

UNIT 1 - ELECTRICITY AND BATTERIES

Content

- Current, voltage and amperage
- Wattage
- Circuits in series and in parallel
- Circuit diagrams
- Symbols in a circuit diagram
- Making batteries
- Measuring using a multimeter

Resources & ICT

- Circuit kits
- Penny Battery
- Fruit and potatoes
- Multimeter
- Batteries

Students to Know

- Main symbols for circuit diagrams
- The difference between current, voltage, amperage and wattage

Students to Understand

- How current is the movement of electrons
- Circuits in series increase voltage
- Circuits in parallel increase amperage
- How to construct circuit diagrams

Students to be able to Do

- Create a variety of batteries from household objects
- Use a multimeter

Cross curricular links

- Citizenship and recycling

Types of assessment

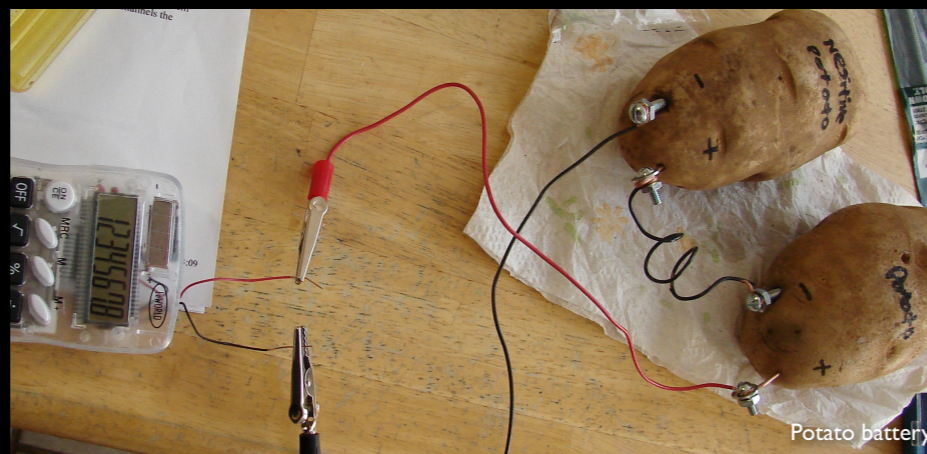
- Formative: questions and answers, discussions, quick quizzes
- Summative: end of unit test

Differentiation incl. EAL

- Vocabulary lists
- Creating circuits with both series and parallel connections

Learning styles activities

- Kinesthetic: hands-on battery making in the laboratory
- Visual: circuit diagrams



Potato battery

David R. Tibble / CC BY-SA 3.0

Global citizenship, internationalism, local environment

- Learning how batteries recycle and can be recharged

UNIT 2 - FORCES

Content

- Potential force
- Gravity
- Air resistance
- Water resistance
- Force diagrams
- Newtons and Newton meters
- Building paper and pasta bridges

Resources & ICT

- iPad app: forces
- Elastic bands, toy cars, paper airplanes, wooden slopes

Students to Know

- How to mark relative forces on a diagram with arrows
- The different kinds of forces

Students to Understand

- That forces cause an effect, e.g. unbalanced = movement
- How shape affects strength in construction

Students to be able to Do

- Carry out experiments which demonstrate and measure forces
- Build a strong bridge with weak materials
- Use a Newton meter

Cross curricular links

- History: the building of monuments, bridges worldwide

Types of assessment

- Formative: questions and answers, discussions, quick quizzes
- Summative: end of unit test, Mohs scale, testing rocks in the laboratory

Differentiation incl. EAL

- Vocabulary lists, paired work with more able supporting
- Extension: research pioneering scientists and forces

Learning styles activities

- Kinesthetic: hands-on in laboratory
- Visual: diagrams, planning for bridge construction



JJ Harrison / CC BY-SA 3.0

Global citizenship, internationalism, local environment

- Bridges, planes, monuments from around the world

UNIT 3 - THE STRUCTURE OF ATOMS

Content

- Electron configurations
- Valence and core electrons
- Atomic bonding
- Atomic numbers
- Crystal structure
- The periodic tables

Resources & ICT

- iPad app: the periodic table
- School trip to the Natural History Museum, Geneva: display on atoms, minerals

Students to Know

- How to determine an atom's electron configuration
- The fundamental particles in an atom and their relationship.
- Patterns within the periodic table (e.g. columns=valence electrons)

Students to Understand

- The different ways atoms bond

Students to be able to Do

- Place 20 elements in the period table

Cross curricular links

- Mathematics: electron configurations

Types of assessment

- Formative: questions and answers, discussions, quick quizzes
- Summative: end of unit test, determining electron configuration, field trip worksheet pack

Differentiation incl. EAL

- Vocabulary lists, diagrams, use of ICT
- Extension: memorising as many positions of elements as possible in the periodic table plus some of their properties

Learning styles activities

- Visual: diagrams of atoms, different periodic tables



Kurchatov city, Semipalatinsk nuclear test site, Kazakhstan

RIAN #440215 / Alexander Lisikin / CC BY-SA 3.0

Global citizenship, internationalism, local environment

- Local environment: field trip to the Natural History Museum, Geneva:



