



Medium Term Plan

Looking more closely



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P levels

Performance attainment targets (P scales) and performance descriptors are used for pupils aged 5 to 16 with special educational needs (SEN) who are working below the standard of the national curriculum tests and assessments. PSTT recognises that the national curriculum levels used in this document are no longer current. We have had so many requests to return these materials to the website that they remain in the documents as a guide for those who have used them in the past. The written statements may be useful to others as an indication of children's development. For further information about P levels see:

<https://www.gov.uk/government/publications/p-scales-attainment-targets-for-pupils-with-sen>

Disclaimer

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Primary Science Teaching Trust recommends that a full risk assessment is carried out before undertaking in the classroom any of the practical investigations contained in the plans.

Safety Note

PSTT advises teachers to refer to either CLEAPSS website or SSERC website for up to date health and safety information when planning practical activities for children.

Big Questions

- What are we made from?
- When we grow, what makes up the extra stuff?

Learning Objectives

Pupils will have opportunities:

- To explore the use of magnification devices to look at specimens and record findings.

Quick review activities

- Use Google earth to progressively zoom into the school and their classroom.
- Watch Powers of 10 <http://www.youtube.com/watch?v=OfKBhvDjuy0>

Answers

- All organisms are made up of cells.
- We start life as one single cell but as we grow cells divide until we have billions of cells, with cells of different types specially adapted to a particular job. Groups of cells of the same type make up tissue (e.g. muscle). Several types of tissues make up an organ (e.g. stomach) and a number of organs together form a system (e.g. digestive system).

Vocabulary relevant to this topic

- Lens - a curved piece of glass
- Magnify - to make bigger
- Microscope - a device used to look at tiny objects
- Sample - a small amount of something
- Cell - the basic unit of life in an animal or plant, which carry out all the vital chemical processes
- Naked eye - the eye without an artificial lens in front of it
- Small, smaller,

Background information about this topic

- The vast majority of living things on Earth are too small to see with the naked eye. Each one is a tiny, highly organised container of chemicals called a cell. Larger organisms are multicellular with organised groups of different cells working together to perform specific functions.
- **Cells** were discovered in 1665 by Robert Hooke looking at bark under a simple microscope. He thought the little boxes resembled monks' cells. The human body consists of about 100 million, million cells. Groups of cells carrying out the same task are called **tissues** e.g. a nerve, muscle. Different tissues can work together to carry out more complicated jobs and these are **organs** e.g., heart is made of muscle, nerve and connective tissue. Groups of organs then form a **system** e.g. digestive or circulatory system.
- Cells come in different shapes and sizes but have same basic functions of:
 - Obtaining energy from food
 - Making new chemicals for the organism
 - Controlling their own chemical reactions
 - Making new cells
 - Keeping their contents together
- Most cells have a nucleus (control centre), cytoplasm (liquid part where chemical reactions vital to life happen) and cell membrane (keeps cell together and controls flow of things in and out of cell). In addition plant cells have a cell wall (for strength), contain a vacuole (fluid-filled sacs in the cytoplasm) and most plant cells contain chloroplasts (for photosynthesis).
- Some cells which do not contain a nucleus are bacteria (the circular DNA is loose inside the cell). In humans, red blood cells and platelets in human blood, cornified cells in the skin and mature hair cells do not contain a nucleus.
- Cells can be specialised for particular jobs, e.g. sperm has a tail, nose lining cells have fine 'hairs' or cilia, leaf has guard cells that open and close stomata to let water out.

Look more closely P1-3

Objective: To explore the use of magnification devices to look at specimens and record findings.

Descriptions of intended outcomes at different levels of attainment

- Allows themselves to be involved in the activity (P1i)
- May react to the images on the magnifiers/ visualisers (P1ii)
- Begins to show an interest in the magnified images (P2i)
- Gathers further sensory evidence by observing for a short but sustained period (P2ii)
- Purposefully uses magnifier to observe a change (P3i)
- Initiates interactions and activities by switching on magnifier or visualiser (P3ii)

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| Possible Activities: | Resources: |
| Experience looking at familiar everyday objects with some a big magnifier or visualiser | Big magnifier, visualise, familiar everyday objects e.g. fabric, hair, sponge, paper, bread, fruit |
| Optional activities you might like to try include: | Resources: |
| Experience looking at different familiar everyday objects with a video magnifier | Video magnifier, everyday objects e.g. cotton wool, cardboard breakfast cereals cereal, vegetables |
| Explore round school and outside using jumbo magnifiers e.g. look at leaves, trees, stones, bricks etc | |

Look more closely P4-6

Objective: To explore the use of magnification devices to look at specimens and record findings.

Descriptions of intended outcomes at different levels of attainment

- Makes simple choices about which objects to observe (P4i)
- Communicates awareness of some obvious changes when looking with a magnifier (P4ii)
- Completes a simple task with guidance (P5i)
- Uses magnifiers with increasing independence (P5ii)
- Engages in experimentation using the magnifiers and visualisers (P6i)
- Completes a procedure following simple instructions (P6ii)

| Possible Activities: | Resources: |
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| Use magnifiers and recordable magnifiers to look at everyday objects and record what they see. | Magnifiers, recordable magnifiers, everyday objects e.g. fabric, paper, sponge, bread |

Look more closely P4-6

Objective: To explore the use of magnification devices to look at specimens and record findings.

| Optional activities you might like to try include: | Resources: |
|---|--|
| Pupils use hand lenses/ visualisers to look at various samples collected from the seaside or woodland or park | Magnifying glasses, visualisers crayons, hair, cotton wool, samples from outdoor environment |
| <p>Use the zoom facility on a phone / tablet / PC zoom further and further into an image</p> <p>Pupils use hand lenses/ visualisers to look at various samples collected from school grounds: rocks, feathers, bark, flowers, grass, soil, insects etc.</p> | |

Points to Note:

Pupils think that there is nothing smaller than what they can see.

