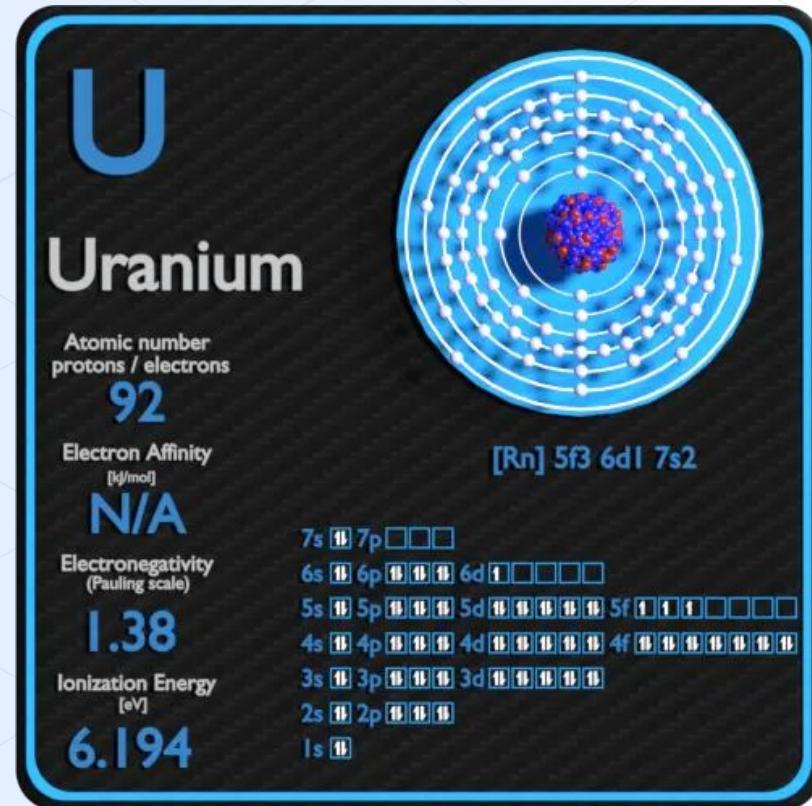
The Hulk and Gamma Radiation





Radioactivity I

- What are elements?
 - An **element** is an atom with a certain number of **protons**
 - E.g. oxygen (8), carbon (6), helium (2)
 - An **isotope** is an element with a certain number of neutrons
- What is radioactivity?
 - Radioactivity is when one element turns into another
 - This is called *decay*
 - Different types of decay with different energies
 - Alpha Decay (very weak)
 - Beta Decay (medium)
 - Gamma Decay (very strong)*





Radioactivity II

- How does this happen?
 - Atoms get too many neutrons in their nucleus
 - They don't like this
 - It's almost like you feel the need to sneeze but can't
 - So they "sneeze" and change the number of protons *(Gamma)
- Uses?
 - Atomic Clocks
 - Nuclear Fission
 - Controlled splitting and decay
 - Nuclear Power
 - Nuclear Weapons
 - Note: Not all Weapons & Power sources use fission





Spider-verse

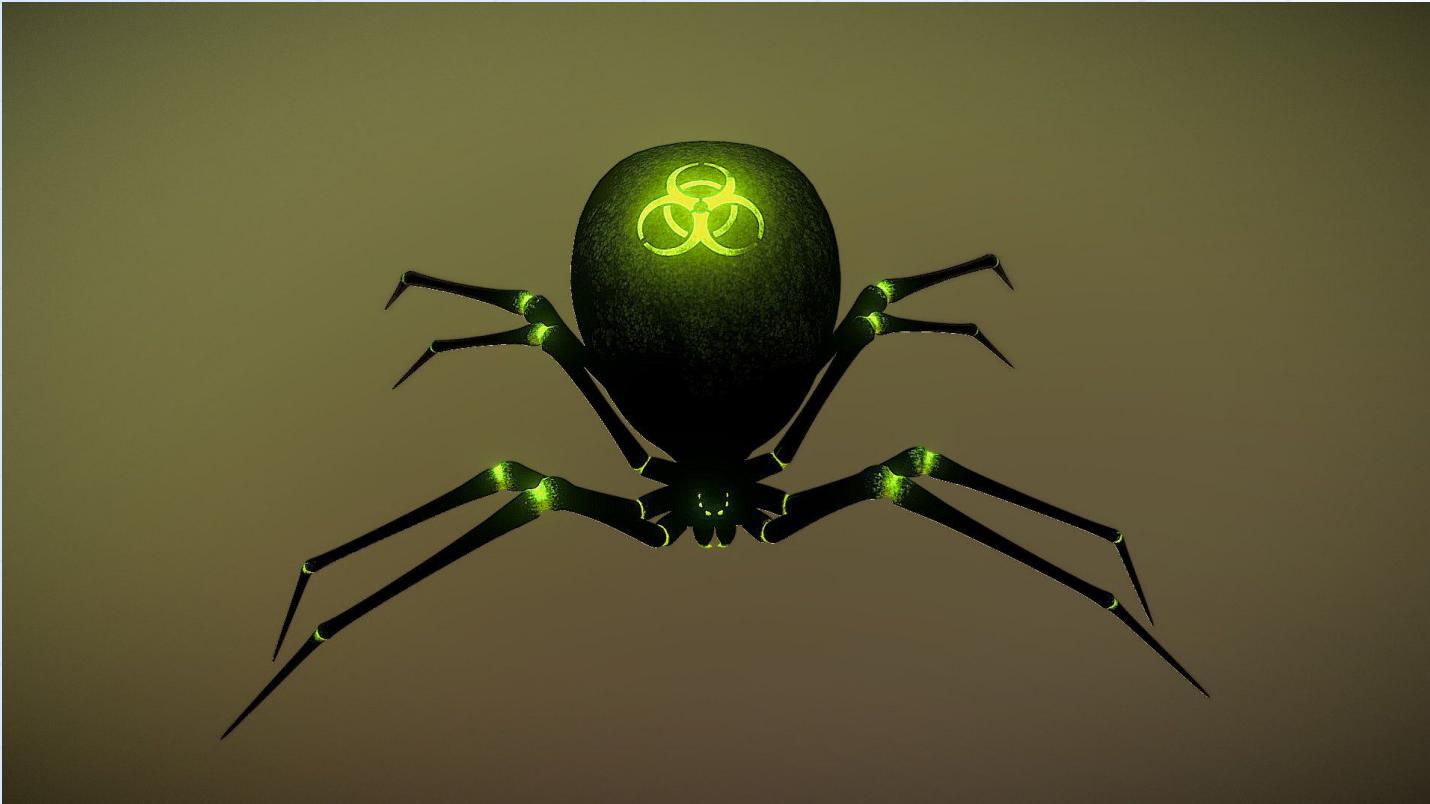
With great power comes great responsibility

