

STEM Pod

The original Centre of the Cell experience! Visit our embryo-shaped STEM Pod, suspended over the laboratories of the Blizard Institute. Once inside, you will learn about the amazing world of cells, the human body and the latest medical research. You can try your hand at virtual experiments, race your poo through your digestive system, and have your cells counted. You also get to see real body parts and diagnose cancer using real microscopes.

Running time: 90 minutes from the start of your visit to the end of your visit. Approx 60 Minutes in the pod itself

Maximum group size: 40 (including accompanying adults)

Suitable for key stages 2 – 5



Running order

1. Introduction: What are cells? (Film)
2. Interactive games
3. Why do scientists study cells? (Film)
4. Interactive games
5. End: Careers in science and healthcare (Film)

Please find the curriculum links listed below. Please note that some of these topics are covered in more depth than others during the one hour in the Pod itself. Students are free to ask questions about any topic at any time.

Key stage 2 Science curriculum links

Working scientifically

Year 3 and 4

- Asking relevant questions and using different types of scientific enquiries to answer them
- Using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions
- Identifying differences, similarities or changes related to simple scientific ideas and processes
- Using straightforward scientific evidence to answer questions or to support their findings

Year 5 and 6

- Planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary
- Using test results to make predictions to set up further comparative and fair tests
- Identifying scientific evidence that has been used to support or refute ideas or arguments

Animals, including humans

Year 3

- 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
- Identify that humans and some other animals have skeletons and muscles for support, protection and movement

Year 4

- Describe the simple functions of the basic parts of the digestive system in humans
- Identify the different types of teeth in humans and their simple functions

Year 5

- Describe the changes as humans develop to old age

Year 6

- Identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood
- Recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function
- Describe the ways in which nutrients and water are transported within animals, including humans

Living things and their habitats:

Year 4

- Recognise that living things can be grouped in a variety of ways
- Recognise that environments can change and that this can sometimes pose dangers to living things.

Year 5

- Describe the life process of reproduction in some animals

Year 6

- Describe how living things are classified into broad groups according to common observable characteristics and based on similarities and differences

Evolution and inheritance

Year 6

- Recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents

Key stage 3 Science curriculum links

Working scientifically

Scientific attitudes

- Pay attention to objectivity and concern for accuracy, precision, repeatability and reproducibility
- Understand that scientific methods and theories develop as earlier explanations are modified to take account of new evidence and ideas, together with the importance of publishing results and peer review
- Evaluate risks

Experimental skills and investigations

- Ask questions and develop a line of enquiry based on observations of the real world, alongside prior knowledge and experience
- 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, where appropriate
- Use appropriate techniques, apparatus, and materials during fieldwork and laboratory work, paying attention to health and safety

Analysis and evaluation

- Interpret observations and data, including identifying patterns and using observations, measurements and data to draw conclusions
- Identify further questions arising from their results

Structure and function of living organisms

Cells and organisation

- 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 membrane, cytoplasm, nucleus, mitochondria
- The hierarchical organisation of multicellular organisms: from cells to tissues to organs to systems to organisms.

The skeletal and muscular systems

- The structure and functions of the human skeleton, to include support, protection, movement and making blood cells
- The function of muscles

Nutrition and digestion

- Content of a healthy human diet
- The consequences of imbalances in the diet
- The tissues and organs of the human digestive system
- The importance of bacteria in the human digestive system

Gas exchange systems

- The structure and functions of the gas exchange system in humans, including adaptations to function
- The impact of exercise, asthma and smoking on the human gas exchange system

Reproduction

- Reproduction in humans (as an example of a mammal), including gametes, fertilisation, gestation and birth

Health

- The effects of recreational drugs on behaviour, health and life processes.

Genetics and evolution

Inheritance, chromosomes, DNA and genes

- Heredity as the process by which genetic information is transmitted from one generation to the next
- The variation between species and between individuals of the same species means some organisms compete more successfully

Key stage 4 Science curriculum links

Working scientifically

The development of scientific thinking

- The ways in which scientific methods and theories develop over time
- Using a variety of concepts and models to develop scientific explanations and understanding
- Appreciating the power and limitations of science and considering ethical issues which may arise
- Explaining everyday and technological applications of science; evaluating associated personal, social, economic and environmental implications; and making decisions based on the evaluation of evidence and arguments
- Evaluating risks both in practical science and the wider societal context, including perception of risk

Experimental skills and strategies

- Using scientific theories and explanations to develop hypotheses
- Planning experiments to make observations, test hypotheses or explore phenomena
- Applying a knowledge of a range of techniques, apparatus, and materials to select those appropriate both for fieldwork and for experiments
- Carrying out experiments appropriately, having due regard to the correct manipulation of apparatus, the accuracy of measurements and health and safety considerations

Analysis and evaluation

- Communicating the scientific rationale for investigations

Vocabulary, units, symbols and nomenclature

- Developing their use of scientific vocabulary and nomenclature

Biology

- Life processes depend on molecules whose structure is related to their function

- The fundamental units of living organisms are cells, which may be part of highly adapted structures including tissues, organs and organ systems, enabling life processes to be performed more effectively
- The characteristics of a living organism are influenced by its genome and its interaction with the environment

Cell biology

- Cells as the basic structural unit of all organisms; adaptations of cells related to their functions; the main sub-cellular structures of eukaryotic cells
- Stem cells in animals

Transport systems

- The need for transport systems in multicellular organisms
- The relationship between the structure and functions of the human circulatory system

Health, disease and the development of medicines

- The relationship between health and disease
- Communicable diseases humans
- Non-communicable diseases
- Pathogens in animals
- Body defences against pathogens and the role of the immune system against disease
- Reducing and preventing the spread of infectious diseases in animals
- The process of discovery and development of new medicines
- The impact of lifestyle factors on the incidence of non-communicable diseases

Coordination and control

- Principles of nervous coordination and control in humans
- The relationship between the structure and function of the human nervous system

Evolution, inheritance and variation

- The genome as the entire genetic material of an organism
- How the genome, and its interaction with the environment, influence the development of the phenotype of an organism
- The potential impact of genomics on medicine
- Single gene inheritance and single gene crosses with dominant and recessive phenotypes
- Genetic variation in populations of a species

Key stage 5 Science curriculum links

AS / A level Biology

Working Scientifically

- Use theories, models and ideas to develop scientific explanations
- Use knowledge and understanding to pose scientific questions, define scientific problems, present scientific arguments and scientific ideas
- Use appropriate methodology, including information and communication technology (ICT), to answer scientific questions and solve scientific problems
- Carry out experimental and investigative activities, including appropriate risk management, in a range of contexts
- Analyse and interpret data to provide evidence, recognising correlations and causal relationships
- Know that scientific knowledge and understanding develops over time
- Consider applications and implications of science and evaluate their associated benefits and risks
- Consider ethical issues in the treatment of humans
- Evaluate the ways in which society uses science to inform decision making

Cells

- The cell theory is a unifying concept in biology
- In complex multicellular organisms cells are organised into tissues, tissues into organs and organs into systems
- During the cell cycle genetic information is copied and passed to daughter cells