

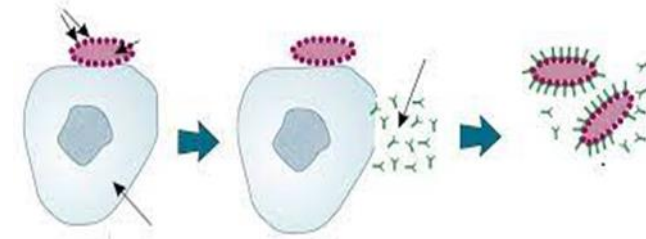
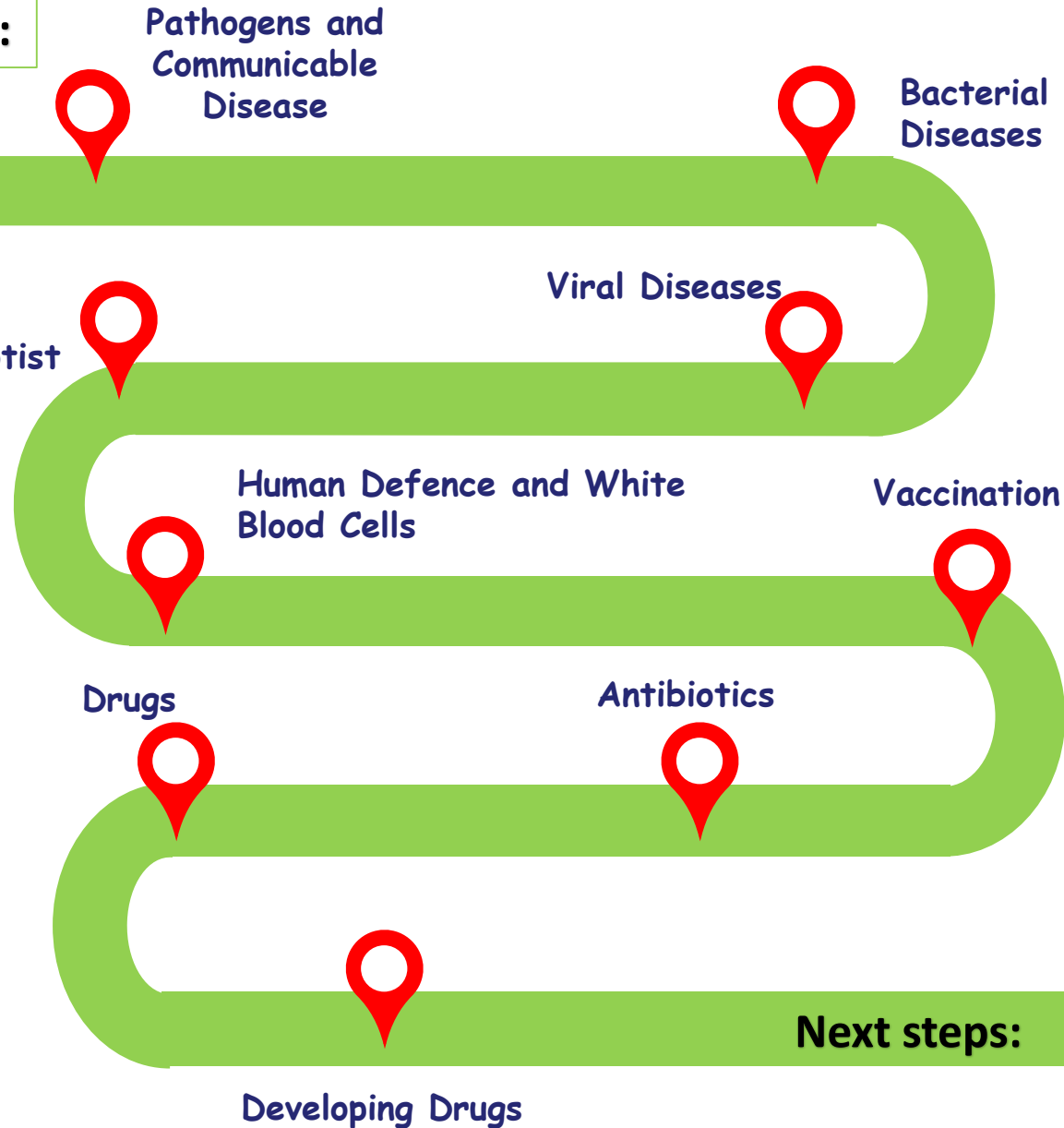
## Prior and Prerequisite learning:

In Year 9 we looked at health and disease, blood cells and their particular roles. We will now build upon this in this topic by looking at how the body protects us against disease.

