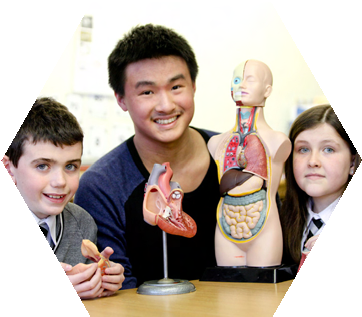
**Medics in Primary Schools**

**Teachers’ Version**

**A QUEEN’S UNIVERSITY / SENTINUS PROGRAMME**



**Medics**

**in Primary Schools**

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**Healthy Body: Programme Background**

The *Medics in Primary Schools* (MIPS) programme provided an opportunity for medical students and primary school pupils to develop their communication skills. The programme, which has been operating since 2001, has involved over 1000 medical students at Queen’s University Belfast, working with over 20,000 primary pupils at 65 primary schools in the greater Belfast area. More recently, during and since the covid pandemic, it has operated online with a number of primary schools in the Province outside this area.

While MiPS has operated in several schools in the Greater Belfast area for over 20 years, schools being taught online since covid have access to a student for one year only. The programme is then offered to schools in other parts of the Province. Each year’s online schools need continued help if they are to carry on the programme in following year without medical student support. This Guide is designed to support these schools. Such material support may also be useful to teachers in the Belfast area currently working with a medical student, and it may be useful to schools outside the current MIPS progrmme. While the original Student Guides concentrated on teaching aspects of the programme, leaving the medical input to the students, this Guide must cover the medical aspects on the assumption that its users are not medically knowledgeable.

**The MIPS Programme:**The main aim of *Medics in Primary Schools* is *to enrich the teaching and learning of health education in primary schools.* The role of *MIPS* is to help develop upper primary pupils’ knowledge and understanding of their bodies and how to look after them.

The original programme was developed by local writers, with the support of former Education and Library Board advisers and field officers, and reflects the Key Stage 2 programme of the Northern Ireland Curriculum. This teaching and learning material comprises a course that can be presented as a whole, or amended to suit the needs of the school. Emphasis is very much on the practical and investigative aspects of each theme.

There are three versions of the Guide: this version for teachers, and in-school and online versions, for QUB Medical students. All versions of the Guide can be accessed on the MiPS area of the Sentinus website: [www.sentinus.co.uk](http://www.sentinus.co.uk). Follow Programmes, then Primary and (page 2) Medics in Primary Schools. Additional resources, listed on page 6, are also available on the Sentinus website.

**Useful Websites**

You may have to cover medically related issues outside your experience or the scope of this Guide. The websites below are useful starting points for finding out more about health and medicine, and were correct and active in August 2024. These general science and health websites are worth exploring as many of their biology and medicine resources can be used at appropriate points in your teaching. Some websites relating to more specific issues that may arise are listed in Appendix 1. You may have to refer to these sites if asked a complex question. If you’re asked a question and don’t know the answer, say you’ll find out and provide this at the next lesson or refer the pupil to a relevant website, like ABPI, NHS, BBC or a specific site from Appendix 1. Please note that, while these specific sites are provided here for you to develop your knowledge and understanding of medical topics, several have material that can be shown directly to pupils. Pupils who show a particular interest in the sciences, particularly biology, should be encouraged to explore these websites.

**NHS (the National Health Service)** [www.nhs.uk](http://www.nhs.uk) Follow Health A – Z for conditions, symptoms and treatment and Medicines A – Z (scroll down) for how medicines work.

[www.healthcareers.nhs.uk](http://www.healthcareers.nhs.uk). Follow Career planning for information on 350 careers in the NHS. You can also find useful information on Resources for teachers and careers advisers (scroll down).

**ABPI (the Association of the British Pharmaceutical Industry)** [www.abpischools.org.uk](http://www.abpischools.org.uk) click on all Topics and follow the relevant Topics column on the left of the screen.

**BBC** [www.bbc.co.uk/bitesize](http://www.bbc.co.uk/bitesize) (units of knowledge and understanding specifically designed for school pupils) and [www.bbc.co.uk/programmes/genres/factual/scienceandnature/scienceandtechnology](http://www.bbc.co.uk/programmes/genres/factual/scienceandnature/scienceandtechnology) (general science television programmes).

**The Teachers’ Guide**

There are three versions of the Guide. One is this teachers’ version. The other two are for medical students: *in-school* for students teaching face to face, and *online* for those teaching remotely. Both Student Guides include teaching and learning material for all parts of the MIPS programme. The online version has specific online support material provided by Preethi Anne Jacob, a QUB medical student who participated in *Medics in Primary Schools* in 2019.  The Student Guides concentrate on teaching issues: the students provide the medical input. All three versions are available on the MIPS area of the Sentinus website.

This particular Guide provides medical information, either directly or through references to relevant websites. It is written for you to develop your lessons as a teacher, and to enable you to meet health education requirements of the Northern Ireland Curriculum. Apart from the MiPS activity sheets and specific links to some websites for use on an interactive whiteboard, most of this this material is not designed to be presented directly to pupils.

Starting with the idea of systems in general,*Healthy Body*covers aspects of some body systems, in this unit particularly the muscular, skeletal and digestive systems. This is followed by a section on nutrition, and the effective and safe storage and preparation of food, emphasising the necessity for clean handling. Pupils then investigate the nature and function of their skin. Later material covers dangers to their skin including chemicals, sharp objects, dirt and, in particular, over-exposure to the Sun. You will help pupils understand how these dangers can be avoided.

Pupils are then invited to explore how they learn *about* the outside world, and how they learn *from* the outside world. They investigate how they perceive the world around us, how their memory works, and how they can improve their thinking, memory and learning. Final units ask pupils to consider their lungs and heart as essential related body organs that they need to keep in fit condition to live healthy lives. It covers the effect of exercise (or lack of it), and the dangers of nicotine, vaping, tar and alcohol, together with an introduction to lung disorders like asthma and bronchitis. Asthma is treated in greater detail. The final section teaches pupils about blood, its composition and circulation.

**The Northern Ireland Curriculum**

The current Northern Ireland primary curriculum, introduced in 2007, has an emphasis on developing skills and capabilities, rather than learning factual material. The curriculum is designed *to develop the young person as an individual, as a contributor to society,* and *as a contributor to the economy and the environment.* As you are aware, science is no longer a discrete subject in the Northern Ireland Curriculum. It is now part of the area of learning: *The World Around Us*. which also includes history, geography and technology.

There is an emphasis in the current Northern Ireland Curriculum on developing the cross-curricular skills of **Communication**, **Using Mathematics**, and **Using ICT** (Information and Communication Technologies). You should identify opportunities that may arise for developing skills and capabilities in these areas. Also important is a focus on **Personal Development and Mutual Understanding** (PD&MU: see [Personal Development and Mutual Understanding | CCEA](https://ccea.org.uk/key-stages-1-2/curriculum/personal-development-mutual-understanding)) of which **Personal Understanding and Health** is a part. Relevant health aims are listed below. PD&MU enables pupils to develop knowledge, understanding and skills in general through their exploration of effective learning strategies as well as investigating how to sustain their health, growth and well-being, and to cope safely with their environment.

Within the *Personal Understanding and Health* area of the curriculum, teachers are expected to help their pupils to:

*- understand the benefits of a healthy lifestyle, including physical activity, healthy eating, rest and hygiene,*

*- recognise what shapes positive mental health,*

*- know about the harmful effects of tobacco, alcohol and solvents,*

*- understand that bacteria and viruses may affect health, and that risks can be decreased when basic routines are followed,*

*- know how the body grows and develops,*

*- know the ways in which they learn best,*

*- identify and practice effective learning strategies,*

**Activity Sheets and Websites**

There are references to **activity sheets** in each part of this Guide. Specific MIPS-related activity sheets can be accessed on the MIPS area of the Sentinus website [www.sentinus.co.uk](http://www.sentinus.co.uk). These sheets are *Word* documents aimed mainly at the middle range of Years 6 and 7 pupils. They may be used for individual or pair / group activities. Some may be given as homework. Three general activity sheets are provided: G1 *Compare and contrast*, G2 *Group discussion* and G3 *Glossary*. These may be used as appropriate. Please note that these MIPS activity sheets are not final, and are deliberately basic in format: they may be used as they are, but you should amend them to meet the abiliities of your pupils.

You should explore the websiteslisted at appropriate points in the units. Have a quick scan of all the listed websites for a unit before you begin the unit, and note those you expect to be useful during your teaching of the unit. Several websites from the STEM collection ([www.stem.org.uk](http://www.stem.org.uk)) that may be of use to you are included on the *Useful Websites* resource on the MIPS area of the Sentinus website [www.sentinus.co.uk](http://www.sentinus.co.uk). You may also find appropriate material on YouTube. Please note that websites referenced in the text and ancillary material were correct in August 2024, but that website addresses, or their internal structure, may have changed since then.

Your teaching should involve the pupils in practical activities as much as possible. Pupils enjoy and learn from practical work, and many of the suggested websites can lead to useful practical work, or have useful additional activity material. Most of these sites are for your own background information, but some can be used directly with pupils. View this material in advance if in doubt about its suitability for class use.

It’s useful to keep an eye on health news items. We’ve had covid-19 from 2021, and in 2022 we had a

strep-A outbreak and a tragedy of breaking ice in Solihull. Currently we’re worrying about Mpox (see [www.nhs.uk/conditions/mpox/](http://www.nhs.uk/conditions/mpox/)), and the possibility of a measles epidemic because of low uptake of MMR and other relevant vaccinations. These are obviously important medically related news items. If serious medical emergencies occur during your teaching, it may be appropriate to spend some time outlining to pupils the medical implications of such events. You can find useful information on a range of medical conditions in [www.nhs.uk/conditions](http://www.nhs.uk/conditions) (Health A to Z).

|  |
| --- |
| **The following relevant resources are available to download from the Sentinus website:** [**www.sentinus.co.uk**](http://www.sentinus.co.uk)**, follow Programmes, then Primary and (page 2) Medics in Primary Schools. Resources are in Word (.docx) format and can be amended as required.**  **MIPS Teaching and Learning Guide: Forms: MIPS Activity Sheets**  **Students’ in-school version Form: Risk Assessment**  **Students’ online version Form: Lesson Plan Outline**  **Teachers’ version List, with links: Useful Websites**  **2022 *Healthy Skin* unit**  **2022 *Healthy Brain* unit** |

**Lesson Plans**

A lesson plan is your detailed description of how you intend to teach one lesson. Most lesson plans include some or all of the components below:

- the **introduction**, possibly referring back to a previous lesson, and / or to pupils’ experience

- the **development**, the sequence of activities that make up the main part of the lesson, including your presentation of material and guidance on individual, pair, group and class activities

- the **conclusion**, usually with the whole class, including your summary of the lesson with reference back to the extent to which the initial objectives were met.