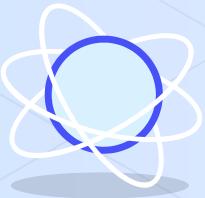
- Who are they?
 - The Original
 - Peter Parker
 - High schooler bitten by radioactive spider
 - Newer variants
 - Miles Morales
 - Spider Gwen
 - Miguel O'Hara
(Spiderman 2099)
 - Many many many more
- Who is your favourite?





Radioactive Spider





Activity





Design your own spider-person!



06

Material Physics

Class Charter

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3. Listen extra carefully in activities and experiments



The Periodic Table

1 H Hydrogen 1.008	2 He Helium 4.003
3 Li Lithium 6.94	4 Be Beryllium 9.012
11 Na Sodium 22.990	12 Mg Magnesium 24.305
19 K Potassium 39.098	20 Ca Calcium 40.078
37 Rb Rubidium 85.468	38 Sr Strontium 87.62
55 Cs Cesium 132.905	56 Ba Barium 137.327
87 Fr Francium [223]	88 Ra Radium [226]
*Lanthanide series	
57 La Lanthanum 138.905	58 Ce Cerium 140.116
59 Pr Praseodymium 140.908	60 Nd Neodymium 144.242
61 Pm Promethium [145]	62 Sm Samarium 150.36
63 Eu Europium 151.964	64 Gd Gadolinium 157.25
65 Tb Terbium 158.925	66 Dy Dysprosium 162.500
67 Ho Holmium 164.930	68 Er Erbium 167.259
69 Tm Thulium 168.934	70 Yb Ytterbium 173.045
**Actinide series	
89 Ac Actinium [227]	90 Th Thorium 232.038
91 Pa Protactinium 231.036	92 U Uranium 238.029
93 Np Neptunium [237]	94 Pu Plutonium [244]
95 Am Americium [243]	96 Cm Curium [247]
97 Bk Berkelium [247]	98 Cf Californium [251]
99 Es Einsteinium [252]	100 Fm Fermium [257]
101 Md Mendelevium [258]	102 No Nobelium [259]

Atomic Number
Symbol
Name
Average Atomic Mass

6 C Carbon 12.011

metals
nonmetals
metalloids

21 Sc Scandium 44.956	22 Ti Titanium 47.867	23 V Vanadium 50.942	24 Cr Chromium 51.996	25 Mn Manganese 54.938	26 Fe Iron 55.845	27 Co Cobalt 58.933	28 Ni Nickel 58.693	29 Cu Copper 63.546	30 Zn Zinc 65.38	31 Ga Gallium 69.723	32 Ge Germanium 72.630	33 As Arsenic 74.922	34 Se Selenium 78.97	35 Br Bromine 79.904	36 Kr Krypton 83.798			
39 Y Yttrium 88.906	40 Zr Zirconium 91.224	41 Nb Niobium 92.906	42 Mo Molybdenum 95.95	43 Tc Technetium [97]	44 Ru Ruthenium 101.07	45 Rh Rhodium 102.905	46 Pd Palladium 106.42	47 Ag Silver 107.868	48 Cd Cadmium 112.414	49 In Indium 114.818	50 Sn Tin 118.710	51 Sb Antimony 121.760	53 Te Tellurium 127.60	53 I Iodine 126.904	54 Xe Xenon 131.293			
55 Cs Cesium 132.905	56 Ba Barium 137.327	*	71 Lu Lutetium 174.967	72 Hf Hafnium 178.49	73 Ta Tantalum 180.948	74 W Tungsten 183.84	75 Re Rhenium 186.207	76 Os Osmium 190.23	77 Ir Iridium 192.217	78 Pt Platinum 195.084	79 Au Gold 196.997	80 Hg Mercury 200.592	81 Tl Thallium 204.38	82 Pb Lead 207.2	83 Bi Bismuth [209]	84 Po Polonium [210]		
87 Fr Francium [223]	88 Ra Radium [226]	**	103 Lr Lawrencium [262]	104 Rf Rutherfordium [267]	105 Db Dubnium [270]	106 Sg Seaborgium [269]	107 Bh Bohrium [270]	108 Hs Hassium [270]	109 Mt Meitnerium [278]	110 Ds Darmstadtium [281]	111 Rg Roentgenium [281]	112 Cn Copernicium [285]	113 Nh Nihonium [286]	114 Fl Flerovium [289]	115 Mc Moscovium [289]	116 Lv Livermorium [293]	117 Ts Tennessine [293]	118 Og Oganesson [294]

