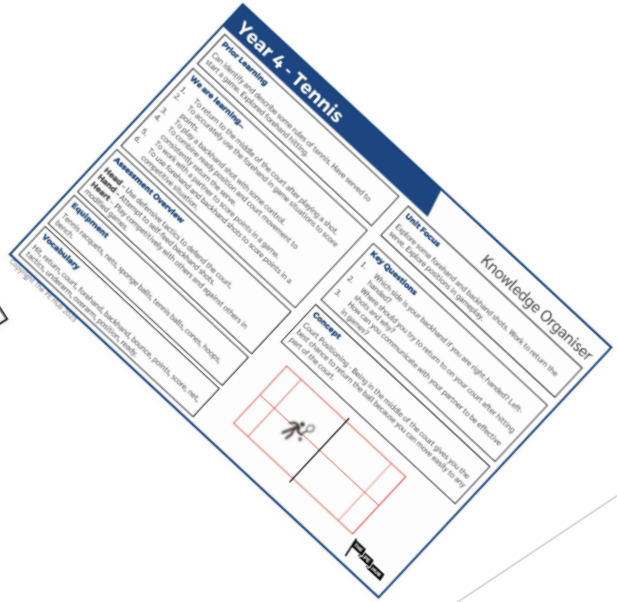
Year 6 Knowledge Organisers

At South Hill, we have created ‘Knowledge Organisers’ to help pupils and parents to know what the children will be learning in each of our Foundation subjects. These contain essential vocabulary and facts for each topic.

Please see ‘Knowledge Organisers’ attached for Year 6 for the Spring term, which will also be in pupil’s books and on working walls in school.



Year 6 Science - Spring 1

YEAR 6 SCIENCE – EVOLUTION AND INHERITANCE

KNOWLEDGE ORGANISER

What have we learnt in this topic before and what we will learn this year?

In Year 4 we learnt in our topic:

- recognise that living things can be grouped in a variety of ways
- explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment
- recognise that environments can change and that this can sometimes pose dangers to living things.

In Year 6 we will learn:

- recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago
- recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents
- identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution.

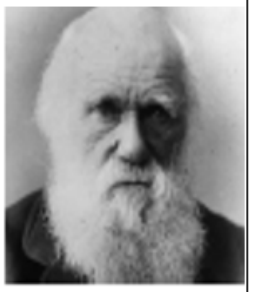
EVOLUTION AND INHERITANCE

The theory of evolution by natural selection (first formuated in Darwin's book "*On the origin of Species*" in 1859) is the process by which organisms change over time as a result of changes in inheritable physical or behavioural traits.

Inheritance refers to the characteristic traits that are genetically passed to offspring from their parents e.g. hair colour, eye colour, height etc. Darwin refers to this as natural selection when the strongest traits survive over generations.

FOCUS SCIENTIST – CHARLES DARWIN - EVOLUTION

Charles Robert Darwin (1809-1882) transformed the way we understand the natural world with ideas that, in his day, were nothing short of revolutionary. He and his fellow pioneers in the field of biology gave us insight into the fantastic diversity of life on Earth and its origins, including our own as a species. To this day, his theory of evolution by natural selection is accepted by the scientific community as the best evidence-based explanation for the diversity and complexity of life on Earth. The theory proposes that the 'fittest' individual organisms - those with the characteristics best suited to their environment - are more likely to survive and reproduce. They pass on these desirable characteristics to their offspring. Gradually these features may become more common in a population, so species change over time. If the changes are great enough they could produce a new species altogether.



ADAPTATION

Living things are adapted to their habitats. This means that they have special features that help them to survive.

An African elephant, for example, lives in a hot habitat and has very large ears that it flaps to keep cool.

A polar bear, on the other hand, lives in a cold habitat and has thick fur to keep warm. It's not just animals that are adapted to their environment, plants are too. A cactus is well adapted for survival in the desert. They have long roots to collect water from a large area and a stem that can store water for a long period of time.

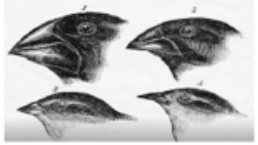
The animals and plants in one habitat are **suited** to live there and may not be able to survive in other habitats. When a habitat changes, the animals and plants that live there are affected.

FOSSILS

How are fossils formed and what do they tell us about animals and plants that used to inhabit the earth?

Fossils are the impressions of the remains of prehistoric animals or plants embedded in rock and presrved in petrified form. Animals change over time and adapt to the surroundings in which they live.

Darwin observed that there were many forms of finches that had different beak sizes and shapes. Once he considered the food sources of each finch, he noted the reason for the adaptations.