A sample lesson plan, based on the first week of *Healthy Body* is included as Appendix 2. Please don’t feel that you must use this format, or every section of it: it is shown here as an example only of how the material of the Guide might be translated into a formal lesson plan: this is a maximum format: your lesson plans are likely to be much shorter than this. A Lesson Plan Outline template is available on the MIPS area of the Sentinus website [www.sentinus.co.uk](http://www.sentinus.co.uk). Many other examples can be found by entering *Lesson Plans* in an internet search box.

|  |
| --- |
| **MED-Lab at W5**  **If your school is planning a visit to W5, there is now a permanent exhibition covering aspects of the human body (supported by Almac) at W5. See** [**https://w5online.co.uk/explore/med-lab**](https://w5online.co.uk/explore/med-lab)**. MED-Lab takes visitors through the systems that keep our bodies alive and working effectively. It displays advanced imaging technologies that enable us to see inside our body. It shows what can go wrong with our body and how we find out about and, ideally, fix the problem.** |

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**Medics in Primary Schools**

#### Healthy Body

This material can contribute to *Personal Understanding and Health*, which is part of the Northern Ireland Curriculum’s area: *Personal Development and Mutual Understanding.* For more information on *Personal Development and Mutual Understanding*, and useful resources that can be downloaded, see [Personal Development and Mutual Understanding | CCEA](https://ccea.org.uk/key-stages-1-2/curriculum/personal-development-mutual-understanding). Statutory requirements in this area are that teachers should enable pupils to develop knowledge, understanding and skills in:

*- their self esteem, self confidence and how they develop as individuals*

*- their management of a range of feelings and emotions and the feelings and emotions of others*

*- effective learning strategies, and*

*- how to sustain their health, growth and wellbeing, and coping safely and efficiently with their environment.*

CCEA material can also be used as appropriate to develop pupils’ cross-curricular capabilities in *Communication*, *Using Mathematics*, and *Using ICT* (Information and Communication Technologies).

There are twenty-one sections in this material covering, within a period of about ten weeks at about 90 – 120 minutes a week.

Sections 1 – 5 (*body systems)* includes most of the body except the skin, brain, heart and lungs, covered in sections 9 – 21.

Sections 6 – 8 (*using food effectively and safely)*, looks at the relationship between a healthy diet and the development of pupils’ bodies.

Sections 9 – 12 (*the skin*) concentrate on our largest organ, and

Sections 13 – 16 (*the brain*) enable us to think, memorise and learn as effectively as possible.

Sections 17 – 21 (*the heart and lungs*) consider the interconnected system of the heart and lungs, and their roles in blood and nutrient circulation

You will find the NHS (National Health Service [www.nhs.uk](http://www.nhs.uk), follow Health A-Z and Medicines A-Z) and ABPI (The Association of the British Pharmaceutical Industry [www.abpischools.org.uk](http://www.abpischools.org.uk)) websites particularly useful in relation to all body systems and medicines. The ABPI site enables access to a downloadable library of resources.

Although the material is broken down into weeks, please regard this as advisory. Don’t feel under pressure to complete everything in the Guide: you will probably find that there is be more material than you can use in the time available. Please note that some activities or possible questions from pupils may require advance planning.

Some elements may be omitted if they are regarded as too advanced or too simple for a particular class, for example, scatter graphs relating energy to the fat content of food, or photosynthesis as the inverse of respiration may be regarded as too complex.

**(Week 1 – Body Systems)**

**1. What is a system?**

*Pupils should learn*

*- how to identify the components of a system*

*- how components of a system relate to one another*

*- what happens if components of a system are damaged or missing*

Introduce pupils to the idea of a system in general, as a group of interacting elements operating together as an effective unit. For example, pupils may already be familiar with a bicycle, computer or motor car, or the water system in their home. These are made up of component parts that enable them to work effectively together as a single system, and which may not work effectively, or not at all, if one of its components is damaged or missing.

Ask for other general examples. Pick one example – possibly a bicycle. Ask pupils to explain how the components of the system work together. Ask what can happen if one component (for example: the bicycle chain or tyres) is damaged or missing. Emphasise the idea that all components or organs in a system (including the systems in our own bodies) should function effectively for the system as a whole to be effective. Compare how a system, such as a motor car or our body functions, due to its different parts working together effectively.  \*You may wish to demonstrate a real system, for example a wind-up clock or a food mixer.

**2. What are our body systems?**

*Pupils should learn*

*- to identify major body systems, and show these on an outline of the human body,*

*- to identify some things that can go wrong with our bodies, and how these can be avoided*

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Leading from section 1, ask pupils for examples of systems within their bodies. Possible responses include digestive, respiratory, cardiovascular or circulatory, integumentary (which covers skin, nails and teeth), nervous, muscular, skeletal, reproductive, urinary, (though pupils may not use these words). See [www.studyread.com/organ-systems-and-their-functions](http://www.studyread.com/organ-systems-and-their-functions) for a summary of information on body systems. Pupils are unlikely to be interested in the endocrine or lymphatic systems at this stage, but if they show an interest, refer them to this website.

**Activity – Where’s my liver?**

\*Provide pupils with outline body diagrams or copies of Activity Sheet B9: *Body systems*, and ask them to locate each system on an outline of the body. Activity sheets can be accessed on the MiPS area of the Sentinus website: [www.sentinus.co.uk](http://www.sentinus.co.uk), under the title *Activity Sheets*. \*An alternative is to use the reverse side of a strip of wallpaper. Lay a pupil on the paper and ask a pupil to draw an outline round her / him. Suggest that pupils use different colours for each system, as the digestive, circulatory and nervous systems are extended throughout the body.

**Activity – What can go wrong?**

Check if some pupils may be sensitive to this activity, and act accordingly. You may find that, as a starter, pupils may be motivated by the questions: *What can go wrong with parts of my body? What can I do about it?* You may wish to use Activity Sheet *B10: Damaged organs* here*.* You might decide in advance to discuss two or three specific ailments. Note that lung and heart conditions, including asthma, are covered in *Healthy lungs and heart.* The NHS website [www.nhs.uk/conditions](http://www.nhs.uk/conditions) may be useful here

You may wish to introduce discussion here of:

- What happens when I go to the doctor?

- What happens if I go to hospital?

These questions may arise at other times during your school visits. Please respond as appropriate. You may find the following websites useful:

<https://educationandbehavior.com/story-about-going-to-the-doctor> What to do if you are ill. This website is American: review it first if you intend to use it in class.

[www.nhs.uk/nhs-services/hospitals/going-into-hospital](http://www.nhs.uk/nhs-services/hospitals/going-into-hospital), scroll to Going into hospital as a patient.

**Extension activity – Going to the doctor**

Divide pupils into groups of three or four. Ask pupils to discuss times when they visited the doctor or hospital for treatments like getting prescriptions for medicine, having wounds stitched, setting broken bones, to discuss their worries or other reasons. This is to establish understanding of how members of the public visit doctors or hospital for different treatments.

[YouTube](https://www.youtube.com/watch?v=zaP-7IoLV4k) The Royal Children's Hospital Melbourne provides a child’s experience of visiting the doctor. You can also find useful YouTube and similar videos by scrolling the right side of the screen. Review any YouTube video before using it in class.

You will be introducing several technical terms in this and other sections of *Healthy Body. \**You may use Activity Sheet B7 or B8: *Body Glossary* here to enable pupils to build up a glossary of terms. Some words are included in this sheet, but pupils may add their own words, with their explanations. In Activity Sheet B7 pupils are asked to match terms with definitions: in Sheet B8 they are asked to make up their own definitions. Expect pupils to be able to identify body systems and organs, but not necessarily to remember all the names. Use Sheet B7 or B8 as you feel appropriate for your class.

*You may wish to adapt this glossary activity sheet for other units. You can use Activity Sheet A6 for this.*

**Extension activity – Body cells**

You might tell pupils that our body systems and organs are composed of cells and show them some of the wide range of human body cells. See [www.abpischools.org.uk](http://www.abpischools.org.uk) all Topics and Cells for a useful overview. \*Search *human body cells* on the Internet for appropriate images. The idea of cells, as the smallest units of life, is referred to later in sections on X-rays, and on the digestive system and nutrition. It’s useful for primary pupils to know (without detail) that our bodies are composed of different types of cells, with different functions. \*You may be asked about stem cells. See [www.abpischools.org.uk](http://www.abpischools.org.uk) all Topics and Stem cells.

**3. What is our muscular system for?**

*Pupils should learn:*

*- about the structure and function of muscles*

*- to recognise how muscles can deteriorate or be damaged*

*- about the importance of regular exercise of the muscles*

Talk about sport and games. Ask pupils about playground injuries and injuries to footballers, netball and tennis players and other athletes, for example hamstring injuries and concussion. Encourage pupils to ask you questions about their muscles, and potential injuries: formulating questions is a key element of learning. See [www.niams.nih.gov/health-topics/sports-injuries](http://www.niams.nih.gov/health-topics/sports-injuries) for muscle and bone injuries and [www.nhs.uk/conditions/head-injury-and-concussion/](http://www.nhs.uk/conditions/head-injury-and-concussion/) for concussion.

Discuss the importance of warming up appropriately before exercise. Emphasise that muscles are less likely to be injured if they are made stronger and more flexible through regular use. With your class teacher’s advice, possibly discuss the dangers of athletes taking steroids or other drugs to improve their muscles.

The BBC Bitesize website [www.bbc.co.uk/bitesize/guides/zpkr82p/revision/1](http://www.bbc.co.uk/bitesize/guides/zpkr82p/revision/1) provides a useful introduction to our muscular system. Some ideas to cover, preferably through questioning the pupils:

- The muscular system functions to enable movement. Muscles enable you to breathe, walk, smile, eat and digest your food.

- Muscle movements are either voluntary or involuntary. Voluntary movements are those we control. Ask for examples (kicking a ball, etc). Involuntary movements are those we do not control. Ask for examples (heartbeat, peristalsis: contraction of the muscles in the gut during digestion, etc).

- Muscles account for about 40% of our body mass.

- Muscle cells are tiny fibres that slide past each other to enable muscle tissue to contract (shorten) and relax (lengthen).

- Muscles can contract to produce a pulling force, but muscles can’t push. You can demonstrate this principle using a rubber band, which can also pull but not push. Stretch the rubber band to show comparison to how the muscle cells stretch.  This means muscle work in pairs to produce opposite effects at, for example, your elbow or knee. As one muscle of the pair is contracted and shortened, the other muscle relaxes and lengthens. Together this pair of muscles is called an antagonistic pair. See [Muscles of the Body: Types, Groups, Anatomy & Functions (clevelandclinic.org)](https://my.clevelandclinic.org/health/body/21887-muscle) for an overview

**Activity – Muscle control**

1. Ask pupils to stand with their right arm bent at their elbow. Ask them to hold their upper arm muscles with their left hand while they straighten and bend their right arm. Discuss what they feel. They should be able to describe how their upper arm muscles (biceps) tighten.

2. Ask pupils to find the antagonistic pair of muscles, the biceps and triceps, near their elbow joint.

3. Working in pairs, ask pupils to place their hands over another pupil’s arm muscles in turn to feel what happens as they move their arms. This may help them understand how the muscles tighten.

Ask pupils to copy the table below into their notebooks, and complete it to report the muscle movements when they bend their elbows, so that their biceps and triceps muscles contract and relax.

|  |  |  |
| --- | --- | --- |
| **Movement (lower arm-raised or lowered?)** | **Biceps muscle**  **(contracts or relaxes?)** | **Triceps muscle**  **(contracts or relaxes?)** |
| **Lower arm is raised** |  |  |
| **Lower arm is lowered** |  |  |

Ask what happens if muscles are not used regularly: they degenerate (atrophy) so inactive people cannot generate enough muscle activity to take part in intense extended exercise. Inactive people may become lazy and overweight / obese. The increasing number of inactive children may lead to a rise in childhood obesity. Be sensitive here if there are overweight children in the class. Ask pupils to make a list of ways they could use to motivate an inactive child to become more active.

\*You may use Activity Sheet B1: *Matching muscles* here.

