Welcome

The Medics in Primary School (MIPS) programme has been running for sixteen years, and during that time it has provided medical students with a unique opportunity to develop and enhance their communication and teaching skills.

In their document Outcomes for Graduates, the General Medical Council explains that all new qualified doctors should be able to “Communicate clearly, sensitively and effectively with individuals and groups regardless of their age”. This may involve conveying complex information in a sensitive and jargon-free manner at an appropriate pace. As a paediatrician, I am particularly eager that students learn to talk and listen to children.

Integral components of the MIPS programme include the opportunity for the medical students to prepare educational sessions (which need to be pitched at the right level), to be observed, and to be provided with constructive feedback in relation to their educational delivery and communication skills - all of these are essential parts of the learning cycle.

I wish you all every success and hope that the knowledge and skills which you acquire during this programme will provide you with a solid foundation for the rest of your undergraduate studies and your future careers. Enjoy this excellent SSC.

Dr Neil Kennedy
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For Principals and Mentoring Teachers

Once again Queen's University and Sentinus are working in partnership to enable the Medics in Primary Schools (MIPS) initiative to run in 2018. Seventy medical students will be taking part.

About forty schools with over 1500 pupils in the Greater Belfast Area will participate in the programme in 2018. Many of these schools have taken part before, some as many as seventeen times. For schools new to the project, and to those schools returning again, I would like to say welcome, and thank you for your willing cooperation. Your ability to make a medical student feel comfortable, and benefit hugely from the experience, is much appreciated by all involved in the organisation and management of the programme.

This programme succeeds only if the teacher and student are working together. We are not trying to produce new teachers, and the medical students may not have all the teaching skills that student teachers might have. The student has to co-operate with, and have the co-operation of, the teacher with whom she or he is working. Otherwise the programme does not succeed.

Feedback, both positive and constructively critical, from the teacher, a mechanism by which we all learn, is much appreciated by all the students. It would be useful to set aside 10 – 15 minutes after each lesson to both congratulate the student on his / her performance, but also to identify points for improvement and offer appropriate advice. Feedback by email would also be very welcome.

The observation visit is intended to be an opportunity for your student to see you as a skilled professional at work. The student is not expected to do any formal teaching on this initial visit. For most students their last experience in a primary classroom may have been sitting at a desk, so watching how a teacher works, while not a pupil, is a whole new experience. I suggest that in the early part of this session your student simply observes you in action, to see your style of teaching. If you involve the pupils in a practical activity, then please invite your student to join in the action. This can help them to know pupils personally, and for pupils to get to know your student as a person. It would also be useful to let your student see your store cupboard, so that they are aware of resources available.

Your student’s first formal visit could be structured in such a way that, after their initial presentation, the pupils ask a series of questions, which interest them and enable them to find out more about your student. It would be useful if the pupils have discussed and formulated some questions beforehand. The student will feel much more confident, for they will then be talking about things with which they are familiar.

The assessment process (see page 34) is built into the programme and, for this to be successful, we need the co-operation of the teacher. The teacher response format has been introduced as a result of student feedback. Students say that they would welcome some overall evaluation of their teaching. The format is modified from a list of Competences for Beginning Teachers, used in initial teacher training. In order to give you as little extra work as possible the form has a series of tick boxes and there is a space for you to add a professional comment at the end. The assessment form and instructions for use will be distributed to each school during the programme.

Each student has website access to a logbook to record their experiences. They are encouraged to use this as a foundation for their assessed reflective commentary. In previous years we have found that some students use the logbook either intermittently or not at all. In order to encourage them to make full use of the logbook we are asking the teacher / mentor to sign off each unit as completed.

A student should never be left on his / her own in charge of a class. I must emphasise this: if an accident were to occur with only an unqualified person in charge, the school would have difficulty in refuting charges of abdication of responsibility.

Finally, may I once again emphasise to principals and teachers that, in the event that the student is not performing in the way the school would expect, I should be contacted. I promise action will be taken to remedy the situation.

My contact details are:

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The Medics in Primary Schools (MIPS) programme provides an opportunity for primary school pupils and medical students to develop their communication skills. The programme, which has been operating since 2001, has involved nearly 1000 medical students at Queen’s University Belfast, working with over 20,000 primary pupils at 65 primary schools in the greater Belfast area. The programme is offered as a Student Selected Component within medical students’ second year course. Students have a placement one afternoon a week for up to ten weeks in the spring semester in a primary school, during which they deliver a science and health education programme to upper primary pupils, and develop their own communication skills in working with young people.

**The MIPS Programme:** The main aims of Medics in Primary Schools are:
1. to enrich the teaching and learning of health education in primary schools,
2. to provide young role models in the classroom, and raise awareness of the work of medical professionals
3. to improve communication between medics and young people

See the Learning Outcomes on page 6 for more detailed objectives specified by the QUB School of Medicine.

The programme was developed by local writers, with the support of the former Education and Library Boards, and reflects the Key Stage 2 programme of the Northern Ireland Curriculum. Students are provided with teaching and learning material, each of four units comprising a two to four week outline course that can be presented as a whole, or amended to suit students’ expertise and the needs of the school. The units are Healthy Body, Healthy Heart and Lungs, Healthy Skin and Healthy Brain. Emphasis is very much on practical and investigative aspects of each theme. Teachers are encouraged to be proactive in their help and support of the student. The programme works because teachers like it, understand it, and become involved. Feedback from teachers is actively encouraged, both directly and by email, and students are also encouraged to ask for comment on their work and their developing pedagogic skills.