Consider: are all adaptations good? What is the impact of human intervention on evolution?
What does this have on the wellbeing of the world and its inhabitants?

Key Vocabulary

evolution	inherit	adaptation	fossil	organism	naturalist	geologist	paleontology	offspring	generation
origin	species	surroundings	environment	inhabitants	survival	habitat	prehistoric	impact	

Year 6 Science - Spring 2

YEAR 6 SCIENCE – LIVING THINGS AND THEIR HABITATS KNOWLEDGE ORGANISER

What have we learnt in this topic before and what we will learn this year?

In Year 4 we learnt in our topic:

Recognise that living things can be grouped in a variety of ways.
Explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment.
Recognise that environments can change and that this can sometimes pose dangers to living things.

In Year 5 we learnt in our topic:

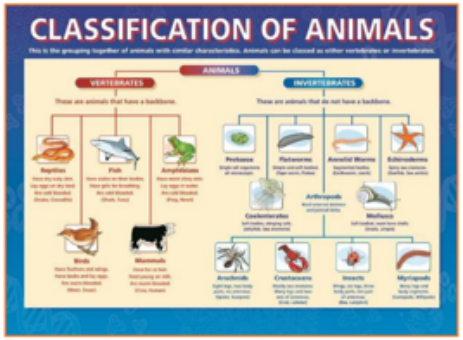
Describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird.
Describe the life process of reproduction in some plants and animals.

In Year 6 we will learn:

Describe how living things are classified into broad groups according to common observable characteristics and based on similarities and differences, including micro-organisms, plants and animals.
Give reasons for classifying plants and animals based on specific characteristics.

CLASSIFICATION KEYS

Scientists, called taxonomists, sort and group living things according to their similarities and differences. This is called a Classification Key – a series of questions are used to classify a living thing.



FOCUS SCIENTIST – CAROLUS LINNAEUS - TAXONOMY

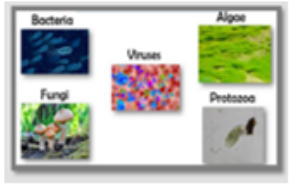
Carolus Linnaeus is the father of taxonomy, which is the system of classifying and naming organisms.

One of his contributions was the development of a hierarchal system of classification of nature. This system includes eight taxa: domain, kingdom, phylum, class, order, family, genus and species.

PLANT KINGDOM AND MICRO ORGANISMS

There are over 275,000 species of plants and microorganisms. All plants are included in one Kingdom (platae) which is then broken down into smaller and smaller divsions based on several characteristics.

Microorganisms
Are invisible to the naked eye, a powerful microscope is needed to see them.
Are everywhere around us, inside us, in our food, in our homes, in the air we breathe and the water we wash in.
Are mostly useful but some are harmful.
Have been around for 3.8 billion years.
They study of microorganisms is called microbiology. They are vital for life on Earth. They generate oxygen, are part of the carbon and nitrogen cycles and can survive the harshest conditions.



LINNAEAN SYSTEM OF CLASSIFICATION

Living organisms are classified into groups depending on their characteristics.
This system was developed in the 18th century by Carl Linnaeus.
The classification of species allows the subdivision of living organisms into smaller and more specialised groups.

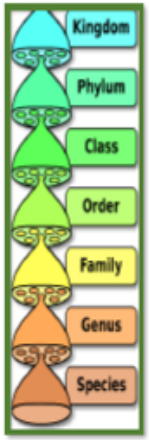
The first division of living things in the classification system is to put them into one of five kingdoms.

The five kingdoms are:

- animals (all multicellular animals)
- plants (all green plants)
- fungi (moulds, mushrooms, yeast)
- protists (*Amoeba*, *Chlorella* and *Plasmodium*)
- prokaryotes (bacteria, blue-green algae)

Further divisions

Living things can then be ranked according to: phylum, class, order, family, genus species



Key Vocabulary

classification organism carbon nitrogen microbiology taxonomy species microorganism
invertebrate vertebrate kingdom phylum class order family genus species

Year 6 Geography - Spring 1

YEAR 6 GEOGRAPHY – BIOMES

KNOWLEDGE ORGANISER

What have we learnt in this topic before and what we will learn this year?

In Year 4, we completed our topic 'Where do we come from' by looking at the UK, as well as understanding the European Union and finding out about our own background and heritage.

In Year 5, we extended our knowledge through our topic 'Locating continents and oceans of the world.'

In Year 6, we will further develop our geography skills to describe the physical and human features of places around the world in relation to their biomes.