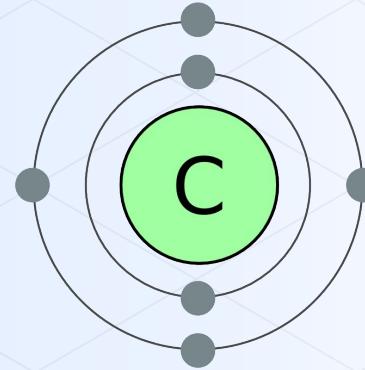




Carbon I

Carbon Carbon Everywhere

- Carbon
 - Carbon is an element on the periodic table [C]
 - It has 6 protons and 6 electrons
- Carbon is everywhere
 - Wood (paper)
 - Pencil “lead”
 - Hair





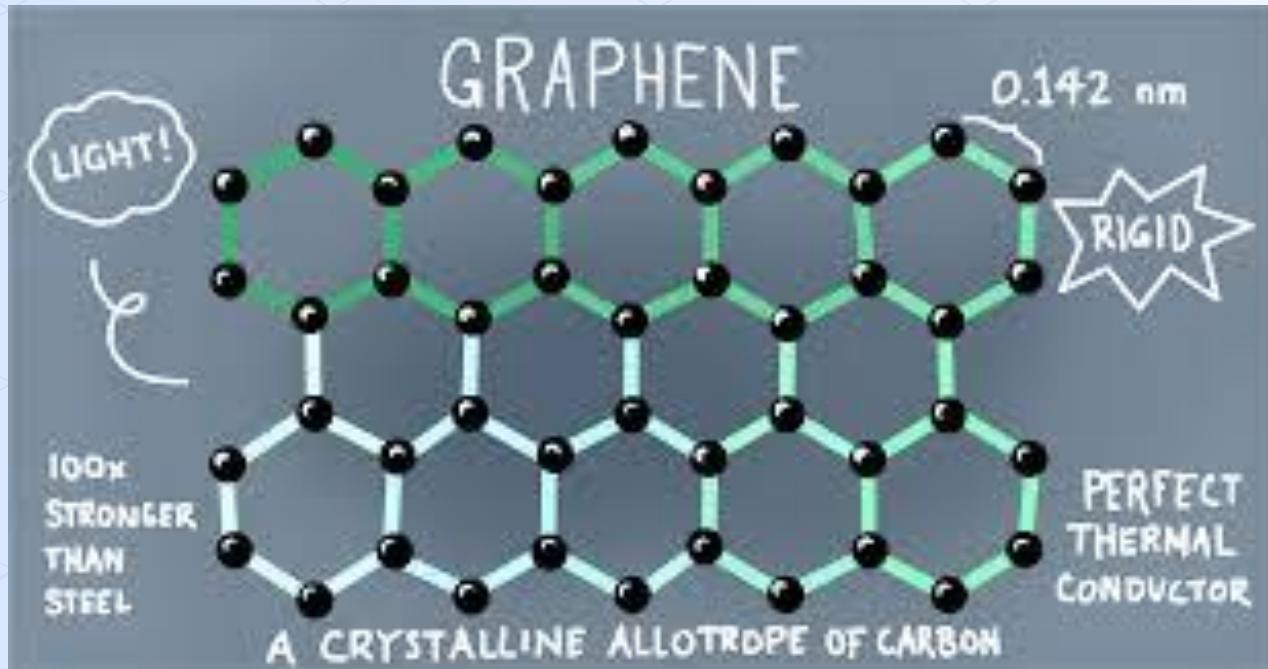
Carbon II

Graphite, Graphene, and Diamond

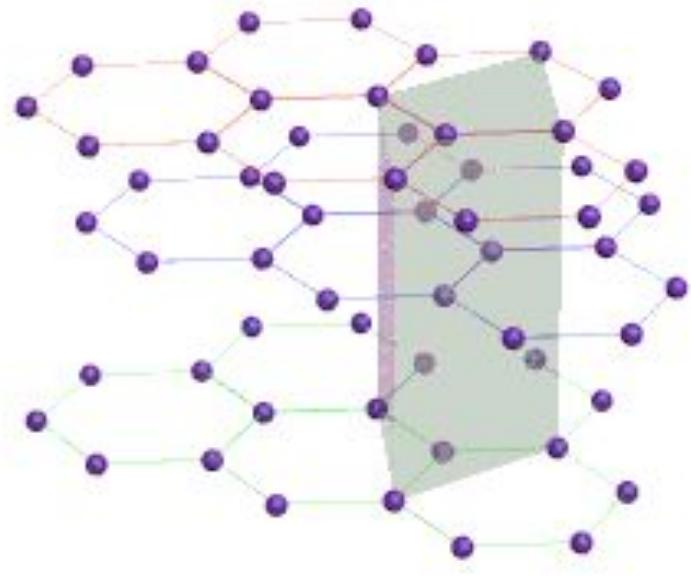
- Graphene
 - Graphene is the strongest material ever tested
 - It's made of a one atom thick layer of carbon atoms
- Graphite
 - Graphite is what's actually in pencils
 - Made of layers of graphene
- Diamond
 - Still made of carbon
 - In a shape called *diamond cubic*



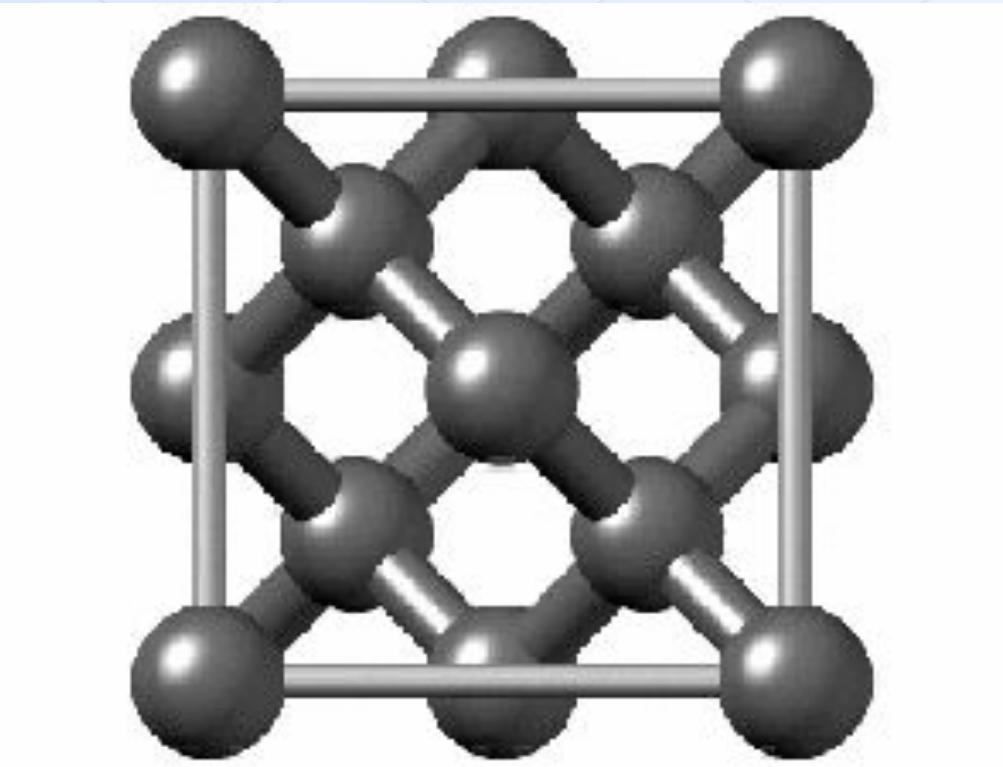
Graphene



Graphite



Diamond

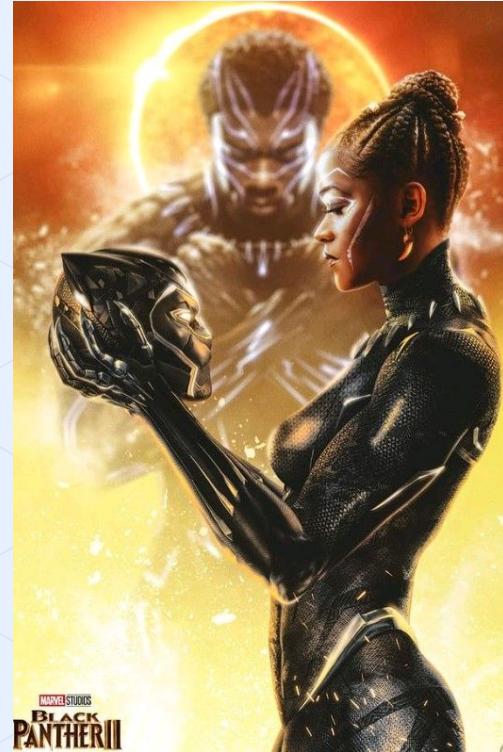




Black Panther

Wakanda Forever

- Royalty of Wakanda
 - Two Black Panthers in the MCU
 - T'Challa - King
 - Shuri - Princess
- Vibranium
 - Vibranium is an incredibly strong material in the Marvel Universe
 - It's very common in Wakanda
 - The Black Panther suit is made from Vibranium