You may find a series of useful introductory resources for this topic and the body in general on [www.stem.org.uk/resources/elibrary/resource/35233/human-body](http://www.stem.org.uk/resources/elibrary/resource/35233/human-body)

**(Week 2 – Bones)**

**4. What is our skeletal system for?**

*Pupils should learn:*

*- about the structure and function of the skeletal system*

*- to investigate bone structure*

*- to recognise dangers to the bones*

*- about the historical use of bone dimensions for measurement*

Ask pupils to feel some of their bones through their skin. Identify some of these. You might use the Latin names, but don’t expect the pupils to remember these: however, they should remember their names in English. Ask them what makes up their skeleton. Explain that the skeletal system includes bones, ligaments and tendons. Ligaments and tendons are soft tissues made of collagen, a type of protein. Ligaments connect bone to bone, tendons connect muscles to bone. Emphasise that these are living, growing tissues, which can be easily damaged.

**Activity – What are bones for?**

Ask pupils what they know about bones. How many are there in the human body? (206) What do they do in their bodies. Ask them to first (i) list some of these bone functions on their own, then (ii) bring their lists together in pairs or small groups, and finally (iii) with the whole class, complete a list (for example: protection (skull and spinal cord, rib cage), giving shape, enabling movement, helping to produce blood, storing minerals, and transferring sound (in the ear). You may find the website <http://kidshealth.org/kid/htbw/bones.html> (Nemours) useful here for a concise explanation of our bones and skeleton.

*You can find useful resources for other areas of MIPS on the kidshealth site.*

*You may find this type of activity – asking each individual for a response, then asking for responses to be discussed in pairs or small groups, and finally in the whole class – useful in other parts of this course.*

**Activity – Reconnect them bones**

\*You will need sheets of A3 paper, and paper fasteners for this activity

Ask pupils to draw their skeleton on a sheet of A3 paper. You can use the Nemours *kidshealth* website above on screen as a model. Then ask them to draw the main bones separately to the same scale, and cut these out. Provide paper fasteners, switch off the screen, and ask them to connect these bones to form a skeleton. This activity may be done in pairs.

Ask pupils how our bones can be damaged, and how damage can be avoided. For example: the use of car seat belts, cycle helmets etc for protection in traffic accidents. Emphasise the importance of using a helmet when cycling, as the skull protects our brain inside, which can be easily damaged. Remind pupils about the importance of calcium in their bone structure.

Joints are formed where two bones meet. Ask pupils about different types of joint in the body (for example: fixed, pivot, saddle, ball and socket, hinge). Explain that bones at a joint are held together and supported by connective tissues, ligaments mostly made from collagen. You may find the websites [Joints in the Human Body: Anatomy, Types & Function (clevelandclinic.org)](https://my.clevelandclinic.org/health/body/25137-joints) and [www.bbc.co.uk/bitesize/guides/zq3sbk7/revision/3](http://www.bbc.co.uk/bitesize/guides/zq3sbk7/revision/3) useful.

**Medical X-rays**

Ask pupils if any of them has been X-rayed recently, and why. X-rays are used in medicine and dentistry to look inside your body to see if there is anything wrong. Broken bones, some cancer growths, and tooth decay can be detected by an X-ray of part of a person. Explain to the class (with the help of any pupil who has been X-rayed recently, if willing) what happens when you are X-rayed.

Explain that too much use of X-rays can be dangerous. Although most pass through your body, they have high energy and can cause harm by altering body cells that they hit. Medical and dental X-rays are usually very low intensity, so there is little hazard. X-ray technicians go behind a lead shield when giving X-rays because they use X-rays often. \*You may need to explain the difference between *energy* and *intensity*. \*You may be asked about the uses of high energy radiation in radiotherapy (see [www.nhs.uk/conditions/radiotherapy](http://www.nhs.uk/conditions/radiotherapy)).

\*You might also discuss other means of looking inside the body (EEG / electroencephalogram, fMRI / functional magnetic resonance imaging, and others etc) here. See <https://newsinhealth.nih.gov/2019/11/medical-scans-explained> for more information.

**Pupils’ bodies are fragile. It would be useful to draw attention to, and emphasise, the following rules for personal safety during your teaching sessions.**

**Playground Safety:** Safety is a condition where we are out of danger. It is important to be safety conscious, particularly in relation to fall hazards, while in the playground, at home, at school or anywhere else. Remember, safety has no quitting time. See, for example [www.cpsc.gov/safety-education/safety-guides/playgrounds/public-playground-safety-checklist](http://www.cpsc.gov/safety-education/safety-guides/playgrounds/public-playground-safety-checklist).

**Road Safety:**  Be careful while crossing the road: if possible, cross roads on light controlled or zebra crossings. Walk on the footpath, but check for broken street paving stones. Wear a seatbelt while travelling in a car or bus. Use a helmet and other protective equipment while cycling, skateboarding or skating.  See [www.nhs.uk/conditions/head-injury-and-concussion](http://www.nhs.uk/conditions/head-injury-and-concussion) for information and advice on concussion.

**Safety at Home:**  Don’t play with mains electricity. Stay away from a gas stove, an open fire, and other fire sources. Be careful while handling sharp objects like scissors or knives. Maintain good housekeeping to prevent slip / trip / fall / cut hazards. See [www.nspcc.org.uk/keeping-children-safe/](http://www.nspcc.org.uk/keeping-children-safe/).

**Extension activity – Handy measurement**

Your skeleton has many bones of different lengths. Ask pupils about bones as historical units of measurement (for example: cubit, fathom, foot, hand, inch, pace, span). Ask them to measure and record some of these for their own bodies, and compare with others in the class. \*You may give pupils Activity Sheet B3*: Handy measurement* at the end of a lesson, ask them to find out what each unit is, measure these for their own body at home, then compare with the rest of the class next week.

**(Week 3 – You are what you eat / Healthy teeth)**

**5. What is our digestive system for?**

*Pupils should learn*

*- to identify and locate the major organs in the digestive system*

*- to understand the operation of the organs of the digestive system*

*- to understand the importance of looking after our teeth*

This leads into sections 6 – 8 on Nutrition. Ask pupils what they already know about their digestive system.

- What are its organs? Expect responses: *mouth, throat, stomach, small and large intestines, liver, kidneys, pancreas.*

- Where are these organs? Show them on an outline of the human body. \*You might reuse Activity Sheet B9: *Body systems* here, looking specifically at the digestive system,

- What are these organs for? What do they do?

**Activity – Food in transit through our digestive system**

Activity Sheet *B4: Food in transit* lists a number of steps that happen as food moves through your digestive system. These are given letters, but are not in a logical order. Ask pupils to list them in their correct order, and to use the letters to show on the diagram where these steps take place.

Some ideas to cover, preferably by questioning the pupils:

- the digestive system in an adult is about 9 metres (30 feet) in length, and food takes about two days to pass through it.

- Nutrients must enter your body cells to take part in chemical reactions essential to life.

- Cells are the smallest unit of life. They are tiny, so food needs to be broken into extremely small pieces to enter your cells. Starting with saliva in your mouth, this process is digestion, the breakdown of large food pieces to smaller soluble pieces that can be carried in the blood.

You may find the following websites useful:

- [www.abpischools.org.uk](http://www.abpischools.org.uk) Follow all Topics and Ellie scours the supermarket.

- [www.nidirect.gov.uk](http://www.nidirect.gov.uk) insert Healthy eating for children in the search box

**6. How can we use food effectively?**

*Pupils should learn:*

*- about factors that contribute to good health including diet and hygiene*

*- how different types of food are used in our body*

*- what can go wrong in our bodies, related to food*

*- what is a ‘good diet’*

*- how to keep their teeth healthy*

*- how to ensure that our body is effectively hydrated*

**Nutrients**

This theme can be developed through your questioning of the pupils. Find out what they already know about nutrition. Ask pupils what food is for. Discuss the nutrients:

- carbohydrates (energy)

- fats (energy storage, heat insulation)

- protein (body development)

- vitamins: A, C, D etc (vision, teeth, bones)

- minerals: sodium, potassium, iron etc (blood cells, teeth)

- calcium (bones)

- fibre (preventing constipation)

- water (cell support, making blood)

See [www.healthline.com/health/food-nutrition/six-essential-nutrients](http://www.healthline.com/health/food-nutrition/six-essential-nutrients) for useful information. To enable pupils to summarise their knowledge and understanding of how their bodies use each nutrient, you may use Activity Sheet B5: *What is food for?* here. You may find it useful to use a spray diagram. See [www.open.edu/openlearn/science-maths-technology/engineering-technology/spray-diagrams](http://www.open.edu/openlearn/science-maths-technology/engineering-technology/spray-diagrams)

What can go wrong? Ask pupils what happens if you eat inappropriate food or drink. (\*Check if any pupil has a diet related disease. \*Develop this sensitively in relation to obese or underweight pupils). Diet related conditions include:

- coronary heart disease / hypertension

- some cancers

- being overweight / obese

- dental problems (see the activity *Healthy teeth* below)

- other diet issues: iron deficiency, coeliac disease, diabetes, anorexia, bulimia, food allergies and intolerances

- issues related to poor food hygiene (see section 8)

- alcohol and tobacco abuse

See the relevant condition on [www.nhs.uk/conditions](http://www.nhs.uk/conditions) to find out more about these issues.

In the light of this, ask what is a ‘good diet’ or a ‘balanced diet’. Ask what is ‘junk food’. Many foods can be either ‘junk’ or ‘healthy’ depending on how, when and how frequently they are eaten.

**Extension activity – Call the Gastroenterologist**

Sometimes your digestive system doesn’t work like it should and you feel sick. \*If possible, invite a gastroenterologist (a doctor who specializes in digestive issues) to provide a short presentation to your class, either in person or as a video. Ask her / him to talk about the parts of the digestive system and ways to keep your digestive system working well. After the talk, pupils can be asked to write a thank you note to the doctor, including one new fact they learned about the digestive system.

*This type of activity – inviting an appropriate expert from outside - can also be used with other topics if you can find an expert willing to discuss her / his work with primary children.*

\*[Find out from Sentinus or W5 if they can provide an Ambassador who can support you in this]

**Activity – the Eatwell Guide**

The Eatwell Guide shows the different types of food we need to eat – and in what proportions – to have a well-balanced and healthy diet. There is useful information on the NHS site:

[www.nhs.uk/live-well/eat-well/the-eatwell-guide/](http://www.nhs.uk/live-well/eat-well/the-eatwell-guide/) and downloadable resources on the British Nutrition Foundation website: [www.foodafactoflife.org.uk](http://www.foodafactoflife.org.uk) follow 7 – 11 Years / Healthy Eating.

**Activity – Healthy teeth**

1. Ask pupils to feel along their teeth with their tongues. Why have their teeth different shapes? Help them to identify incisor, canine and molar teeth, and to discuss what each shape of tooth is for.

2. Ask each pupil to write down a question about teeth. *You may prefer to provide this as a homework exercise, and follow up with the rest of this and the following activity next week.* Then in groups of three or four let them discuss these questions. Visit each group to help them find answers. Discuss key questions with the class.

**Activity – Rules for healthy teeth**

Ask each pupil to write a sentence on how they look after their teeth. Bring these sentences together first within small groups, then in the whole class to develop a list of *Rules for Healthy Teeth*. In discussion, emphasise the importance of brushing their teeth in the morning and last thing at night, as well as cleaning between their teeth. Ask how often they visit their dentist for check-ups.

You may find the following website useful:

- [www.dentalhealth.org/downloads-and-resources](http://www.dentalhealth.org/downloads-and-resources) Choose from Key Stage 2 units. It’s worth exploring this site for further dental information.

