

Science – Year 7 2023-2024

| Term 1 | Week 1 | Week 2 | Week 3 | Week 4 | Week 5 | Week 6 | Week 7 | Week 8 | Week 9 | Week 10 | Week 11 | Week 12 | Week 13 | Week 14 | Week 15 |
|--------|-------------------------|--------|--------|--------|--------|---|--------|--------|--------|------------------|---------|---------|----------|---------|---------|
| | Introduction to Science | | Cells | | | Everyday materials part 1 & Substance and particles | | | | The solar system | | | Genetics | | |

| Term 2 | Week 16 | Week 17 | Week 18 | Week 19 | Week 20 | Week 21 | Week 22 | Week 23 | Week 24 | Week 25 | Week 26 |
|--------|---------------------------|---------|---------|---------|---------|---------|---------|---------|--------------------|---------|---------|
| | Everyday materials part 2 | | | Forces | | Health | | | Chemical reactions | | Energy |

| Term 3 | Week 27 | Week 28 | Week 29 | Week 30 | Week 31 | Week 32 | Week 33 | Week 34 | Week 35 | Week 36 | Week 37 | Week 38 | Week 39 |
|--------|---------|---------|---------------------|---------|---------------------|---------|---------|---------|------------|---------|------------------------|---------|------------|
| | Sound | | Earth and pollution | | Heating and cooling | | Rocks | | Ecosystems | | Circuits and magnetism | | Assessment |

Science – Year 8 2023-2024

| Term 1 | Week 1 | Week 2 | Week 3 | Week 4 | Week 5 | Week 6 | Week 7 | Week 8 | Week 9 | Week 10 | Week 11 | Week 12 | Week 13 | Week 14 | Week 15 |
|--------|-----------|--------|--------|--------|--------|--------|--------|--------|--------|----------|-----------|---------|---------|---------|---------|
| | Organisms | | | Matter | | | Waves | | | Revision | Reactions | | | | |

| Term 2 | Week 16 | Week 17 | Week 18 | Week 19 | Week 20 | Week 21 | Week 22 | Week 23 | Week 24 | Week 25 | Week 26 |
|--------|---------|---------|---------|---------|---------|---------|-------------------------|---------|---------|---------|---------|
| | Genes | | | | Energy | | Revision and assessment | | Earth | | |

| Term 3 | Week 27 | Week 28 | Week 29 | Week 30 | Week 31 | Week 32 | Week 33 | Week 34 | Week 35 | Week 36 | Week 37 | Week 38 | Week 39 |
|--------|----------------|---------|---------|---------|---------|---------|--------------------------------|---------|---------|---------|----------|--------------------------|---------|
| | Electromagnets | | | Forces | | | Respiration and photosynthesis | | | | Revision | Getting ready for year 9 | |

Science – Year 9 2023-2024

| Term 1 | Week 1 | Week 2 | Week 3 | Week 4 | Week 5 | Week 6 | Week 7 | Week 8 | Week 9 | Week 10 | Week 11 | Week 12 | Week 13 | Week 14 | Week 15 |
|--------|----------------|--------|---------------|--------|------------------------|-------------------|-----------------|--------|-------------------|----------|---------|---------|---------|------------|---------|
| | Science Skills | | NHS/Forensics | | Electrical engineering | Climate Scientist | Smart materials | Metals | Natural materials | Plastics | Rates | Enzymes | | Resistance | |

| Term 2 | Week 16 | Week 17 | Week 18 | Week 19 | Week 20 | Week 21 | Week 22 | Week 23 | Week 24 | Week 25 | Week 26 |
|--------|--------------|--------------------|---------|------------|---------|---------|---------|---|---------|--------------------------|---------|
| | Acceleration | Transport in cells | Ecology | Extraction | | Speed | | Retrieval and quizzing (addressing misconceptions of KS3) | | Cell biology foundations | |

| Term 3 | Week 27 | Week 28 | Week 29 | Week 30 | Week 31 | Week 32 | Week 33 | Week 34 | Week 35 | Week 36 | Week 37 | Week 38 | Week 39 |
|--------|--------------------------|---------|---------|---------|-------------------------------|------------------------------|---------|---------|---------|--------------------|---------|---------|---------|
| | Cell biology foundations | | | | Revision for trust assessment | Atomic structure foundations | | | | Energy foundations | | | |

Science – Year 10 2023-2024

| Term 1 | Week 1 | Week 2 | Week 3 | Week 4 | Week 5 | Week 6 | Week 7 | Week 8 | Week 9 | Week 10 | Week 11 | Week 12 | Week 13 | Week 14 | Week 15 |
|--------|--------|--------|--------|------------------------|--------|--|--------|-----------------------|----------------|---------|---|---------|-------------------------|---------|---------------|
| | Energy | | | Human processes (know) | | Atomic structure retrieval and chemical changes (know) | | Particle model (know) | Disease (know) | | Quantitative know and energy changes (know) | | Atomic structure (know) | | Plants (know) |

| Term 2 | Week 16 | Week 17 | Week 18 | Week 19 | Week 20 | Week 21 | Week 22 | Week 23 | Week 24 | Week 25 | Week 26 |
|--------|----------------|---------|--------------------|---------|-------------------------|---------|-----------------|------------------------|---------|-----------------|---------|
| | Bonding (know) | | Electricity (know) | | Human processes (apply) | | Bonding (apply) | Particle model (apply) | | Disease (apply) | |

| Term 3 | Week 27 | Week 28 | Week 29 | Week 30 | Week 31 | Week 32 | Week 33 | Week 34 | Week 35 | Week 36 | Week 37 | Week 38 | Week 39 |
|--------|--------------------------|---------|--------------------------|----------------|--|---------|---------------------|---------|---------|-----------------------|---------------|--------------------|---------|
| | Chemical changes (apply) | | Atomic structure (apply) | Plants (apply) | Energy changes apply & Chemical changes extend | | Electricity (apply) | | | Quantitative (extend) | Mock Feedback | Required practical | |

Science – Year 11 Foundation 2023-2024

| Term 1 | Week 1 | Week 2 | Week 3 | Week 4 | Week 5 | Week 6 | Week 7 | Week 8 | Week 9 | Week 10 | Week 11 | Week 12 | Week 13 | Week 14 | Week 15 |
|--------|-------------------------|--------|--|--------|--------------------------|--------------------|--------|------------------------------------|---------------|---------|--------------------|---------|--------------------------|---------|---------|
| | Human processes (apply) | | Bonding, energy changes, and quantitative apply, chemical extend | | Atomic structure (apply) | Homeostasis (know) | Mocks | Chemical analysis (know and apply) | Forces (know) | | Inheritance (know) | | Organic (know and apply) | Waves | |

| Term 2 | Week 16 | Week 17 | Week 18 | Week 19 | Week 20 | Week 21 | Week 22 | Week 23 | Week 24 | Week 25 | Week 26 |
|--------|----------------|----------------------------|------------------|--------------|----------------|---------|---------------------|---------|---------|-----------------------------|-----------------|
| | Ecology (know) | Resources (know and apply) | Magnetism (know) | Rates (know) | Forces (apply) | | Inheritance (apply) | | | Atmosphere (know and apply) | Ecology (apply) |

| Term 3 | Week 27 | Week 28 | Week 29 | Week 30 | Week 31 | Week 32 | Week 33 | Week 34 | Week 35 | Week 36 | Week 37 | Week 38 | Week 39 |
|--------|---------------|----------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| | Rates (apply) | Revision | | | | | | | | | | | |

Science – Year 11 Higher 2023-2024

| Term 1 | Week 1 | Week 2 | Week 3 | Week 4 | Week 5 | Week 6 | Week 7 | Week 8 | Week 9 | Week 10 | Week 11 | Week 12 | Week 13 | Week 14 | Week 15 |
|--------|-------------------------|--------|--|--------|--------------------------|--------------------|--------|------------------------------------|---------------|---------|--------------------|---------|--------------------------|---------|---------|
| | Human processes (apply) | | Bonding, energy changes, and quantitative apply, chemical extend | | Atomic structure (apply) | Homeostasis (know) | Mocks | Chemical analysis (know and apply) | Forces (know) | | Inheritance (know) | | Organic (know and apply) | Waves | |

| Term 2 | Week 16 | Week 17 | Week 18 | Week 19 | Week 20 | Week 21 | Week 22 | Week 23 | Week 24 | Week 25 | Week 26 |
|--------|----------------|------------------------------------|-------------------------|--------------------------------|--------------|---------|----------------|---------|---------------------|-----------------------------|--------------------------|
| | Ecology (know) | Resources (know, apply and extend) | Magnetism (know higher) | Homeostasis (apply and extend) | Rates (know) | Mocks | Forces (apply) | | Inheritance (apply) | Atmosphere (know and apply) | Rates (apply and extend) |

| Term 3 | Week 27 | Week 28 | Week 29 | Week 30 | Week 31 | Week 32 | Week 33 | Week 34 | Week 35 | Week 36 | Week 37 | Week 38 | Week 39 |
|--------|--------------------------|---------|----------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| | Rates (apply and extend) | | Revision | | | | | | | | | | |

Science – Year 11 Triple Physics 2023-2024

| Term 1 | Week 1 | Week 2 | Week 3 | Week 4 | Week 5 | Week 6 | Week 7 | Week 8 | Week 9 | Week 10 | Week 11 | Week 12 | Week 13 | Week 14 | Week 15 |
|--------|-------------------|--------|--------|------------------|--------|--------|--------|----------------|--------|---------|---------|---------------|---------|---------|---------|
| | Waves (knowledge) | | | Magnetism (know) | | | Mocks | Forces (apply) | | | | Waves (apply) | | | |

| Term 2 | Week 16 | Week 17 | Week 18 | Week 19 | Week 20 | Week 21 | Week 22 | Week 23 | Week 24 | Week 25 | Week 26 |
|--------|---------------|---------|----------------|---------|---------|-----------------|---------|---------|---------|---------|---------|
| | Space (apply) | | Waves (extend) | | | Forces (extend) | | | | | |

| Term 3 | Week 27 | Week 28 | Week 29 | Week 30 | Week 31 | Week 32 | Week 33 | Week 34 | Week 35 | Week 36 | Week 37 | Week 38 | Week 39 |
|--------|-------------------|---------|---------|----------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| | Magnetism (apply) | | | Revision | | | | | | | | | |

