

SCIENCE - SCHEMES OF WORK

For Children Aged 8 to 12

Science Lessons Structure

Time – Approx. 90 minutes

1. Remind class of last topic area explored and relate to current topic where appropriate.
2. Discuss and explore with concrete and abstract examples.
3. Experiments – where appropriate, possible and necessary.
4. Drama – Pupils enact areas of topic where appropriate.
5. Group Work – Set small groups an area to explore.
6. Practical Application – discuss and explore how topic area is applied in every life.
7. Making Connections – discuss and explore connections between topic and other topic areas and subjects.
8. Media – use video clips and programmes and/or computer programmes and websites where appropriate.
9. Record through text and illustrations. Pupils under 10 to copy teacher's whiteboard recording. Pupils above 10 to record using their own words.
10. Quiz.

Resources

1. Science Books
2. Pendulum
3. Electronics Kit
4. Electroscope
5. Science Games
6. Globes
7. Planetarium
8. Night Sky Action Pack
9. Human Torso Model
10. Science Posters
11. Prisms & Mirrors
12. Magnets Kit
13. Chemistry Lab Kit
14. Energy Lab Kit
15. Kitchen Chemistry – Smart Science Kit
16. Communications – Inventors Handbook Kit
17. Rockets – Inventors Handbook Kit
18. Robots 1 & 2 – Inventors Handbook Kit
19. Microscope
20. Collected Scientific Items
21. BBC Primary Learning
22. Internet
23. Newspapers & Magazines

- 24. Apple Mac & Computer Programmes
- 25. DVD Videos and Clips

Science Subject Areas

- 1. Physics
- 2. Chemistry
- 3. Astronomy
- 4. Biology

YEAR 4

Autumn Term

1. PHYSICS

1. Motion, Work & Energy

- a. Constant Motion
 - i. Big Bang explosion
 - ii. Rotating Galaxies
 - iii. Earth spinning on its axis & orbiting Sun
- b. Newton's Laws of Motion
- c. Work & Energy
- d. Law Of Conservation of Energy
- e. Potential and Kinetic Energy
- f. Acceleration
- g. Momentum
- h. Friction
 - i. The Effects of Friction
 - ii. Air, Surface and Water Friction

2. Gravity

- a. Introduction & Overview
- b. Newton's Law of Gravitation - Difference between Mass and Weight
- c. Using the Force of Gravity

3. Heat & Temperature

- a. Definition of Heat
- b. Properties and Behaviour of Heat
- c. Common Temperature Scales

Spring Term

2. CHEMISTRY

4. Soluble & Insoluble

- a. Soluble Materials
- b. Insoluble Materials
- c. Atomic Behaviour and Structure of Materials
- d. Atomic Behaviour of Water

5. Reversible & Irreversible

- a. Reversible Processes
- b. Irreversible Processes
- c. Atomic Behaviour and Structure of Materials

3. ASTRONOMY

6. The Universe

- a. Introduction & Overview – Size & Structure of the Universe – Parallel Universes?
- b. The Big Bang
- c. The Night Sky – Looking Back In Time
- d. Atomic Particles of the Universe
- e. Large Bodies in the Universe
- f. The Search for Life
- g. Fate of the Universe

7. Planet Earth

- a. Introduction to the Solar System
- b. Cross Section of Earth - Size and Position of Planet Earth
- c. Creation of Planet Earth – From Dust to Planetesimal to Planet
- d. Arrival of Water from Comets
- e. General Behaviour of Planet Earth
- f. Fate of Planet Earth

Summer Term

8. The Planets

- a. Creation of the Planets
- b. Mercury
- c. Venus
- d. Mars
- e. Jupiter
- f. Saturn
- g. Uranus
- h. Neptune
- i. Planets in Other Solar Systems & the Possibility of Life

4. BIOLOGY

9. Animal Classification

- a. Vertebrates & Invertebrates
- b. Evolution of Animals Timeline
- c. Fish
- d. Amphibians
- e. Reptiles
- f. Mammals
- g. Birds

10. Animal Survival

- a. Animal Survival Techniques
- b. Extinction
- c. Endangered Species

YEAR 5

Autumn Term

1. PHYSICS

11. Universal Forces

- a. Gravity
- b. Electro-Magnetism
- c. Strong Nuclear Force
- d. Weak Nuclear Force

12. Sound

- a. Sound Waves
- b. Measuring Sound
- c. Sound in Music
- d. Speed of Sound
- e. The Doppler Effect

2. CHEMISTRY

13. Atoms

- a. Introduction & Overview
- b. The Bohr & Schrödinger Models
- c. Inside the Atom – Electrons, Protons & Neutrons
- d. Molecules - Behaviour of Molecules in Solids, Liquids & Gases