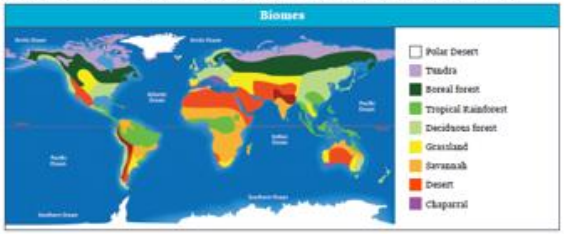
WHAT IS A BIOME?

Biomes are areas of our planet with similar **climates**, **landscapes**, **animals** and **plants**.

What lives in each biome depends on:

- how warm or cold it is
- how dry or wet it is
- how fertile the soil is

The animals in a biome depend upon plants for food. The plants in a biome often also depend upon the animals for spreading pollen and seeds so that new plants can grow. So both plants and animals rely on each other to stay alive.



INSPIRATIONAL DAY

We will be making our own self-contained biome.

A totally self-contained system of living (plants and animals) and non-living (water and minerals) components. The goal is to balance it such that it can survive with no input other than energy (light).
Is it possible? That is what we are trying to find out!

BIOMES OF THE WORLD

Rainforest
it can rain more than 250cm a year.
It is difficult to grow crops.
Lots of the world's wildlife can be found here.

Temperate forest
Limited open spaces.
weather limits when plants can grow.
Transport is difficult.

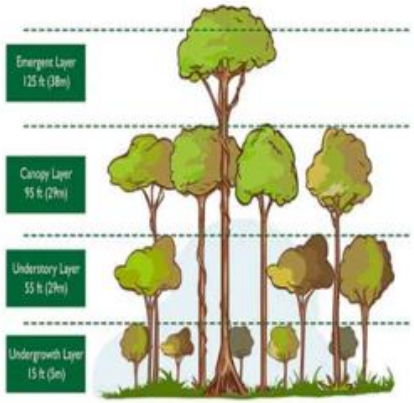
Desert
It is often dangerously hot or cold.
It is difficult to find water.
There are limited food sources

Tundra
Dangerously cold in winter.
Poor nutrients in the soil.
It rarely rains.

Savannah
It rarely rains.
It is difficult to find water.
It is difficult to grow crops.

Tiaga
Limited open spaces.
Transport is difficult.
Cold in winter.

LAYERS OF THE RAINFOREST



Emergent layer
These are the tallest trees on the rainforest. Some can grow up to 50m tall.

Canopy layer
The canopy is the thickest layer of the rainforest and is home to many birds and species of animals.

Understory layer
This layer has shorter, young trees and some shrubs and bushes.

Undergrowth layer
This layer is home to many insects and larger animals. This layer receives little sunlight but a few smaller plants and shrubs can grow here.

Key Vocabulary

Biome equator latitude longitude hemisphere climate precipitation biodiversity tundra taiga temperate forest desert savannah rainforest deforestation climate change eco system

Year 6 Geography - Spring 2

YEAR 6 GEOGRAPHY – AFRICA

KNOWLEDGE ORGANISER

What have we learnt in this topic before and what we will learn this year?	WHERE IN THE WORLD IS AFRICA?
In Year 4, through our topic 'Where do we come from' we looked at the UK, as well as understanding the European Union and finding out about our own background and heritage. In Year 5, we extended this knowledge through our topic 'Locating continents and oceans of the world.' In Year 6, we will further develop our skills and knowledge through our study of Africa.	Africa is the second largest continent on Earth. It has a land size of 30.37 million km². It is connected to Asia by the Middle East. Africa is bordered by the Atlantic Ocean to the west and the Indian Ocean in the east. Africa has 54 countries. Africa covers 6% of Earth's total surface area. With 1.3 billion people, it accounts for about 16% of the world's human population. Algeria is the largest country in Africa. This country is among the ten largest countries in the world. Lagos in Nigeria is the largest city in Africa. With more than 22 million inhabitants, Lagos is also one of the biggest metropolitan cities in the world and is estimated to become the world's largest city by 2100 with more than 100 million inhabitants! 

WHERE IS KENYA?

Kenya is located in east Africa:

- Population of 44 million.
- The capital city is Nairobi.
- Mombasa, situated in the coast, is one of Kenya's largest cities.
- The Tana river is the longest in Kenya.
- Mount Kenya is the highest mountain (5200m).
- Kenya's coastline is on the Indian Ocean. Swahili and English are the official languages

Maasai People

Maasai people traditionally live in mud huts made from mud, sticks, grass and cow dung.
Many Maasai are farmers and own large herds of cows, goats and sheep.
The Maasai people love music and dance.
They often sing and the men perform a special jumping dance.