Science – Year 11 Triple Chemistry 2023-2024

| Term 1 | Week 1 | Week 2 | Week 3 | Week 4 | Week 5 | Week 6 | Week 7 | Week 8 | Week 9 | Week 10 | Week 11 | Week 12 | Week 13 | Week 14 | Week 15 |
|--------|--------------------------|--------|--------|-------------------------------|--------|------------------|--------|--|--------|---------|----------------------------------|---------|--|---------|---------|
| | Chemical analysis (know) | | | Organic chemistry (knowledge) | | Paper 1 revision | Mocks | Resources (knowledge) Mock feedback | | | Rates and atmosphere (knowledge) | | Chemical analysis and atmosphere (application) | | |

| Term 2 | Week 16 | Week 17 | Week 18 | Week 19 | Week 20 | Week 21 | Week 22 | Week 23 | Week 24 | Week 25 | Week 26 |
|--------|-----------------------|---------|--------------------|---------|-----------------------------------|---------|---------|--|---------|---------|----------------|
| | Organic (application) | | Rate (application) | | Mocks and resources (application) | | | Mock feedback and organic chemistry (extend) | | | Rates (extend) |

| Term 3 | Week 27 | Week 28 | Week 29 | Week 30 | Week 31 | Week 32 | Week 33 | Week 34 | Week 35 | Week 36 | Week 37 | Week 38 | Week 39 |
|--------|--|---------|--------------|----------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| | Required practical skills and intervention | | Mock paper 2 | Revision | | | | | | | | | |

Science – Year 11 Triple Biology 2023-2024

| Term 1 | Week 1 | Week 2 | Week 3 | Week 4 | Week 5 | Week 6 | Week 7 | Week 8 | Week 9 | Week 10 | Week 11 | Week 12 | Week 13 | Week 14 | Week 15 | |
|--------|--------------------|--------|--------|--------|--------|--------|--------|--------------------|--------|---------|----------------|---------|---------|---------|---------|--|
| | Homeostasis (know) | | | | | | Mocks | Inheritance (know) | | | Ecology (know) | | | | | |

| Term 2 | Week 16 | Week 17 | Week 18 | Week 19 | Week 20 | Week 21 | Week 22 | Week 23 | Week 24 | Week 25 | Week 26 | |
|--------|---------------------|---------|---------|---------------------|---------|---------|---------|----------------------------------|---------|---------|---------|--|
| | Homeostasis (apply) | | | Inheritance (apply) | | | | Ecology (apply) Exam practice | | | | |

| Term 3 | Week 27 | Week 28 | Week 29 | Week 30 | Week 31 | Week 32 | Week 33 | Week 34 | Week 35 | Week 36 | Week 37 | Week 38 | Week 39 |
|--------|----------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| | Revision | | | | | | | | | | | | |

Topic map - Year 7 - Cells

Prerequisite knowledge

Prerequisite knowledge

- Explore and compare the differences between things that are living, dead, and things that have never been alive
- Find out about and describe the basic needs of animals, including humans, for survival (water, food and air)
- MRS GREN
- Examples of organisms; bacteria, fungi, humans, plants
- Some may have basic knowledge of cells
- The names of major organs

Overview

| Substantive | Hinterland |
|--|---|
| <p>Know that...</p> <ul style="list-style-type: none">● A cell is a fundamental unit of life● Cells are observed under a microscope● Cells are made up of: nucleus, cell wall, cell membrane, mitochondria, chloroplasts, cytoplasm, vacuole● Different organelles have different functions● Animal and plant cells differ and how● Substances move in and out of cells by diffusion● Diffusion is the movement of particles from a high concentration to a low concentration● Bacteria are unicellular organisms and how they are structured● Cells are specialised for a particular function: Sperm, egg, root hair cell, red blood cells, muscle cell, neurone● A multicellular organism is made up of lots of different cells● A tissue is a collection of the same cells working for a specific function● An organ is a 2 or more different tissues working for a specific function● An organ system is a group of organs working for a specific function | <ul style="list-style-type: none">● Robert Hooke and the microscope● Discovery of bacteria - Leeuwenhoek● Evolution from bacteria● Rudolf Virchow - Cells dividing |

- Total magnification = eyepiece lens x objective lens
- Cells are really small

National curriculum links

- Cells as the fundamental unit of living organisms, including how to observe, interpret and record cell structure using a light microscope
- The functions of the cell wall, cell membrane, cytoplasm, nucleus, vacuole, mitochondria and chloroplasts
- The similarities and differences between plant and animal cells
- The role of diffusion in the movement of materials in and between cells
- The structural adaptations of some unicellular organisms
- The hierarchical organisation of multicellular organisms: from cells to tissues to organs to systems to organisms.

Pedagogical approaches

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Practical

Practical's involved

- Microscopes
- Scientific drawings - collect objects and draw
- Diffusion using agar - Acids and alkalis

Assessment

| What is being assessed? | How |
|--|--|
| Prior knowledge quiz - Checkpoint - Synoptic - | Knowledge drop etc MCQ/match up/written Cumulative exam style questions (KS3) (30 marks with 15 marks being current topic) |

Disciplinary knowledge/Procedural knowledge

| Disciplinary knowledge | Procedural knowledge |
|---|---|
| <p>How...</p> <ul style="list-style-type: none"> ● To use a microscope ● To make scientific observations ● To do scientific drawings ● To ask questions and make observation ● To make predictions/hypothesise ● Scientific ideas and methods develop ● Evaluate risks ● To calculate results | <p>How..</p> <ul style="list-style-type: none"> ● Set up a microscope ● Observe specimens under a microscope ● To multiply numbers together ● To sequence in order of complexity ● To sequence a timeline ● To use a stopwatch ● |

Misconceptions and Common Errors

- The Students will need to be introduced to the key terms structure and function first before being introduced to cells. **Structure** should be described as the way in which the parts inside the cell are arranged and organised. **Function** is described as how the parts work to do a particular job.
- Misconception 1: Cell walls are impenetrable - Reality: there are small holes in the cell wall (plasmodesmata)
- Misconception 2: The cell membrane is a solid structure - Reality: It is made of millions of phospholipids that create a flexible and porous membrane.
- Misconception 3: The nucleus is the brain of the cell - Reality: The brain is an organ the nucleus controls the cells activities.
- Misconception 4: The cell only has one cell membrane - Reality: There is also a membrane around the nucleus, vacuole also has a membrane.
- Misconception 5: Plants take in all the substances they need through their roots. Reality: Plants take in air through the leaves.
- Errors: Setting up a microscope
- Errors: Understanding why we use the lowest objective lens and how changing the objective lens alters the field of view.

Ark curriculum misconceptions:

- The organelles within a cell are bigger than a cell
- Cells are 2D
- All cells are the same size and shape
- The cell wall, vacuole and membrane are impenetrable
- 'Be careful' is a precaution when presented with various risks

Topic map - Year 7 - Cells

Prerequisite knowledge

| Prerequisite knowledge |
|---|
| <ul style="list-style-type: none">● Explore and compare the differences between things that are living, dead, and things that have never been alive● Find out about and describe the basic needs of animals, including humans, for survival (water, food and air)● MRS GREN● Examples of organisms; bacteria, fungi, humans, plants● Some may have basic knowledge of cells● The names of major organs |

Overview

| Substantive | Hinterland |
|---|---|
| <p>Know that...</p> <ul style="list-style-type: none">● A cell is a fundamental unit of life● Cells are observed under a microscope● Cells are made up of: nucleus, cell wall, cell membrane, mitochondria, chloroplasts, cytoplasm, vacuole● Different organelles have different functions● Animal and plant cells differ and how● Substances move in and out of cells by diffusion● Diffusion is the movement of particles from a high concentration to a low concentration● Bacteria are unicellular organisms and how they are structured● Cells are specialised for a particular function: Sperm, egg, root hair cell, red blood cells, muscle cell, neurone● A multicellular organism is made up of lots of different cells● A tissue is a collection of the same cells working for a specific function● An organ is a 2 or more different tissues working for a specific function | <ul style="list-style-type: none">● Robert Hooke and the microscope● Discovery of bacteria - Leeuwenhoek● Evolution from bacteria● Rudolf Virchow - Cells dividing |

- An organ system is a group of organs working for a specific function
- Total magnification = eyepiece lens x objective lens
- Cells are really small

National curriculum links

- Cells as the fundamental unit of living organisms, including how to observe, interpret and record cell structure using a light microscope
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Pedagogical approaches

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Practical

Practical's involved

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|--|--|
| Prior knowledge quiz - Checkpoint - Synoptic - | Knowledge drop etc MCQ/match up/written |

Cumulative exam style questions (KS3) (30 marks with 15 marks being current topic)

Disciplinary knowledge/Procedural knowledge

| Disciplinary knowledge | Procedural knowledge |
|---|---|
| <p>How...</p> <ul style="list-style-type: none"> ● To use a microscope ● To make scientific observations ● To do scientific drawings ● To ask questions and make observation ● To make predictions/hypothesise ● Scientific ideas and methods develop ● Evaluate risks ● To calculate results | <p>How..</p> <ul style="list-style-type: none"> ● Set up a microscope ● Observe specimens under a microscope ● To multiply numbers together ● To sequence in order of complexity ● To sequence a timeline ● To use a stopwatch ● |

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Lesson structure

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|----------------|-------|-------------------|--|
| Learning Chunk | Cells | Number of lessons | |
|----------------|-------|-------------------|--|

| Lesson number | Type of Lesson (Recall, Content, Checkpoint, Synoptic) | Title | Knowledge | Responsive teaching | Practical | Lesson structure |
|---------------|--|---------------------------------------|---|---|---|---|
| 1 | Recall | What are the building blocks of life? | Prior knowledge quiz Prerequisite: <ul style="list-style-type: none"> • Explore and compare the differences between things that are living, dead, and things that have never been alive • Find out about and describe the basic needs of animals, including humans, for survival (water, food and air) • MRS GREN • Examples of organisms; bacteria, fungi, humans, plants • Some may have basic knowledge of cells • The names of major organ | Hinge question (show me) done on whiteboards. show different living and non living things. students need to hold up their whiteboard and say whether it has cells or not. Include things like dead wood (address misconceptions) Mrs Gren multiple choice low stakes quiz. what does each letter stand for | | Start with an explanation of what cells are and how they make up all living things. (smallest unit of life). Hinge (see responsive teaching) Recall Mrs Gren ensure the students know this through the low stakes quiz. finish with Activity in which students have to identify the major organs in the body. print off a labelled body and students need to fill in the organ names. add word bank as scaffolding for students of lower prior attainment |
| 2 | Content | How can we see our cells? | <ul style="list-style-type: none"> • How to set up and use a microscope • Label parts of a microscope • View objects under a microscope | check understanding of the parts of a microscope after initial teaching. print off light microscope and get students to | <ul style="list-style-type: none"> • Seamonkeys/ microscopes | Intro - how do we see things that are small? Start lesson introduce what a light microscope is. how do we use them identify the different parts of a light |