14. Elements

- a. Elements, the Ingredients of the Universe
- b. Creation Of Elements – The Big Bang
- c. The Periodic Table
- d. Hydrogen
- e. Helium
- f. Oxygen
- g. Nitrogen
- h. Chlorine
- i. Neon
- j. Argon, Krypton, Radon & Xenon

Spring Term

2. CHEMISTRY

15. Compounds

- a. Introduction & Overview
- b. Water
- c. Story of a Water Molecule – From the Big Bang to Today

3. ASTRONOMY

16. The Magnetic Shield
- a. The Iron Catastrophe
 - b. Function & Importance of the Magnetic Shield
17. Moons
- a. Creation of the Moon – Collision with Earth
 - b. Role & Behaviour of the Moon
 - c. Ganymede
 - d. Titan
 - e. Europa
 - f. Io
18. Meteors & Comets
- a. Meteors & Shooting Stars
 - b. Comets
 - c. The Asteroid Belt

4. BIOLOGY

19. The Plant Kingdom & Reproduction
- a. The Differences Between Plants, Animals & Minerals – Composition of Organisms
 - b. Plant Evolutionary Timeline
 - c. Parts of the Flowering Plant
 - d. Spore Plants, Gymnosperms & Angiosperms
 - e. Parts of the Flower
 - f. Transportation of Water and Nutrients
 - g. Pollination
 - h. Fertilisation
 - i. Germination
 - j. Parts of the Seed
 - k. Seed Dispersal & Dormancy
 - l. Photosynthesis
 - m. Cross Section of a Leaf
 - n. Plant Records

Summer Term

4. BIOLOGY

20. Skeleton & Muscles

- a. The Human Skeleton
- b. Animal Skeletons
- c. Composition of Bones – Bone Structure & Growth
- d. How Bones Mend
- e. The Hands
- f. The Feet
- g. Joints & Ligaments
- h. Muscles

21. Senses

- a. The Five Senses
- b. Sight – The Eye
- c. Hearing – The Ear
- d. Smell – The Nose
- e. Touch – Skin
- f. Taste – Mouth & Tongue

22. Digestive System & Nutrition

- a. Digestion
- b. Mouth – Teeth & Saliva
- c. Oesophagus
- d. The Stomach
- e. The Small Intestines
- f. The Large Intestines
- g. The Liver
- h. The Kidneys
- i. Nutrition
- j. Healthy Diets

23. Skin, Hair & Nails

- a. Skin – An Overview
- b. Cross Section of Skin
- c. Skin – Wounds & Healing
- d. Skin Infections & Diseases
- e. The Dermis
- f. The Epidermis
- g. Hair
- h. Nails

YEAR 6

Autumn Term

1. PHYSICS

24. Electricity

- a. Introduction & Overview
- b. Electrostatics – Voltage
- c. Electric Currents
- d. Measuring Electricity
- e. How Light Bulbs work
- f. Electrical Appliances

25. Magnetism

- a. Earth's Magnetic Field
- b. Compasses
- c. Magnets & Metals
- d. Magnetic Lines of Force

26. Electromagnetic Waves

- a. Waves
- b. Properties of Electromagnetism
- c. The Electromagnetic Spectrum
- d. Maxwell's Electromagnetism Equations
- e. Gamma Rays
- f. X-Rays
- g. Ultra-Violet Light
- h. Light
 - i. Introduction & Overview
 - ii. Reflection
 - iii. Periscopes
 - iv. Refraction
 - v. Prisms
- i. Infrared
- j. Microwaves
- k. Radio Waves

2. CHEMISTRY

27. Elements

- a. Gold

- b. Silver
- c. Aluminium
- d. Tin
- e. Carbon
- f. Calcium
- g. Copper
- h. Lead

28. Compounds

- a. Natural Compounds – Life Forms – Humans etc...

Spring Term

3. ASTRONOMY

29. The Sun

- a. Position & Role of Our Sun
- b. Birth of the Sun – The Solar Nebula
- c. Lifecycle of Our Sun
- d. Cross Section of the Sun – Basic Sun Facts
- e. Sunspots & Solar Prominences
- f. Death of the Sun

30. Stars

- a. Introduction & Overview
- b. How Our Sun Compares with Other Stars
- c. Creation of Stars
- d. Supernovas

31. Nebulae

- a. Introduction & Overview – Clouds of the Universe
- b. Supernova Remnants
- c. Emission Nebula
- d. Reflection Nebula
- e. Dark Nebula
- f. Planetary Nebula

32. Galaxies

- a. Introduction & Overview
- b. The Milky Way
- c. Spiral Galaxies

- d. Andromeda
- e. Barred Spiral Galaxies
- f. Elliptical Galaxies

Summer Term

4. BIOLOGY

33. Evolution

- a. Introduction & Overview
- b. The Family Tree
- c. Evolution Timeline
- d. History of Evolutionary Theory
- e. Charles Darwin
- f. The Origin of Species
- g. Natural Selection
- h. Sexual Selection
- i. Mendel's Laws of Heredity
- j. What Makes Us Who We Are?
- k. DNA
- l. Mutations
- m. Environmental Mutations