GEOGRAPHICAL FEATURES OF AFRICA

Africa's major geographical features include the Nile River, Sahara Desert, Great Rift Valley, Mount Kilimanjaro and the Serengeti.

It is surrounded by the Atlantic Ocean and the Indian Ocean.

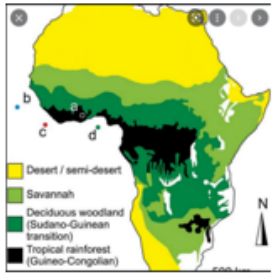
Africa is home to nine of the world's deserts:

- Sahara Desert.
- Kalahari Desert
- Karoo Desert
- Danakil Desert
- Chalbi Desert
- Namib Desert
- Guban Desert
- Nyiri Desert.

BIOMES OF AFRICA

What biomes are found in Africa?
The Savannah Biome is the largest Biome in southern Africa, occupying 46% of its area, and over one- third the area of South Africa.

Across the Equator the **tropical rainforest** is found in Africa.



Over one-third of the African continent is covered by **desert**, from the Mediterranean to South Africa and the Indian to the Atlantic oceans. The deserts in Africa are home to some of the most extreme landscapes and stark conditions on Earth, as well as some of the most beautiful.

The Sahara is the largest desert in Africa, and the largest hot desert in the world – with summer temperatures reaching 122 °F (50 °C) – and stretching across 12 North African countries. The desert was created around 7 million years ago.

Key Vocabulary

Africa continent equator latitude longitude tropic of Cancer tropic of Capricorn hemisphere climate precipitation biodiversity desert savanna climate change weather climate native

Year 6 Art - Spring 1

YEAR 6 ART – MARK MAKING AND ILLUSTRATIONS

KNOWLEDGE ORGANISER

What have we learnt before in Art and what we will learn next?

In Year 3, we used mark making to sketch our Stone age cave animals.

In Year 4, in our watercolour topic, we used sketching to show facial expressions and body language. We used marks and lines to create texture and reflections.

In Year 5, we used our mark making skills to create mood and texture when drawing our 'Dragon eyes'.

In Year 6, we will continue to develop our mark making skills to draw our own creatures based on The Spiderwick Chronicles which are imaginative and communicate emotion.

ARTIST– VINCENT VAN GOGH

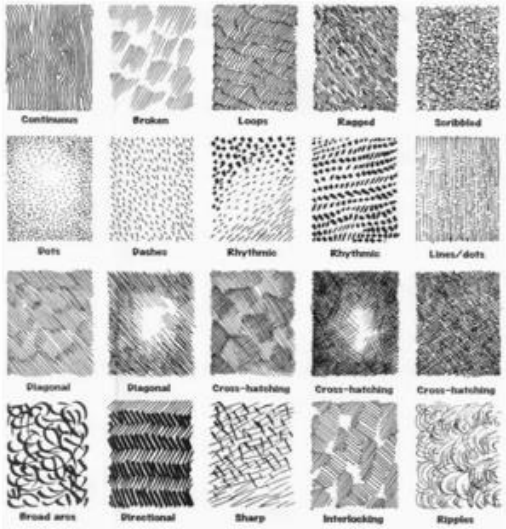
Van Gogh was a 'Post- Impressionist' painter. Post impressionism focuses on line, colour and emotion.
Between 1881 and 1890, van Gogh painted nearly 900 pictures but he only ever sold one or two!
He began by painting peasants in dark colours but then started painting with bright colours.
He is most famous for paintings of sunflowers, 'Starry Night' and lots of 'Self-Portraits'.

ILLUSTRATIONS AND TEXTILES

Artists use illustrations to communicate emotions through their sketches which they do to try to show a sense of self and imagination. Artists use a variety of different tools to create drawings and illustrations.

Using a variety of textiles and mixed media will create emotions and bring the illustration to life.

MARK MAKING



Mark making is a term used to describe the different lines, patterns, and textures we create in an artwork.

A number of different tools can be used to create different effects with your drawings, including erasers for removing marks and sponges for rubbing and smudging.

It is also important to consider a variety of surfaces to draw onto, creating interesting textures and backgrounds to drawings

ILLUSTRATOR – TONY DiTERLIZZI

When he was 9 years old, DiTerlizzi wrote and illustrated a book 30 – 40 pages long about one of his favorite topics — bugs.

Tony creates detailed pencil drawings and then adds thin coats of gouache paint – like watercolour but thicker so you need to water it down.