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| | | | <ul style="list-style-type: none"> Observe specimens under a microscope Total magnification = eyepiece lens x objective lens | <p>label multiple parts</p> <p>Demo how to set up a microscope/ how to carry them from place to place. Cold call throughout the demo to check understanding</p> <p>I do we do ou do independent practice on magnification calc</p> | | <p>microscope</p> <p>demo how to set up a microscope slide how to focus the image and how to change magnification</p> <p>allow students to look at specimens under the microscopes. get some biological slides to let students look at as well once they have looked at their own slide</p> <p>Finish by introducing the equation for calculating magnification. fifa practice. i do we do you do examples on the board</p> |
| 3 | content | What do my cells look like? | <ul style="list-style-type: none"> A cell is a fundamental unit of life Cells are really small Animal cells are made up of: nucleus, cell membrane, mitochondria, cytoplasm Different organelles (Part of a cell) have different functions Observe ready made animal cells under a microscope and sketch them | <p>Label animal cell organelles</p> <p>Match animal cell organelles to their functions</p> <p>Analyse animal cell drawings (BEST resource)</p> | <ul style="list-style-type: none"> Microscopes - ready made slides | <p>Start: Answer questions on microscopes and magnification (retrieval questions and show-me boards)</p> <p>Animal cell activities (x3)</p> <p>End: Answer questions on animal cell organelles and functions (Heads-Up)</p> |
| 4 | Content | How do my cells compare to a plant's? | <ul style="list-style-type: none"> Plant cells are made up of: nucleus, cell membrane, mitochondria, cytoplasm, chloroplast, vacuole, cell wall Animal and plant cells differ and how Observe specimens under a microscope | <p>Label plant cell organelles</p> <p>Match plant cell organelles to their function</p> <p>Analyse plant cell drawings (BEST resource)</p> | <ul style="list-style-type: none"> Microscopes - ready made slides | <p>Start: Spot the animal cells mistakes (in books/show me boards)</p> <p>Plant cell activities (x3)</p> <p>End: Compare animal and plant cells (sentences/venn diagram)</p> |
| 5 | Content | | <ul style="list-style-type: none"> Create slides using onion cells Observe plant cells under a microscope | <p>Demo how to set up a microscope/ how to carry them from place to place. Cold call throughout the demo to check understanding</p> | <ul style="list-style-type: none"> Make slides - onion- animal cells - Microscope | <p>once pre lesson retrieval has been completed start the practical by demoing how to prepare a slide using</p> |

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| | | | <ul style="list-style-type: none"> • Draw scientific diagrams of cells observed • Checkpoint | <p>Walk around and check all students scientific diagrams and pick out the best one. look at this example under visualiser and discuss with class as to why this is a good example</p> <p>RTP to check understanding of the first 5 lessons. peer asses after completion and collect scores. identify what students found difficult and what questions were not answered well so we can re cap or add similar questions to pre lesson retrieval</p> | | <p>onion and iodine</p> <p>When the practical has been completed start class discussion and identify what cell structure could be seen. What did it look like? (sketch an example of what the cells looked like)</p> <p>Jumbled method for students to unjumble and put in order.</p> <p>Start checkpoint then peer assess and collect scores to finish lesson</p> |
| 6 | content | Do all cells have a nucleus? | <ul style="list-style-type: none"> • Bacteria are unicellular organisms and how they are structured • A multicellular organism is made up of lots of different cells | <p>Define uni and multicellular using picture prompts</p> <p>Label bacterial cell organelles</p> <p>Match bacterial cell organelles to their function</p> <p>Analyse bacterial cell drawings (BEST resource)</p> | | <p>Start: Answer questions on microscope practical (in books/show me boards)</p> <p>Bacterial cell activities (x4)</p> <p>End: Answer questions on bacterial cell organelles and functions (in books/show me boards)</p> |
| 7 | content | | <ul style="list-style-type: none"> • Cells are specialised for a particular function: Sperm, egg, root hair cell, red blood cells, muscle cell, neurone | <p>Best resources: multiple choice low stakes quiz. to be done on whiteboards in show me activity. this ensure learning has been understood and misconceptions can be addressed either in lesson or in upcoming pre lesson retrieval activities</p> <p>Demo how to set up a microscope/ how to carry them from place to place. Cold call throughout the demo to check understanding</p> | <ul style="list-style-type: none"> • Microscopes - ready made slides | <p>Once pre lesson retrieval has been completed allow the students to look at some of the pre-made slides containing specialised cells under the microscopes. this is a great opportunity to sketch the specialised cells in a pre-made table. Print off table in which students have to describe each cell's structure when looking at them.</p> <p>When this has been completed, set students off on a be the teacher activity. separate into groups via tables and give each table a different specialised cell with function and structure. all other groups have to fill in the info being delivered into a table/mind map while the other group teaches.</p> |

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| | | | | | | Recall students to places and begin class discussion / recall finish with best resource low stakes multiple choice quiz |
| 8 | content | | <ul style="list-style-type: none"> • A tissue is a collection of the same cells working for a specific function • A organ is a 2 or more different tissues working for a specific function • An organ system is a group of organs working for a specific function • Circulatory, digestive & reproductive system • Checkpoint | <p>check for understanding of pre-existing knowledge by asking students to identify organs in the body.</p> <p>Ask what makes up these organs? leading q can be addressed then or at the end of lesson to see if the lesson has been understood</p> <p>Cold calling throughout</p> <p>don't move on from cells>tissues>organs>organ systems if misconceptions are identified at each stage</p> <p>learning checkpoint to be completed at the end of lesson</p> | | <p>start on the most basic level. students should have an understanding that cells are the most basic building block of all life. open question: what is a tissue? Can you name any that you have already heard of?</p> <p>What makes up these tissues? Then move on to organs. Larger than tissues. What makes up these organs? Can you name any organs from pre existing knowledge? What are the roles of these organs? how do they complete these roles (adaptations). Once students have an understanding of what makes up tissues and organs move onto organ systems. What makes up these organ systems get students to spot the trend in sizes as we move from cells to tissues to organs to organ systems. list some examples of organ systems and their functions in our bodies For one specialisation give an example of its function within that system. do this for cell tissue and organ as a scaffold for what's required from students. allow students to then come up with other ideas on an a3 page in their tables as groups</p> <p>Complete checkpoint and peer asses. collect marks and spot key areas for reinforcement</p> |
| 9 | Content | How do smells reach my nose? | <ul style="list-style-type: none"> • Substances move in and out of cells by diffusion • Diffusion is the movement of particles from a high concentration to a low concentration | <p>Define diffusion using picture prompts</p> <p>Carry out skittles with water practical</p> <p>Examples and non-examples: Diffusion</p> | <ul style="list-style-type: none"> • Skittles and petri dishes • Air freshener | <p>Start: Answer questions on levels of organisation (in books/show me boards)</p> <p>Diffusion activities (x3)</p> <p>Watch air freshener demonstration (live modelling)</p> <p>End: Answer questions on diffusion</p> |

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| | | | | | | (in books/show me boards) |
| 10 | Content | Am I practical ready? | <ul style="list-style-type: none"> • To ask questions and make observation • To use a stopwatch • To make predictions/hypothesis • Evaluate risks | <p>Write hypothesis</p> <p>Identify variables</p> <p>Complete risk assessment</p> <p>Carry out agar cubes with acid class practical</p> | <ul style="list-style-type: none"> • Agar cubes with acid | <p>Start: Answer questions on hazard symbols (in books/show me boards)</p> <p>Watch agar cubes with acid demonstration (live modelling)</p> <p>Diffusion practical activities (x4)</p> <p>End: Analyse results</p> |
| 11 | Slippage | | | | | |
| 12 | Synoptic | | | | | |

Topic map - Year 7 – Everyday materials

Prerequisite knowledge

| Prerequisite knowledge |
|---|
| <p>As part of the KS2 curriculum students should be able to:</p> <p>Year 2: identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses</p> <p>year 4: compare and group materials together, according to whether they are solids, liquids or gases observe that some materials change state when they are heated or cooled, and measure or research the temperature at which this happens in degrees Celsius (°C)</p> <p>Year 5: compare and group together everyday materials on the basis of their properties, including their hardness, solubility, transparency, conductivity (electrical and thermal), and response to magnets</p> <p>know that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution</p> <p>use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating</p> <p>give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic</p> <p>the action of acid on bicarbonate of soda</p> <p>year 7 - substances and particles part 1- particle model, solids, liquids and gases.changes of state</p> |

Overview

| Substantive | Hinterland |
|---|---|
| <p>Know that...</p> <ul style="list-style-type: none">properties describe how a material or substance looks or behaves.metals, glass, plastic, wood and fabrics are useful everyday materials. | <ul style="list-style-type: none">Acid first thought about in ancient greek times ' sour tasting'(alkaline) is derived from an Arabic root word associated with "roasting" because of the fact that the first bases were from the soap-making substances obtained from |

- give examples of how each of the materials above are used
- describe how their use is linked to their properties
- Most metals are strong, hard and shiny materials that can be hammered into different shapes without breaking. They are good conductors of heat and electricity and some are magnetic. Their properties make them useful for objects such as cutlery, saucepans, cars and coins
- Plastics are materials made from chemicals and are not found in nature. They are strong and waterproof. They can be made into any shape by applying heat. Plastics are not magnetic. They are good insulators and don't conduct heat or electricity. They're used to make things like bags, bottles and toys
- Glass is made by melting sand and other minerals together at very high temperatures. It is normally transparent and can be made into different shapes. Thick glass can be strong, but thin glass breaks easily. It's used for objects that need to be transparent, such as windows and spectacles.
- Wood comes from trees. It is strong, flexible and long-lasting. It is an insulator of heat and electricity. It's used to make things such as furniture.
- Fabrics are made from thin fibres woven together. Different fabrics have different properties. They can be stretchy (a pair of tights), insulating (a woollen coat) or absorbent (a towel). Fabrics are used to make clothes as they are flexible, warm and do not wear out easily.
- compare general properties of metals and nonmetals
- Composite materials are made from two or more different types of material.
- Composite materials are synthetic and are made by a chemical process.
- Composite materials are designed for specific uses eg concrete is a composite material made of sand, gravel and cement. breathable fabrics contain the benefits of nylon but non of the disadvantages(other composites will be covered in year 8)

roasting ashes and treating them with water and slaked lime(calcium oxide)

- Belgian chemist r Leo Baekeland pioneered the first fully synthetic plastic in 1907.'bakelite' used in bakelite telephones
- Joseph Aspdin of England invented portland cement
- Abū Mūsā Jābir ibn Ḥayyān,- first studies of distillation in 800AD, he also invented the alembic which is still used to distil alcohol today
- chromatography was discovered by Mikhail Tsvet investigating
- plant pigments

- compare the properties of concrete and breathable fabrics to their raw materials

part 2 Substances (after particle model part 1)

- a pure substance is a single substance made of only one type of particle.- they are either elements or compounds
- a mixture is two or more compounds or elements not chemically bonded
- the particle model diagrams used to represent the atoms/molecules in elements, compounds and mixtures.
- periodic table is list of all pure elements
- compounds such as water, table salt (sodium chloride) carbon dioxide
- mixtures are described as impure and small amounts of other substances are call impurities
- pure substances have a fixed melting/boiling point ,impurities change the melting and boiling points
- solute, solvent,dissolve,soluble, insoluble, solution are defined as
- solute- solid or gas that dissolves in a solution eg salt, sugar, coffee granules, polystyrene,
- Dissolving is a process when a solute is mixed with a solvent and the solute breaks into much smaller particles that are too small to see and spreads out.
- solvent-the liquid that a solute dissolves in eg water, acetone, ethanol, petrol
- A solution is made when a solute dissolves into a solvent.
- If a substance can dissolve into a solvent, it is soluble. If it cannot dissolve, it is described as insoluble.
- examples of soluble and insoluble substances
- how to use the particle model to represent the particles in solutes, solvents and solutions
- the mass of solute and solvent is conserved when a solution is made.
- label the equipment and method separating techniques of mixtures including, filtration, evaporation, distillation and chromatography
- give examples of the mixtures these separate.