## Why are we learning this?

Pathogens are microorganisms such as viruses and bacteria that cause infectious disease in animals and plants. We need to have an understanding of how our bodies can protect us to help fight disease.

# B3 Infection and Response



The knowledge gained in this topic can be used when learning about photosynthesis and respiration in the B4 Bioenergetics topic

## Prior and Prerequisite learning:

In Year 9 we looked at the structure and function of plants cells and how they are adapted to carry out photosynthesis. We will build on this in this topic and look at respiration and metabolism.

# B4 Bioenergetics

Photosynthesis

The Rate of Photosynthesis

Measuring the Rate of Photosynthesis Practical

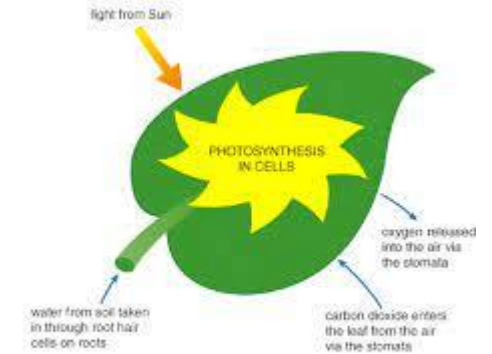
Respiration and Metabolism

Aerobic Respiration

Anaerobic Respiration

Exercise

Next steps:



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The knowledge gained in this topic can be used when you will learn about how the body can survive in particular situations in the next topic of B5 Homeostasis and Response

### Why are we learning this?

Photosynthesis releases oxygen which has built up over millions of years in the Earth's atmosphere. Animals and plants use this oxygen to oxidise food in a process called respiration. We need to be able to link these two fundamental life processes together in both animals and plants and explain how they are important in order to survive.

## Prior and Prerequisite learning:

In Year 9 we looked at the structure of an atom and the different subatomic particles. We will now build upon this topic by looking at types of bonding and different states of matter.

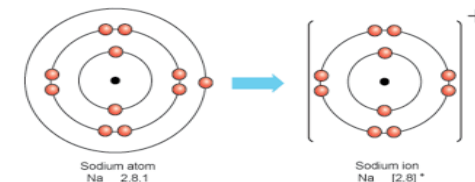
### Why are we learning this?

Chemists use theories of structure and bonding to explain the physical and chemical properties of materials. Analysis of structures shows atoms can be arranged in a variety of ways such as giant structures. We can use this knowledge to engineer new applications in a range of different technologies.

# C2 – Bonding, Structure and Properties of Matter



Ionic Compounds



Structures of Carbon

You will be taking knowledge from this topic to explore further the idea of mass and concentration in chemical reactions in C3 Quantitative Chemistry

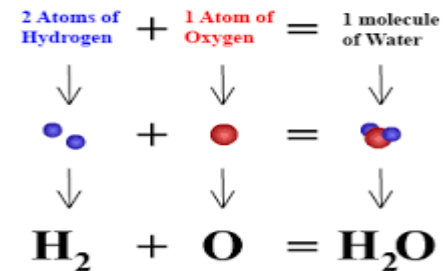
## Prior and Prerequisite learning:

# C3 Quantitative Chemistry Foundation

In Year 9 we learnt about how to use chemical symbols and formulae to represent elements and compounds. In this topic we will look at how to quantify the number of atoms in a compound with the use of equations.

Conservation of mass and balancing equations

Percentage of an element



Relative atomic mass

### Why are we learning this?

Chemical reactions can be classified in various ways. Identifying different types of chemical reaction allows chemists to make sense of how different chemicals react together, to establish patterns and to make predictions about behaviour of other chemicals. Chemical equations provide a means of representing chemical reactions and are a key way for chemists to communicate chemical ideas.