As he drew the sketches, he wrote notes about the creatures, annotating his drawings to bring them to life with details such as how they moved and what they smelled like.

Key Vocabulary

shading, design, cross-hatch, technique, dots, form, line, patchwork, colour, waves, texture, scribble, tone, zigzag, composition, circular, perspective, diagonal lines, mood

Year 6 DT - Spring 2

YEAR 6 DT – POP UP BOOKS

KNOWLEDGE ORGANISER

What have we learnt before in DT and what we will learn next?

In Year 2, through our topic 'Who are the heroes?' we looked at moving pictures and created our own using levers, sliders and wheels.

In Year 3, we extended this knowledge through the implementation of using different levers and linkages.

In Year 6, we will continue to develop our skills with flexible and stiff materials through our 'Pop up books' topic where we will make mechanisms and structures.

MATTHEW CHRISTIAN REINHART

Matthew Christian Reinhart (born September 21, 1971) is an American **writer** and **illustrator** of children's **pop-up books** and picture books. His most recent books include Frozen: a Pop-up Adventure and Lego Pop-up: A Journey to the Lego Universe. From before Matthew could remember, art always took centre stage. Throughout his childhood, his sketchbook was always nearby. Being creative just felt right to him, whether just drawing pictures or crafting wild contraptions out of anything he could scavenge around the house. He loved reading and learning about nature, science and ancient history, but his school notebooks often had more drawings than actual notes!

Despite studying medicine, Matthew decided to follow his dream and retrained as an industrial designer, focusing on designing toys. In a few years, he discovered his true calling: becoming a children's book **author**, **illustrator** and **paper engineer**.

A HISTORY OF POP UP BOOKS

Paper pop-ups are fascinating **three-dimensional books** containing paper pieces that rise up or move when the book is opened and folded completely flat when the book is closed. Although now popularly used for children's books, it was not until the **18th century** when pop-up books were used for children's literature. Historically, it was also used for a wider range of topics like **philosophy, astronomy, geometry** and **medicine**. One of the first **movable books** was recorded in Spain during the 13th century that was made by **Ramon Llull** for mystical philosophy. Today's pop-up books still continue to fascinate readers of all ages and cultures, some of the more notable titles are made by artists like **Robert Crowther, Robert Sabuda, David Carter** and **Matthew Reinhart.**

TECHNIQUES – STRUCTURES AND MECHANISMS

A **structure** is something that stands alone.
A **mechanism** is a system of parts working together.

Slit angle fold
The most elementary mechanism used for a single piece of paper is a slit. This is made by simply cutting and folding at certain angles so that portions of the paper will pop out when the folding angle is 90 degrees.

Flaps
additional pieces of paper added to a book by either gluing or folding.

Pulley
A sliding paper tab, ribbon, or string is pulled, pushed, and manoeuvered to reveal a new image. The tabs can also activate a pop-up.

Pop up (tent, box, v, step folds)
The pop-up element is attached to facing pages and unfolds from the center of the page when the book is open; it collapses into itself when the book is closed.

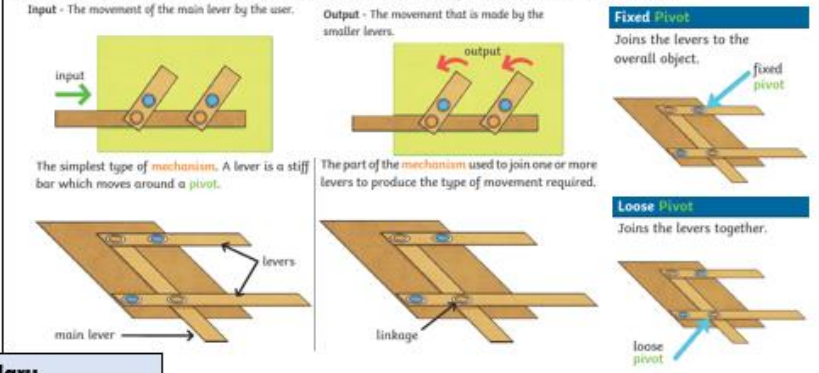
Levers
A rigid bar that moves around a pivot.

Slider
Moving in one direction – up/down, left or right to make an object move – plane, car…

Rotator
composed of several revolving, affixed circles each annotating an idea. The circles are cut out and fastened together so that they could rotate upon each other as needed.

MECHANISMS - SLIDERS, LEVERS AND LINKAGES

Sliders move in one direction – up/down or side to side.
A **lever** is a rigid bar that moves around a pivot.
A **linkage** is a bar joining one or more levers to produce the type of movement required. The term 'linkage' is also used to describe lever and linkage mechanism as a whole.