**(Week 4 – Energy from food / Food safety)**

**Activity – Healthy lunch**

1. Remind pupils about the importance of a healthy diet. Emphasise the importance of calcium in developing healthy teeth. Say that, while sugar is a very good source of energy, it can also damage their teeth and may lead to obesity. Ask them, in pairs or small groups, to write down (1) five foods that contain calcium, and (2) five foods that contain sugar. Then develop these lists for the class.

2. Ask half the class (group 1) to identify items that **should** be in their lunch boxes. Ask the other half (group 2) to identify items that **should not** be in their lunch boxes. Following this discussion, ask pupils, in pairs or small groups, to draw a healthy lunch box that will be good for their teeth. Suggest that when they eat foods containing sugar, this should be during a meal, not between meals. For items identified by group 1 remind students to include foods that would create a balanced meal, one which would be healthy for their body. And ideally, they should clean their teeth after each meal.

You may find the following website useful:

- [www.abpischools.org.uk](http://www.abpischools.org.uk) (ABPI). Follow all Topics, then Balanced Diet and Teacher information: Next. See also all Topics and Diet and digestion.

*You can find useful resources for other areas of MIPS on the ABPI site (follow* all Topics*).*

**7. How do we get energy from food?**

*Pupils should learn*

*- how basic life processes like digestion and respiration relate in order to maintain healthy bodies*

*- why our bodies need energy from the world around us*

*- where this energy comes from*

*- about the security of our food supply*

*- about drought and water security and conservation*

**Ensuring Food Security**

Ask pupils how they think climate change will affect food supply. Climate change leads to extremes of weather, such as droughts and floods. Droughts lead to reduced crop yields. Plants breathe through their roots so when the roots are in too much water by flooding they can’t get the gases they need, and they are also liable to fungal diseases. See also [www.abpischools.org.uk](http://www.abpischools.org.uk) Follow all Topics, then Climate change and health for other health related effects of climate change.

Food security means that everyone in the world should have access to enough safe and nutritious food to enable them to live active and healthy lives. Changing climate is having a significant, but uncertain impact on food security. Government and intergovernmental policies need to be developed on food safety and security, water allocations, and land use. Further information on food security is available on the *Home* and *Research* pages (top line) on the QUB **Institute for Global Food Security website** [www.qub.ac.uk/Research/GRI/TheInstituteforGlobalFoodSecurity](http://www.qub.ac.uk/Research/GRI/TheInstituteforGlobalFoodSecurity) **also provides useful information on Food Security, as does** [www.ifpri.org/topic/food-security](http://www.ifpri.org/topic/food-security) (the International Food Policy Research Institute).

Increased rainfall and temperature in climate change result in increased water contamination and increased bacterial growth, leading to digestive illnesses. Climate change may also lead to significantly increased rainfall (resulting in flooding and increased pollution) or significantly decreased rainfall (resulting in drought and seriously decreased crop yields).

**Energy from food**

Ask pupils: What is energy? A simple but accurate answer is: *Energy is what can make things move*. This includes things themselves. Ask where this energy comes from to operate, for example, washing machines, toys, cars, aeroplanes and people: from electricity (mains and batteries), food, petrol, gas and other solid and liquid fuels, wind, moving water, sunlight etc.

Ask pupils why their bodies need energy. Some possible answers:

- The heart uses energy to pump blood around the body

- The body needs energy to keep warm

- The muscles need more energy during active sports.

- The brain uses energy to think and learn. (Emphasise that our brains need a lot of energy: about 20% of the body’s total energy needs)

Where does this energy come from? Food and drink, and oxygen in the air.

How do we get energy from food? Energy is released by respiration, a chemical reaction:

**Respiration** fuel + oxygen 🡪 carbon dioxide + water + energy

Explain that this is a general chemical reaction for releasing energy from all types of fuel. Where do the fuel and oxygen come from? The fuel in a car is petrol or diesel: the fuel in our bodies comes from food, mainly sugars and fats. The oxygen comes from the air (about 20% of air is oxygen, most of the rest is nitrogen). Plant material like wood, fruit and seeds can be used as fuel for our bodies. Wood is burned to provide heat energy to keep us warm, fruit and seeds are used as food. The original energy in these reactions comes from the Sun providing photosynthesis. Show that photosynthesis is the reverse reaction of what happens in plants:

**Photosynthesis** carbon dioxide + water + energy 🡪 plant material + oxygen

See also [www.abpischools.org.uk](http://www.abpischools.org.uk) Follow all Topics, then Plants and photosynthesis for background information on plant cells.

**Activity – Energy for life**

Use Activity sheet *B6: Energy for life* here. \*Ask the pupils the previous week to bring in examples of nutrition information from food wrappers. Explain that kilojoules (kJ) and kilocalories (kCal) are both units of energy, and that a kilocalorie is about 4.2 kilojoules. The joule is the unit of energy used internationally in science. Both units are normally given on food labels, as the amount of energy available from 100 grams of the food. A teaspoonful of sugar provides about 80 kilojoules of energy.

The amount of energy pupils need depends on their age, sex and lifestyle. Energy on food labels is normally recorded in kilojoules (kJ).  At age 11 human energy needed per day is from about 8,000 kilojoules (about 1,900 kilocalories) for a fairly inactive pupil to about 11,000 kilojoules (about 2,600 kilocalories) for a very active one.

**Homework activity – How much energy do I need to live?**

\*Ask pupils in advance to record their energy intake from food and drink during each of the three days before this lesson (in kilojoules or kilocalories). Explain that they can find this information on food packaging labels. Ask pupils to compare their own figures with their recommended intake. You might use [www.omnicalculator.com/health/eer-estimated-energy-requirement](http://www.omnicalculator.com/health/eer-estimated-energy-requirement). \*This asks pupils to input their age, sex, height and mass, so you may need scales and a tape measure. You may have to explain the difference between kilojules and kilocalories.   Emphasise that, while too many kilojoules / kilocalories of energy above the recommended minimum intake can be deposited as fat in their bodies, they need at least this amount for a healthy lifestyle.

**Homework activity – Where does my food come from?**

\* Provide pupils with an outline map of the world. Search *outline map* to find an appropriate outline.

Ask pupils over the next week to list six foods used at home and identify on the map what country they came from.

**8. How can we use food safely?**

*Pupils should learn*

*- how food can become unsafe to eat*

*- what can be done to avoid different types of contamination*

*- that heavier rainfall due to climate change can result in greater water contamination*

*- that increased bacterial growth resulting from climate change increases the danger of digestive illness*

**Activity – What can go wrong with food?**

Using food safely can be developed through your questioning of the children. Find out what they already know about food safety. Climate change can result in increased water contamination and increased bacterial growth, leading to digestive illnesses. Ask pupils to say what can go wrong with the following foods (for example: contamination by toxic material, fungus, bacteria or pests (animals or insects), and deterioration over time):

- raw meat

- cooked meat

- frozen food

- chilled food

- canned food (meat, fruit, vegetables etc)

- fruit juices (in glass and plastic bottles, waxed containers etc)

- milk

Refer to ‘use by’ and ‘best before’ dates, and the difference between them. See

[www.food.gov.uk/safety-hygiene/best-before-and-use-by-dates](http://www.food.gov.uk/safety-hygiene/best-before-and-use-by-dates) for information on this.

Emphasise “always read the label”.

Discuss food contamination with pupils

- types of contamination (dirt, toxins, e coli, salmonella etc)

- how it happens

- its effect on the food, and on the consumer

- how contamination can be prevented.

Pupils should be advised to wash their hands before meals, after using the toilet, and after coming in from outside, particularly if they have been handling animals.

**Useful websites:**

[www.sciencelearn.org.nz/resources/588-bacteria-good-bad-and-ugly](http://www.sciencelearn.org.nz/resources/588-bacteria-good-bad-and-ugly) for explanation of the different good and bad bacteria in and around us.  Not all bacteria are bad for us.

<https://learn.genetics.utah.edu/content/cells/scale/>  for a comparison of sizes of different microorganisms.

**Activity – Spreading bacteria**

Bacteria divide in two about every 20 minutes as long as they have adequate food, liquid and warmth. Increasing global temperatures result in greater bacterial growth. Explain to pupils that bacteria die if it’s too hot, and don’t divide if it’s too cold. Start with one bacterium. Ask pupils to write down how many there will be after 20 minutes, 40 minutes, 1 hour .... Go on as long as you like (after 10 hours there will be over 400 million). Emphasise the importance of cooking raw meat thoroughly to kill bacteria, for a sufficient time at the correct minimum temperature, and the importance of freezing perishable food that will be used later.

\*If available, show pupils a needle probe thermometer for checking cooked food temperature. You can demonstrate this in a beaker of hot water.

Packaging: Ask pupils to say why specific types of packaging are used for particular foods. \*It’s useful to have examples available. \*Pupils may be asked the previous week to bring in sample packaging materials for food preservation, for example: cans (be careful with sharp edges), waxed boxes, plastic bottles.

Pupils may not be aware of the differences between bacteria and viruses. If your pupils have direct access to the Internet, they may use Activity Sheet B11: *Bacteria and viruses* to find out more. This may be set as a homework.

**Activity – Safe storage**

\*Ask pupils in advance to bring in pictures of food from magazine advertisements, for example, packs of flour, tomato sauce, milk, baked beans, canned soup, frozen peas, cheese, butter, sausages, eggs, yogurt, pasta, potatoes. \*Provide pupil groups with A3 pages labelled ‘cupboard’, ‘refrigerator’ and ‘freezer’, and ask them to place each picture in its proper storage. More than one answer may be acceptable for some items.

**Extension Activity – Food safety**

Ask pupils to design a poster they can put up in their kitchens to show people how to store and prepare food safely.

You may find the following websites useful for information on food preservation:

- [www.howstuffworks.com/food-preservation.htm](http://www.howstuffworks.com/food-preservation.htm) (Discovery Communications)

- <http://en.wikipedia.org/wiki/Food_preservation>

**Extension activity – How the body fights infection**

We have learnt about the different cells within the body. These include immune cells, white blood cells, macrophages, T cells, B cells, etc (search on the Internet). These cells become active in different scenarios such as allergies, fever, etc. You may ask the pupils for times when they had a fever or allergic reaction.

View [www.sciencelearn.org.nz/resources/165-fighting-infection-introduction](http://www.sciencelearn.org.nz/resources/165-fighting-infection-introduction)  for an explanation of how the body’s immune system fights infection.

**(Week 5 – Skin)**

This week’s material is condensed from a previous three-week unit. For further information, the original 2022 *Healthy Skin* unit is available on the MiPS area of the Sentinus website [www.sentinus.co.uk](http://www.sentinus.co.uk).

**9. What is skin? What does it do?**

*Pupils should learn:*

*- the structure of their skin, including its basic components*

*- the purpose of each component of their skin*

**\*Check in advance if the school has these resources:**

- lenses (+20D, if available) or hand magnifier

- Sellotape (for skin peeling)

- "head" and other types of thermometer

- (if available) temperature sensors and computer

- microscopes

**Activity – Investigating my skin**

The theme should be developed through your questioning of the children. Ask pupils to look at their own skin (or a Sellotape peeling) through a lens (and microscope if available). The Sellotape peeling is made by sticking a piece of Sellotape to the pupil’s fingertip and removing it (an impression of the pupil’s fingerprint should be seen). Ask them to draw and describe what they see. \*You may find Activity Sheet B12: *Magnification* useful here to get across the idea of magnification.