**The Medical Students:** Every second year medical student at Queen’s University is offered a Student Selected Component, covering two afternoons a week during their second semester (January – April). One afternoon each week is spent in school, the other for research of resources and lesson preparation. Students who choose MIPS are given training in working with upper primary pupils and deliver a science and health education programme in their partner school. They receive this Student Teaching and Learning Guide detailing the material they may wish to teach, and ways are suggested through which the programme might be delivered. Additional resources are available on the MIPS area of the Sentinus website: www.sentinus.co.uk. Follow Programmes, then Medics in Primary Schools. Finally, they are assessed on their developing pedagogic skills during the programme. An electronic logbook is available on the Sentinus website to record reflections on their experiences. This can later be used as a basis for their reflective commentary.

**The Pupils:** As the programme operates during afternoon sessions after students are at lectures in the morning, schools must be within easy travelling distance of south Belfast. About forty primary schools in the Greater Belfast area enthusiastically engage in the programme each year. Pupils look forward to the ‘young doctor’ visiting each week and working with them. Their response is very positive: some see the student as a role model for them in considering potential careers in medicine or related areas.

**The Teachers:** During the autumn, the Programme Manager visits principals of potential schools outlining the advantage to the school of participation, together with the schools’ responsibilities. Teachers from participating schools also receive the course materials. They are encouraged to develop their mentoring skills with young students who do not intend to become teachers, but who do wish to develop their communication skills. Teachers are invited to an information afternoon at Queen’s University in November.
Student Introduction

Welcome to MIPS, the Medics in Primary Schools programme. You will spend an afternoon a week during most of the next three months presenting a relevant and interesting health education programme to a group of upper primary pupils. Your role will be to help develop their knowledge and understanding of their bodies and how to look after them, and to let them see you as a model for what they might be doing in ten years’ time.

During your time in school you will probably be working with a Year 7 (P7) class, though you may be asked to work with younger pupils. You will not have to teach the class alone: there must be a teacher in the classroom with you at all times. The role of the class teacher will be to support you, apply discipline if necessary, and to observe your activity in order to provide you with the essential feedback you need to develop your teaching capability.

Most participating schools are allocated one MIPS student. However, in some larger schools, there may be two or more of you there, possibly with different classes, possibly with the same class. You visit the school once each week, either Tuesday or Thursday afternoon depending on the school timetable. How long you spend in school depends on your travel time to get there, and the school timetable. Effectively your time in class is from the time you arrive in the school, as soon after 1.30 pm as possible, until the school’s normal closing time for Year 7. Please note that, because of variation in distances to schools, and in end-of-school times, there will inevitably be significant variation between students in the duration of your time in school. Your other afternoon each week is for research of resources and lesson preparation.

Training meetings are at Queen’s in the first week of the semester (Tuesday 9 or Thursday 11 January). In these you will be introduced to the topics of the MIPS programme: Healthy Body, Healthy Heart and Lungs, Healthy Skin and Healthy Brain. You will also be given an indication of what you need to know about current primary school education, and how it has changed since your time there.

Your first school experience is the observation day (Tuesday 16 or Thursday 18 January). This is your initial opportunity to meet the pupils you will be helping to learn over the next ten weeks or so. We suggest that in the early part of this session you simply observe your teacher in action, to see her / his style. If the pupils are involved in a practical activity, you should also join in the action. This can help you to get to know pupils personally, and for them to get to know you as a person. You are not expected to do any formal teaching on this visit.

From the next week onwards, you will be teaching the pupils, with your teacher as an active supporter, and responsible for keeping the class under control. So, at the end of your observation afternoon you should discuss with your teacher the units (detailed on pages 11 – 33 of this Guide), which you will cover, and their order of presentation. Ask your teacher to let you see the class store cupboard, so that you will be aware of resources available. Also ask about the procedure for printing photocopies of material you may wish to use.

As you teach these units, feedback is essential if you are to improve your teaching skills and capabilities: you should set up a procedure for your teacher to comment constructively on your teaching if this is not done automatically. Suggest that your teacher emails a few notes of comment after each session.

In your next visit (Tuesday 23 or Thursday 25 January), you should be given an opportunity to introduce yourself more formally. We ask you to design your own powerpoint presentation to bring with you on this visit. Each slide should have the title Medics in Primary Schools at the top and should also include the new logos of MIPS’ main supporters: Queen’s University Belfast and Sentinus. Suggested text for your presentation – the main questions are in bold – and some of the information you may wish to disclose follows each question:

1. **Who am I?** Your background, where you live, your school education: how you got from primary school to where you are now, what you do in your spare time.
2. **What do I do at Queen’s?** Your university course, why you chose it, what you plan to do in the future.
3. **Where do I study?** Where the School of Medicine is, who goes to it, how you can become a student.
4. **Why am I here?** To teach science and health education, to learn from teacher and pupils, to answer pupils’ questions.
5. **When will I be in school?** Day, time, duration and type of lessons in MIPS.

4
Encourage pupils to ask you questions: they learn more effectively this way. You should feel comfortable with what information you disclose. Do be aware that although you are informing the pupils you should be discreet, particularly about yourself. To help ensure that this is a dialogue rather than just a front of class presentation, teachers should have asked their pupils to prepare some relevant questions in advance, and these can be taken at appropriate points. You might like to ask each pupil to bring in a medical question they would like answered. You could then cover these either at the beginning of a session, or at an appropriate point later in your teaching. You may also find it useful to hand out sticky labels, and ask pupils to write their first names in felt tip, so that you can address individual pupils personally. This makes for more effective communication.

As the pupils will see you as a medical expert, you are likely to be asked medically related questions outside the scope of this Guide. We encourage you to respond within your expertise to questions on the following topics (raised in previous years) if they arise. If you find more useful websites related to these topics, please let us know.