- pH is a way we can classify a substance
- the 3 classifications are acidic, alkaline, neutral and often are in solution, can be made into a solution if they are soluble substances
- indicators are used to identify the property of pH
- litmus paper is an indicator that can be blue/red- they are red in acidic solutions and blue in alkaline.
- red cabbage contains chemicals that can be used as an indicator, pink/red in acids, blue/green in alkaline, purple in neutral
- The pH scale shows range/strength of how acidic a substance is. It can be measured using a pH meter which gives a numerical value or universal indicator paper or solution
- The pH scale ranges from 0 (very acidic) through 7 (neutral) to 14 (very alkaline).
- pH charts are used to compare results
- give examples of everyday substances and lab specific chemicals of acids, alkalis and neutral solutions, including HCl, stomach acid lemon juice, tomato juice, milk, pure water, salt water, blood, handsoaps, bleach, NaOH
-

National curriculum links

- Composite materials properties of ceramics, polymers and composites (qualitative)
- the properties of metals and non-metals
- the pH scale for measuring acidity/alkalinity; and indicators
- the concept of a pure substance
- mixtures, including dissolving
- diffusion in terms of the particle model
- simple techniques for separating mixtures: filtration, evaporation, distillation and chromatography
- the identification of pure substances

Pedagogical approaches

Practical

Practical's involved

- investigate the physical properties of metals, glass, plastic, wood and fabrics
- investigate dissolving, which substances are soluble/insoluble - which form solutions
- investigate the temperature of pure/impure substances - pure water- salt water
- filtration
- evaporation/crystallisation
- distillation
- chromatography
- investigate pH using litmus, pH metres, red cabbage, universal indicators

Assessment

| What is being assessed? | How |
|--|--|
| Prior knowledge quiz - Checkpoint - Synoptic - | Knowledge drop etc MCQ/match up/written Cumulative exam style questions (KS3) (30 marks with 15 marks being current topic) |

Disciplinary knowledge/Procedural knowledge

| Disciplinary knowledge | Procedural knowledge |
|---|--|
| How... <ul style="list-style-type: none">● pay attention to objectivity and concern for accuracy, precision, repeatability and reproducibility● evaluate risks● ask questions and develop a line of enquiry based on observations of the real world, alongside prior knowledge and experience | How.. <ul style="list-style-type: none">● set up equipment for filtration- paper, funnel, conical flask, chromatography and evaporation● measure volumes of liquids● use a pipette● record temperature using a thermometer● use a chart to identify pH |

- make predictions using scientific knowledge and understanding
- select, plan and carry out the most appropriate types of scientific enquiries to test predictions, including identifying independent, dependent and control variables
- use appropriate techniques, apparatus, and materials during fieldwork and laboratory work, paying attention to health and safety
- make and record observations and measurements using a range of methods for different investigations; and evaluate the reliability of methods and suggest possible improvements
- interpret observations and data, including identifying patterns and using observations, measurements and data to draw conclusions
- present reasoned explanations, including explaining data in relation to predictions and hypotheses
- identify further questions arising from their results

Misconceptions and Common Errors

- When a substance has dissolved it has 'disappeared'. Substances (like sugar) 'melt' in water
- linking macro and micro observations in solutions
- common errors- misusing the terms, solute, solvent and solution
- suspended powders might look like they dissolve
- difference between evaporating/boiling - linked to distillation
- pH is a measure of strength not concentration
- acids 'eat materials and burn you'
- All polymers have the same properties

- density as a property

Lesson structure

| | | | |
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| Learning Chunk | Everyday materials | Number of lessons | |
|----------------|--------------------|-------------------|--|

| Lesson number | Type of Lesson (Recall, Content, Checkpoint, Synoptic) | Title | Knowledge | Responsive teaching | Practical | Lesson structure |
|---------------|--|-------|---|---|---|--|
| 1 | Recall | | <p>Prerequisite quiz</p> <p>properties describe how a material or substance looks or behaves.</p> <p>compare and group together everyday materials on the basis of their properties, including their hardness, solubility, transparency, conductivity (electrical and thermal), and response to magnets</p> | <p>MCO to recall knowledge</p> <p>True and false activity after the practical</p> <p>Use the results table to draw conclusions to record physical properties of different objects. Ask students if all metals are attracted by magnets.</p> | <ul style="list-style-type: none"> • investigate the physical properties of metals, glass, plastic, wood and fabrics | <ul style="list-style-type: none"> • retrieval questions • students complete the MCO and then move straight to practical activity. • printed tables to record the physical properties of different materials. (15 mins) • students will draw conclusions from their results table. • think pair share activity to state a use of each material and then students complete a knowledge drop table to link properties to uses. |

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| | | <p>metals, glass, plastic, wood and fabrics are useful everyday materials- detail below.</p> <p>give examples of how each of the materials above are used- detail below</p> <p>describe how their use is linked to their properties- detail below)</p> <p><i>-Most metals are strong, hard and shiny materials that can be hammered into different shapes without breaking. They are good conductors of heat and electricity and some are magnetic. Their properties make them useful for objects such as cutlery, saucepans, cars and coins</i></p> <p><i>-Plastics are materials made from chemicals and are not found in nature. They are strong and waterproof. They can be made into any shape by applying heat. Plastics are not magnetic. They are good insulators and don't conduct heat or electricity. They're used to make things like bags, bottles and toys</i></p> <p><i>-Glass is made by melting sand and other minerals together at very high temperatures. It is normally transparent and can be made into different shapes. Thick glass can be strong, but thin glass breaks easily. It's used for objects that need to be transparent, such as windows and spectacles.</i></p> <p><i>-Wood comes from trees. It is strong, flexible and long-lasting. It is an insulator of heat and electricity. It's used to make things such as furniture.</i></p> <p><i>-Fabrics are made from thin fibres woven together. Different fabrics have different properties. They can be stretchy (a pair of tights), insulating (a woollen coat) or absorbent (a towel). Fabrics are</i></p> | <p>students complete a knowledge drop table linking the properties of metals, wood, fabric and plastic to their uses.</p> | | |
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|-----------------------|--|--|---|---|---|---|-----------|--|------------|--|--------------|--|-----------------------|-------------------------------------|-------------------|-------------------------------|--|--|
| | | | <i>used to make clothes as they are flexible, warm and do not wear out easily.</i> | | | | | | | | | | | | | | | |
| 2 | Content | | <ul style="list-style-type: none"> compare general properties of metals and nonmetals | <p>Match the words to their definitions</p> <table border="1"> <tr> <td>a. Transparent</td> <td>A material that you cannot see through</td> </tr> <tr> <td>b. Opaque</td> <td>A substance that needs a lot of heat to melt</td> </tr> <tr> <td>c. Brittle</td> <td>A material that does not let electricity flow easily</td> </tr> <tr> <td>d. Malleable</td> <td>A material that can be bent without breaking</td> </tr> <tr> <td>e. High Melting point</td> <td>A material that you can see through</td> </tr> <tr> <td>f. Poor conductor</td> <td>A material that breaks easily</td> </tr> </table> <p>white board quiz to identify the word looking at pictures and definitions.</p> <p>group activity- students sort the materials into metals and nonmetals.</p> | a. Transparent | A material that you cannot see through | b. Opaque | A substance that needs a lot of heat to melt | c. Brittle | A material that does not let electricity flow easily | d. Malleable | A material that can be bent without breaking | e. High Melting point | A material that you can see through | f. Poor conductor | A material that breaks easily | order materials made of metals and nonmetals | <p>students to complete the match the word activity and then white board quiz to show understanding.</p> <p>students identify the materials as metals and non metals</p> |
| a. Transparent | A material that you cannot see through | | | | | | | | | | | | | | | | | |
| b. Opaque | A substance that needs a lot of heat to melt | | | | | | | | | | | | | | | | | |
| c. Brittle | A material that does not let electricity flow easily | | | | | | | | | | | | | | | | | |
| d. Malleable | A material that can be bent without breaking | | | | | | | | | | | | | | | | | |
| e. High Melting point | A material that you can see through | | | | | | | | | | | | | | | | | |
| f. Poor conductor | A material that breaks easily | | | | | | | | | | | | | | | | | |
| 3 | content | | <ul style="list-style-type: none"> Composite materials are made from two or more different types of material. Composite materials are synthetic and are made by a chemical process. Composite materials are designed for specific uses eg concrete is a composite material made of sand, gravel and cement. breathable fabrics contain the benefits of nylon but non of the disadvantages(other composites will be covered in year 8) compare the properties of concrete and breathable fabrics to their raw materials checkpoint | <p>Multiple choice quiz to identify the composite out of the choices. (best resources on composites)</p> <p>Show me by answering</p> <ol style="list-style-type: none"> What happens when more couscous is added? Why do you think this happens? How is the composite like modelling clay? How is the composite like couscous? <p>Show me:</p> | Investigate the strength of a composite using modelling clay and couscous. (Best resources) | <p>multiple choice quiz using white board to identify prior knowledge of students on composites.</p> <p>Practical investigation: students to identify the variables used in the investigation and design a results table guided by the teacher. (15 mins)</p> <p>Assess understanding by completing the activities.</p> | | | | | | | | | | | | |

| | | | | <p>What properties do you think reinforced concrete will have?</p> <table border="1"> <thead> <tr> <th></th> <th>Steel</th> <th>Concrete</th> <th>Reinforced concrete</th> </tr> </thead> <tbody> <tr> <td>Strong when squashed.</td> <td>Yes, but rods may buckle.</td> <td>Yes</td> <td>?</td> </tr> <tr> <td>Strong when stretched.</td> <td>Yes</td> <td>No</td> <td>?</td> </tr> <tr> <td>Durable</td> <td>Rusts if not protected.</td> <td>Yes</td> <td>?</td> </tr> <tr> <td>Strong when heated.</td> <td>Loses strength quickly in a fire.</td> <td>Yes</td> <td>?</td> </tr> </tbody> </table> <p>Identify the properties of reinforced concrete stating how they are beneficial.</p> <p>True and false activity</p> | | Steel | Concrete | Reinforced concrete | Strong when squashed. | Yes, but rods may buckle. | Yes | ? | Strong when stretched. | Yes | No | ? | Durable | Rusts if not protected. | Yes | ? | Strong when heated. | Loses strength quickly in a fire. | Yes | ? | |
|------------------------|-----------------------------------|----------|---------------------|---|--|-------|----------|---------------------|-----------------------|---------------------------|-----|---|------------------------|-----|----|---|---------|-------------------------|-----|---|---------------------|-----------------------------------|-----|---|--|
| | Steel | Concrete | Reinforced concrete | | | | | | | | | | | | | | | | | | | | | | |
| Strong when squashed. | Yes, but rods may buckle. | Yes | ? | | | | | | | | | | | | | | | | | | | | | | |
| Strong when stretched. | Yes | No | ? | | | | | | | | | | | | | | | | | | | | | | |
| Durable | Rusts if not protected. | Yes | ? | | | | | | | | | | | | | | | | | | | | | | |
| Strong when heated. | Loses strength quickly in a fire. | Yes | ? | | | | | | | | | | | | | | | | | | | | | | |