Key Vocabulary

material join levers sliders spacers mechanism structure input output linkage cut fold unfold
fixed pivot loose pivot rotary pull mechanism internal lift hinge spring linear

Year 6 PE - Spring 1

Year 6 – Gymnastics Unit 2

Knowledge Organiser

Prior Learning

Demonstrated accuracy, consistency, and clarity of movement. Arranged own apparatus to enhance work and vary compositional ideas. Experience flight on and off high apparatus.

Unit Focus

Perform increasingly complex sequences. Combine own ideas with others to build sequences. Compose and practise actions and relate to music. Show a desire to improve competency across a broad range of gymnastics actions.

We are learning...

1. to perform a 10-element sequence using both floor and apparatus.
2. to perform with equipment and respond creatively to music.
3. to create judging criteria and assess performances against it.
4. to create and perform interesting patterns as part of a group.
5. to select and apply the appropriate walk and presentation to start a sequence.
6. to perform a 10-element sequence with a 1-minute time limit.

Key Questions

1. Why is it a challenge to adapt your sequence to fit in with a timescale?
2. Which were your favourite elements to perform?
3. What is stimuli?
4. Can you suggest any different compositional ideas that may be used?

Equipment

Mats, hoops, cones, wall bars, beanbags, low apparatus, action cards, tabletops, box tops, stopwatch, music player.

Vocabulary

Half lever, box splits, bridge, broad jump, splits, dish, arch, bounce, competency, complex, stimuli, mirror, match.

Concepts

Stimulus is something that causes a reaction, especially interest, excitement or energy added into a gymnastics sequence such as music or objects including ribbons and balls.

Assessment Overview

Head - Compose a sequence that will achieve the highest score against the criteria.
Hand - Perform increasingly complex sequences.
Heart - Work independently and in small groups to make up sequences to perform to an audience.

Year 6 PE - Spring 1

Year 6 - Hockey

Knowledge Organiser

Prior Learning

Developed passing, dribbling and shooting skills. Can confidently select and apply basic skills in a game situation. Learnt ways of marking and defending.

Unit Focus

Choose and implement a range of strategies and tactics. Combine and perform more complex skills at great speed. Recognise and describe good individual and team performances.

We are learning...

1. To shoot under pressure from close range.
2. To perform long corner routines as part of a team.
3. To use goal-side marking to prevent an attacker from getting closer to the goal.
4. To use a banana run to force an oncoming attacker out wide.
5. To use a hit-out to successfully restart a game
6. Indian dribble and to play competitively using new skills.

Key Questions

1. What set plays did you use in a game, and were they successful?
2. When would you use Indian Dribble in a game situation?
3. What strategies did your team use to defend?

Equipment

Sticks, a range of balls (hard, foam or quick sticks balls), cones, goals, bibs, stopwatch.

Vocabulary

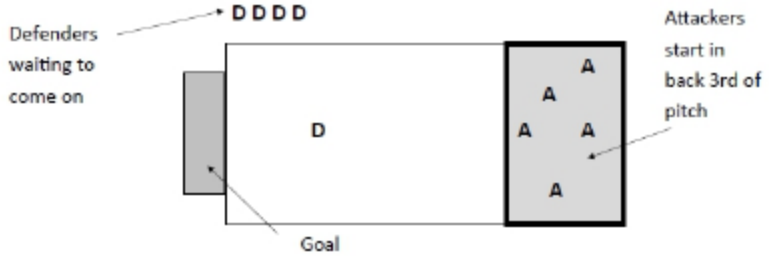
Power, distance, perform, consistent, fair play, tackle, covering, supporting.

Rules

- Implement a long corner for any ball unintentionally hit off the back line by the defence.
- If the attacking team hit the ball of the back line, take a hit out.

Assessment Overview

Head – Choose and implement a range of strategies to attack and defend.
Hand – Shoot from close range.
Heart – Use and apply boundary rules such as corners, self pass and sideline.



Year 6 PE - Spring 2

Year 6 - Cricket

Knowledge Organiser

Prior Learning

Linked a range of skills and use in combination. Collaborated with a team to choose, use and adapt rules in games. Recognised how some aspects of fitness apply to cricket, e.g., power, flexibility and cardiovascular endurance.

Unit Focus

Apply cricket rules in a variety of styles of games. Attempt a small range of recognised shots. Use a range of tactics for attacking and defending in the role of bowler, batter and fielder.

We are learning...

1. To create pressure on a batter by using a ring field.
2. To track and catch a high ball consistently.
3. To perform a short-pitched bowl to get a batter to hit the ball in the air.
4. To work in a pair to restrict runs scored when fielding.
5. To play an on-drive.
6. To set an attacking field.