- **Antimicrobial Resistance** ([www.abpischools.org.uk/topic/antimicrobial-resistance](http://www.abpischools.org.uk/topic/antimicrobial-resistance) and [www.nhs.uk/NHSEngland/ARC/Pages/AboutARC.aspx](http://www.nhs.uk/NHSEngland/ARC/Pages/AboutARC.aspx)),
- **Attending the doctor**, what to do if you are ill ([www.myenglishteacher.eu/blog/at-the-doctor-medical-english-vocabulary-list](http://www.myenglishteacher.eu/blog/at-the-doctor-medical-english-vocabulary-list)),
- **Bacteria / viruses** and appropriate prescription of antibiotics ([www.bbc.co.uk/bitesize/ks2/science/living_things/microorganisms/read/2](http://www.bbc.co.uk/bitesize/ks2/science/living_things/microorganisms/read/2)),
- **Careers in healthcare, psychology and social healthcare** ([www.healthcareers.nhs.uk](http://www.healthcareers.nhs.uk)),
- **Health and safety**, and risk assessment ([www.hse.gov.uk/healthservices/index.htm](http://www.hse.gov.uk/healthservices/index.htm)),

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)),
- **Medication and drugs**: what they do / dangers / what are they made of ([www.abpischools.org.uk/topic/medicines-to-treat-disease/1/1](http://www.abpischools.org.uk/topic/medicines-to-treat-disease/1/1)),
- **Organ donation** ([www.organdonation.nhs.uk](http://www.organdonation.nhs.uk)),
- **Stem cell research** ([www.sciencedaily.com/news/health_medicine/stem_cells](http://www.sciencedaily.com/news/health_medicine/stem_cells)),

Some other topics raised by pupils in previous years (the brain and nervous system, healthy eating, effective exercise, teeth and dental hygiene) are outlined later in this Guide, but you might like to develop them further. Other topics, particularly those associated with work and careers in health related services, might be developed informally at appropriate points if you are given a lead by pupils. For careers in healthcare see for example [www.healthcareers.nhs.uk](http://www.healthcareers.nhs.uk). You might also refer to relevant websites or other sources of information. Those listed above are provided as examples only; you can search for others. These websites are listed mainly for your own background information: please check with your teacher before using any of these in class.

Discuss your response to potential questions on reproduction, drugs, substance and alcohol abuse in advance with your teacher, as schools have their own policies in relation to these areas. Do not teach First Aid or CPR (CardioPulmonary Resuscitation) unless you have appropriate certificated training.

You will be expected to spend the afternoon when you are not at school researching and preparing material and resources for the next teaching session. Previous participants following the same unit have found it useful to meet or exchange ideas as a pair or a group, or through electronic social media.

Note that schools vary in their attitude to teachers’ dress, and to the form of address to adults in the classroom. Female students should dress as they would for a hospital attachment. Male students should wear a shirt and tie for their observation visit, and agree with their teacher appropriate dress for subsequent visits. Also decide with your class teacher how pupils should address you in class: first name or surname.
Learning Outcomes

Below are the learning outcomes specified by the School of Medicine for the MIPS Student Selected Component. A self-check list is included on page A8 of this Guide. You can use this as a starting point for your reflective commentary. An electronic template of this self-check form, with space for comments, (in Word format) is available on the MIPS area of the Sentinus website www.sentinus.co.uk. The Comments / Evidence box in this will expand to take your text.

On successfully completing MIPS you should be able to:
- communicate effectively with young children on a one to one basis
- communicate effectively with young children in groups
- provide young children with concise explanations about health and scientific concepts
- communicate with teachers about lesson planning and content
- present ideas in a ‘front of group’ situation
- use ICT to convey health and scientific concepts appropriately to young children
- prepare lesson plans to manage and organise teaching and learning material
- employ appropriate pedagogic strategies to convey medical and scientific concepts appropriately to young children
- reflect on positive and negative aspects of teaching activity
- improve performance following feedback from others and personal reflection
- manage time effectively

The Student Teaching and Learning Guide

This Guide comprises teaching and learning material for the four units of the MIPS programme. Please note that the Guide is written for you as an adult to develop your lessons, and to enable you to meet the learning outcomes above: apart from the activity sheets and links to some websites for use on an interactive whiteboard, this material is not designed to be presented directly to pupils. The Guide concentrates on the teaching and learning aspects of the programme: you provide the medical input.

Starting with the idea of systems in general, Healthy Body covers aspects of body systems, confined in this unit to the muscular, skeletal and digestive systems: other systems have their own units. This is followed by a section on nutrition, and the effective and safe storage and preparation of food, emphasising the necessity for clean handling.

Healthy Heart and Lungs asks pupils to consider their hearts and lungs 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, tar and alcohol, together with an introduction to lung disorders like asthma and bronchitis. The final section teaches pupils about blood, and its composition and circulation.

Healthy Skin is introduced by pupils' investigation into the nature and function of their own skin, supported by your expertise. Later sections cover 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.

Healthy Brain asks pupils 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. Finally they draw up a list of rules for a healthy mind, and healthy relationships with other people.

Each unit is independent, so they can be covered in any order, though you might like to use Healthy Body as an introduction. As the total time required to cover all units completely would be about 12 weeks, you are very unlikely to use all the material. Although each unit is divided into two to four weekly lessons, please regard this as advisory only, and discuss with your class teacher how the material can be used most effectively. You should work out an outline programme with your teacher on your observation day.
The class may already be familiar with some elements of the programme. These can be omitted, or the teacher may want you to cover them as reinforcement. If you feel it might be worthwhile to cover other aspects of health education, please do so – after first checking with your teacher. Students often find that pupils ask more general questions outside the scope of the units, for example about meeting and talking with doctors, life in hospitals, diseases and general hygiene. If you feel responses are appropriate, and your class teacher agrees, treat these questions informally as they arise. Formal areas like ABC for Life, CPR (CardioPulmonary Resuscitation) and First Aid should be left to trained professionals, unless you already have appropriate certificated training, and your class teacher agrees. Some students bring in their own resources, stethoscopes as an obvious example. This is encouraged, but again check with your class teacher before you do this. If required, a risk assessment form is available on the MIPS area of the Sentinus website www.sentinus.co.uk.