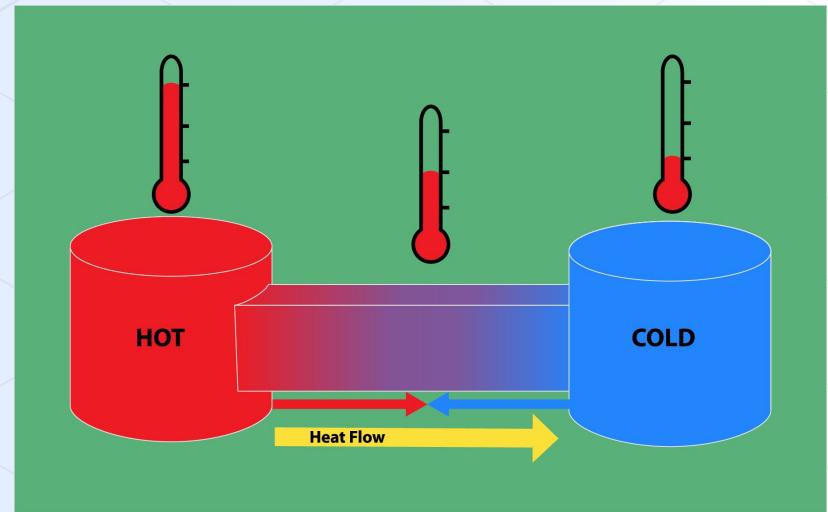
Black Panther





Thermodynamics I

- Thermodynamics
 - Studies the changes in things like pressure, volume, and **temperature**
 - Talks about changes in **heat** and energy
 - Uses a branch of maths called *statistics* to describe how the really small things are affected by heat

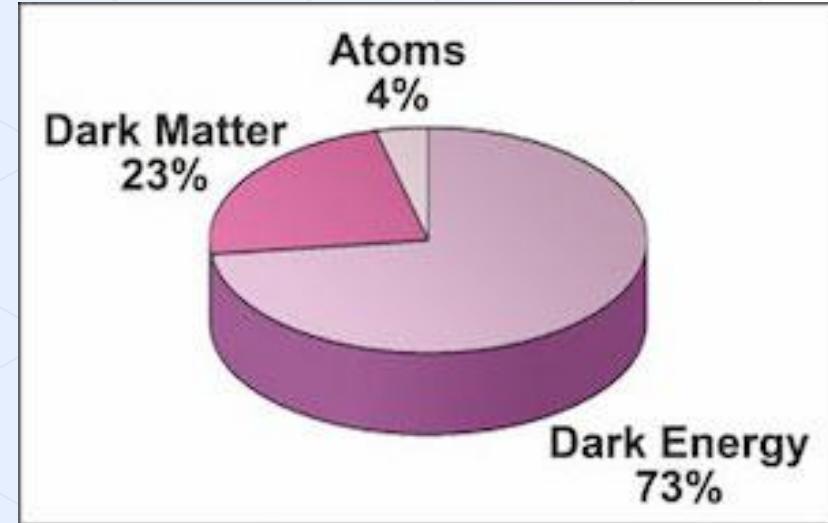




Thermodynamics II

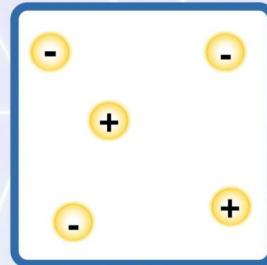
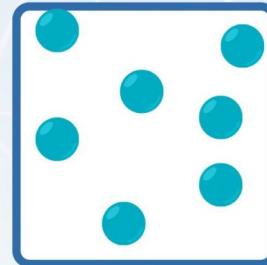
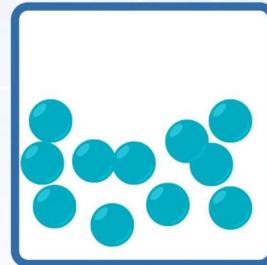
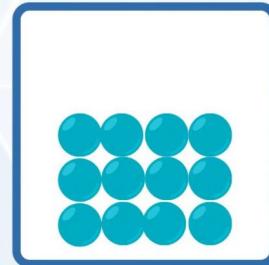
States of Matter

- States of Matter
 - Matter is anything that has mass and takes up volume
 - I.e. Pretty much everything we see
 - Heating or cooling matter can change its state
 - There are loads but only 4 important ones
 - Solid
 - Liquid
 - Gas
 - Plasma





States of Matter





How Superheroes deal with Heat

- Heat hurts
 - Humans are not meant to deal with large amounts of heat transfer
 - Either hot or cold
- Superheroes who can deal with heat?
 - The Human Torch
 - Firestorm
 - Any other?

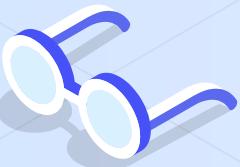
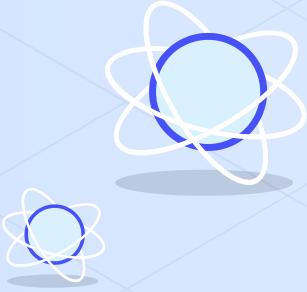


Activity



Design a hero

Design a superhero who can control temperature and heat, manipulate states of matter, or anything else!





Non-Newtonian Fluids

Is it a liquid? Is it a solid?

