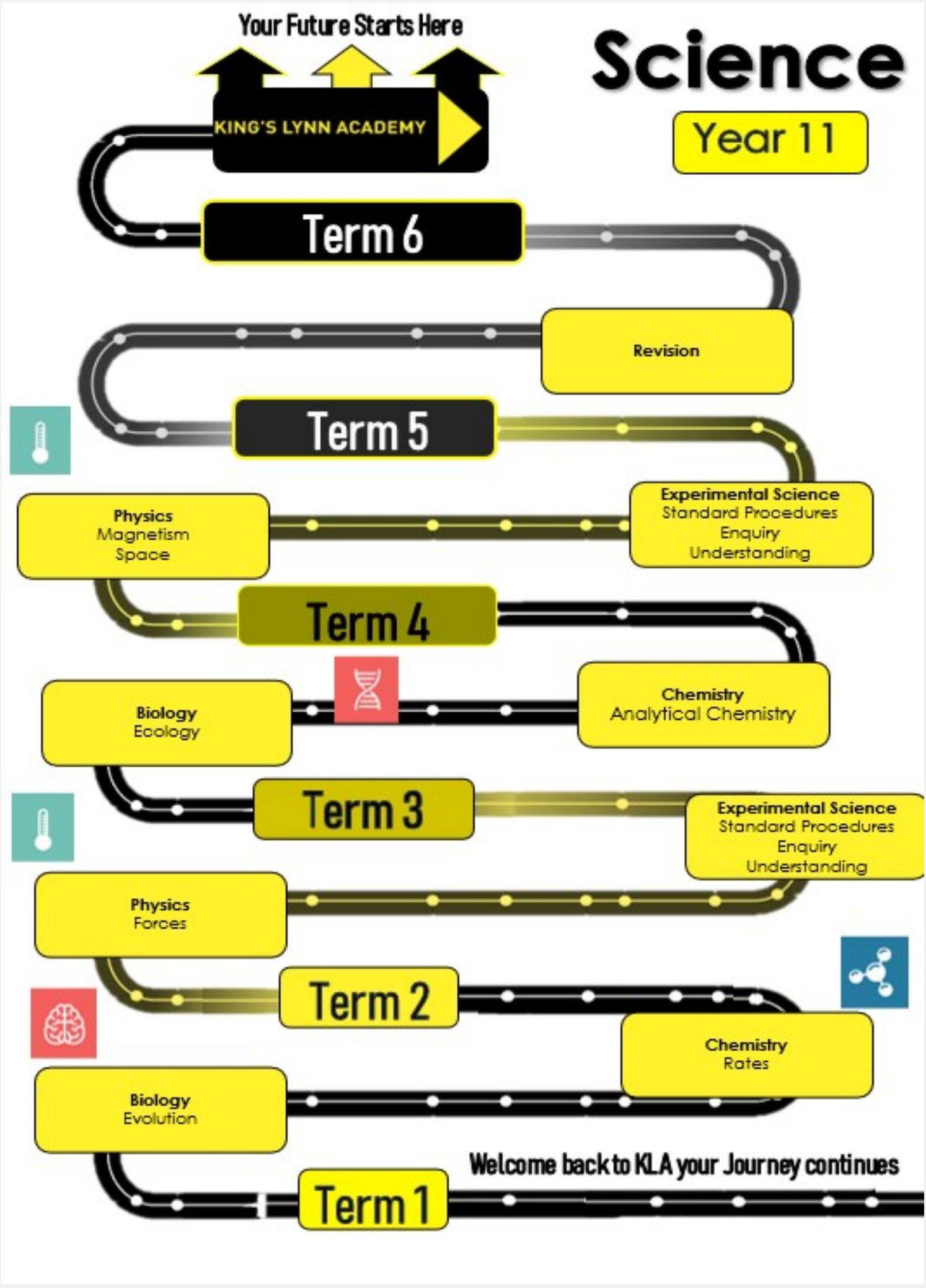
KING'S LYNN ACADEMY

KNOWLEDGE ORGANISER

Year 11 Spring Term 2024

NAME:


Your Future Starts Here
KING'S LYNN ACADEMY
Science
Year 11
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Welcome back to KLA your Journey continues
Term 1

Evolution: Big ideas

Genes

What expert understanding do we want after 5 years?