The Northern Ireland Curriculum

The current Northern Ireland primary curriculum, introduced in 2007, has an emphasis on developing skills and capabilities, rather than just 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. 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. So, as primary science teaching has declined significantly since 2007, some pupils may not have the background of science knowledge and understanding you may expect.

There is an emphasis on developing the cross-curricular skills of Communication, Using Mathematics, and Using ICT (Information and Communication Technologies). You should discuss with your teacher opportunities that may arise for developing skills and capabilities in these areas.

Central to the aims of the Northern Ireland Curriculum is a focus on Personal Development and Mutual Understanding (PD&MU) of which Personal Understanding and Health is a part. Relevant aims are listed below. PD&MU enables pupils to develop knowledge, understanding and skills 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. Employability is also a personal development theme, so it is useful to give pupils an idea of life as a student doctor and other medically related careers as the opportunity arises.

Within the Personal Understanding and Health area of the curriculum, teachers are expected to help their pupils:
- 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 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,
Please discuss with your class teacher how your activity in the classroom can help pupils meet these objectives. Also discuss guidance material with your teacher before you start each unit, particularly in relation to practical activities, and act on her / his advice. Some activities marked * in the Guide require advance preparation or previous week planning with your teacher. Advice on how to develop a lesson plan is outlined below, and an outline lesson plan form is available on the MIPS area of the Sentinus website www.sentinus.co.uk.

**Activity Sheets and Websites**

Your teaching should involve the pupils in practical activities as much as possible. There are references to **activity sheets** in each unit. These can be accessed on the MIPS area of the Sentinus website www.sentinus.co.uk. Follow Programmes, then Medics in Primary Schools. The activity sheets are **Word** documents aimed mainly at the middle range of Year 7 pupils. They are deliberately basic, and may need amendment to meet the abilities of your pupils; please discuss this with your teacher, and feel free to develop them to meet your own, and your school’s requirements. They may be used for individual or pair / group activities. Some may be given as homework, or used by the teacher between visits. Activity sheets are provided in black and white only as, because of printing costs, your school may be reluctant to print in colour. Please check your school’s policy on photocopying, and let the school have advance copies by email of material you would like photocopied. As the material you copy is for the benefit of the school’s pupils, you should not be expected to pay for it.

**Useful websites** are listed at appropriate points in the units, and a more comprehensive list is included, with live links, on the MIPS area of the Sentinus website www.sentinus.co.uk. Many of these have useful practical activities. Most of these sites are for your own background information, but several can be used directly with pupils, assuming the classroom has an interactive whiteboard and access to the Internet. View the material in advance and, if in doubt about its suitability, check with your teacher before you show it to pupils. It’s useful to have a quick scan of all the listed websites for a unit before you begin each unit, and note those you expect to be useful during the unit. Please note that websites referenced were correct in November 2017, but that website addresses, or their internal structure, may have changed since then.

**Lesson Plans**

A lesson plan is a teacher's detailed description of how she / he intends to teach one lesson. Most lesson plans include some or all of the components below, not necessarily in the following order:

- **the title** of the lesson
- **preparation** required in advance of the lesson, including any **background information** about the pupils or topic that you think is relevant
- **the time** needed to complete the lesson
- **background experience, knowledge and understanding** you assume the pupils already have
- **objectives / learning intentions** are what the pupil should **know, understand and be able to do** at the end of the lesson (for MIPS, these are included in this MIPS Student Teaching and Learning Guide)
- **success criteria** are what you expect your pupils to be able to do if you have carried out your lesson successfully, so they should reflect the aims / objectives of the lesson. They should be identified in discussion with your teacher with specification of which of the objectives / learning intentions you would expect (i) all, and (ii) most of the pupils to be able to achieve
- **references** to the Northern Ireland Curriculum as appropriate, including the cross-curricular skills: Communication, Using Mathematics, and Using ICT
- **resources** required for effectively presenting the lesson [Identify those that need advance planning, or photocopying – usually marked * in this Guide]
- **the introduction**, 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.
- **homework**, if appropriate, setting any further work the pupils should do in relation to the theme, or in advance of the next week.

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A sample lesson plan, based on the first week of Healthy Body (Student Guide pages 11 – 13), is included below. Please do not 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 can be translated into a formal lesson plan. A Lesson Plan Outline template is available on the MIPS area of the Sentinus website www.sentinus.co.uk.

Sample Lesson Plan: Body Systems (Healthy Body – Week 1)

Title: Body Systems

Advance Preparation and Background Information
- Read Week 1 of the Healthy Body unit in the Student Guide, and highlight key elements
- Discuss relevant points with my class teacher, including the school’s policy on sex education and availability of photocopying, and with other MIPS students.
- Look at the websites:
  BBC - www.bbc.co.uk/science/humanbody/body/index_interactivebody.shtml
  ABPI - www.abpischools.org.uk. Follow 7 – 11, then Science, then Body Builder
Check Activity Sheets (see resources below) for relevance, and arrange photocopying as appropriate

Time required: 60 – 90 minutes

Background experience, knowledge and understanding
Pupils should already be familiar with some systems, for example, a bicycle, a computer or a weather system. They should also be generally familiar with organs and systems their bodies. Detail is not required initially: this will be developed by you 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 bodies
- about the structure and function of muscles
- to recognise how muscles can deteriorate or be damaged

Success criteria
At the end of the lesson, 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
These criteria (for example, the number of components / organs required, and differentiation between ‘all pupils’ and ‘most pupils’) should be modified after discussion with your teacher in the light of class capabilities.

Northern Ireland Curriculum
The unit can contribute to Personal Understanding and Health, which is part of Personal Development and Mutual Understanding (see the Introduction to the Student 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 the internet and other electronic sources

Resources
Activity Sheet B1: Matching muscles (cards cut out in advance)
Activity Sheet B7: Body systems glossary (both formats)
Activity Sheet B8: Damaged organs
Activity Sheet B9: Body systems
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, computer, car, the hot water system at home, the solar system.
2. Ask pupils for other examples. Ask individual pupils, 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 a component is damaged or missing.