- A different state of matter?
 - Not really - they're still liquid
 - The viscosity (how runny it is) depends on how much stress you put on it
 - For instance, they might seem like solids when you punch them but then liquid if you slowly move in it
- Examples
 - Toothpaste
 - Blood
 - Oobleck

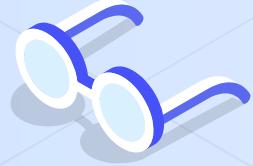




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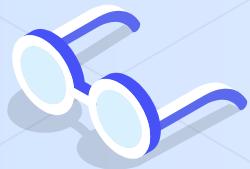
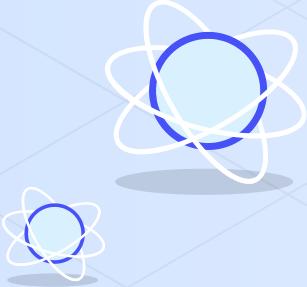
NON NEWTONIAN FLUIDS





Experiment

Make Oobleck



Class Charter

1. Everybody respects everybody else
2. At least one fun fact per class (remember to raise your hand!)
3. Listen extra carefully in activities and experiments



A Word from an Expert





Making our own Superheroes



Making your own Superhero

“The only advice anybody can give is, if you wanna be a writer, keep writing.”. - Stan Lee

- What type of superhero?
 - Completely up to you
 - You can determine everything you want YOUR superhero to be
 - Could be all good
 - Could be an antihero
 - etc.
 - On ONE condition:
 - They must use science