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| 4 | Content | <ul style="list-style-type: none"> a pure substance is a single substance made of only one type of particle.- they are either elements or compounds a mixture is two or more compounds or elements not chemically bonded the particle model diagrams used to represent the atoms/molecules in elements, compounds and mixtures. periodic table is list of all pure elements compounds such as water, table salt (sodium chloride) carbon dioxide mixtures are described as impure and small amounts of other substances are call impurities | <p>picture prompt to write definitions of pure, impure substances, elements, mixtures and compounds (Use particle model diagram)</p> <p>independent practice: Why is bottled water not pure?</p> <p>what ?</p> <p>Why?</p> <p>students write what is water (compound), why? because it is made of two types of elements bonded together.</p> | <p>Order iron + sulfur demo to show mixtures, elements and compounds.</p> <p>ask what and why for each of the leement, mixture and compound.</p> | <p>after retrieval model using lego the difference between elements, compounds and mixtures.</p> <p>then show students iron, sulphur and iron sulfide. given them 1 minute to think and identify which one is element, compound and mixture.</p> <p>students then complete a picture prompt sheet.</p> <p>reflection at the end to write down why bottled water is impure.</p> |
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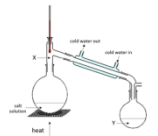
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| 5 | content | <ul style="list-style-type: none"> pure substances have a fixed melting/boiling point ,impurities change the melting and boiling points measure volumes of liquids record temperature using a thermometer pay attention to objectivity and concern for accuracy, precision, repeatability and reproducibility evaluate risks | <ul style="list-style-type: none"> HInge question : What statement is correct about purity of substances? <ul style="list-style-type: none"> students carry out the practical using a practical method provided. identify variables for the practical (Draw results table) write down conclusion from the results (model | <p>investigating the boiling point of salt water and pure water</p> | <ul style="list-style-type: none"> students carry out practical investigation using the method provided. model the practical and cold call to repeat the instructions. Reiterate the importance of precision and accuracy. Students must write down hypothesis and draw a results table correctly (Self assess to check for answers) |
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| | | | <ul style="list-style-type: none"> • make predictions using scientific knowledge and understanding • select, plan and carry out the most appropriate types of scientific enquiries to test predictions, including identifying independent, dependent and control variables • use appropriate techniques, apparatus, and materials during fieldwork and laboratory work, paying attention to health and safety • make and record observations and measurements using a range of methods for different investigations; and evaluate the reliability of methods and suggest possible improvements • interpret observations and data, including identifying patterns and using observations, measurements and data to draw conclusions • present reasoned explanations, including explaining data in relation to predictions and hypotheses • identify further questions arising from their results | <ul style="list-style-type: none"> • results provided) • MCQ at the end to check understanding. | | |
| 6 | content | | <ul style="list-style-type: none"> • checkpoint • Dissolving is a process when a solid is mixed with a liquid and the solid breaks into much smaller particles that are too small to see and spreads out • If a substance can dissolve, it is soluble. If it cannot dissolve, it is described as insoluble. • examples of soluble and insoluble substances • evaluate risks | <ul style="list-style-type: none"> • identify variables • measure volumes using measuring cylinder • measure mass using balance. • use a glass rod to stir. • record observations in the table. <p>White board quiz to identify if a</p> | investigating dissolving | <p>which substances dissolve in water and make a solution eg salt, sugar, sand, iron filings, calcium carbonate, copper sulphate (ark mastery)</p> <p>identify the correct definition of dissolving from the three options provided.</p> <p>Students complete the practical to identify which substances dissolve and which ones dont.</p> <p>Record their results in a table draw conclusions after the practical and evaluate the practical after completing.</p> <p>use white board to identify from</p> |

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|---|---------|--|--|---|---|
| | | <ul style="list-style-type: none"> ask questions and develop a line of enquiry based on observations of the real world. make predictions using scientific knowledge and understanding select, plan and carry out the most appropriate types of scientific enquiries to test predictions, including identifying independent, dependent and control variables use appropriate techniques, apparatus, and materials during fieldwork and laboratory work, paying attention to health and safety make and record observations and measurements using a range of methods for different investigations; and evaluate the reliability of methods and suggest possible improvements interpret observations and data, including identifying patterns and using observations, measurements and data to draw conclusions present reasoned explanations, including explaining data in relation to predictions and hypotheses identify further questions arising from their results | <p>substance is soluble or insoluble in water.</p> <p>Risk: glass used carefully.</p> | | <p>the pictures on the screen if a certain solute is soluble and insoluble.</p> |
| 7 | content | <ul style="list-style-type: none"> solute, solvent, solution are defined as solvent-the liquid that a solute dissolves in eg water, acetone, ethanol, petrol A solution is made when a solute dissolves into a solvent. | <p>match the keyword to the correct definition. (paired work</p> <p>freyer model diagrams to solute, solvents and solution.</p> <p>model the particle diagram of salt + water solution.</p> | <p>practical to measure the mass of solute, solvent and then the solution to prove how mass is conserved before and after the solution is made.</p> | <p>Slow practical model he practicedl and rehearse instructions students draw a results table before the practical to record their readings.</p> <p>Write Hypothesis first and conclude whether to prove or disprove the law of conservation of mass.</p> |

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| | | <ul style="list-style-type: none"> examples of solutions linked to last lesson how to use the particle model to represent the particles in solutes, solvents and solutions the mass of solute and solvent is conserved when a solution is made use appropriate techniques, apparatus, and materials during fieldwork and laboratory work, paying attention to health and safety interpret observations and data, including identifying patterns and using observations, measurements and data to draw conclusions present reasoned explanations, including explaining data in relation to predictions and hypotheses identify further questions arising from their results | <p>Students complete one for sugar + water in their books.</p> <p>model the practical: What do we use to measure the volume of a liquid? What do we use to measure mass? calculate the total mass before and after the solution is made.</p> <p>What is the unit for mass?</p> | | |
| 8 | Content | <ul style="list-style-type: none"> label the equipment and method of the separating technique for insoluble and soluble solids (filtration, evaporation/crystallisation), give examples of the mixtures these separate. set up equipment for filtration- paper, funnel, conical flask and evaporation use appropriate techniques, apparatus, and materials during fieldwork and laboratory work, paying attention to health and safety make and record observations and measurements using a range of methods for different investigations; and evaluate the reliability | <p>Match the names of the equipment to the picture</p> <p>Name the separation technique - Provide pictures of equipment set up for each technique; students to label the technique.</p> <p>Which technique will you use to separate the following solutions?</p> <p>students carry out the practical to separate a mixture of rock salt using filtration and evaporation</p> <p>evaluate the practical to suggest improvements.</p> | rock salt practical -filtration and crystallisation | after identifying the equipment. Model the steps of the practical and get students to complete the separation techniques. |

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| | | | of methods and suggest possible improvements | | | |
| 9 | Content | | <ul style="list-style-type: none"> label the equipment and method for the separating technique of chromatography set up equipment for chromatography give examples of the mixtures these separate. use appropriate techniques, apparatus, and materials during fieldwork and laboratory work, paying attention to health and safety make and record observations and measurements using a range of methods for different investigations; and evaluate the reliability of methods and suggest possible improvements interpret observations and data, including identifying patterns and using observations, measurements and data to draw conclusions present reasoned explanations, including explaining data in relation to predictions and hypotheses identify further questions arising from their results | <p>white board quiz to label the different parts of a paper chromatogram</p> <p>model the practical and students carry out the practical to show understanding.</p> <p>MCO: what types of mixture can be separated using paper chromatography.</p> <p>identify the risk assessment: Could stain the surfaces, glass could break spillage could lead to slippery surfaces.</p> <p>Calculate the Rf value.(Guided practice)</p> <p>Independent practice: use their chromatogram and calculate the Rf value of their samples write down a conclusion based on their results: which dyes are mixtures of multiple colours.</p> | chromatography practical | <p>model the practical. targeted questioning to get students to think how this technique is used to separate the mixture of colours.</p> <p>Why is the base line drawn in a pencil?</p> <p>pace around the classroom to question students and identify any misconceptions.</p> <p>students draw diagrams in their books whilst they are waiting for the chromatograms to be completed.</p> |
| 10 | content | | <ul style="list-style-type: none"> label the equipment method for technique of distillation and mixtures separated with this technique. use appropriate techniques, apparatus, and materials during fieldwork and laboratory work, paying attention to health and safety | <p>recall- match the separation technique to its definition.</p> <p>Show me-label the equipment of distillation.</p> <p>Model the practical and name the equipment.</p> <p>Reiterate the evaporation,condensation happening at each stage.</p> | Distillation demo - coke and water | <p>use video to show distillation.</p> <p>then students label the diagram of distillation.</p> <p>Model the practical to separate a mixture of coke and water. Students identify evaporation and condensation techniques.</p> <p>Reflection: independent practice-students write down</p> |