Development Activities

Section 1. What is a system?
1. Choose one example (bicycle or other example chosen by 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 be ineffective, or 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 your own medical knowledge.
7. Encourage pupils to ask you questions. Formulating questions is an essential part of learning.
8. (If time) Use Activity Sheet B7a or B7b: 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. Discuss warming up before exercise.
2. Through questioning and discussion develop the ideas about muscles in the Student Guide Section 3 (third paragraph)
3. Carry out the activity: Muscle Control in the Student Guide 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 B7a or B7b as appropriate, if not used in class.

The following relevant resources are available in Word format to download on the Sentinus website: www.sentinus.co.uk, follow Programmes, then Medics in Primary Schools.

MIPS Teaching and Learning Guide 2018
List: Learning Outcomes
MIPS Student Personal Logbook 2018
Form: Lesson Plan Outline
Form: Risk assessment
List: MIPS Activities
List: Useful Websites
Forms: MIPS Activity Sheets
Medics in Primary Schools
Healthy Body

Please discuss this guidance material with your class teacher before starting this unit, particularly in relation to practical activities, and act on her / his advice.

Some parts of this material may have been covered already by your class as part of the Northern Ireland Key Stage 2 Curriculum. Your role may then be to reinforce pupils' knowledge and understanding of these areas, rather than to teach them about their bodies as new material. This unit can contribute to Personal Understanding and Health, which is part of the Northern Ireland Curriculum's area: Personal Development and Mutual Understanding (PD&MU). For more information on this aspect of the primary school curriculum, and useful resources that can be downloaded, see http://ccea.org.uk, follow Curriculum, then Key Stage 1&2, then PD&MU. The 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 eight sections in this unit covering:

(1 – 5) body systems, confined here to the muscular, skeletal and digestive systems. Other systems are covered in Healthy Brain, Healthy Heart and Lungs, and Healthy Skin. You will find the ABPI and BBC websites (www.abpischools.org.uk and www.bbc.co.uk/science/humanbody) useful in relation to all body systems. The ABPI site enables access to a downloadable library of resources, and offers free relevant posters.

(6 – 8) using food effectively and safely, looking at the relationship between a healthy diet and the development of pupils' bodies.

Although the material is broken down into weeks, please regard this as advisory as your actual programme should be decided through discussion between you and your class teacher. Don’t feel under pressure to complete everything in this Guide: you will probably find that there is more material than you can use in the time available. Please note that some activities (marked *) require advance planning or discussion with your class teacher the previous week. Some elements may be omitted if they have already been effectively covered, or if they are regarded as too advanced for a particular class, for example: scatter graphs relating energy to the fat content of food, or photosynthesis as the inverse of respiration.

Week 1

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 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, the water system in their home, or the solar system. 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 at all, if one of its components is damaged or missing.

Ask for other general examples. Pick one example (possibly a bicycle), and 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. *You may wish to demonstrate a real system, for example a wind-up clock or a food mixer.

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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

Leading from section 1, ask pupils for examples of systems within their bodies. Possible responses include digestive, respiratory, circulatory, central nervous, muscular, skeletal, reproductive, urinary, skin (though pupils may not use these words). *Check in advance the school’s policy on sex education, as pupils are likely to suggest the reproductive system. *The BBC website www.bbc.co.uk/science/humanbody/body/index_interactivebody.shtml, which has activities and games related to the human body, can be used on an interactive whiteboard.

Activity – Where’s my liver?
*Provide pupils with outline body diagrams or copies of Activity Sheet B10: 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, 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 draw an outline round her / him. Suggest that pupils use different colours for each system, as the digestive, circulatory and central nervous systems are extended through the body.

Activity – What can go wrong?
*Check with your class teacher in advance in case some pupils may be sensitive to this activity. 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 B9: Damaged organs 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 will be introducing several technical terms in this and other sections of Healthy Body. *You may use Activity Sheet B7: 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 B7a pupils are asked to match terms with definitions: in B7b 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.

You may wish to adapt this glossary activity sheet for other units.

Extension Activity – Body cells
As an extension, 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. *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 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

Extension Activity – Build your own cell
You might find the BBSRC (Biotechnology and Biological Sciences Research Council) material Build Your Own Cell useful here. www.bbsrc.ac.uk/society/schools Follow Primary Resources then Build your own cell. You can find useful resources for other areas of MIPS on the BBSRC site.

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 injuries to footballers, netball and tennis players and other athletes, for example hamstring injuries. Encourage pupils to ask you questions about their muscles, and potential injuries: formulating questions is a key element of learning. Discuss the importance of warming up properly before exercise. Emphasise that muscles are less likely to be injured if they are made stronger and more flexible through regular use. Possibly discuss the dangers of athletes taking steroids or other drugs to improve their muscles.

Some ideas to cover, preferably through questioning the pupils:
- The muscular system functions to enable movement. Muscles enable you to 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, 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: muscles can’t push. This means they work in pairs to produce opposite effects at, for example, your elbow or knee. As one muscle of the pair contracts and shortens, the other muscle relaxes and lengthens. Together this pair of muscles is called an antagonistic pair.

**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. Ask them to copy the table below in 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. Suggest that they place their hands over each muscle in turn to feel what happens as they move their arms.

<table>
<thead>
<tr>
<th>Movement (lower arm-raised or lowered?)</th>
<th>Biceps muscle (contracts or relaxes?)</th>
<th>Triceps muscle (contracts or relaxes?)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lower arm is raised</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lower arm is lowered</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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. The increasing number of inactive children may lead to a rise in childhood obesity. *Be sensitive here if there are obese children in the class: check with your class teacher. Ask pupils to make a list of ways they could use to motivate an inactive child to become active. You may use Activity Sheet B1: *Matching muscles* here.