34. Cells

- a. Blood Cells
- b. Organ Cells
- c. Tissue Cells
- d. Nerve Cells

35. Breathing & Circulation

- a. Respiration
- b. The Mouth
- c. The Windpipe
- d. Lungs

36. Blood & Other Bodily Fluids

- a. Composition of Blood
- b. Circulation of Blood
- c. The Heart
- d. Blood Vessels

37. Animal Reproduction

- a. Asexual Reproduction
- b. Eggs
- c. Reproduction in Mammals
- d. In Gestation Periods in Different Animals
- e. Birth – Difficulties in Ensuring Survival

YEAR 7

All Year

1. PHYSICS

38. Motion, Work & Energy Project

- a. Newton's Laws of Motion
 - i. Law of Inertia
 - ii. Law of Constant Acceleration
 - iii. Law of Conservation of Momentum
- b. Work & Energy
- c. Law Of Conservation of Energy
- d. Potential and Kinetic Energy – Difference between Speed and Velocity
- e. Formulas for Potential and Kinetic Energy
- f. Acceleration
- g. Momentum
- h. Centripetal & Centrifugal Forces
- i. Angular Momentum
- j. Torque
- k. Formulas for Work and Energy
- l. Friction
 - i. The Effects of Friction
 - ii. Air, Surface and Water Friction
 - iii. Conversion of Kinetic into Thermal Energy
 - iv. Formulas for Friction

39. Gravity Project

- a. Introduction & Overview
- b. Newton's Law of Gravitation - Difference between Mass and Weight
- c. Formula for Newton's Law
- d. Using the Force of Gravity
- e. Gravity in Space

40. Universal Forces Project

- a. Gravity
- b. Electro-Magnetism
- c. Strong Nuclear Force
- d. Weak Nuclear Force
- e. Grand Unified Theories – Superstring Theory

Autumn Term

1. PHYSICS

41. Heat & Temperature

- a. Definition of Heat
- b. Properties and Behaviour of Heat
- c. Common Temperature Scales
- d. Absolute Zero
- a. Superconductivity
- b. Four Laws of Thermodynamics
- e. Entropy

2. CHEMISTRY

42. Atoms

- a. The Bohr & Schrödinger Models
- b. Inside the Atom – Electrons, Protons & Neutrons
- c. Isotopes

43. Elements

- a. The Periodic Table
- b. Sulphur
- c. Phosphorus

3. ASTRONOMY

44. Stars

- a. Creation of Stars
- b. Supernovas
- c. Lifecycle of Different Types of Stars
- d. Neutron Stars

4. BIOLOGY

45. Brain and the Nervous System

- a. Introduction & Overview
- b. The Brain & Spinal Cord
- c. The Brain's Nerve Cells

46. The Immune System

- a. The Lymphatic System
- b. The Skin
- c. Bolstering the Immune System

Spring Term

1. PHYSICS

47. Einstein and Relativity

- c. The Theory of Special Relativity
- d. $E = mc^2$ – Relationship between Mass and Energy
- e. General Relativity

48. Nuclear Physics

- a. Nuclear Fusion – Stars
- b. Fission
- c. Nuclear Power & Bombs – Splitting the Atom
- d. Radioactivity
- e. Lasers

2. CHEMISTRY

49. Elements

- a. Sodium
- b. Magnesium
- c. Potassium
- d. Silicon
- e. Zinc
- f. Mercury

3. ASTRONOMY

50. Black Holes

- a. The Theory of Black Holes
- b. How Might Black Holes Be Created

4. BIOLOGY

51. Human Reproduction

- a. Sexual Intercourse
- b. The Female Reproductive System
- c. Menstruation & Menopause
- d. The Male Reproductive System
- e. Pregnancy & Birth

Summer Term

1. PHYSICS

52. Quantum Physics

- a. Quantum Mechanics
- b. Quarks
- c. The Uncertainty Principle

2. CHEMISTRY

53. Compounds

- a. Artificial Compounds – Plastic, Soap etc...

3. ASTRONOMY

54. Galaxies

- a. Irregular Galaxies
- b. Large Magellanic Cloud
- c. Local Group of Galaxies
- d. Super Clusters & Colliding Galaxies

55. Empty Space & Dark Matter

- a. Empty Space
- b. Background Radiation
- c. Dark Matter

4. BIOLOGY

56. The Human Mind & Psychology

- a. The Absorbent Mind of the Infant
- b. The Relativity of Perception
- c. Mind Patterns
- d. Sigmund Freud & Psychoanalysis
- e. Carl Jung's Psychology
- f. Neuroses
- g. Psychoses
- h. The Mind of a Damaged Brain