**Activity – Skin Structure**

Develop on the board a diagram of the skin (which should be similar to the diagram below) from pupils’ answers to questions. Also encourage the pupils to ask you questions. Don’t show the diagram or the website as a first step: develop it slowly. Alternatively, you can use www.abpischools.org.uk Follow all Topics and Skin structure and function.  Then follow the Next keys to the quiz on page 5. Invite pupils individually to come to the whiteboard to drag labels of the structures of the skin on this page to appropriate blanks. If required, do the other quizzes on page 5. You can also explain the function of the different structures while the pupils perform these activities.

The diagram on page 3 of this resource can be used at the end of the topic for consolidation or revision. Pupils need not remember the diagram in detail, but they should understand the relationships between components. You may use Activity Sheet B14: *Labelling Skin* here.

**Components (parts) of your skin are (A) hair, (B) dead skin flakes, (C) opening of sweat duct (pore), (D) surface layer, (E) nerve receptor, (F) oil gland, (G) capillaries, (H) sweat gland, (J) nerve, (K) artery, (L) fat, and (M) vein.**

A picture containing linedrawing, map, text

Description automatically generated

Pupils should know that our skin includes the following components:

(1) surface (epidermis),

(2) soft tissue (dermis),

(3) hair and oil glands,

(4) sweat glands,

(5) nerves,

(6) blood (arteries > capillaries > veins), and

(7) fat

Terms in brackets above should be discussed, but not necessarily to be remembered by pupils.

Ask the question: What is each component for?

Pupils should understand the operation of each of these components in relation to

(1) temperature control,

(2) heat insulation,

(3) energy storage,

(4) sense of touch,

(5) protection from harm, and

(6) keeping water and other unwanted materials out of their body

**Optional Homework Activity – Connecting Skin**

Use Activity Sheet B14: *Connecting Skin*. The left column lists some components of your skin. The right column lists some functions of these components. Draw lines connecting each component to the appropriate function. There may be more than one line in connection with some boxes.You may find the following websites useful:

**- British Association of Dermatologists** [www.bad.org.uk/patient-information-leaflets](http://www.bad.org.uk/patient-information-leaflets) for information on professional leaflets and presentations on skin. Scroll down to the A-Z list and choose appropriate leaflets which can be downloaded for your own background information. Note that these are designed for you as a health professional, not directly for pupils.

- **ABPI: the Association of the British Pharmaceutical Industry** [www.abpischools.org.uk](http://www.abpischools.org.uk) Follow all Topics, then scroll down the Topics column to Skin Structure and Function. This is written for Key Stage 4, and should be useful for your own information. However the material, particularly the images, can be used at primary level with your appropriate commentary.

**10. How can we protect our skin, and keep it healthy?**

*Pupils should learn:*

*- about potential dangers to their skin*

*- how they can be protected from these dangers*

**Activity – Skin under attack**

Ask each pupil to list four things that can attack their skin. Then ask them, in small groups and finally as a class, to develop a more comprehensive list. This should include:

(1) chemicals and allergens,

(2) germs / bacteria / viruses / fungi

(3) dirt, which may contain germs and dangerous chemicals

(4) sharp objects

(5) insect and animal stings and bites

(6) wind, dryness, and air and water pollution

(7) excessive sun exposure

**Activity – Save our skin**

Divide the class into small groups of three or four, and allocate one of the dangers 1 – 6 (and any others provided by the class) to each group. Ask the groups to find out (i) how the danger can attack their skin, (ii) how to prevent damage, and (iii) what to do if their skin is damaged. After 5 – 10 minutes, ask each group to report on at least one aspect of their investigation. Treat danger 7 (excessive sun exposure) separately using the resources below. You may use Activity Sheet B13: *Saving my Skin* here.

*You can use this type of reporting back activity in other units*

**Extension Activity – Stings and grazes**

You might find the BBC material *Bites and Stings* useful here and elsewhere: [www.bbc.co.uk/teach/class-clips-video/pshe-ks2-bites-and-stings/zxnxqfr](http://www.bbc.co.uk/teach/class-clips-video/pshe-ks2-bites-and-stings/zxnxqfr). This website has useful first aid information not confined to bites and stings. Emphasise means of protecting your skin from these dangers: the importance of hygiene and skincare, bathing and hand washing, protective clothing when necessary, safe handling of tools and chemicals.

Discuss what happens when you cut or graze your skin: the importance of washing the wound and covering it to keep out dirt and germs. Suggest that if they have a recent wound, they keep a diary (with drawings) of what happens as the wound heals, and the scab falls off.

**Optional Activity – Effective hand washing**

Covid-19 experience emphasised the importance of effective hand washing. If available, *Glo Germ* units for the assessment of hand washing techniques are useful here. Pupils apply gel to their hands, and then put their hands under the ultra-violet lamp. The parts of their hands where bacteria may exist glow in the ultra-violet light. The pupils then wash their hands and repeat the exercise. On the second occasion the number of bacteria is reduced (but probably not eliminated).

There is useful resource material on effective hand-washing techniques on [www.glogerm.com](http://www.glogerm.com). Read the home page, then click on Education, then (dropdown) School Worksheets. USA Grade 6 is about the middle of our KS2. MIPS Activity Sheet B13*: Saving my skin* may be useful here for consolidation and revision.

The NHS guide to effective hand washing is available at [www.yas.nhs.uk/media/3142/detailed-handwashing-poster.pdf](http://www.yas.nhs.uk/media/3142/detailed-handwashing-poster.pdf). It might be worth suggesting that the school put up either the Glo Germ, NHS, or the Nevada poster in a prominent position near the sink.

**11. How can we protect our skin from the sun?**

Identify means of protecting the skin form dangers associated with the sun. \*You can find several useful resources at [www.careinthesun.org](http://www.careinthesun.org), managed by Cancer Focus Northern Ireland. Follow Resources, then Schools. This has downloadable resources, including teachers’ guides, background information and statistics, as well as activities for children.

**12. What else can we find out about our skin?**

If you have time, other possible topics include: plastic surgery, aging, acne and eczema, fingerprinting. Enter these words or phrases into an internet search box for more information and ideas.

**Activity – Good habits: Personal hygiene**

Personal hygiene is how you care for your body and maintain good health. Ask pupils individually to list three good hygiene habits. Then ask them to come together in groups of three or four to build up a larger list. Then build up a final list on the board. Some examples include:

1. Washing your hands after returning from outside, and before every time you have food

2. Bathing daily and combing your hair

3. Brushing your teeth twice daily

4. Clipping your nails periodically

5. Covering your mouth while coughing or sneezing

6. Changing your underclothes daily

**(Week 6 – Use your head: perceiving and thinking)**

This week’s material is condensed from a previous three-week unit. For further information, the original 2022 *Healthy Brain* unit is available on the MiPS area of the Sentinus website.

In the Northern Ireland Curriculum, introduced in 2007, the processes of perceiving, thinking and learning are regarded as essential. See <http://ccea.org.uk>, follow Key Stages 1&2, then scroll to Personal Development and Mutual Understanding (PD&MU). See also the Big Picture of the Curriculum at Primary (in Useful Links).

**13. Perception: How do I learn about the outside world?**

*Pupils should learn that we get information from the world around us through our senses:*

*- seeing: what, where, how far, how close up, magnified, one or many, large or small?*

*- hearing: range of sounds, loudness, pitch or frequency*

*- tasting: bitter, salty, sour, sweet, savoury*

*- smelling: nice, nasty*

*- touching: temperature, texture, hardness, pain, pleasure*

**Activity – The world around us**

Ask pupils how we find out about the world around us. This can start from the questions:

- How do we know what is outside of us?

- What are our senses? Where are they located in our bodies?

- What sort of information do our senses provide?

- How do our senses connect with our brains?

Encourage pupils to ask you questions. Develop the idea of perception. As well as our own perception we also find out about the world around us by talking with people, reading books and using television and the internet sensibly. See <http://en.wikipedia.org/wiki/Sense> for detailed background information.

**Activity – Finding out about the world around us**

1. Divide the class into five groups. Ask each group to discuss for three minutes one of the following questions: What can I find out about the world around us by touching / seeing / smelling / hearing / tasting? How can I do this?

2. Then ask a representative from each group to report to the whole class.

**Activity – Keep still**

Perception, using our senses, is the first step towards making sense of the world around us.

- Ask pupils to sit still for one minute and, individually, to record all the sounds they hear during this time. Ask them to listen more carefully for quiet sounds. Notice the range of sounds in the environment.

- Record the sounds on the board. Ask pupils to classify these. Discuss what criteria we can use for classifying (possibly natural, human or mechanical sources, loud or soft, high or low pitch).

- Are there sounds we don't notice in everyday life? Senses have ranges of sensitivity. Ask how we might increase our sound sensitivity.

**Activity – See better**

Ask pupils to look in front of them, inside the room and out through the window, and record all the things they see during one minute. Ask how we might increase our ability to see small things, leading to the idea of using magnifying glasses and microscopes, and to see far away things using telescopes or binoculars. Emphasise the idea that our senses can be enhanced through the appropriate technology. Develop ideas on the physical processes of seeing. Try and get as much information as possible through questioning the pupils. A possible sequence might be:

- structure of the eye

- function of the parts of the eye

- what can go wrong with each of these parts

- what can be done if something goes wrong

- how the operation of the eye be improved

For detail enter ‘eye structure diagram’ in an internet search box

**Activity – Pinhole camera**

*\*You may need to ask pupils or the school to collect empty Pringles or similar containers in advance for this activity.*

You can show how an image of the world around us can be projected onto the retina using a pinhole camera made from a Pringles container (see [www.exploratorium.edu/science\_explorer/pringles\_pinhole.html](http://www.exploratorium.edu/science_explorer/pringles_pinhole.html), or search ‘pinhole camera’ for instructions). Cut the tube so that the longer (camera) piece is 20 centimetres. The image is faint: ask how this can be improved. Making the pinhole larger results in a brighter image, but poorer focus, leading the idea of using a lens. Our eye is obviously more complex, but the use of a lens increases the amount of light that can be gathered, and enables sharper focus.

\*(**Extension**) If you have access to a +5 dioptre lens, make the pinhole larger and place this lens in the enlarged pinhole of the 20 cm tube. What happens to the image then?

Wikipedia provides a useful article on optical illusions (<http://en.wikipedia.org/wiki/Optical_illusions>). You might use some of these on an interactive whiteboard.

While this section has concentrated on the senses of seeing and hearing, discuss the idea that we and other animals also get a lot of information about the world around us through smelling, tasting and touching. Blind people can read through Braille, using their sense of touch. Many animals use their sense of smell much more than we do, and dogs can be trained to smell out illegal drugs and detect specific diseases. You can find further information and activities on:

Neuroscience for Kids <http://faculty.washington.edu/chudler/chsense.html>.

**14. How can I learn from the world around us?**

*Pupils should learn that we learn through our interaction with the environment.*

When we meet a new experience or a problem in the environment, we either:

- change the environment around us (as a simple example, we open a door so that we can go through it, or as a more complex example, we organise a group to clear up litter on a local beach), or

- change ourselves, the neuron connection structure in our brain (know not to touch a hot kettle next time). According to Jean Piaget (see [www.simplypsychology.org/piaget.html](http://www.simplypsychology.org/piaget.html) and associated websites), we *adapt* the world around us to suit ourselves, or we *accommodate* ourselves to the world. This is the process of learning, and so we learn from experience. This is simplified: read the reference above for more information, particularly the meanings of adaptation and accommodation.

**Activity – Adaptation and accommodation**

Give pupils three minutes to write down as many examples of adaptation and accommodation as possible. Then bring these together on the board.