Natural selection leads to Evolution
Big idea

Over generations natural selection can lead to changes in a species; they evolve. Because all life on Earth evolved from a common ancestor, all organisms are related and what is learned about the function of a gene in one organism is relevant in others. This knowledge can be used in genetic engineering to manipulate genetic material to our advantage. Evolutionary processes have led to tremendous diversity; there is variation within species as well as between species. Evolution and its underlying genetic mechanisms of inheritance and variation are key to understanding both the unity and the diversity of life on Earth.

How does the unit develop this?

Adaptation
Key Concept

Ecosystems change due to abiotic and biotic factors, species need to adapt to these changes in order to survive as a species.

Sub-concepts

Biotic, abiotic factors, ecosystems

Facts

- Ecosystems include all parts of the habitat, both biotic and abiotic factors, changing one can cause an impact on many other factors and species.

Organisation of an Ecosystem
Key Concept

Feeding relationships can be represented by food chains, all food chains start with a photosynthetic producer.

Sub-concepts

Materials need to be cycled through the carbon cycle and water cycle to be used again by organisms.

Facts

- Producers are eaten by primary consumers, which may then be eaten by secondary consumers and then tertiary consumers.

Biodiversity
Key Concept

Biodiversity is the variety of all the different species of organisms on earth, or within an ecosystem.

Sub-concepts

The future of the Human Species on Earth relies on us maintaining a good level of biodiversity

Facts

- Humans have a huge impact on biodiversity with waste management, land use and deforestation, only recently have conservation methods been used.

Forces

P7 Magnetism: Big ideas

What expert understanding do we want after 5 years?

Fields produce forces
Big idea

Gravitational, electric, and magnetic forces act at a distance. These can be explained by force fields that extend through space and can move other objects. Objects with mass cause attractive gravitational fields
Electric and magnetic forces are different aspects of one interaction. Magnets cause magnetic fields and changing magnetic fields cause electric fields. Many devices use this interaction to generate motion and electricity.

How does the unit develop this?

Magnetism
Key Concept

Magnets have poles that attract and repel each other. This is a force that acts at a distance.

Sub-concepts

Magnetic Fields

Facts

- Like poles attract
- Unlike poles repel

The Motor Effect
Key Concept

When a current flows through a conducting wire a magnetic field is produced around the wire. The strength of the magnetic field depends on the current through the wire and the distance from the wire.

Sub-concepts

Electric Motors

Facts

- Flemings Left hand Rule

Transformers – Triple Science
Key Concept

If an electrical conductor moves relative to a magnetic field or if there is a change in the magnetic field around a conductor, a potential difference is induced across the ends of the conductor.

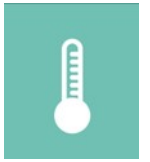
Sub-concepts

Generator, Microphone, Transformer

Facts

- The Transformer Equation

P8 Space: Big ideas



How does the unit develop this?

Life Cycle of Stars
Key Concept

A star goes through a life cycle. The life cycle is determined by the size of the star.

Sub-concepts

- Fusion
- Nova
- Supernova
- Stellar Mass

Facts

- Red Giant
- White Dwarf
- Red Dwarf
- Black Hole

Red-Shift
Key Concept

The Big Bang theory suggests that the universe began from a very small region that was extremely hot and dense.

Sub-concepts

- Red Shift
- Supernova
- Dark Mass
- Dark Energy
- Model

Facts

- Red Shift
- Doppler Effect
- Mass
- Big Bang

Matter

Reactions rearrange matter : Big ideas

What expert understanding do we want after 5 years?