Key Questions

1. What is an attacking field?
2. What are the reasons for working in pairs to retrieve the long ball?
3. What is the benefit of bowling the short ball?

Equipment

A range of balls, a range of bats and striking equipment, stumps, button cones, batting cones, hoops.

Vocabulary

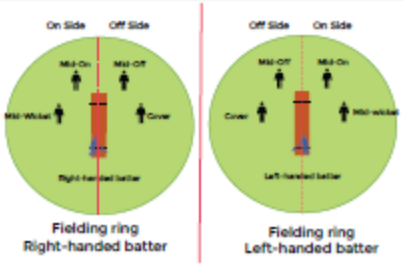
Urgency, acquire, high ball, tracking, short delivery, long balls, on drive, off side, on side, slip, short leg, silly point, innings, retires, attack

Concept

- The cricket field is split into two imaginary halves, the on side and the off side. These sides change depending on whether the batter is left or right-handed.

Assessment Overview

Head – Apply with consistency standard rules of (modified) games.
Hand – Attempt to track and catch high balls in isolation and gameplay.
Heart - Work as a pair to field long balls.



Fielding ring
Right-handed batter

Fielding ring
Left-handed batter

Year 6 PE - Spring 2

Year 6 - Football

Knowledge Organiser

Prior Learning

Played effectively in a variety of positions and formations. Related a greater number of attacking and defensive tactics to gameplay. Attempted more skills when performing movements at speed.

Unit Focus

Choose and implement a range of strategies to attack and defend. Perform a wider range of more complex skills. Recognise and describe good performances. Suggest, plan and lead simple drills for given skills.

We are learning...

1. To set up a shooting opportunity for a teammate.
2. To restrict an opponent's space by defending with my partner.
3. To perform a penalty kick with power and accuracy.
4. To attack and shoot as a pair.
5. To perform the role of cover defender to stop the opposition's attack.
6. To use close control to keep possession of the ball under pressure.

Key Questions

1. Compare week 6's performance to week 1. Can you think of a way you have improved individually and as a team?
2. What is the role of the covering defender?
3. Which part of your foot is best to kick with for accuracy?

Equipment

Footballs, cones, goals, bibs, stopwatch.

Vocabulary

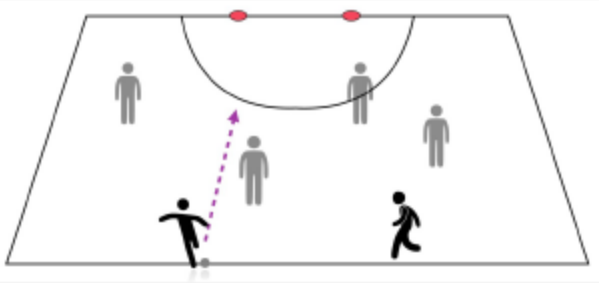
Fair play, tackle, covering, supporting, strategy, set up, assist, deny, set play, covering, defender.

Rules

- Penalty awarded for a professional foul when defending.
- Free pass if a foul is committed outside of the penalty area.

Assessment Overview

Head – Devise a drill that develops a particular skill.
Hand – Apply correct body position when closing down a player to defend.
Heart – Collaborate with a partner to implement simple defensive techniques.



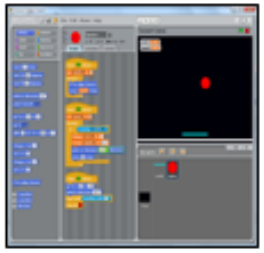
Year 6 Computing - Spring 1

COMPUTING: PROGRAMMING

Y6 KNOWLEDGE ORGANISER

Overview

Variables in Games



- Programming is when we make and input a set of instructions for computers to follow.

-Variables are changeable elements of a program. Scratch is one app in which we can explore variables.

-We use algorithms which we can plan, model, trial and debug, in order to create accurate command sequences, that enable variables to be enacted in games.

Basic Variables

-Variables: A variable is something that is changeable. A variable can be set and changed throughout the running of a program.

In computer programming we use variables to store information that might change and can be used later in our program. E.g. in a game a variable could be the current score of the player; we would add 1 to the variable whenever the player gained a point.

Making Variables in Scratch – The Basics

-Select 'Variables' (dark orange circle) from the menu on the left. Either choose from the available variables or 'Make A Variable.'
-Select 'Events' (light orange circle) from the menu on the left. Choose what needs to happen for the variable to change. E.g. 'When this sprite clicked' or 'when space key pressed.'
-Select 'Variables' again from the menu on the left. Choose what will happen when the event happens, e.g. 'change score by 1' (to add a point) or 'change score by -1' to remove a point.