BOOM

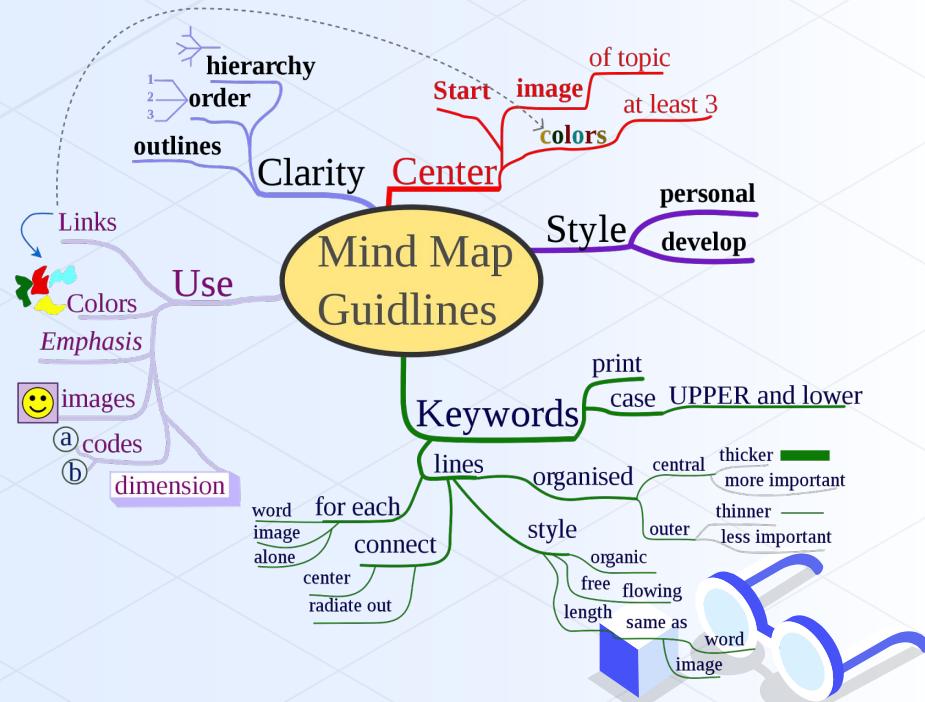




Mind Maps

How to think out an idea

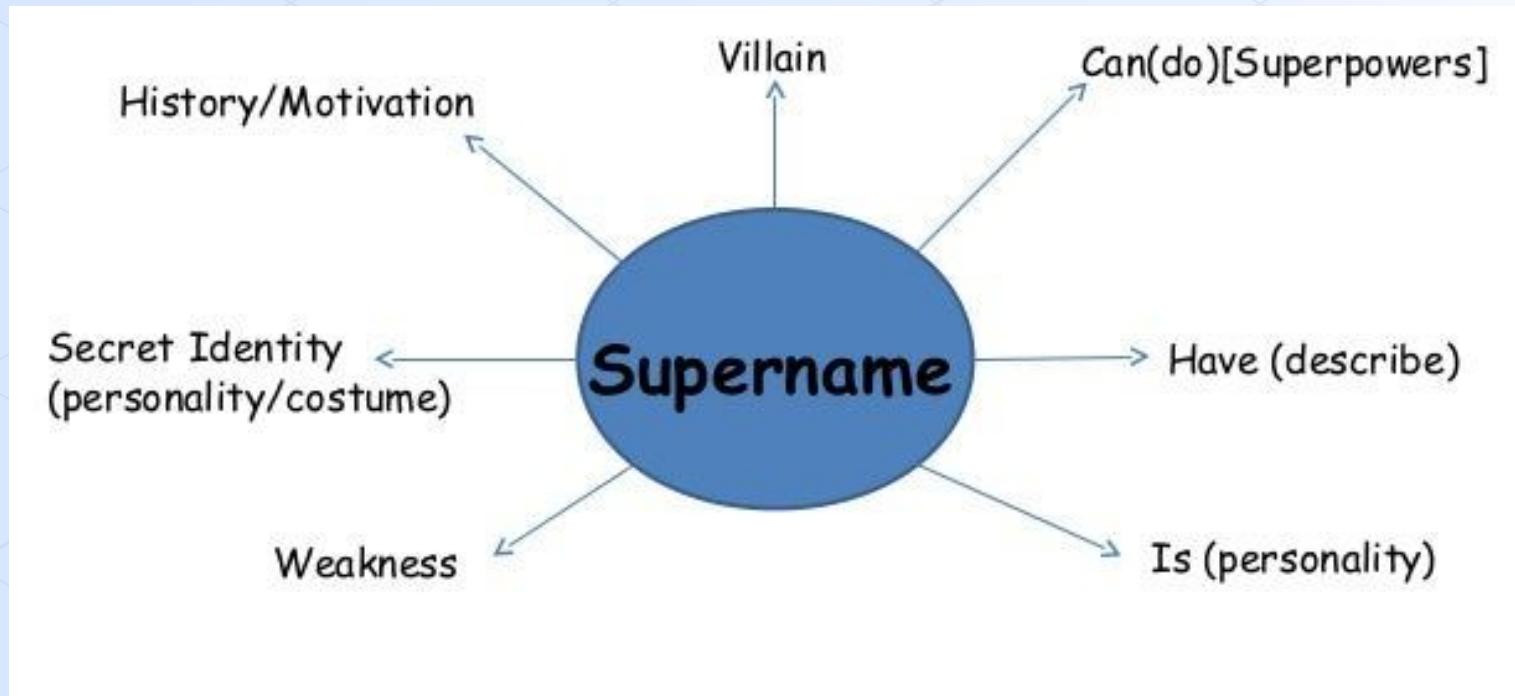
- What is a mind map?
 - A mind map is a diagram used to develop ideas
- How to make one?
 - Write the central idea in the middle of the page and draw a loop around it
 - All the information you can think of comes out as a line from it.
 - You can connect new pieces of information off of that too



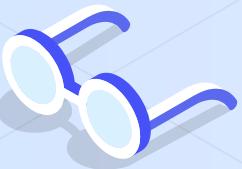
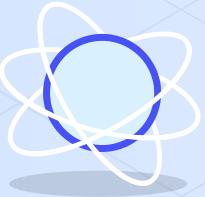


Sample Mind Map

*Note this is an example, you do NOT have to stick to it



Activity





Character Sheet I

What goes into making a character?

- What is a character sheet?
 - A character sheet is a way to get all the information regarding a character down in a simple way in one place
- What goes into our character sheet?