Next steps:

You will be taking your maths skills and use of equations in the next topic C4 Chemical Changes

Concentration of Solutions

Relative formula mass

## Prior and Prerequisite learning:

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### Why are we learning this?

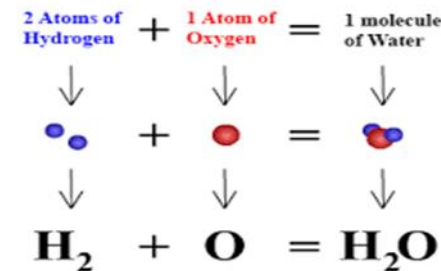
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Conservation of Mass and Balancing Equations

Relative Atomic Mass

# C3 Quantitative Chemistry

## Higher



Percentage of an Element

Relative formula Mass

Relative Masses and Moles

Balanced Equations to Calculate Mass

Using Moles to Balance Equations

Limiting Reactants

Concentration of Solution

Next steps:

You will be taking your maths skills and use of equations in the next topic C4 Chemical Changes

## Prior and Prerequisite learning:

In the last topic we learnt about how to quantify the number of atoms in a compound with the use of equations. In this topic we will look at the reactivity series and the importance of metals.

### Why are we learning this?

Knowing about different chemical changes meant that scientists could begin to predict exactly what new substances would be formed and use this knowledge to develop a wide range of different materials and processes. The extraction of important resources from the Earth makes use of the way that some elements and compounds react with each other and how easily they can be 'pulled apart'.

Acids and Bases

Reactions of Acids

# C4 – Chemical Changes Foundation

The Reactivity Series

potassium	most reactive	K
sodium		Na
calcium		Ca
magnesium		Mg
aluminium		Al
carbon		C
zinc		Zn
iron		Fe
tin		Sn
lead		Pb
hydrogen		H
copper		Cu
silver		Ag
gold		Au
platinum	least reactive	Pt

Electrolysis

Extracting Metals

Reactions of Metals

Next steps:

Electrolysis of Aqueous Solutions

You will be taking knowledge from this topic and applying it to different reactions in C5 Energy Changes