**Week 2**

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. 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? 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 to 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. 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 units.

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. Then ask them to draw the main bones separately to the same scale, and cut these out. Provide paper fasteners and ask them to connect these bones to form a skeleton. You can find useful class exercises on bone identification and skeleton building on www.bbc.co.uk/schools/podsmission/bones/annie02.shtml

Activity – Chicken bones
* You need to prepare the material for this activity about a week in advance. *Check with your class teacher about potential hazards and carry out a risk assessment. There is a risk assessment form on the MIPS area of the Sentinus website: www.sentinus.co.uk.

Take some cooked chicken bones: make sure they are clean by boiling them in water, rinsing them in antiseptic, and allowing them to dry. Separate the bones into three groups A, B and C:

A – Clean these bones using antiseptic, and leave them to dry. These bones contain both calcium and collagen, and so are hard and strong
B – Clean them, then leave them to soak in vinegar for a week. The acid in the vinegar dissolves out the calcium.
C – Burn them in a fire, then retrieve them when cool. The fire burns out the collagen.
Place each set of bones in a transparent food bag.

Be safe: Tell pupils to be careful not to touch the sharp ends if the bones break.
Divide the class into small groups and give each group one of the set of bones A, B or C. Explain what has been done to each set of bones, and why. Ask pupils to examine the bones carefully and write a description of what they look like, and how they feel to touch. Ask them to try to bend the bones, and describe what they find. Rotate the groups so that each has an opportunity to examine all three sets of bones.

You may use Activity Sheet B2: Chicken bones here. You will have to explain about calcium and collagen to help them answer the last question. This can lead to discussion of calcium deficiency and bone diseases like arthritis and osteoporosis.

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.

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, mostly made from collagen. You may find the website www.bbc.co.uk/science/humanbody/body/factfiles/joints/ball_and_socket_joint.shtml, which includes links to other types of joint, useful. You may find it easier to connect to this (and other websites) through the Website screen on the MIPS area of the Sentinus website www.sentinus.co.uk.

Ask pupils if any of them has been X-rayed, and why. X-rays are used in medicine and dentistry to look inside your body to see if there is anything wrong. Broken bones, cancer growths, and tooth decay can be detected by an X-ray of a person. Explain to the class (with the help of any pupil who has been X-rayed recently) what happens when you are X-rayed.
Explain that too much use of X-rays can be dangerous. Although they can pass through your body, they have high energy, and can also cause harm by altering body cells they hit. Medical and dental X-rays are usually very low intensity, so there is little hazard. But, 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.

You might also discuss other means of looking inside the body (EEG, fMRI etc) here. Search for these on the Internet to find more information on these techniques.

Extension activity – Handy measurement
Your skeleton has many bones of different lengths. Ask pupils about bones and joints as historical units of measurement (for example: cubit, fathom, foot, hand, inch, pace, span). Ask them to measure and record some of these for themselves, 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, and measure these for their own body at home, and then compare with the rest of the class next week.

Week 3

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

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 B10: 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 is about 6.5 metres (20 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 very small pieces to enter your cells. Starting with saliva, this process is digestion, the breakdown of large food pieces to smaller soluble pieces.

You may find the following websites useful:
- www.bbc.co.uk/science/humanbody/body/factfiles/organs_anatomy.shtml (BBC Science). Choose any digestive organ (stomach, small and large intestines, liver, kidneys, pancreas)
- www.abpischools.org.uk/page/modules/dietanddigestion/diet8.cfm (ABPI)
- www.enjoyhealthyeating.info/nutrition (Public Health Agency (NI))

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 the body
- what can go wrong in our bodies, related to food
- what is a ‘good diet’
- how to keep their teeth healthy
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, calcium, iron etc (blood cells, bones, teeth)
- fibre (preventing constipation)
- water (cell support, making blood)

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.

What can go wrong? Ask pupils what happens if you eat food or drink inappropriately. (*Check if your teacher knows any pupil with a diet related disease. *Develop this sensitively in relation to obese or underweight pupils: check with your class teacher.). Diet related conditions include:
- coronary heart disease / hypertension
- some cancers
- being overweight / obesity
- 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 bad food hygiene (see section 8)
- alcohol abuse

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 and when they are eaten.

**Activity – the Eatwell Plate**
The Eatwell Plate 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/Livewell/Goodfood/Pages/eatwell-plate.aspx](http://www.nhs.uk/Livewell/Goodfood/Pages/eatwell-plate.aspx), and downloadable resources on the British Nutrition Foundation website: [www.foodafactoflife.org.uk](http://www.foodafactoflife.org.uk) Follow 8 – 11 Years / Healthy Eating and Key Fact 2. See also downloadable resources 100 and 150 – 159 at the foot of the screen.

**Activity – Healthy teeth**
1. Ask pupils to feel along their teeth with their tongues. Have their teeth different shapes? Help them to identify incisor, canine and molar teeth, and to discuss what each shape of teeth is for.

2. Ask each pupil to write down a question about teeth. Then in groups of three or four let them discuss these questions. Visit each group to help them find answers.

3. 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.

**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. 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 the class to identify items that (i) should, and (ii) should not be in their lunch boxes. Following this discussion, ask pupils, in pairs or small groups, to design a healthy lunch that will be good for their teeth. Suggest that when they eat foods containing sugar, this should be during a meal, not between meals. If possible, they should clean their teeth after each meal.
You may find the following websites useful:
- [www.abpischools.org.uk](http://www.abpischools.org.uk) (ABPI). Follow 11 – 14, then Science and Balanced Diet. You can find useful resources for other areas of MIPS on the ABPI site.
- [www.healthyteeth.org](http://www.healthyteeth.org) (Nova Scotia Dental Association). Follow Public / Your Oral Health

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

Ask pupils: What is energy? The simple answer is: energy is something that can make things (including itself) move. Ask where this energy comes from to run, for example, washing machines, toys, cars, aeroplanes and people. Electricity (mains and batteries), petrol and other liquid fuels, wind 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)

Where does this energy come from? Food and drink.