 - Remember, all the stats can go from 1 to 5 and you have 25 overall points to spend





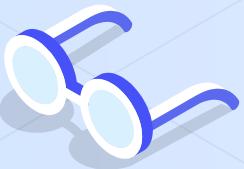
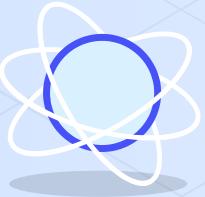
Character Sheet II

Stats Explained

- Strength
 - Physical Strength
- Perception
 - How aware your superhero is to their surroundings (e.g. spider sense)
- Endurance
 - How much damage can your superhero take?
- Charisma
 - How good is your superhero at talking to people and convincing them to do stuff?
- Intelligence
 - Knowledge, wisdom, and your superhero's ability to think quickly
- Agility
 - Coordination and the ability of your superhero to move well
- Luck
 - How lucky is your superhero?



Activity

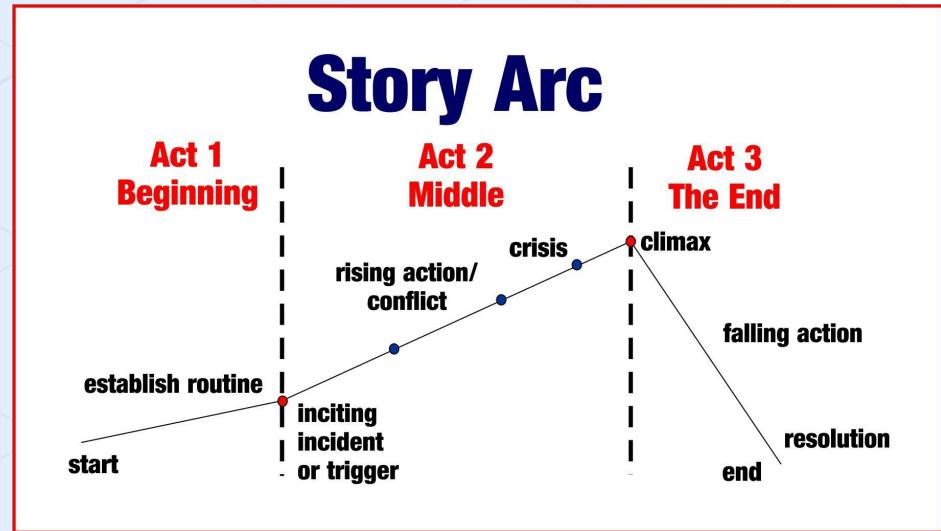




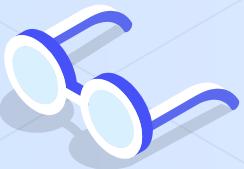
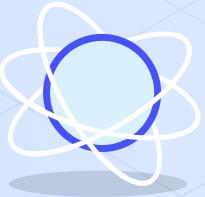
Writing a story

What goes into writing a story?