## Prior and Prerequisite learning: Acids and Bases

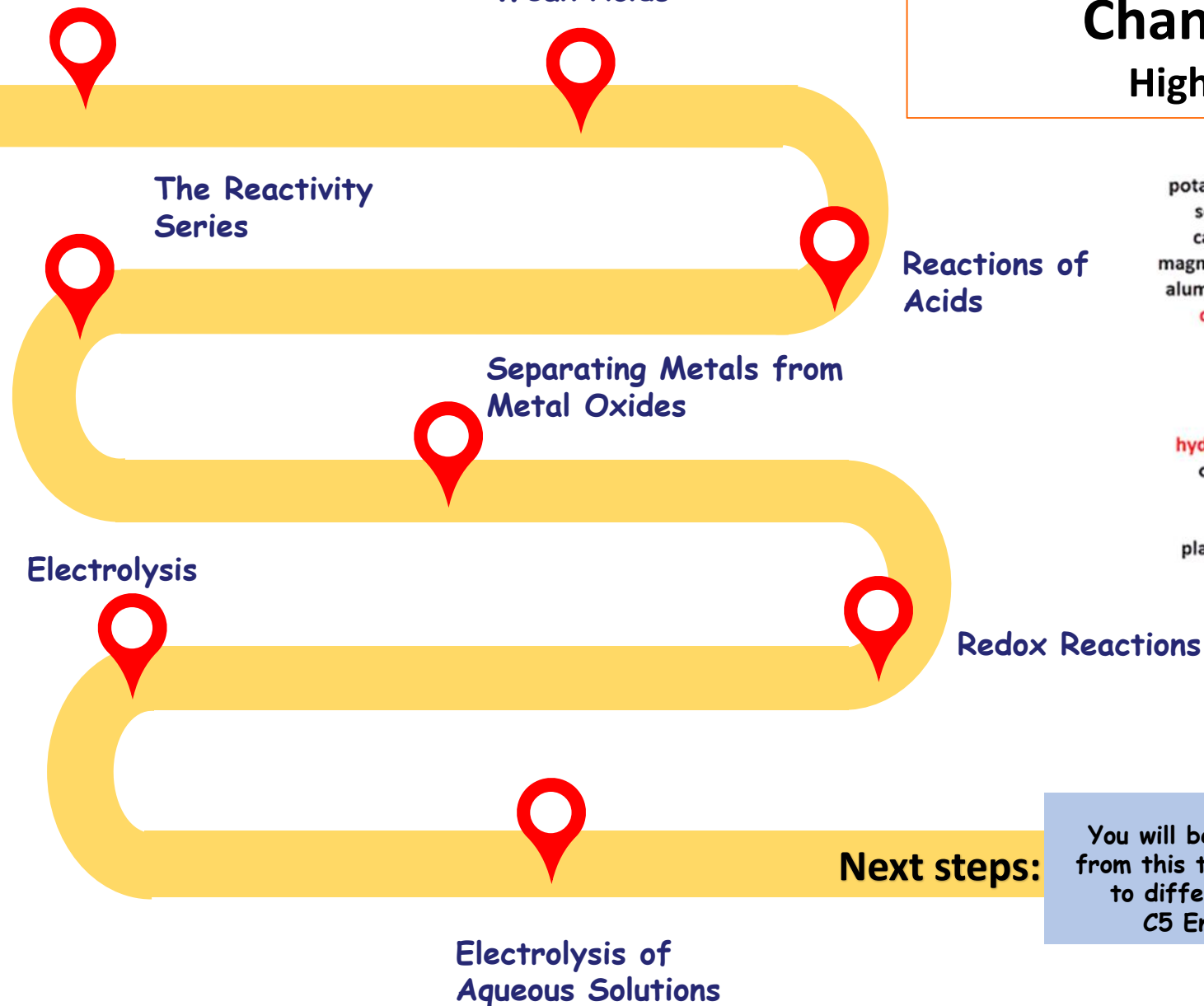
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Strong Acids and Weak Acids

# C4 – Chemical Changes Higher



potassium	most reactive	K
sodium		Na
calcium		Ca
magnesium		Mg
aluminium		Al
carbon		C
zinc		Zn
iron		Fe
tin		Sn
lead		Pb
hydrogen		H
copper		Cu
silver		Ag
gold		Au
platinum	least reactive	Pt

You will be taking knowledge from this topic and applying it to different reactions in C5 Energy Changes

## Prior and Prerequisite learning:

In the last topic we learnt about the reactivity series and the importance of metals. In this topic we will look at energy changes and examples of different reactions.

### Why are we learning this?

Energy changes are an important part of chemical reactions. The interaction of particles often involves the transfers of energy due to the breaking and formation of bonds.

# C5 Energy Changes Foundation

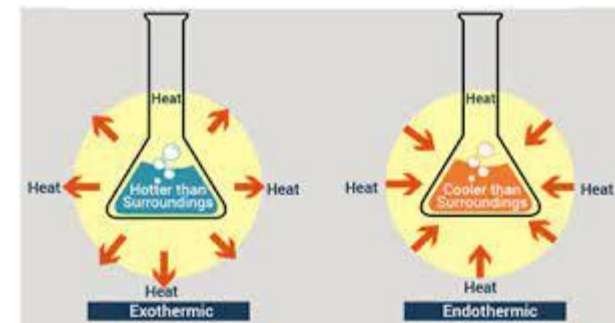
## Exothermic and Endothermic Reactions

## Measuring Energy Changes Practical

## Reaction Profiles

**Next steps:**

You will be taking knowledge from this topic and applying it to rates of reaction in C6 The Rate and Extent of Chemical Change





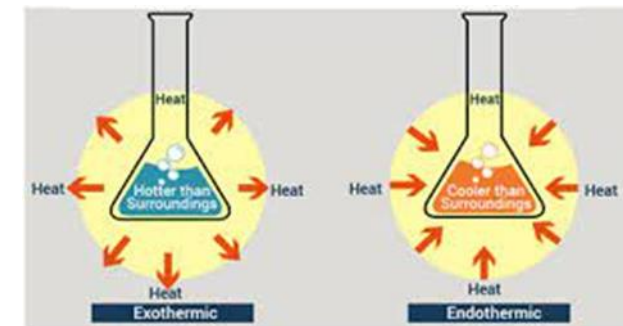
## Prior and Prerequisite learning:

# C5 Energy Changes Higher

In the last topic we learnt about the reactivity series and the importance of metals. In this topic we will look at energy changes and examples of different reactions.