They may also think that all magnifiers have the same magnification and clarity.

They may also experience that the closer you get to something the more blurred it becomes.

Safety awareness:

Sanitise hands when returning to the classroom.

Look more closely P7-8

Objective: To explore the use of magnification devices to look at specimens and record findings.

Descriptions of intended outcomes at different levels of attainment

- Makes simple recordings of findings (P7i)
- Makes more detailed observations e.g uses some everyday words to describe what they saw (P7ii)
- Starts to seek information from a secondary source (P8i)
- Explores and observes similarities and differences (P8ii)

| Possible Activities: | Resources: |
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| <p>Pupils use various lenses to look at the same objects. E.g. telescope, binoculars, IWB microscope, hand lenses, magnifying glass, visualisers and talk about which is best</p> <p>Play ‘What do you think you are looking at?’ Pupils look at images which have been magnified e.g. needle, feather, fish scales, fruit, plant roots etc. Talk about why they look different.</p> | <p>Binoculars, telescope, hand lens, IWB microscope, magnifying glass, hand lens, objects e.g. hair, skin, cotton wool, newspaper</p> |

Look more closely P7-8

Objective: To explore the use of magnification devices to look at specimens and record findings.

| Optional activities you might like to try include: | Resources: |
|--|---|
| <p>Pupils use a video microscope, hand lens or visualiser to look at dry moss and then after water is added.</p> <p>Pupils use the internet to research other microscopic images of the human body e.g. blood, skin, hair, fat, skeleton etc.</p> | <p>Dry moss, water, petri dishes, video microscope, Internet access</p> |
| <p>Pupils take pictures of different letters from a newspaper or book using a video microscope and sort out ones that are the wrong way round.</p> <p>Pupils could use the internet to research microscopic images of parts of plants, e.g. pollen, stem, root hair cell, guard cells etc.</p> | |

Points to Note:

Pupils may think that there is nothing smaller than what we can see with a microscope.

Microscopes show 3D objects.

Easi-scope from TTS attaches to a computer through USB and can take videos or still images

Look more closely L1-3

Objective: To explore the use of magnification devices to look at specimens and record findings.

Descriptions of intended outcomes at different levels of attainment

- Responds appropriately to teacher instructions / demonstration with help (L1i)
- Recognises scientific development e.g. microscopes that help us (L1ii)
- Asks simple questions stimulated by looking at cells (L1iii)
- Draws on their observations and ideas to answer simple questions about cells (L2i)
- Uses microscope correctly to make observations (L2ii)
- Makes simple comparisons between the features of things seen under the microscope (L2iii)
- Responds appropriately to teacher instructions / demonstration without help (L3i)
- Sequences images and communicates findings (L3ii)
- Represents things in the real world using models (L3iii)

Look more closely L1-3

Objective: To explore the use of magnification devices to look at specimens and record findings.

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| <p>Possible Activities:</p> | <p>Resources:</p> |
| <p>Microscope/ visualiser with slide samples underneath / Display on the IWB if you have a USB microscope using low magnification. If appropriate pupils draw what they can see or take photos and label.</p> <p>Onion epidermis / privet epidermis / cheek cell prepared by the teacher and placed under the USB microscope. Cells are introduced as the tiny building blocks which make up animals (including us) and plants. Teacher uses Lego to demonstrate this.</p> <p>Listen to the clip on you tube https://www.youtube.com/watch?v=Swcz_TJMz0I</p> | <p>USB Microscope / visualizer, light microscope, slides cover slips, samples of petals, bee legs, insect wings, hair etc.</p> <p>Lego blocks</p> |
| <p>Optional activities you might like to try include:</p> | <p>Resources:</p> |
| <p>Compare a cheek cell and an onion cell. Introduce the word nucleus, cytoplasm, membrane, wall and vacuole if appropriate</p> <p>Build a simple model cell or build a specialised model cell e.g nerve cell using range of materials</p> <p>Pupils look at prepared slides (commercial) of body parts such as the blood, organs, blood vessels, skin, muscles etc</p> <p>Talk about how microscopes help us and who might use them</p> | <p>Material to make cells e.g. plastic bags, wallpaper paste, jelly, objects for nucleus e.g. marbles, boxes, string, wool, old tights, stuffing materials etc. commercially prepared slides of body parts.</p> |

Look more closely L1-3

Objective: To explore the use of magnification devices to look at specimens and record findings.

Pupils sequence images in order of size. Images of a person, a hand, a finger, a finger nail, skin (with hairs showing), skin cells, skin cell. Pupils can then be encouraged to make a video clip about what cells are and why we can't see them with our naked eye.

Use 'dropbox' to show exemplar in class work and share the evaluation process.

Watch what happens to cells when salt water is added using time lapse features on the video microscope

Points to Note:

Pupil may think that they are not made of cells and that plant cells and animal cells are the same.

They may also think that cells are 2D.

Safety awareness:

Pre-prepared microscope slides are available commercially.

Glass slides and cover slips can smash. Cardboard slides are available or plastic petri dishes can hold small samples for viewing with a microscope.

Children in primary schools would not be expected to prepare their own microscope slides.