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| | | <ul style="list-style-type: none"> make and record observations and measurements using a range of methods for different investigations; and evaluate the reliability of methods and suggest possible improvements interpret observations and data, including identifying patterns and using observations, measurements and data to draw conclusions present reasoned explanations, including explaining data in relation to predictions and hypotheses identify further questions arising from their results Checkpoint | <p>describe the use of a thermometer in the technique.</p> <div data-bbox="896 127 1198 526"> <p>BEST STUDENT WORKSHEET</p> <p>Distillation states</p> <p>Some salt solution is being distilled.</p>  <p>Some children talk about the names and states of the substances found at X and Y. What do you agree with, and why?</p> <div data-bbox="929 391 1153 502"> <p>Adam: The salt solution is heated up at X. The salt solution is in the liquid state at X. The salt solution is in the liquid state at Y. The water is in the liquid state at Y.</p> <p>Step: You can see the water in the liquid state at Y. The water is in the liquid state at Y. However, water is in liquid.</p> <p>Why: As it is in the liquid state, but it is liquid and comes out as liquid, not it is water in the liquid state.</p> </div> </div> <p>Use MCQ to check understandings.</p> | | <p>the steps of distillation in their books.</p> |
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| 11 | content | <ul style="list-style-type: none"> pH is a way we can classify a substance the 3 classifications are acidic, alkaline, neutral and often are in solution, can be made into a solution if they are soluble substances indicators are used to identify the property of pH litmus paper is an indicator that can be blue/red- they are red in acidic solutions and blue in alkaline. use appropriate techniques, apparatus, and materials during fieldwork and laboratory work, paying attention to health and safety make and record observations and measurements using a range of methods for different investigations; and evaluate the reliability of methods and suggest possible improvements | <div data-bbox="896 710 1198 1173"> <p>BEST STUDENT WORKSHEET</p> <p>Indicators</p> <p>Some students are discussing indicators.</p> <div data-bbox="918 790 1187 917"> <p>Tyler: An indicator tells you whether a solution is an acid or alkali.</p> <p>Jehan: An indicator releases a red colour from acids (and blue from alkalis).</p> <p>Leroy: Different indicators change colour at different pH levels.</p> <p>Paul: Indicators make an acid react with an alkali.</p> </div> <p>1. What do you agree with, and why?</p> </div> <p>MCQ to check prior understanding</p> <p>model the practical and students identify substances as acids, alkalis or neutral.</p> <p>Students then carry out practical and complete the table.</p> | <p>testing substances with red/blue litmus paper</p> | <p>Check prior understandings by using MCQ: Model the practical and students complete the practical after going through safety instructions. students draw the results table and complete.</p> |
|----|---------|---|---|--|--|

- interpret observations and data, including identifying patterns and using observations, measurements and data to draw conclusions
- present reasoned explanations, including explaining data in relation to predictions and hypotheses
- identify further questions arising from their results

Risk assessment: Acids and alkalis could be corrosive.

name the equipment before carrying out the practical.

complete the following tasks as reflection

BEST STUDENT WORKSHEET

Identifying alkalis

An unknown solution was poured into a test tube. The red litmus paper turned blue.

1. What type of solution is in the test tube?

Put a tick (✓) in the box next to the best answer.

A. acid

B. alkali

2. Which of the following solutions could be inside the test tube?

For each statement, tick (✓) one column to show what you think.

| | I am sure this is acid | I think this is acid | I think this is an alkali | I am sure this is an alkali |
|------------------------------|------------------------|----------------------|---------------------------|-----------------------------|
| A. vinegar | | | | |
| B. sodium carbonate solution | | | | |
| C. ammonia | | | | |
| D. sodium chloride solution | | | | |
| E. sodium hydroxide solution | | | | |

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BEST TEACHER NOTES

Drain cleaner

Sometimes chemicals are poured down the drain to get rid of any blockages.

Caustic soda is a type of drain cleaner. It is corrosive.

DO NOT touch or use drain cleaner yourself!

Some students are discussing whether caustic soda is an acid or alkali.

1. What do you agree with and why?

12

- red cabbage contains chemicals that can be used as an indicator, pink/red in acids, blue/green in alkaline, purple in neutral
- give examples of everyday substances and lab specific chemicals of acids, alkalis and neutral solutions, including HCl, stomach

- MCQ to identify the definition of an indicator.

pH scale

Some students are discussing indicators.

John: pH tells you the strength of acid and alkalis.

Making red cabbage indicator + testing substances

https://docs.google.com/document/d/13fxppwFL5zt05xi0FGJpaWFLbVkSh6JER5bQj_F6Yu/edit#heading=h.gjdqxs (use questions from end of sheet)

students carry out the practical using the method modelled by the teacher.

15 minutes to complete the practical and then 10 mins use a pipette to test substances with the indicator.

| | | | | | | |
|----|--|--|---|---|--|---|
| | | | <p>acid lemon juice, tomato juice, milk, pure water, salt water, blood, handsoaps, bleach, NaOH</p> <ul style="list-style-type: none"> ● use a pipette ● use appropriate techniques, apparatus, and materials during fieldwork and laboratory work, paying attention to health and safety ● make and record observations and measurements using a range of methods for different investigations; and evaluate the reliability of methods and suggest possible improvements ● interpret observations and data, including identifying patterns and using observations, measurements and data to draw conclusions ● present reasoned explanations, including explaining data in relation to predictions and hypotheses ● identify further questions arising from their results | <p>Monica: the pH of a solution tells you how acidic a solution is.</p> <p>Peter: pH values determine whether a solution is acidic or alkaline.</p> <p>Priyanka: The lower the pH the more dangerous a solution is. Who do you agree with, and why?</p> <ul style="list-style-type: none"> ● Link back to litmus paper in reflection task ● students make a red cabbage indicator and use it to test if substances are acids or alkalis and record results in a table. (using correct methods and equipment for the practical) ● risk assessment : spillage of chemicals, boiling water, safety goggles, hairs tied, stools under tables and tidy tables. <p>https://docs.google.com/document/d/1wv5YLK8NS695Pv2I52j1oPSKKxF0gaZnzNbbUm7FBEl/edit acids and alkali checklist, ensure students understand precisely what they are looking for</p> | | |
| 13 | | | <ul style="list-style-type: none"> ● The pH scale shows range/strength of how acidic a substance is. It can be measured using a pH meter which gives a numerical value or universal indicator paper or solution ● The pH scale ranges from 0 (very acidic) through 7 (neutral) to 14 (very alkaline). ● pH charts are used to compare results ● give examples of everyday substances and lab specific chemicals of acids, alkalis | <p>prior understanding check using MCQ.</p> <p>students complete the practical and identify using pH scale if the solution is acid, alkali or neutral.</p> <p>conclusion: Explain why using pH scale is better than litmus paper.</p> <p>risk assessment: chemicals must be handled carefully, glass ware</p> | Using UI paper/solution + pH meters testing substances | <p>model the practical and then students carry out the practical and identify the substances as acids, alkalis and neutral.</p> <p>pace around the class and help students use the pH scale if they are struggling.</p> |

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| | | | <p>and neutral solutions, including HCl, stomach acid lemon juice, tomato juice, milk, pure water, salt water, blood, handsoaps, bleach, NaOH</p> <ul style="list-style-type: none"> • use a chart to identify pH • use appropriate techniques, apparatus, and materials during fieldwork and laboratory work, paying attention to health and safety • make and record observations and measurements using a range of methods for different investigations; and evaluate the reliability of methods and suggest possible improvements • interpret observations and data, including identifying patterns and using observations, measurements and data to draw conclusions • present reasoned explanations, including explaining data in relation to predictions and hypotheses • identify further questions arising from their results | | | |
| 14 | Slippage | | | | | |
| 15 | Synoptic | | | | | |

Topic map - Year 7 - Forces

Prerequisite knowledge

| Prerequisite knowledge |
|---|
| <p>At KS2 (Year 5) Pupils are taught to</p> <ul style="list-style-type: none">● explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object● identify the effects of air resistance, water resistance and friction, that act between moving surfaces● recognise that some mechanisms including levers, pulleys and gears allow a smaller force to have a greater effect |

Overview

| Substantive | Hinterland |
|--|---|
| <p>Know that...</p> <ul style="list-style-type: none">● Forces can be categorised as contact or non contact forces and give examples● pushes and pulls arise because of interactions between objects● We use force arrows to show the size and direction of a force.● Forces can be balanced and unbalanced and this affects movement.● Forces can deform object by stretching and squashing (elastic bands)● Rubbing between surfaces causes friction● The unit of force is Newtons (N)● Free body diagrams show how forces interact● Resultant forces are the sum of all forces on an object● Forces always arise in pairs● Lubricants can reduce friction● Newton metres can be used to measure forces● Forces can make objects move, change direction and change shape | <ul style="list-style-type: none">● The work of Galileo at the Tower of Pisa and proof on the Apollo 15 mission.● The work of Sir Isaac Newton |

National curriculum links

- forces and fields: electrostatic, magnetic, gravity
- forces as vectors

Pedagogical approaches

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Practical

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| Practical's involved |
| <ul style="list-style-type: none"> • Forces dance mat • Investigating the effects of friction • Hookes law? |

Assessment

| What is being assessed? | How |
|-------------------------|--|
| Prior knowledge quiz - | Knowledge drop etc |
| Checkpoint - | MCQ/match up/written |
| Synoptic - | Cumulative exam style questions (KS3) (30 marks with 15 marks being current topic) |

Disciplinary knowledge/Procedural knowledge

| Disciplinary knowledge | Procedural knowledge |
|---|---|
| How... <ul style="list-style-type: none"> • To draw results tables • To identify the variables in a practical | How.. <ul style="list-style-type: none"> • To use a Newton metre |

- To measure forces using a Newton metre
- To plot a simple bar chart
- To calculate resultant forces
- To draw line graphs
- To decide axis on a graph
- To draw a line of best fit
- To draw conclusions from a graph

Misconceptions and Common Errors

- if there is motion, there is a force acting
- there cannot be a force without motion
- when moving the force is in the direction of the motion
- if there is no motion, then there is no force acting
- if there is no force, there is no motion
- constant speed results from a constant force
- Forces get things going but don't stop them
- Forces transfers from one object to another
- Inanimate objects don't exert forces (tables etc)

Lesson structure

| Learning Chunk | Forces | Number of lessons | |
|-------------------|--------|----------------------|--|
|-------------------|--------|----------------------|--|

| Lesson number | Type of Lesson (Recall, Content, Checkpoint, Synoptic) | Title | Knowledge | Responsive teaching | Practical | Lesson structure |
|---------------|--|-------|---|---|---|---|
| 1 | Recall | | <ul style="list-style-type: none"> ● Prerequisite quiz ● Define forces ● Forces can be categorised as contact or non-contact forces and give examples ● Identify forces acting in various scenarios | https://docs.google.com/presentation/d/1ovebrfHsZOLzzE56y2sO3xJFO1PY10drJS_iLQOmzHU/edit#slide=id.p20 | <p>Gravity rules- effects of mass and distance</p> <p>Demo : Use the tennis ball ring around the head</p> <p>Circus of activities(contact /non contact;</p> <p>Magnetism- floating magnets or train</p> <p>Electrostatic – Balloon., Electric field</p> <p>Demo -</p> | <p>Class completes pre requisition quiz</p> <p>Go over concept of forces – do students recall any and can they describe these</p> <p>Go through some examples of contact and non-contact forces – class discussion</p> <p>Demo some contact and non contact forces</p> <p>Provide a work sheet with different scenarios –</p> <p>Carousel activity – students to carry out and complete</p> <p>Conclude with a compare exercise – contact vs non-contact.</p> |