Exothermic and Endothermic Reactions

Measuring Energy Changes Practical



### Why are we learning this?

Energy changes are an important part of chemical reactions. The interaction of particles often involves the transfers of energy due to the breaking and formation of bonds.

Reaction Profiles

Next steps:

You will be taking knowledge from this topic and applying it to rates of reaction in C6 The Rate and Extent of Chemical Change

Bond Energies

## Prior and Prerequisite learning:

In the last topic we learnt about energy changes and examples of different reactions. In this topic we will look at reversible reactions and how to measure rates of reaction.

### Why are we learning this?

Chemical reactions occur at different rates and many variables can be manipulated in order to speed them up or slow them down. In industry, chemists and chemical engineers determine the effect of different variables on reaction rate and yield of product.

Rate of Reaction

Factors  
Affecting Rates  
of Reaction

Measuring Rates  
of Reaction

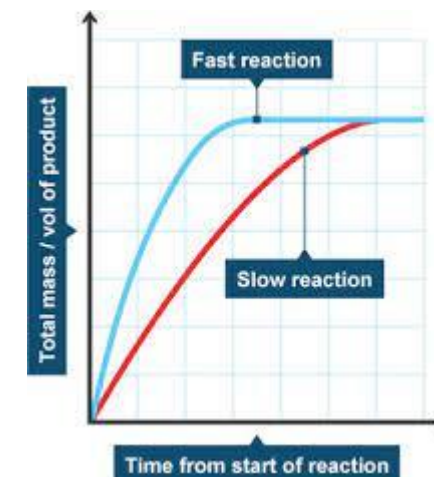
Graphs of Rates of  
Reaction

Working Out  
Reaction  
Rates

Reversible Reactions

Next steps:

# C6 – The Rate and Extent of Chemical Change Foundation



You will be taking knowledge from this topic and applying it to carbon compounds in C7 Organic Chemistry

## Prior and Prerequisite learning:

Rate of Reaction

In the last topic we learnt about energy changes and examples of different reactions. In this topic we will look at reversible reactions and how to measure rates of reaction.

Factors Affecting Rates of Reaction

# C6 – The Rate and Extent of Chemical Change

Higher

Measuring Rates of Reaction

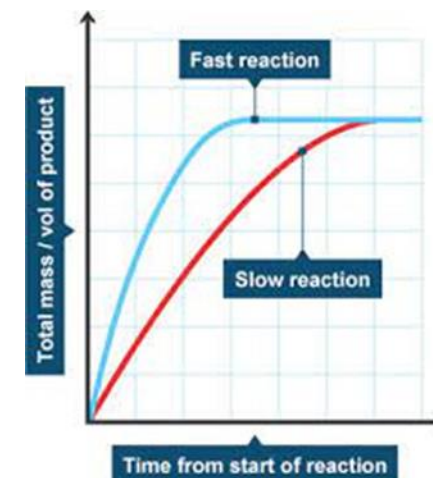
Graphs of Rates of Reaction

### Why are we learning this?

Chemical reactions occur at different rates and many variables can be manipulated in order to speed them up or slow them down. In industry, chemists and chemical engineers determine the effect of different variables on reaction rate and yield of product.