This is common sense, and should be developed from questioning the pupils about their experiences in learning: How did you learn to play hockey or football, cook a meal, about energy ...? Introduce *neurons* simply without detail as the electrical connections in the brain and spinal cord – like a computer (though emphasise that the human brain can do far more than the fastest computer – but AI (artificial intelligence) may change this.

**15. How can I improve my memory and learning?**

*Pupils should learn that*

*- reinforcing neuron connections develops memory and learning.*

*- there are several types of memory*

**Activity – Effective learning**

\*Identify a topic (not necessarily in science) that the pupils have covered in class some time in the last week. You may use Activity Sheet A1: *Increasing Learning* here.

1. Write the title of the topic on the board. Ask each pupil to write down two important points about the topic.

2. Ask them to share their ideas in pairs, then small groups.

3. Provide each group with a sheet of A1 (flipchart size) paper. Ask groups to organise their material on paper, so that they can remember it easily. Some may use bullet points or a spray diagram, or other means of presentation. They have to think about clustering material, connecting it to other material, using mnemonics, and presenting it so that others can understand it.

See [www.open.edu/openlearn/science-maths-technology/engineering-technology/spray-diagrams](http://www.open.edu/openlearn/science-maths-technology/engineering-technology/spray-diagrams).

However, appreciate that many pupils may prefer to learn through words rather than pictures or diagrams. You can find further information on different types of memory at <http://en.wikipedia.org/wiki/Memory> and [www.human-memory.net/types.html](http://www.human-memory.net/types.html).

There are many papers on different styles of learning. However, there are conflicting arguments on the usefulness of these models. You can find information from a commercial organisation on learning styles on: <https://teachable.com/blog/types-of-learning-styles>. Much of this material is useful, though it’s also useful to bear in mind that what works well for one pupil may not work for others. Read [www.britishcouncil.org/voices-magazine/four-reasons-avoid-learning-styles-one-alternative](http://www.britishcouncil.org/voices-magazine/four-reasons-avoid-learning-styles-one-alternative) for a counter argument.

**Activity – On the other hand**

Practice helps you to learn new things and to get better at doing them. Ask pupils to write their name with the hand they don’t normally use. Ash them to repeat this continuously for about two minutes. Now compare the final attempt with the first. Which is better? Not reinforcing memory causes withering of the neuron connections (for example, reducing our ability to learn a second language after the age of two or three).

How well we learn depends on learning actively rather than passively. We can learn some things by just listening to someone talk or passive reading. We learn more by seeing as well, as in reading actively (asking, after you read each paragraph, ‘what was that paragraph all about?’) or using audio-visual material. It helps even more if we see a demonstration or take part in discussion about what we have heard and seen. Probably the most effective way of learning for ourselves is to teach what we have learned to other people. The more the neuron connections in our brain are reinforced the more effectively we learn.

**Increasing Learning**

**Actively using learning**

**Teaching others**

**Practice by doing**

**Discussion groups**

**Demonstration**

**Audio-visual**

**Reading**

**Lecture / listening**

On the basis of what pupils have learned about how memories are stored in the brain, develop means of improving memory: structuring the information, teaching others. This information is summarised in the diagram above, which leads up from least to most effective means of learning. Listening is passive. Reading is also passive, but you can stop and re-read material to get a better understanding. In discussion groups you can improve understanding by exchanging ideas. To teach others effectively or actively using learning you need to understand what you’re doing.

**16. How can I look after my brain?**

Ask the children for answers to the question: *How can I look after my brain?*  Then group ideas, possibly including:

- Protect it: wear a cycle helmet and sports protection as appropriate. Know that fire kills by suffocation more often than burning (so oxygen doesn’t get to the brain). Learn to swim.

- Have a broad, balanced diet. Identify diet fads and fashions. Emphasise the importance of factual research-based knowledge in this area.

- Take appropriate body and brain exercise: ensure effective breathing and blood circulation to carry oxygen to your brain. Do thinking exercises in puzzles and games.

- Have enough sleep and rest, for recovery. But – there are still many things that we don’t understand about the brain and sleep.

**(Week 7 – Healthy heart)**

**17. What is our heart for? How can we keep it healthy?**

*Pupils should learn:*

*- the location of the heart and lungs within the body, and their relationship with each other and with other organs*

*- that the heart is a muscular pump that pumps blood around the body*

*- the positive effects of diet and exercise on the heart*

*- the negative effects of nicotine, tar, vaping and carbon monoxide in cigarette smoke, on the heart and lungs*

*- what is meant by blood pressure and pulse rate, and why these are important*

*- the negative effects of increasing air pollution (particulates and ozone), and increasing global temperatures*

*- about Frank Pantridge’s part in the invention of the portable defibrillator*

*- how circulation of the blood was reported by William Harvey*

The aims above can be developed through your questioning of the pupils. Find out what they already know about the heart. Ask them:

- where their heart is in their body

- what their heart does

Help pupils to locate their heart and lungs as their heart beats and they breathe in and out. Show them how to feel their pulse as blood flows through their arteries. Explain what is meant by blood pressure, and why this is important. See [www.nhs.uk/conditions/blood-pressure-test](http://www.nhs.uk/conditions/blood-pressure-test)/ for general information on the importance of blood pressure. The ABPI website [www.abpischools.org.uk](http://www.abpischools.org.uk) provides information at GCSE level on the heart’s part in the circulation of blood and other essential material. Follow all Topics, then scroll down the Topics column to Heart and circulation.

Develop an outline diagram of the heart from children's answers to questions, your own knowledge, and information from the Internet (see, for example [Human Heart Diagram Labeled | Science Trends](https://sciencetrends.com/human-heart-diagram-labeled/)). Identify components of the heart’s structure. What is each component for?

Explain how the heart pumps blood through the body as it beats. The right side of the heart is responsible for receiving used blood from the body (through veins) and sending it to the lungs to get oxygen. The left side of the heart is responsible for sending refreshed blood from the lungs to the rest of the body through arteries. The heart, veins and arteries work together to send blood throughout your body (blood circulation).

**Activity – Pulse rate**

The number of times your heart beats in one minute, that is it pushes the blood through your arteries, is your pulse rate.  Ask pupils to predict what can change their pulse rate. Ask them how they feel after running continuously for five minutes. Answers can include feeling breathless, hot, the heart beating against their chest.

\*Check if any pupils may have heart or breathing problems that might prevent them from carrying out these exercises.

\*You need exercise space and facilities, clocks or stopwatches (possibly pupils’ electronic watches or cellphones), and graph paper for this activity.

Ask pupils to predict what can change pulse rate. Ask them to measure their pulse rate.

(1) before exercise (running on the spot for one minute),

(2) immediately after exercise,

(3) five minutes later.

Ask pupils to record the mean (average) of three pulse measurements at each point in the activity. Ask what they can learn from their results. Draw a graph of pulse rate against time immediately before, immediately after, and five minutes after exercise. Look at and discuss: the mean value for the class, boy / girl variation (if any), bar chart of ranges. You may use activity sheet *C1:* *Pulse rate* here.

**Activity – Frank Pantridge**

Frank Pantridge was a heart consultant at the Royal Victoria Hospital and Queen’s University Belfast from 1950 to 1982. Ask pupils what they know about him. Ask them to use books and the Internet to find out about him, then to write 50 - 100 words about his achievements. Also, ask them to find out and record (i) what a defibrillator does, (ii) where they might find one, (iii) how they could find out when and how to use one, and (iv) why it is so useful. They should realise that it would be useful to know how to use a defibrillator before there is a necessity to use one.

**Extension Activity – William Harvey**

Ask pupils to look at [www.bbc.co.uk/history/historic\_figures/harvey\_william.shtml](http://www.bbc.co.uk/history/historic_figures/harvey_william.shtml) and write about fifty words on him. The Wikipedia site <http://en.wikipedia.org/wiki/William_Harvey> provides links to additional information.

**Useful websites**

- **Association of the British Pharmaceutical Industry** [www.abpischools.org.uk](http://www.abpischools.org.uk) Follow all Topics, then Heart and circulation.

- **Wellcome Trust** [www.stem.org.uk/elibrary/resource/34279](http://www.stem.org.uk/elibrary/resource/34279) on the effect of exercise on the heart

- **Royal Society** [www.stem.org.uk/resources/elibrary/resource/315584/what-affects-your-heart-rate](http://www.stem.org.uk/resources/elibrary/resource/315584/what-affects-your-heart-rate)

**(Week 8 – Healthy lungs)**

**18. What are our lungs: what do they do?**

*Pupils should learn:*

*- the location of the lungs within the body, and their relationship with other organs*

*- that we need oxygen to stay alive, and that this comes from the air*

*- how circulation and respiration relate in order to maintain healthy bodies*

*- that air enters the lungs by breathing*

*- the effects of coughing and sneezing in spreading disease*

*- about asthma, its prevention and treatment (This is treated in more detail in pages 45 – 48)*

*- the effect of exercise on the lung and diaphragm muscles*

*- that smoking can cause lung cancer, emphysema and chronic bronchitis*

*- the effects of coronaviruses, including covid-19*

*- about increased allergies and lung infections throughout the year due to increased airborne pollen*

*- about the effects of pollution and high ambient temperatures on the heart and lungs*

These themes can be developed through your questioning of the pupils. Find out what they already know about the lungs. Ask them:

- where their lungs are in their body

- what their lungs do

- what is in the air they breathe in (mostly nitrogen, but emphasise about 20% oxygen) and breathe out (mostly nitrogen, but about 4% carbon dioxide and some water vapour)

- what happens when they cough or sneeze

- what happens when they breathe in dust.

**Activity – PM2.5**

\* You will need a football and some very small steel ball bearings (or similar very small objects) for this activity.

PM2.5 particles are **particulate material**(PM) in the atmosphere that have a diameter of less than 2.5 mm (micrometers), about one thirtieth the diameter of a human hair. Ask about half the class to form a line around the room. Hand a football to the pupil at one end of the line. Ask her / him to pass the ball to the next person and so on along the line. Now take the football from the pupil at the other end of the line and hand them a very small ball bearing and ask them to send this back. Repeat the exercise with the other half of the class. Quite likely some small objects will get lost somewhere along the pupil lines.

Air passages in the lungs are lined with cilia, hair-like projections that move microbes and dust out of these passages. Particles as small as PM2.5 tend to get trapped within the lungs, like the ball bearing, and cause inflammation because they are foreign there.

**Activity – Lung operation**

Demonstrate on yourself how your lungs and diaphragm work together. Ask pupils to follow your movements:

1. Put one hand on your chest and the other on the upper part of your tummy.

2. Now breathe in deeply. You will notice that your chest and your tummy rise as the air goes into your lungs.

This activity explains how your lungs inflate (chest rises) and your diaphragm lowers to allow breathing in (your lungs can extend to their maximum potential and help create a vacuum in the lungs to pull air in). When you breathe out your lungs expel all the air (your chest falls) and your diaphragm returns to original position. \*Check if any pupils may have heart or breathing problems and respond appropriately.

You may find the following websites useful:

- **University of Edinburgh** [www.youtube.com/watch?v=eGicIbMde2E](http://www.youtube.com/watch?v=eGicIbMde2E)  showing how the lungs and diaphragm work together to help in breathing. Several other useful youtube videos are identified on this website.

- **Encyclopaedia Britannica** <https://kids.britannica.com/kids/article/lung/353400> for information on lung function. Click on either kids or students.

**Activity – Breathing lungs**

\*You need exercise space and facilities, clocks or stopwatches for this activity. Ask pupils to measure their breathing rate before and after exercise (running on the spot for one minute), What can they learn from these results?