| | | | | | | |
|---|---------|--|---|--|--|---|
| 2 | content | | <ul style="list-style-type: none"> • Forces always arise in pairs • We use force arrows to show the size and direction of a force. • Free body diagrams show how forces interact • The unit of force is Newtons (N) • Explain that unsupported objects fall towards the earth because of the force of gravity acting between the Earth and the falling object. | <p>Show variations of balanced and unbalanced force – pictures – class discussion- Best resources :</p> <p>https://docs.google.com/presentation/d/1AOHg_w18UhtGUnsBLrT-wYL-z-N5-cbOx/edit#slide=id.p38</p> <p>Students given various scenarios for which they draw the free body diagram having seen examples on a visualizer</p> <p>Forces acting in pairs worksheet to be completed :</p> <p>https://docs.google.com/presentation/d/1p--pxO_fxigI5-1l4MZSIKZJWwrTHVvR2C-w7xC4PDnw/edit#slide=id.p9</p> | <ul style="list-style-type: none"> • Dropping cup cake and timing practical • Make predictions • Write a method IV- number of cupcake cases DV: Time taken to hit the floor CV: Distance • Design a results table • Draw force diagrams of each drop • Graph – bar chart | <p>Demo tug of war – concept of one side having a bigger force</p> <p>Introduce free body diagrams - force arrows</p> <p>Forces acting in pairs – model for a book on a table</p> <p>Demo the cupcake practical – upon completion produce some free body diagrams – bigger mass downward arrow bigger (bigger mass)</p> |
| 3 | Content | | <ul style="list-style-type: none"> • Forces can be balanced and unbalanced and this affects movement. • Resultant forces are the sum of all | <p>Recapped on balanced and unbalanced forces – quiz</p> <p>Resultant forces – define</p> <p>Calculating RF – use an example – model on the</p> | <p>Tug of war /arm wrestling</p> <p>Air track</p> <p>Rugby player getting knocked down.- video</p> | <p>Give various day to day examples. – Pushing a trolley etc. go through some examples and how they are to be represented on a diagram.</p> <p>Describe using newton’s and numbers what RF is and how to</p> |

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| | | | <p>forces on an object</p> <ul style="list-style-type: none"> To calculate resultant forces Checkpoint | <p>board I do we do you do.</p> <p>Independent practise working out RF (worksheet) and completing an exam question</p> | <p>Large newton meter with a pulley and rope-predict the motion</p> | <p>calculate this.</p> <p>Allow time for independent practise – facilitate</p> <p>Quiz</p> |
| 4 | content | | <ul style="list-style-type: none"> Rubbing between surfaces causes friction Lubricants can reduce friction Newton metres can be used to measure forces To identify the variables in a practical To measure forces using a Newton metre To plot a simple bar chart | <p>Provide examples of surfaces that are examples of friction – class discussion and record on board</p> <p>Demo effect of lubricant on force of friction – students predict what may happen before – check if they were right</p> <p>Use Visualizer – bar chart – students then complete their own</p> | <ul style="list-style-type: none"> Investigating the effects of friction <p>https://docs.google.com/document/d/1gyZb800zQfvgeeamv_luq0JWgYtqHW3FEhtbuY_mWGY/edit</p> <p>Practical: different surfaces (IV)</p> <p>Mass (CV)</p> <p>Measure speed of moving the mass on the different materials (DV)</p> <p>Bar chart produced</p> <p>Conclusion – Highest friction surface</p> | <p>Discuss the force friction - can be useful – examples of where and where not so useful</p> <p>Demo the practical and group students accordingly – cold call and go over safety</p> <p>Model how to fill in the work sheet correctly</p> <p>Use a visualizer to model a bar graph - and what makes a good one.</p> |
| 5 & 6 | content | | <ul style="list-style-type: none"> Forces can deform object by | <p>Show objects that represent deformation</p> | <ul style="list-style-type: none"> L5: Hookes law-strawberry laces | <p>First lesson:</p> |

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|---|---------|--|--|---|---|---|
| | | | <p>stretching and squashing (elastic bands)</p> <ul style="list-style-type: none"> To draw results tables | <p>and allow students to come up with a definition</p> <p>Set up apparatus correctly – clamp stand</p> <p>Write a risk assessment</p> <p>Results table – students recall where variables go in a table</p> <p>https://docs.google.com/presentation/d/10rcjkw21Prm_hnUcLduyyZwd6-H9Dfch2aHvGZfQc/edit#slide=id.p18</p> | <p>https://docs.google.com/presentation/d/10rcjkw21Prm_hnUcLduyyZwd6-H9Dfch2aHvGZfQc/edit#slide=id.p9</p> <p>L6- Carry out practical</p> | <p>What is deformation and extension</p> <p>Carry out the experiment demo – planning, risk assessment , what data needs to be recorded – design a results table</p> <p>Second lesson: Carry out the practical, record data, present data in a graph - use visualizer Provide model data Errors Conclusion</p> |
| 7 | content | | <ul style="list-style-type: none"> To draw line graphs To decide axis on a graph To draw a line of best fit To draw conclusions from a graph | <p>Display variation of graphs – recall which graphs used for continuous and discontinuous data</p> <p>Complete practical</p> <p>Provide model results – students to complete independently - visualizer – model graph if needed</p> | <p>Practical - ramps and recording speed a car moves down the ramp whilst changing heights</p> | <p>Go over examples of continuous and discontinuous data</p> <p>Present different scenarios- which graph is more suitable and why</p> <p>Present data for which students produce the correct graph from a practical</p> |

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| 8 | Slippage | | Checkpoint | Complete checkpoint and SA | | |
| 9 | Synoptic | | | | | |

Topic map - Year 7 - Health

Prerequisite knowledge

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| Prerequisite knowledge |
| <ul style="list-style-type: none"> Identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene. identify that animals, including humans, need the right types and amount of nutrition, and that they cannot make their own food; they get nutrition from what they eat describe the changes as humans develop to old age. recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function Genetic variation is inherited (disorders) |

Overview

| Substantive | Hinterland |
|---|---|
| Know that... <ul style="list-style-type: none"> the effects of recreational drugs (including substance misuse) on behaviour, health and life processes Health is a state of complete physical, mental and social well being and not merely the absence of disease. Different types of health and how it can affect us physically and mentally. | <ul style="list-style-type: none"> Benjamin Rush, the "father of American psychiatry," was the first to believe that mental illness is a disease of the mind and not a "possession of demons." |

- Recall that people have both physical health and mental health, which can range from good to ill.
- Identify factors associated with good and ill physical health in humans, other animals, and plants.
- Identify factors associated with good and ill mental health in humans.
- Different ways to improve mental health
- There is a relationship between good physical health and good mental wellbeing
- How hormones can play a role in the way we feel
- Stress, anxiety and depression have different symptoms
- Recognise that changes in normal body appearance, function and behaviour can be symptoms of ill health.
- Evaluate definitions of health.
- the importance of sufficient good quality sleep for good health and how a lack of sleep can affect weight, mood and ability to learn.
- noncommunicable diseases (cancer and heart disease)
- Recreational drugs have serious effects on behaviour and health.
- Some recreational drugs are illegal and others are legal.
- Effects of smoking on health
- Effects of alcohol on health
- Use of prescription and OTC drugs and the effects on health with long term use.
- What is addiction and the physical/ mental effects of withdrawal.
- Smoking and alcohol effects during pregnancy
- Recall that the good health of all organisms can be compromised by diseases
- Recall that diseases can be caused by pathogens, lifestyle, environment
- Distinguish between infectious and noninfectious diseases.
- Explain that medicines, including antibiotics, can be used to treat the cause or symptoms of some diseases.
- Apply the idea that some factors increase or decrease the risk of disease.

- the longest time a human being has gone without sleep is 11 days and 25 minutes. The world record was set by ... American 17-year-old Randy Gardner in 1963.
- Caffeine is most popular recreational drug - Coffee is the most popular drink worldwide (after water) with over 400 billion cups consumed each year. Last year in Britain, £1Bn was spent on coffee.
- 1 July 2007 – it became illegal to smoke in any pub, restaurant, nightclub, and most workplaces and work vehicles, anywhere in the UK.
- Debate - should sugary drinks be banned for under 18's?
- Estimated smoking related burden on the NHS is £2.6 billion per year
- Estimated alcohol related burden on the NHS is £3.5 billion per year

- The effects of recreational drugs (including substance misuse) on behaviour, health and life processes.

Pedagogical approaches

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Practical

| |
|---|
| Practical's involved |
| <ul style="list-style-type: none"> • Alcohol goggles • Tar demo • Recreational drugs models • Reaction time practical |

Assessment

| What is being assessed? | How |
|--|--|
| Prior knowledge quiz - Checkpoint - Synoptic - | Knowledge drop etc MCQ/match up/written Cumulative exam style questions (KS3) (30 marks with 15 marks being current topic) |

Disciplinary knowledge/Procedural knowledge

| Disciplinary knowledge | Procedural knowledge |
|--|--|
| How... <ul style="list-style-type: none"> • Compare and evaluate statements of health • Evaluate the use of data and make links. • Analysis of data in graphs • interpret data from tables | How.. <ul style="list-style-type: none"> • identify for and against ideas • Read values from axis on graphs • |

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Misconceptions and Common Errors

- Good health means you do not have disease
- Being 'fat' means you have poor health
- If you are rich you will have better health than someone who is poor.
- You can control whether you suffer with poor mental health
- There is no link between good mental health and lifestyle
- Sleep is not important for good health
- All drug use has a negative effect on the body
- Smoking and alcohol always kill a developing foetus if pregnant
- The idea of causes vs correlation. eg smoking 'causes' cancer rather than has a strong correlation
- legal drugs cause less harm because they are legal

Lesson structure

| | | | |
|----------------|--------|-------------------|--|
| Learning Chunk | Health | Number of lessons | |
|----------------|--------|-------------------|--|

| Lesson number | Type of Lesson (Recall, Content, Checkpoint, Synoptic) | Title | Knowledge | Responsive teaching | Practical | Lesson structure |
|---------------|--|---|--|--|-----------|--|
| 1 | Recall | Does lifestyle have an impact on longevity? | <ul style="list-style-type: none"> • Prerequisite quiz • recognise the impact of diet, exercise, drugs | MEG: 1.being healthy means not eating fast food 2.humans can make their own food say it again but better-defining lifestyle | | "What is a lifestyle?" student to use image to come is with a definition of lifestyle and what it may consist of whole class discussion on what a persons 'lifestyle' is and adding to original answers |

| | | | | | | |
|---|---------|---|---|--|--|--|
| | | | <p>and lifestyle on the way their bodies function</p> <ul style="list-style-type: none"> describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene. identify that animals, including humans, need the right types and amount of nutrition, and that they cannot make their own food; they get nutrition from what they eat describe the changes as humans develop to old age. | <p>think-paired-shared</p> <p>addressing MEG</p> <p>'Explaining it' humans experience different life cycles. use your knowledge from the lesson to form a dialogue on how to maintain 'good health' as you reach old age</p> <p>opportunity for students to apply their understanding to real life application</p> | | <p>TPS activity- food wheel, what are the essential nutrients and why are they essential</p> <p>BBC bitesize video- student to take notes on why it's good to have a healthy diet exercise in relation to lifestyle</p> <p>differentiation mental and physical health based on scenarios</p> <p>human life cycle- 6 stages of a human life cycle</p> <p>reflection- which is the most important factor (sleep, exercise, drugs and sleep) contributing to longevity?</p> |
| 2 | Content | Is mental illness a possession of demons? | <ul style="list-style-type: none"> Health is a state of complete physical, mental and social well being and not merely the absence of disease. | <p>MEG:</p> <ol style="list-style-type: none"> unhealthy means being 'overweight' and not having a balanced diet 'health' only depends on the absence of disease <p>show me boards</p> | Japanese art of forest bathing article | RP- show me boards on previous lesson |