Working Out Reaction Rates

Reversible Reactions



Next steps:

You will be taking knowledge from this topic and applying it to carbon compounds in C7 Organic Chemistry

Le Chatelier's Principle

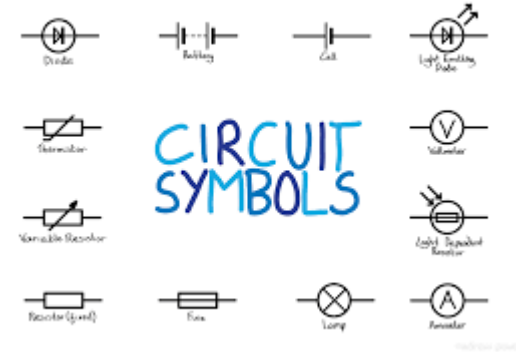
## Prior and Prerequisite learning:

In Year 9 you learnt about different types of energy and renewable and non renewable resources. In this topic we will build upon this to apply this to electricity.

### Why are we learning this?

Electric charge is a fundamental property of matter everywhere. Many circuits are powered with mains electricity, but portable electrical devices must use batteries of some kind. Electrical power fills the modern world with artificial light and sound, information and entertainment, remote sensing and control.

# P2 Electricity



You will be taking knowledge from this topic and applying it to P4 Atomic Structure

## Prior and Prerequisite learning:

In the last topic we learnt about different types of circuits, how to measure current and electricity in the home. In this topic we will look at the subatomic parts of an atom and different types of radiation.

### Why are we learning this?

*Ionising radiation is hazardous but can be very useful. Although radioactivity was discovered over a century ago, it took many nuclear physicists several decades to understand the structure of atoms, nuclear forces and stability. Today radioactive materials are widely used in medicine, industry, agriculture and electrical power generation.*

Structure of  
Atoms

The discovery of  
the nucleus

# P4 Atomic Structure

Radioactive  
Decay

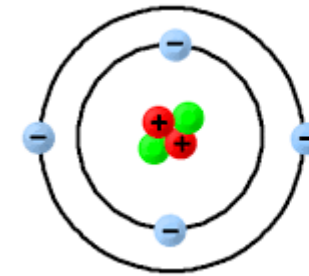
Isotopes

Half Lives

Contamination  
and irradiation

Risks and uses  
of Radiation

Next steps:



+ Proton  
● Neutron  
- Electron

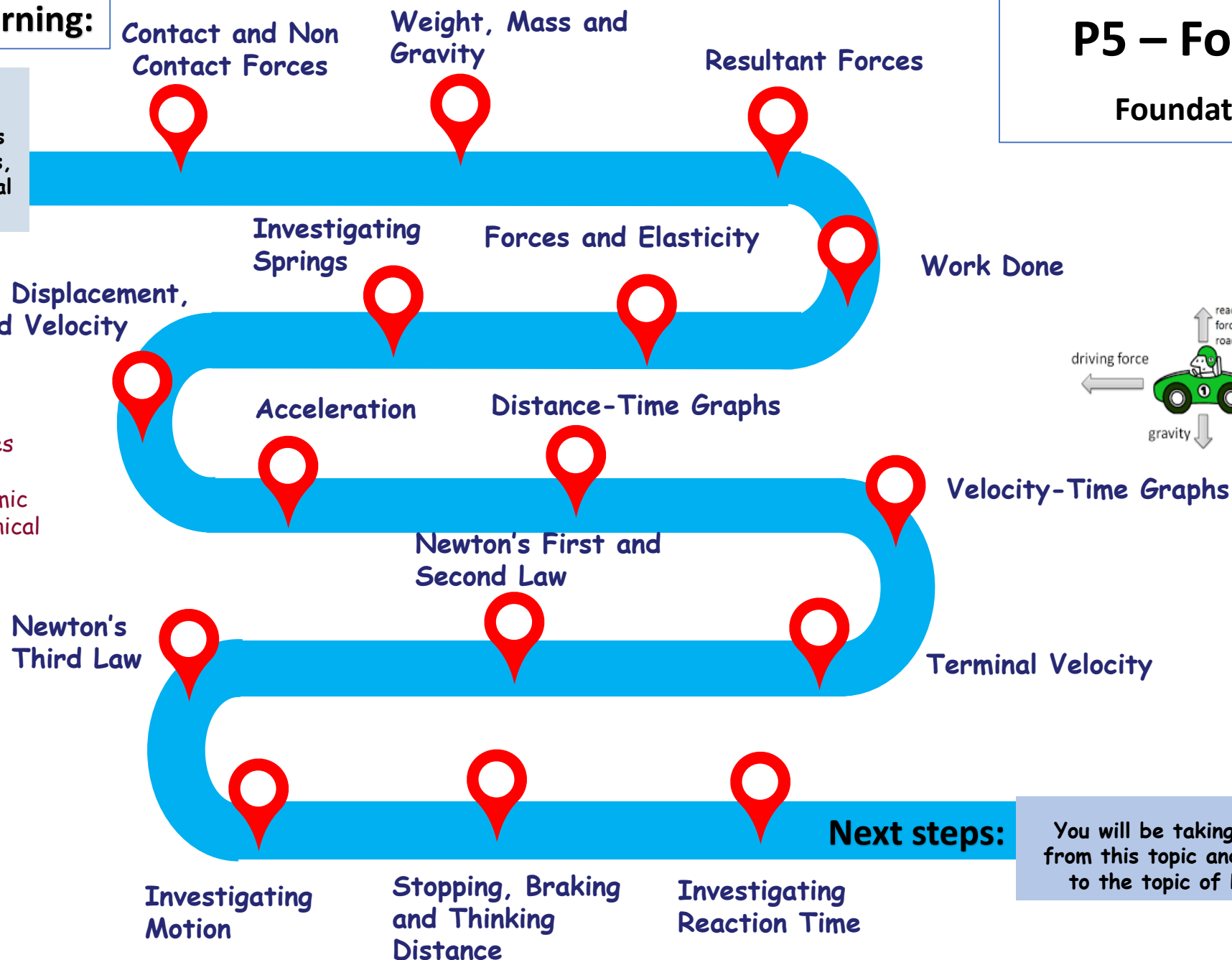
You will be taking knowledge from this topic and applying it to P5 Forces.