How do we get energy from food?

Energy is released by respiration, a chemical reaction:

**Respiration**

\[
\text{fuel} + \text{oxygen} \rightarrow \text{carbon dioxide} + \text{water} + \text{energy}
\]

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 is food. The oxygen comes from the air (about 20% of air is oxygen).

*Check with your teacher if pupils are familiar with photosynthesis. If so, show that this is the reverse reaction of what happens in plants, and that plant material like wood, fruit and seeds can be used as fuel. The energy in this case comes from the Sun.

**Photosynthesis**

\[
\text{carbon dioxide} + \text{water} + \text{energy} \rightarrow \text{plant material} + \text{oxygen}
\]

**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 kilojoules. Both units are normally given on food labels, as the amount of energy available per 100 grams of the food, but kilojoule is an internationally used unit of energy. You can find a table of food energy values and other useful food energy information on [http://apjcn.nhri.org.tw/server/info/books-phds/books/foodfacts/html/data/data2a.html](http://apjcn.nhri.org.tw/server/info/books-phds/books/foodfacts/html/data/data2a.html) (APJCN: the Asia Pacific Journal of Clinical Nutrition).

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

**Activity – How much energy do I need to live?**

*Ask pupils in advance to record their energy (kilocalorie) intake from food and drink during each of the three days before this lesson. Explain that they can find this information on food packaging labels, or on the APJCN website listed above.
In the lesson, ask pupils to compare their own figures with their recommended intake, which they can find on the UBM Medica Australia calculator: www.mydr.com.au/tools/child-energy-calculator. *This needs to be done sensitively: please ask your teacher for advice. Emphasise that, while too many 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.

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

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. Ask pupils to say what can go wrong with food (for example: contamination by toxic material, fungus, bacteria or pests (animals or insects), and deterioration):
- 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/science/microbiology/use-by-and-best-before-dates for information on this.

Discuss contamination with pupils
- types of contamination (toxins, e coli, salmonella etc)
- how it happens
- its effect on the food, and on the consumer
- how contamination can be prevented.
If appropriate, link this with the Glo Germ hand washing exercise in week 2 of Healthy Skin. You may choose to use the Glo Gem equipment here.

Activity – Spreading bacteria
Bacteria divide in two about every 20 minutes as long as they have adequate food, liquid and warmth. 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 temperature, and the importance of freezing perishable food that will be used later.

*If available, show pupils a needle thermometer for checking cooked food temperature

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.

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. 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. Emphasise “always read the label”. Discuss the significance of ‘use by’ and ‘best before’ dates.
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 (Discovery Communications)

Developing cross-curricular skills in Healthy Body

Communication:
- using appropriately scientific words and phrases related to the units, for example: system, muscles, voluntary movement, biceps, digestive system, collagen, nutrition, respiration, contamination, and developing a glossary of these terms.
- reporting on investigations, using a range of media including paper, electronic, verbal class presentations

Using mathematics:
- drawing appropriate tables and graphs, and extracting useful information from these.
- food energy calculations

Using ICT:
- measuring temperature (if a sensor is available),
- word processing and presentation of information,
- accessing information on websites, and choosing appropriate material.

Notes
Medics in Primary Schools

Healthy Heart and Lungs

Please discuss this guidance material with your class teacher before starting this unit, particularly in relation to practical activities, and act on her / his advice.

Apart from the section on blood (week 3), some of this material may already have been covered by your class. Your role may be to reinforce the children’s knowledge and understanding of the structure, function and protection of heart and lungs rather than teach these as new material (weeks 1 and 2). They are unlikely to have covered the function of blood in detail.

Week 1

1. What is our heart, and what does it do?
2. How can we keep our heart 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 and carbon monoxide in cigarette smoke on the heart and lungs
- what is meant by blood pressure
- how circulation of the blood was discovered 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

Explain what is meant by blood pressure, and why this is important

Help pupils to locate their heart and lungs as their heart beats and they breathe in and out. Ask them to feel their pulse as blood flows through their arteries.

Develop an outline diagram of the heart from children’s answers to questions, your own knowledge, and information from the Internet (see www.bbc.co.uk/science/humanbody/body/factfiles/heart/heart.shtml). What is each component for? Note that most school Internet information is aimed at 11 - 16, rather than primary pupils, and may need to be simplified. Identify components of the heart’s structure.

Activity – Pulse rate

*You need exercise space and facilities, clocks or stopwatches, and graph paper for this activity. *Check with your teacher if any pupils may have heart or breathing problems

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, if possible, to record the mean (average) of three pulse measurements at each point in the activity. Ask what can they 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, bar chart of ranges. You may use activity sheet H1: Pulse rate here.

Activity – Frank Pantridge

Frank Pantridge was a heart consultant at the Royal Victoria Hospital and Queen’s University from 1950 to 1982. Ask pupils to use books and the Internet to find out about him, then to write about fifty words about his achievements. Ask them to find out what a defibrillator does, where they might find one, and why it is so useful.
Extension Activity – William Harvey

Useful websites
- www.abpischools.org.uk (Association of the British Pharmaceutical Industry) - Follow 14-16 then Biology: heart and circulation. This is written for Key Stage 4, but edited material can be used at primary level
- www.bbc.co.uk/science/humanbody - Follow Human Body and Mind, then on the relevant organ

Week 2

3. What are our lungs, and what do they do?
4. How can we keep our lungs healthy?

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
- the effect of exercise on the lung and diaphragm muscles
- that smoking can cause lung cancer, emphysema and chronic bronchitis

The 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 (emphasise oxygen) and breathe out (some carbon dioxide and water vapour)
- what happens when they cough or sneeze

Activity – Breathing lungs
*You need exercise space and facilities, clocks or stopwatches, and means of measuring lung capacity and volume, for this activity. *Check with your teacher if any pupils may have heart or breathing problems

Ask pupils to measure:
(1) their lung volume,
(2) their breathing rate before and after exercise (running on the spot for one minute),
(3) their peak flow rate

What can they learn from these results?