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|--|--|--|--|---|--|---|
| | | | <ul style="list-style-type: none"> • Different types of health (mental, emotional, physical) • Recall that people have both physical health and mental health, which can range from good to ill. • Identify factors associated with good and ill physical & mental health in humans, other animals, and plants. Humans: diet, exercise, risk factors eg drugs/smoking, stress from work/life, anxiety and depression from financial, family, work. Plants: access to water and minerals in soil, access to sunlight. • There is a relationship between good physical health and good mental wellbeing. | <p>Give an example and ask students to share answer</p> <p>dating cards- Responsive teaching mind map</p> <p>example- exercising release chemicals in the brain that makes you feel good</p> <p>exit ticket</p> | | <p>-what is lifestyle? -what are factors that contribute to a healthy lifestyle? -how do humans get their nutrients?</p> <p>whole class discussion- health depends on 3 things: physical, mental and social. can you think of any examples of each</p> <p>BPS model</p> <p>Hinterland- Benjamin Rush, the "father of American psychiatry," was the first to believe that mental illness is a disease of the mind and not a "possession of demons.</p> <p>place dating cards on each table, students should fill in flow chart</p> <p>Mind Map- on psychological, biological and social factors associated with good ill in humans, other animals and plants</p> <p>deeper thinking Q- do any of them have a relationship?</p> <p>Refer back to the 'japanese art of the forest bathing article' to question students on how this could increase one's physical mental and social well being</p> <p>reflection- exit questions</p> |
|--|--|--|--|---|--|---|

| | | | | | | |
|---|---------|-----------------------------------|---|---|--|--|
| 3 | Content | Can humans survive without sleep? | <ul style="list-style-type: none"> • Stress, anxiety and depression have different symptoms • Recognise that changes in normal body appearance, function and behaviour can be symptoms of ill health. Eg putting on or losing weight can be cause for concern. • Evaluate definitions of health. • Different ways to improve mental health. Walking, exercising, yoga, healthy diet, not drinking excessively, being outdoors, doing things that release endorphins. • The importance of sufficient good quality sleep for good health and how a lack of sleep can affect weight, mood and ability to learn. • checkpoint | <p>recall- true or false quiz based on previous MEGs</p> <p>MEG- symptoms are only present for pathogenic disease</p> <p>deliberate vocabulary development- A symptom is a physical or mental feature which is regarded as indicating a condition. Something that indicates the presence of a disorder</p> <p>Teacher led task- students to fill in chart</p> | | <p>true or false quiz</p> <p>TPS- dual coding, changes to physical appearance due to physical and mental changes</p> <p>DT- How might a person's appearance change when going through mental health difficulties?</p> <p>WCD- what are symptoms? students should be able to recognise symptoms of diseases. This is an opportunity to get them thinking about mental disorders.</p> <p>table- stress and anxiety and depression definition, physical symptoms, and ways of improving mental health (treatment)</p> <p>Hinterland question- The longest time a human being has gone without sleep is 11 days and 25 minutes. The world record was set by ... American 17-year-old Randy Gardner in 1963.</p> <p>How can insufficient sleep affect your mental health? sentence starter and keyword box</p> <p>reflection- Poster promoting good health- create a poster to promote different ways to mental health to student at the Coop Academy</p> |
|---|---------|-----------------------------------|---|---|--|--|

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|---|---------|---|--|--|---|---|
| 4 | content | Will paracetamol cure my disease? | <ul style="list-style-type: none"> • noncommunicable diseases (cancer and heart disease) • There are many different types of disease that exist in the world today. • Diseases can be caught, develop over time or be inherited. • Some lifestyle factors are linked to cancer, such as eating a poor diet, being exposed to radiation and smoking. • Cancer caused by uncontrollable cell growth • Some cancers can be treated with chemotherapy, radiotherapy, surgery | <p>MEG- paracetamol will cure a cold</p> <p>MEG-antibiotics cure all pathogens</p> <p>MEG- vaccines stop you from catching diseases</p> <p>Responsive teaching mind map-complete throughout the lesson</p> | | <p>RP- cops and robbers list 3 factors that contribute towards good health</p> <p>MWBQ- can you catch it?</p> <p>TPS- state which disease is communicable and noncommunicable</p> <p>images of lifestyle factors that are linked to cancer (class discussion and complete mind map)</p> <p>What is cancer? independent task</p> <p>teacher lead task on types of cancer, how it spreads, treatment</p> <p>mind map benign vs malignant tumours</p> <p>analysing a pie chart on common cancer in males and females. Creating a double bar chart</p> <p>Reflection- case study, be the doctor</p> |
| 5 | Content | What happens to your body when you stop | <ul style="list-style-type: none"> • How tar, carbon monoxide and nicotine affect the body and lungs | <ul style="list-style-type: none"> • Picture prompts • Choral reading | <ul style="list-style-type: none"> • Tar model | <ul style="list-style-type: none"> • Picture prompts <ul style="list-style-type: none"> ◦ Non smoker's and smoker's lung • Choral reading • Tar model <ul style="list-style-type: none"> ◦ Use to describe how tar, carbon monoxide and nicotine affect the body |

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| | | smoking ? | | | | <ul style="list-style-type: none"> ● Video <ul style="list-style-type: none"> ○ List 5 effects of stopping smoking on your body ● Reflection <ul style="list-style-type: none"> ○ Make a leaflet |
| 6 | Content | Is alcohol as dangerous as smoking ? | <ul style="list-style-type: none"> ● Short term and long term effects of smoking on health ● Short term and long term effects of alcohol on health ● Smoking and alcohol effects during pregnancy | <ul style="list-style-type: none"> ● Cops and robbers ● Table fill/teach your partner ● Reaction time rulers ● Reflection | <ul style="list-style-type: none"> ● Reaction time rulers | <ul style="list-style-type: none"> ● Cops and robbers ● Table fill/teach your partner <ul style="list-style-type: none"> ○ Page 34 in key stage 3 science revision guide/information sheets ○ Short term effects of alcohol and smoking ○ Long term effects of alcohol and smoking ○ Effects of alcohol and smoking during pregnancy ● Reaction time rulers <ul style="list-style-type: none"> ○ Independent variable - without wearing and with wearing beer goggles ○ Dependent variable - catch distance ● Reflection <ul style="list-style-type: none"> ○ Write conclusion |
| 7 | content | Why was self-isolation important during the coronavirus pandemic? | <ul style="list-style-type: none"> ● Distinguish between infectious and noninfectious diseases ● How pathogens are spread ● Basic pathogens (bacteria and viruses) ● Good and bad bacteria | <ul style="list-style-type: none"> ● True or false concept cartoons ● Table sort ● Video ● Match up ● Picture prompts ● Yoghurt drink ● Can they catch it | | <ul style="list-style-type: none"> ● True or false concept cartoons <ul style="list-style-type: none"> ○ Alcohol and smoking ● Table sort <ul style="list-style-type: none"> ○ Communicable and non-communicable diseases ● Video <ul style="list-style-type: none"> ○ List 5 ways the flu spread ● Match up <ul style="list-style-type: none"> ○ Ways pathogens spread to their examples ● Picture prompts <ul style="list-style-type: none"> ○ Pathogens ● Yoghurt drink |

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| | | | | | | <ul style="list-style-type: none"> ○ Good and bad bacteria ● Can they catch it <ul style="list-style-type: none"> ○ Communicable and non-communicable diseases |
| 8 | content | What discoveries changed the world of medicine? | <ul style="list-style-type: none"> ● Use of prescription and OTC drugs and the effects on health with long term use ● Explain that medicines, including antibiotics, can be used to treat the cause or symptoms of some diseases ● Apply the idea that some factors increase or decrease the risk of disease ● checkpoint | <ul style="list-style-type: none"> ● Picture prompt ● Bacteria balloon ● Hinterland ● Flow chart ● Agar swabs ● What is the question | <ul style="list-style-type: none"> ● Bacteria balloon ● Agar swabs | <ul style="list-style-type: none"> ● Picture prompt <ul style="list-style-type: none"> ○ Bacterial cell organelles and functions ● Bacteria balloon <ul style="list-style-type: none"> ○ Demonstration to show how some antibiotics kill bacteria ● Hinterland <ul style="list-style-type: none"> ○ Alexander Flemming's discovery of antibiotics ● Flow chart <ul style="list-style-type: none"> ○ Order Alexander Flemming's discovery of antibiotics ● Agar swabs <ul style="list-style-type: none"> ○ Demonstrations and class practical ● What is the question <ul style="list-style-type: none"> ○ Antibiotics and culturing bacteria |
| 9 | content | How do drugs affect the nervous system? | <ul style="list-style-type: none"> ● A drug is a substance that has an effect on the body ● Medicinal drugs and recreational drugs ● Some recreational drugs are illegal and others are legal such as alcohol, tobacco and caffeine | <ul style="list-style-type: none"> ● Agar plates from last lesson ● Picture prompts ● Think, pair, share ● Frayer models ● Table sort ● Retrieval practice ● Class discussion ● Question pyramid | <ul style="list-style-type: none"> ● Agar plates from last lesson | <ul style="list-style-type: none"> ● Agar plates <ul style="list-style-type: none"> ○ Observe ● Picture prompts <ul style="list-style-type: none"> ○ Medicinal and recreational drugs ● Think, pair, share <ul style="list-style-type: none"> ○ Use to define drug ● Frayer models <ul style="list-style-type: none"> ○ Complete for medicinal and recreational drugs ○ Ventolin, artemisinin (case study), alcohol and nicotine examples ● Table sort |

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| | | | <ul style="list-style-type: none"> ● recreational drugs can be classed as stimulants or depressants ● Effects of stimulants and depressants on the body ● Recreational drugs have serious effects on behaviour and health ● What is addiction and the physical/ mental effects of withdrawal ● Recreational drugs can be addictive | | | <ul style="list-style-type: none"> ○ Legal and illegal recreational drugs ● Retrieval practice <ul style="list-style-type: none"> ○ List the effects of alcohol and nicotine on the body ○ Use to define stimulant and depressant recreational drugs ● Class discussion <ul style="list-style-type: none"> ○ List what think paragraph (case study) is about ○ Address addiction misconceptions ● Question pyramid <ul style="list-style-type: none"> ○ Types of drug |
| 10 | Synoptic | | | | | |