## Prior and Prerequisite learning:

In the last topic we learned about subatomic parts of an atom and different types of radiation. In this topic we will look at different forces, graphs and the application to the real world.

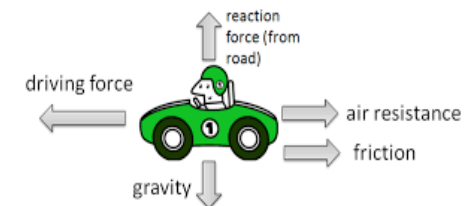
### Why are we learning this?

Engineers analyse forces when designing a great variety of machines and instruments, from road bridges and fairground rides to atomic force microscopes. Anything mechanical can be analysed in this way. Recent developments in artificial limbs use the analysis of forces to make movement possible.



# P5 – Forces

## Foundation



You will be taking knowledge from this topic and applying it to the topic of P6 Waves



## Prior and Prerequisite learning:

In the last topic we learned about subatomic parts of an atom and different types of radiation. In this topic we will look at different forces, graphs and the application to the real world.

Distance, Displacement, Speed and Velocity

### Why are we learning this?

Engineers analyse forces when designing a great variety of machines and instruments, from road bridges and fairground rides to atomic force microscopes. Anything mechanical can be analysed in this way. Recent developments in artificial limbs use the analysis of forces to make movement possible.

Contact and Non Contact Forces

Weight, Mass and Gravity

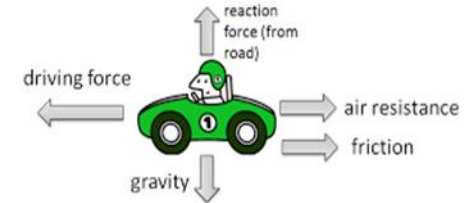
Resultant Forces

## P5 – Forces Higher

Investigating Springs

Forces and Elasticity

Work Done



Acceleration

Distance-Time Graphs

Velocity-Time Graphs



Newton's Third Law

Newton's First and Second Law

Terminal Velocity



Investigating Motion

Next steps:

Stopping, Braking and Thinking Distance

Investigating Reaction Time

Momentum

You will be taking knowledge from this topic and applying it to the topic of P6 Waves