UNIT 4 - DENSITY AND PRESSURE

Content

- Formulae for calculating pressure and density
- Density of common materials
- Use of Eureka cans
- Calculating the density of solids and liquids
- Pressure of solids, liquids and gases
- Experiments to show pressure

Resources & ICT

- iPad app: pressure
- Density blocks, Eureka cans, standard lab equipment

Students to Know

- The formulae for calculating pressure and density
- That materials have different densities
- A selection of materials and their relative and specific densities

Students to Understand

- How the state of matter affects pressure
- How to rearrange the density formula to find volume and mass

Students to be able to Do

- Carry out experiments to determine the density of liquids and solids
- Pressure experiments, e.g. imploding a can

Cross curricular links

- Geography: changes in atmospheric pressure according to altitude

Types of assessment

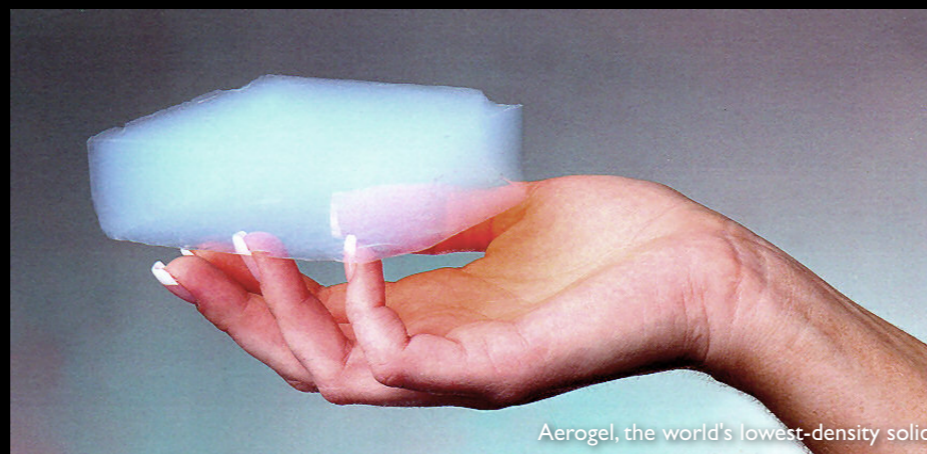
- Formative: questions and answers, discussions, quick quizzes
- Summative: end of unit test, determining electron configuration, field trip worksheet pack

Differentiation incl. EAL

- Support offered to students who may find formulae use challenging
- Extension: students researching experiments about pressure

Learning styles activities

- Kinesthetic: hands-on laboratory experiments
- Mathematical: use of formulae



Aerogel, the world's lowest-density solid

Courtesy NASA / JPL-Caltech / Public domain

Global citizenship, internationalism, local environment

- The creation of new, lighter materials for construction and medical practices

UNIT 5 - FOOD WEBS

Content

- Food chains
- Food webs
- Ecosystems
- Local examples
- Food pyramids
- Population pyramids

Resources & ICT

- Internet research on local wildlife examples
- iPad app: food chains

Students to Know

- The difference between a food chain and a food web
- Local examples of food webs
- The definition of an ecosystem
- Kinds of ecosystems

Students to Understand

- How to construct a food pyramid
- How to use a population pyramid

Students to be able to Do

- Connect food chains to construct food webs

Cross curricular links

- Geography: ecosystems

Types of assessment

- Formative: questions and answers, discussions, quick quizzes
- Summative: end of unit test, rubric-based assessment on food-web examples

Differentiation incl. EAL

- Vocabulary lists
- Extension: independent research into international example of food webs

Learning styles activities

- Language: using class resource of different languages to construct a multicultural food web



Giant Kingfisher at Rietvlei Nature Reserve, South Africa

R. Martins / Leoa's Photography / CC BY-SA 3.0

Global citizenship, internationalism, local environment

- Local environment: local examples of food webs



UNIT 6 - CHEMICAL AND PHYSICAL CHANGES

Content

- Review flame test
- Review kinds of reactions: combustion, combination, decomposition
- The creation of salts
- Safety in the laboratory with the use of acids
- Chemical equations

Resources & ICT

- iPad app: chemical reactions

Students to Know

- How to combine metals and acids to make a salt
- How to construct the name of a salt from its components, e.g. magnesium and hydrochloric acid to obtain magnesium chloride

Students to Understand

- How to balance chemical equations
- Why elements change the colour of a flame
- Safety precautions in the laboratory

Students to be able to Do

- Carry out experiments with compounds and elements to make salts in the laboratory

Cross curricular links

- PHSE: health and the origins of salts in medication

Types of assessment

- Formative: questions and answers, discussions, quick quizzes
- Summative: end of unit test, laboratory test to create a salt, assessed by rubric

Differentiation incl. EAL

- Vocabulary lists
- Support given to students when balancing equations

Learning styles activities

- Mathematical: the use of chemical equations



Toby Hudson / CC BY-SA 3.0 AU

Global citizenship, internationalism, local environment

- Local environment: how to dispose of chemicals