- The properties of a substance depend upon the type of atoms it contains and the strength of the bonds holding them together. The properties determine the uses the substance is suitable for.

How does the unit develop this?

Gas tests & Chromatography
Key Concept

In a chemical change a new substance is formed. Signs include a permanent colour change, fizzing, giving off light or heat, change in mass, a precipitate forming.

Sub-concepts

Chemical change, physical change

Facts

Tests for hydrogen, oxygen, chlorine and carbon dioxide.
Separating liquids using chromatography.

Testing for positive and negative ions
Key Concept

In a chemical change a new substance is formed. Signs include a permanent colour change, fizzing, giving off light or heat, change in mass, a precipitate forming.

Sub-concepts

Some ions produce precipitates, others produce colours all of which can be identified.

Facts

- If the concentration of one of the reactants or products is changed, the position of equilibrium changes.

Using Resources: Big ideas

Matter

What expert understanding do we want after 5 years?

Earth systems interact
Big idea

The cycling of matter in the Earth systems depends on physical and chemical processes, over short and long timescales. Humans rely on resources from these systems for minerals, fresh water, fuels and other raw materials.

How does the unit develop this?

Product Lifecycle
Key Concept

environmental chemists study how human activity has affected the Earth's natural cycles, and how damaging effects can be minimised.

Sub-concepts

Sustainable development, alternative methods of extracting metals, product lifecycle assessments.

Facts

- Sustainable development means using resources in a way which will not compromise future generations.
- Examples of metal extraction include phytomining and leaching.
- Products can be analysed to examine the effect on the environment. This can include energy and water use.

Using Materials
Key Concept

In order to maximise the resources we have, scientists have found ways to enhance the existing properties of materials; or to prevent materials from degrading.

Sub-concepts

Corrosion, Alloys, Ceramics, Polymers, Composites,

Facts

- Corrosion is the destruction of materials by chemical reactions with substances in the environment. Rusting is an example of corrosion. Both air and water are necessary for iron to rust.
- Most metals in everyday use are alloys.
- Many materials in use today can be classified as composites, polymers or ceramics

Year 11

Science

Knowledge Questions

Below are a series of questions.

Use these to apply your knowledge and practice.

Biology
Define interdependence
What is the difference between a food chain and a food web?
How is energy lost between each trophic level?

Chemistry
How is potable water different from seawater?
Explain an example of sustainable development
Why is corrosion a problem?

Physics
Why does a compass work?
Explain the parts of a motor
How does current in a conductor produce a force?

Year 11

Science

Knowledge Checklist

	KNOWLEDGE CHECKLIST	KNOWLEDGE PROGRESS R	A	G
1	Ecosystems change due to abiotic and biotic factors, species need to adapt to these changes in order to survive as a species.			
2	Feeding relationships can be represented by food chains, all food chains start with a photosynthetic producer.			
3	Biodiversity is the variety of all the different species of organisms on earth, or within an ecosystem.			
4	•Sustainable development means using resources in a way which will not compromise future generations.			
5	Examples of metal extraction include phytomining and leaching.			
6	Products can be analysed to examine the effect on the environment. This can include energy and water use.			
7	Magnets have poles that attract and repel each other. This is a force that acts at a distance.			
8	When a current flows through a conducting wire a magnetic field is produced around the wire. The strength of the magnetic field depends on the current through the wire and the distance from the wire.			
9	Fusion is a process that happens in stars			
10	Read shift shows our universe is expanding			

High Flyers - Enrichment Task

Edwin Powell Hubble (November 20, 1889 – September 28, 1953)was an American astronomer. He played a crucial role in establishing the fields of extragalactic astronomy and observational cosmology.

Hubble proved that many objects previously thought to be clouds of dust and gas and classified as "nebulae" were actually galaxies beyond the Milky Way. He used the strong direct relationship between a classical Cepheid variable's luminosity and pulsation period[[6] (discovered in 1908 by Henrietta Swan Leavitt) for scaling galactic and extragalactic distances.[8]