More Complex Variables

- Variables should always have a value and an appropriate name.

-Adding Callouts: Select 'Looks' from the menu on the left. Add it to the variable program. Edit the text to change the callout.

-Adding Motion: Many games require sprites to change position. This is achieved using the 'Motion' commands. Select 'Motion' from the menu on the left. Choose from the available motion commands.

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-Adding Comments: Comments are a good way of showing that you understand what your code is doing. Right click on the block that you want to comment on, and add in your comment.

Sequencing and Algorithms

-A **sequence** is a pattern or process in which one thing follows another.

-We design **algorithms** (sets of instructions for performing a task) to help us program sequences involving multiple output devices (e.g. LEDs and motors).

-Programming is the process of keying in the code recognized by the computer into the software (using your algorithm).

Trialling and Debugging

-Programmers do not put their computer programs straight to work. They **trial** them first to find any errors:

-Sequence errors: An instruction in the sequence is wrong or in the wrong place.
-Keying errors: Typing in the wrong code.
-Logical errors: Mistakes in plan/thinking.

-If your algorithm does not work correctly the first time, remember to **debug** it.

Important Vocabulary

Programming	Variable	Scratch	Events	Code	LED	Algorithm	Motor	Modify	Debugging

Year 6 Computing - Spring 2

COMPUTING: PROGRAMMING

Y6 KNOWLEDGE ORGANISER

Overview

Using Micro:bits

- Programming is when we make a set of instructions for computers to follow.

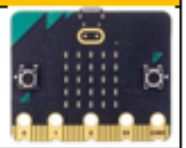
-Micro:bits are small computers that perform different actions based on programs written on computer software. Programs are then downloaded to the micro:bit.

-Micro:bits have a range of input sensors that can be used as input triggers for different codes to run.

-Output devices on Micro:bits (e.g. LED displays) can be programmed to display words, pictures and numbers.

The Basics of Micro:bits

-What is a Micro:bit? A micro:bit is a pocket-sized computer. We can write programs on our computers which can then be transferred to micro:bits to run.
-Micro:bits have an LED light display, buttons, sensors and many input/output features that we can program.



The Parts of a Micro:bit - Front

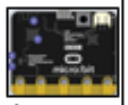
1. A and B buttons: make things happen.

2. LED Display: shows words, pictures, numbers.

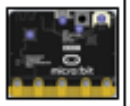
3. Light Sensor: Measures the light that falls onto the micro:bit.

4.Input and Output Pins: Connects the micro:bit to other devices.

The Parts of a Micro:bit - Rear



5. Temperature Sensor
6. Compass
7. Accelerometer – Detects movement
8. Radio Communication – to communicate with other micro:bits and devices.
9. USB Port – Connects device to computer. 10. Reset Button
11. Battery Socket – to power away from the computer.
12. Processor – The 'brain' of the device.

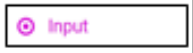


Using Micro:bit Software

-Software Interface: Just like other programming software, the micro:bit interface has programming blocks and a programming area. The emulator gives a simulation for testing code.

-Basic Blocks: Can be used to do things like display images, text and pictures on the LED display. They should be placed into the 'on start' or 'forever' blocks.

-Input Blocks: Enables the user to create 'triggers' using different parts of the micro:bit device, e.g. 'on button … pressed.'



-Logic Blocks: Allow conditions to be set. E.g. 'If, then, else' blocks allow us to set actions for when certain conditions are met (true), and alternative actions for when they are not met (false).

-Math Blocks: Includes numbers and sums in programs. The 'pick random number' block can allow different codes to run dependent on the random number generated.

Transferring to Micro:bit

Micro:bit can be connected to the computer using a USB cable.

1. Select 'download'
2. Locate the file in the downloads folder.
3. Copy the file from the MICROBIT drive.
4. Run the program on the micro:bit.

-Micro:bit will only run code that has been downloaded. If code is changed in the editor, it will need to be downloaded again in order to run on the micro:bit.

Sensing Inputs

-There are a number of input sensors on micro:bits, including the buttons, light sensor, accelerometer, compass, temperature sensor and GPIO pins.

-We can create algorithms that enable different codes to run depending upon what is detected by different sensors.

-Remember to trial your programs and to debug them if there are sequence, keying, or logical errors.

Important Vocabulary

Programming	Micro:bit	LED	Sensor	Random	Condition	Accelerometer	Sequence	Emulator	Motion