- What is a storyboard?
 - A storyboard is a technique used to get the general idea of story down before writing it out in its entirety
 - The idea is to draw (sketch) and describe scenes in the story until you have a structure.
- The story arc
 - Tried and tested layout a story should (not has to) follow



Activity



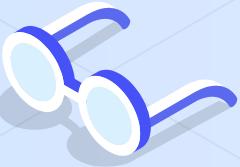
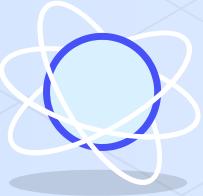


Finale

Class Charter

1. Everybody respects everybody else
2. At least one fun fact per class (remember to raise your hand!)
3. Listen extra carefully in activities and experiments

Table Quiz



Round 1 - Magnetism

1. What is Magneto's real name? (first name will do)
2. True or False: You can find a magnet with only 1 pole
3. How many types of magnetic materials are there?
4. Name 3 examples of magnetism in the real world
5. A lot of magnets have two poles (called dipoles), what are they called?
6. How many poles (not necessarily magnetic poles) does the Earth have? (Closest answer gets the points)



Round 2 – Xmen & Evolution

1. Give an example of genetic trait
2. What power does Professor X have?
3. True or false: Mutations are permanent
4. Evolution by natural selection was discovered by:
 - a. Albert Einstein
 - b. Isaac Newton
 - c. Charles Darwin
 - d. Marie Curie
5. There are plant cells and animal cells, which one looks more like a circle?
6. How many days can a human last without water?



Round 3 – Quantum Physics

1. Name the three particles that make up an atom
2. What is the name of the fictional particle that allows Antman to become really big / small?
3. What non-size related power does Antman have?
4. True or False: If Antman was to be turned into a black hole, he would need to be smaller than a proton
5. What is the name of the place that Antman goes where the normal rules of time and space don't apply?
6. What was the name of the theory of quantum gravity that we watched a video on in class (Hint it's: _____ Theory)



Round 4 – Technology

1. Who were the two main superheroes we discussed in class?
2. What are the name of the beams that Ironman uses to fly?
3. What does Batman use to scale buildings?
4. True or False: It's easy to build a working parachute
5. Batman cannot fly but he can _____
6. What was the name of the suit that Ironman built in a cave?



Round 5 – Radiation & Mutations

1. Radioactivity was discovered by:
 - a. Albert Einstein
 - b. Isaac Newton
 - c. Charles Darwin
 - d. Marie Curie
2. Name a type of radiation
3. What superhero did we cover that was turned into one by gamma radiation?
4. Name two Spider-people (real names or spider names)
5. True or False: Radiation can change the structure of DNA
6. How many types of radioactive decay are there?

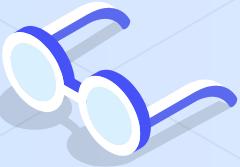
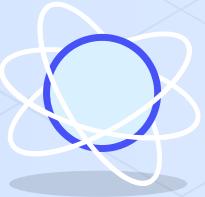


Round 6 - Material Physics

1. Name an example of an element
2. Sketch what **graphene** looks like
3. What is the Black Panther's name in the MCU (current or previous)?
4. What are the four main states of matter?
5. What element is in human hair, wood, and pencil "lead"
6. What is the black panther suit made of?



Summary





The Course

- The course layout
 - Each class featured a particular area of science and a corresponding superhero / set of superheroes
 - Flipping back and forth between superheroes and science
 - We'd try to fit in a couple activities / experiments each class





The Course Material

A Quick Summary of what we covered

- Magnetism
 - We talked about magnets, how they work, what they look like, etc.
 - Spoke about Magneto and how realistic he is
- X-Men & Evolution
 - DNA, Chromosomes, Genes, etc.
 - What is a mutation?
 - Evolution
 - Separated the DNA of a Strawberry
- Quantum Physics
 - What is an atom? What makes up an atom?
 - How does Antman work?
 - What is the Quantum Realm
 - Special request: String Theory
- Technology
 - Ironman, Batman and what gives them the ability to be on par with superpowered heroes
 - Built parachutes





The Course Material

A Quick Summary of what we covered

- Radiation & Mutation
 - Learned about radiation (safe and unsafe) and radioactivity
 - Looked at the Hulk and all the spider-people
- Material Physics
 - The Periodic Table
 - Carbon and how it is EVERYWHERE
 - Black Panther
 - Thermodynamics
 - We made Oobleck
- Making our own Superheroes
 - Everyone (either in pairs or by themselves) worked on designing their own superhero
 - Learned about what makes a good superhero and superhero story
 - Practiced mind maps as a way to get ideas onto a page to begin structuring a comic story.



Thank You!

If you have any questions or feedback please let me know!

All the course materials can be found here:

https://github.com/farrencc/ctyi_superhero_science