Develop diagrams of the lungs from children's answers to questions, your own knowledge, and information from reference books or the Internet. Identify their structure. What is each component for? Explain the blood flow connection between the heart and lungs, and to the rest of the body.

**19. How can we keep our lungs healthy?**

Identify dangers to the lungs (from children’s answers to your questioning):

(1) dust and dirt (including asbestos),

(2) chemicals,

(3) germs: bacteria / viruses

(4) cigarette smoke,

(5) vaping

Ask pupils what protection is needed against each of these, what protection do we already have, and how can we enhance this protection? \*Before discussing asthma (see below), lung cancer or other lung conditions, check if this may be a sensitive issue for some pupils.

Vaping is an increasing problem for young people. It can lead to nicotine addiction. Vaping products also use some harmful metals and toxic chemicals which can damage the lungs and other organs.

**Activity – Healthy lungs poster**

Ask pupils to design a poster on how to keep their lungs healthy. Themes might include:

1. Smoking and vaping are bad for health

2. Exercise makes your lungs stronger

This may be a group activity in class, or set as a homework activity.

\*Check if your school is involved in *Smokebusters* organised by Cancer Focus Northern Ireland (<https://cancerfocusni.org/primary-programmes/smokebusters/>). If not, suggest they join. It might also be useful to look at <https://cancerfocusni.org/cancer-prevention>.

**Covid-19**

Covid-19 has been very much at the front of the news since early 2020. It is now less prevalent but not eliminated. According to the World Health Organisation (<https://covid19.who.int/>), by August 2024 there have been over 775 million confirmed covid-19 cases and nearly seven million covid related deaths worldwide. Check on [www.health-ni.gov.uk/coronavirus](http://www.health-ni.gov.uk/coronavirus) for current local information.

|  |
| --- |
| **Next week is devoted to Asthma, which is a condition probably affecting about 15% of your pupils. You should read the following notes and act accordingly.** |

**\*Asthma**

Week 3 of this unit concentrates on asthma. It would be useful to ask pupils to spend about half an hour in advance browsing through [www.abpischools.org.uk/topics/](http://www.abpischools.org.uk/topics/) Follow Breathing and asthma in the Topics column.

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\*Check in advance which pupils in your class have asthma and whether it may be appropriate to ask them specific questions in class. Please suggest to pupils with asthma that they should bring their inhalers with them next week.

**(Week 9 – Asthma)**

***This week’s material is based on work produced in 2001 for the SCAMP programme by the South and East Belfast Health and Social Services Trust.***

*Pupils should learn:*

*- how asthma affects the lungs and related breathing tubes / airways*

*- how a mild attack of asthma can be treated in an emergency*

*- how any attack of asthma can be treated in an emergency*

*- how asthma can be treated in the long term to prevent future attacks*

*- how asthma may be prevented*

*- what other people can do to help people with asthma*

**20. Introduction to asthma**

The following websites provide an effective overview: [www.abpischools.org.uk/topics/](http://www.abpischools.org.uk/topics/) Follow Breathing and asthma in the Topics column. This is written for Key Stage 3, but most of the material can be used at primary level. The *NHS* site [www.nhs.uk/conditions/asthma/](http://www.nhs.uk/conditions/asthma/) and *Asthma + Lung UK*, [www.asthmaandlung.org.uk](http://www.asthmaandlung.org.uk) are also useful.

**Decide whether encouraging pupils to discuss their asthma in class is appropriate**.

Again, the aims above can be developed through your questioning of the pupils. Ask them:

- what they already know about asthma

- if they know anyone with asthma

- if any of them has asthma

You can use questions like *What next*? Nationally, about 15% of key stage 2 children have been diagnosed with asthma, so you may get help from some children with asthma in your class.

**What is asthma?**

Asthma is a condition that affects the air tubes (mainly the trachea and two bronchi) that carry air into and out of our lungs. The muscles around these tubes can tighten and they become narrow. They produce mucus which then tends towards blocking the already constricted tubes. The origins of Asthma as a condition are uncertain. If it begins before the age of twelve it is probably an interaction between genetic factors and early life exposures (for example, certain viral infections and allergen exposure).  If after age twelve the source is more likely to be a trigger of environmental origin. At present there is no cure for asthma, but there are several fairly successful means of treatment. Asthma is non-transmissible: it is not caused by germs.

**What are the triggers for asthma?**

If you consider it appropriate, start by asking pupils with asthma what causes their asthma attacks. Triggers for asthma are any things that irritate your breathing tubes and cause the symptoms of asthma. These are shown in the table below. Some people’s asthma is associated with substances they work with, like paint sprays, animals, flour, latex and sawdust. Asthma differs from person to person, and they may be affected by one or more different triggers.

|  |  |  |
| --- | --- | --- |
| **Infections, like colds and influenza** | **Allergies, like pollen and dust mites** | **Animal fur and feathers** |
| **Home: condensation, mould and damp** | **Exercise** | **Sudden changes in weather. Wind, humidity, thunderstorms** |
| **Feelings and emotions, like laughter** | **Heating in buildings** | **Being outside** |
| **Some food and drink** | **Smoking tobacco, vaping**  **(e-Cigarettes) and smoke from other sources** | **Some cuddly toys** |

**What are the symptoms of asthma?**

Asthma symptoms include:

- a feeling of tightness around your chest,

- finding it hard to breathe,

- wheezing when you breathe out,

- a lot of coughing.

As a means of remembering these symptoms you can ask pupils to remember the acronym: SWIFT

**S**  **S**hortness of breath

**W**  **W**heezing

**I**  **I**ncreased coughing

**F** **F**ast breathing

**T** **T**ightness in the chest

The NHS website [www.nhs.uk/conditions/asthma/](http://www.nhs.uk/conditions/asthma/) has a series of useful articles in asthma: [Overview](https://www.nhs.uk/conditions/asthma/), [Symptoms](https://www.nhs.uk/conditions/asthma/symptoms/), [Causes](https://www.nhs.uk/conditions/asthma/causes/), [Diagnosis](https://www.nhs.uk/conditions/asthma/diagnosis/), [Treatment](https://www.nhs.uk/conditions/asthma/treatment/), [Living with](https://www.nhs.uk/conditions/asthma/living-with/) asthma, [Asthma attacks](https://www.nhs.uk/conditions/asthma/asthma-attack/)

Some or all of these symptoms happen because the lining of the breathing airways of someone with asthma swells and produces mucus, and the muscles around your breathing airways begin to tighten.

More severe asthma attacks include:

- becoming very short of breath,

- working hard to breathe (indrawing of the rib cage, including above and below the chest wall), and

- being unable to speak in sentences.

**How do inhalers help?**

If any of these symptoms occur it will become harder to breathe and you should then use your **reliever** inhaler, which treats the symptoms. There are two main types of inhaler:

- **Reliever inhalers** are used when symptoms occur. They relax the muscles of your breathing airways to help air to get in and out of your lungs. They should relieve your symptoms within a few minutes, but may cause a temporary faster heartbeat. Reliever inhalers are usually blue.

- **Preventer inhalers** must be used regularly, normally twice a day to reduce symptoms, so they need to be taken every day even when you are well.  They reduce the inflammation inside your airways to enable air to get in and out of your lungs more freely. Preventer inhalers can be red, brown or orange. Black or purple inhalers are combinations of reliever and preventer.

**What action is needed in the event of a pupil having a mild asthma attack?**

If a child has a mild asthma attack, then:

- try to calm the child

- loosen any tight clothing

- seat the child in an upright position

- encourage deep, steady breathing

- use the reliever (one puff of the (usually blue) reliever every 30 seconds, up to ten puffs)

If the child improves within five minutes, then let her / him resume previous activity.

If the child does not improve, have someone call her / his parents or guardians, and continue using the reliever every 30 seconds. See the guidelines next for a severe attack.

**What action is needed in the event of a pupil having a severe asthma attack?**

If a child is having a severe asthma attack, then

- have someone contact a doctor and the child’s parents or guardians immediately

- try to calm the child

- loosen any tight clothing

- seat the child in an upright position

- encourage deep, steady breathing

- use the reliever (one puff every 30 seconds)

If the child’s condition has not improved at this point, dial 999 for an ambulance.

- if the child has a supply of oral steroids, give these now.

- while awaiting the ambulance you can give the child a further round of up to 10 puffs blue salbutamol inhaler.

**(Week 10 – Blood, glorious blood)**

**21. What is your blood, and what does it do?**

*Pupils should learn some of the following:*

*- that blood carries essential gases and food to all parts of the body*

*- the difference between arteries, capillaries and veins*

*- the function of red cells (oxygen and glucose carrying), white cells (disease protection) and platelets (clotting)*

*- the role of blood in developing resistance to disease*

*- what anaemia is, and how it is related to diet*

*- what blood tests are for*

*- about the work of the Blood Transfusion Service*

The objectives above can be developed through your questioning of the children. Find out what they already know about blood. What is blood? What are its components (red cells, white cells, platelets and plasma)? What does each component do? How can blood be used to detect potential illnesses? What are blood tests for? The NHS Blood and Transplant website [www.blood.co.uk/about-blood/components](http://www.blood.co.uk/about-blood/components) is useful here. You may use Activity Sheet *C2:* *Blood, glorious blood* here for consolidation and revision.

Ask the pupils to identify the differences between arteries, capillaries and veins. Explain what each does, and how its form enables each to perform its specific function.

View [www.fi.edu/heart/its-alive](http://www.fi.edu/heart/its-alive)  for an explanation of blood and its components within the body.

**Activity – Spraying blood.**

Use the answers from the pupils, and your own knowledge and understanding, to build up a spray diagram, summarising the properties of blood. You can find information on developing spray diagrams on

[www.open.edu/openlearn/science-maths-technology/engineering-technology/spray-diagrams](http://www.open.edu/openlearn/science-maths-technology/engineering-technology/spray-diagrams).

You may use Activity Sheet *C3: Spraying blood* as a starting point. You might build up a class response on the interactive whiteboard.

The information on your spray diagram should be similar to the information pupils have written into their Activity Sheet *C2: Blood, glorious blood*. Ask pupils which sheet they think would be most useful in helping them remember information about blood. Some pupils prefer listing information in words and brief notes only, others find diagrams more useful. Explain that different people learn and remember in different ways.

You may refer to the websites below, and your own background, to develop pupils’ understanding of the need for blood donation, how donated blood is used, and the uses of blood tests.

- [www.nibts.org](http://www.nibts.org) (Northern Ireland Blood Transfusion Service)

- [www.blood.co.uk](http://www.blood.co.uk) (NHS Blood and Transplant)

- [www.nhs.uk/conditions/Blood-tests/Pages/Introduction.aspx](http://www.nhs.uk/conditions/Blood-tests/Pages/Introduction.aspx) (NHS) about blood tests.

**Developing cross-curricular skills**

**Communication:**

- making posters to illustrate, for example, the action of the heart, lungs and blood, the dangers of tobacco smoke

**-** using appropriately scientificwords and phrases related to the units, for example: heart, lungs, circulation, respiration**,** red cells, white cells, system, muscles, voluntary movement, biceps, digestive system, collagen, nutrition, respiration, contamination, neuron, and developing a glossary of these terms.

- reporting on investigations and what they have learned, using a range of media including paper, electronic, verbal class presentations

**Using mathematics:**

**-** accurate time measurement, volume measurement,

- calculating mean values of sets of results

- drawing appropriate tables and graphs, and extracting useful information from these.

- food energy calculations

**Using ICT:**

- word processing and presentation of information,

- accessing information on websites, and choosing appropriate material.

**Appendix 1: Useful websites**

The websites below are useful starting points for finding out more about health and medicine, and were correct and active in August 2024. Some websites relating to specific issues that may arise are listed here. You may have to refer to these sites if asked a complex question. Please note that, while these specific sites are provided here for you to develop your knowledge and understanding of medical topics, several have material that can be shown directly to pupils. Pupils who show a particular interest in the sciences, particularly biology, should be encouraged to explore relevant websites.

**General websites:**

**NHS (the National Health Service)** [www.nhs.uk](http://www.nhs.uk) Follow Health A – Z for conditions, symptoms and treatment and Medicines A – Z (scroll down) for how medicines work.

[www.healthcareers.nhs.uk](http://www.healthcareers.nhs.uk). Follow Career planning for information on 350 careers in the NHS. You can also find useful information on Resources for teachers and careers advisers (scroll down).

**ABPI (the Association of the British Pharmaceutical Industry)** [www.abpischools.org.uk](http://www.abpischools.org.uk) click on all Topics and follow the relevant Topics column on the left of the screen.

**BBC** [www.bbc.co.uk/bitesize](http://www.bbc.co.uk/bitesize) (units of knowledge and understanding specifically designed for school pupils) and [www.bbc.co.uk/programmes/genres/factual/scienceandnature/scienceandtechnology](http://www.bbc.co.uk/programmes/genres/factual/scienceandnature/scienceandtechnology) (general science television programmes).

**Subject-specific websites:**

- **Antimicrobial Resistance** [www.nhs.uk/NHSEngland/ARC/Pages/AboutARC.aspx](http://www.nhs.uk/NHSEngland/ARC/Pages/AboutARC.aspx), follow antibiotic resistance. This material is written for adults and senior pupils, and is therefore suitable for your own background information, rather than directly for pupils. The parent site [www.nhs.uk/conditions/](http://www.nhs.uk/conditions/) provides an alphabetical list of conditions pupils may enquire about.

[www.abpischools.org.uk](http://www.abpischools.org.uk) Follow all Topics and Antimicrobial Resistance

- **Attending the doctor**, <https://educationandbehavior.com/story-about-going-to-the-doctor> What to do if you are ill. This website is American. It will need some commentary: review it first if you intend to use it in class.

- **Bacteria / viruses** [www.differencebetween.com/difference-between-bacteria-and-vs-viruses](http://www.differencebetween.com/difference-between-bacteria-and-vs-viruses) Compares and contrasts bacteria and viruses. See also [www.sciencelearn.org.nz/resources/176-microorganisms-friend-or-foe](http://www.sciencelearn.org.nz/resources/176-microorganisms-friend-or-foe). This material from New Zealand includes descriptive material on bacteria, viruses and other microorganisms, with useful activities and resources. You might ask pupils to use Activity Sheet A4: *Compare and Contrast* to summarise this material.

- **Careers in healthcare, psychology and social healthcare** [www.healthcareers.nhs.uk](http://www.healthcareers.nhs.uk) Information on 350 careers in the NHS at apprentice and degree level. Follow Explore roles or Career planning.

**- Covid-19** [www.nhs.uk/conditions/coronavirus-covid-19](http://www.nhs.uk/conditions/coronavirus-covid-19) This is a general NHS website page of current advice for adults on the pandemic. Follow Northern Ireland (at the foot of the screen)

- **Going into hospital** [www.nhs.uk/nhs-services/hospitals/going-into-hospital](http://www.nhs.uk/nhs-services/hospitals/going-into-hospital), scroll to Going into hospital as a patient. General information hospital admission: this is aimed at hospital patients in general, but should also be relevant to KS2 pupils.

**- Health and climate change**. There are several sites on [www.abpischools.org.uk](http://www.abpischools.org.uk) Follow all Topics then Climate change, Climate change and health and Climate change pages

- **Health and safety**, [www.safetybank.co.uk/health-and-safety-best-practice-guide](http://www.safetybank.co.uk/health-and-safety-best-practice-guide). This website is aimed mainly at industrial employers and employees. A Risk Assessment template is available on the MIPS area of the Sentinus website [www.sentinus.co.uk](http://www.sentinus.co.uk).

- **Infectious diseases, common diseases and their symptoms**

[www.mayoclinic.org/diseases-conditions/infectious-diseases/symptoms-causes/dxc-20168651](http://www.mayoclinic.org/diseases-conditions/infectious-diseases/symptoms-causes/dxc-20168651). A useful introduction to infectious diseases from the Mayo Clinic, a major treatment and research hospital in the USA. See also [www.nhs.uk](http://www.nhs.uk), follow Health A – Z.

- **Medication and drugs,**  www.abpischools.org.uk Follow all Topics and Medicines to treat disease. What medicinal drugs do / their dangers / what they are made of. You will find other useful medical information on the ABPI site.

- **Mental health** [www.mentalhealth.org.uk/northern-ireland](http://www.mentalhealth.org.uk/northern-ireland). Follow Explore mental health for background information.

**- Microorganisms** [www.bbc.co.uk/bitesize/search?q=microorganisms&page=1](http://www.bbc.co.uk/bitesize/search?q=microorganisms&page=1) Links to BBC programmes covering microorganisms, particularly in relation to food.

- **Organ donation** [www.organdonation.nhs.uk](http://www.organdonation.nhs.uk) This website is aimed at adults considering organ donation. Review it first before using any element of it in class.

- **Radiotherapy** [www.nhs.uk/conditions/radiotherapy](http://www.nhs.uk/conditions/radiotherapy) A helpful overview of radiotherapy. You may also find some of the sites at the foot of the screen useful for other topics.

- **Roles of healthcare professionals / multidisciplinary teams**  [What Are Multidisciplinary Teams In Health And Social Care? - Care Learning](https://carelearning.org.uk/blog/workforce/what-are-multidisciplinary-teams-in-health-and-social-care/) An overview illustrating how multidisciplinary teams are organized in healthcare.

- **Stem cell research** www.mayoclinic.org/tests-procedures/bone-marrow-transplant/in-depth/stem-cells/art-20048117 A general overview on stem cells, suitable for adult reading.

- **Sports related injuries**, [www.betterhealth.vic.gov.au/health/healthyliving/sports-injuries](http://www.betterhealth.vic.gov.au/health/healthyliving/sports-injuries) Types of sports injury. [www.healthline.com/health/sports-injuries](http://www.healthline.com/health/sports-injuries). Sports injuries prevention and treatment.

- **Ultrasound therapy**  [www.webmd.com/pain-management/what-to-know-about-ultrasound-physical-therapy](http://www.webmd.com/pain-management/what-to-know-about-ultrasound-physical-therapy) Overview.

**Appendix 2: Sample Lesson Plan**

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| **Lesson Title:** Body Systems (Healthy Body – Week 1)  **Advance Preparation and Background Information**  - Read Week 1 of the *Healthy Body* unit of the Student Guide, and highlight key elements  - Check the school’s policy on sex education and availability of photocopying.  - Look through the websites:  BBC - [www.bbc.co.uk/science/humanbody/body/index\_interactivebody.shtml](http://www.bbc.co.uk/science/humanbody/body/index_interactivebody.shtml)  ABPI - [www.abpischools.org.uk/topics/body-builder](http://www.abpischools.org.uk/topics/body-builder/body-builder/). Scroll to Download library, then as appropriate below.  - Check Activity Sheets (see resources below) for relevance, and \*arrange photocopying.  **Time required:** 60 – 90 minutes.  **Background experience, knowledge and understanding**  Pupils should already be familiar with some systems, for example, a bicycle or more complex kitchen utensils. They should also be generally familiar with organs and systems in their bodies. Detail is not required initially: this will be developed by me during relevant lessons.  **Objectives / Learning Intentions** [from the Student Guide]  Pupils should learn  - how to identify the components of a system  - how components of a system relate to one another  - what happens if components of a system are damaged or missing  - to identify major body systems, and show these on an outline of the human body  - to identify some of the things that can go wrong with our body systems  8  - about the structure and function of muscles  - to recognise how muscles can deteriorate or be damaged  **Success criteria**  At the end of the lesson, all / most pupils should be able to:  - identify six major components of a bicycle (or any other system used as an example)  - describe how (for example) the pedals, chain and wheels of a bicycle are related  - explain what happens if the chain breaks while they are riding a bicycle  - identify six systems or organs in the human body  - explain what happens if one of these systems or organs is not working properly  **Northern Ireland Curriculum**  The unit can contribute to Personal Understanding and Health, which is part of Personal Development and Mutual Understanding in the Northern Ireland Curriculum (see the Introduction to this Guide).  **Communication:** Accessing information from books, the internet, and other sources. Using scientific words and phrases appropriately, for example: system, digestive, muscle.  **Using Mathematics**: not relevant to this unit  **Using ICT**: Word processing. Accessing, and editing appropriately, information from books, and the internet and other electronic sources  **\*Resources**  Activity Sheet B1: Matching muscles \*(cards cut out in advance)  Activity Sheets B7 or B8: Body glossary (possibly both formats)  Activity Sheet B9: Body systems glossary  Activity Sheet B10: Damaged organs  Clips identified from BBC and ABPI websites [Check these in advance]  **Introduction**  1. Introduce the idea of a system in general, as a group of interacting elements operating as a single unit. Examples: bicycle, food mixer, computer, car, the hot water or electrical system at home, the solar system.  2. Ask pupils for other examples. Ask individual pupils to write down examples, then pairs or small groups to write down four examples, and finally bring these together as a class.  3. Emphasise, by questioning the pupils, the idea that systems are made up of component parts that enable them to work effectively together as a single entity, and may not work properly if one or more components is damaged or missing.  **Development**  **Section 1. What is a system?**  1. Choose one example (bicycle or similar example chosen by the class). Ask pupils to explain how the components of the system work together.  2. Ask pupils what can happen if one component (for example: chain or tyres, or other appropriate example) is damaged or missing. Use Activity Sheet B9: Damaged organs  3. Emphasise the idea that all components in a system should function effectively for the whole system to be effective, and that the system may not be effective, or may not work at all, if specific components are damaged or missing.  **Section 2. What are our body systems?**  1. Discuss the idea of body systems as examples of systems in general  2. Ask pupils in pairs to write down examples of systems within their own bodies.  3. Ask them to join another group to compare their lists.  4. Write a final class list from pupil responses on the board. Possible responses include digestive, respiratory, circulatory, central nervous, muscular, skeletal, reproductive, urinary, skin.  5. Ask pupils to locate these on an outline of the body. Use Activity Sheet B10: Body systems.  6. Ask pupils what can happen if one system, or part of a system, (for example: heart or liver) is damaged. Some of this may have to be answered from my own medical knowledge.  7. Encourage pupils to ask questions. Formulating questions is an essential part of learning.  8. (If time) Use Activity Sheet B7 or B8: Body Glossary (as appropriate) to enable pupils to record what each body system does. This may be set as a homework activity if not used in class.  **Section 3. What is our muscular system for?**  1. Find out what games pupils play. Ask what injuries may occur. Emphasise warming up before exercise. Emphasise concussion.  2. Through questioning and discussion develop the ideas about muscles in the *Healthy Body* unit of this Guide, Section 3 (third paragraph)  3. Carry out the activity: Muscle Control in *Healthy Body* Section 3  4. For consolidation, use Activity Sheet B1: Matching muscles  **Plenary / Conclusion**  Ask pupils to summarise what they have learned. Refer back to the objectives.  Ask: Have you learned ….. (each of the objectives)?  **Homework**  Activity sheet B7 or B8 as appropriate, if not used in class |