*Equipment to support these activities is available for you to use. See the box on page 6 of this Guide. Details can also be found on the module page on Queen's Online.

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

Identify dangers to the lungs (from children's answers to questioning):
(1) dust and dirt (including asbestos),
(2) chemicals,
(3) cigarette smoke,
(4) germs / bacteria

Ask the children what protection is needed against each of these, what protection do we already have, and how can we enhance this protection? *Before discussing asthma, lung cancer or other lung conditions, check with your class teacher if this may be a sensitive issue for some pupils.
Check if your school is involved in Smokebusters organised by Cancer Focus Northern Ireland (https://cancerfocusni.org/cancer-prevention/schools-programme/smokebusters/). If not, suggest they join.

**Useful websites**
- [www.abpischools.org.uk](http://www.abpischools.org.uk) (Association of the British Pharmaceutical Industry) - Follow 11 – 14, then Science: breathing and asthma. This is written for Key Stage 3, but edited material can be used at primary level

**Week 3**

5. **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? 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. Blood is not part of the current Key Stage 2 curriculum, so their knowledge of blood is likely to be considerably less than they know about the heart and lungs. You may use Activity Sheet H2: 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.

**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 [http://systems.open.ac.uk/materials/T552](http://systems.open.ac.uk/materials/T552) - click on Spray diagrams. You may use Activity Sheet H3: Spraying blood as a starting point. You might build up a class response on the interactive whiteboard.

*You may find it effective to use spray diagrams in other units.*

The information on your spray diagram should be similar to the information pupils have written into their Activity Sheet H2: 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 in *Healthy Heart and Lungs*

**Communication:**
- using scientific words and phrases related to the units, for example, heart, lungs, circulation, respiration, red cells, white cells
- making posters to illustrate, for example, the action of the heart, lungs and blood, the dangers of tobacco smoke
- reporting on investigations, using a range of media including paper, electronic, verbal class presentations

**Using mathematics:**
- accurate time measurement, volume measurement,
- drawing tables and appropriate types of graph
- calculating mean values of sets of results

**Using ICT:**
- word processing and presentation of information,
- accessing information on websites, and choosing appropriate material.

**Notes**
Medics in Primary Schools

Healthy Skin

Please discuss this guidance material with your class teacher before starting this unit, particularly in relation to practical activities, and act on her / his advice.

Healthy Skin is unlikely to have been covered in class. Work on the assumption that most of this material is new to pupils. This unit can contribute to Personal Understanding and Health, which is part of the Northern Ireland Curriculum’s area: Personal Development and Mutual Understanding (PD&MU). For more information on this aspect of the primary school curriculum, see http://ccea.org.uk, follow Curriculum, then (drop down) Key Stage 1&2, then Personal Development and Mutual Understanding. The material can also be used as appropriate to develop pupils’ cross-curricular capabilities in Communication, Using Mathematics, and Using ICT (Information and Communication Technologies).

Week 1

1. What is skin?
2. 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). Ask them to draw and describe what they see. You may find Activity Sheet S1: Magnification useful here to get across the idea of magnification.

Activity – Skin temperature
*You will need appropriate thermometers for this activity. Ask pupils to find out the temperature of their skin. How does this compare with the temperature of the air around them? Probably about twenty degrees warmer. What are the implications of this? There is a loss of heat energy from the (warmer) body to the (cooler) air, so there must be a source of energy inside the body (from food), and a means of insulation, which can be within the skin (fat) or outside (clothes). This can be linked to the nutrition section of the Healthy Body unit.

Activity – Skin Structure
Develop on the board a diagram of the skin (which should be similar to the diagram on page 24) from pupils’ answers to questions. Also encourage the pupils to ask you questions. Do not show the diagram or website as a first step. The diagram on page 2 of the ABPI web resource listed below can be used at the end of the topic for consolidation or revision. Pupils need not remember the diagram, but they should understand the relationships between components. You may use Activity Sheet S3: Labelling Skin here.
Pupils should know that 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)

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

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

Not all of the objectives will be achieved during the first day. Some may be covered at appropriate points later, in relation to dangers to the skin.

You may find the following websites useful:
- www.bad.org.uk  (British Association of Dermatologists). Follow Patient Information Leaflets for information on professional leaflets and presentations on skin, which can be downloaded for your own background information. Note that these are designed for you as a health professional, not directly for pupils.
- www.bbc.co.uk/science/humanbody  (BBC Science) Follow Organs, then Skin
- www.abpischools.org.uk  (ABPI: the Association of the British Pharmaceutical Industry). Follow 14 – 16, then Science, then Skin Structure and Function  This is written for Key Stage 4, but edited material can be used at primary level
Week 2

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

Note: this should not be regarded as a first aid session, as most schools have their own policies and procedures on first aid.

_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 (sun exposure) separately, using the resources in section 4.

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

**Extension Activity – Stings and things**
You might find the BBSRC (Biotechnology and Biological Sciences Research Council) material _Stings and Things_ useful here. www.bbsrc.ac.uk/society/schools  Follow Primary Resources then Stings and things (near the foot of the screen). _You may find resources from this site useful in other units._

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.

**Activity – Effective hand washing**
_Glo Germ_ units for the assessment of hand washing technique are useful here. Children sprinkle a powder on their hands, and then put their hands under the lamp. The unwashed parts of their hands, where bacteria may remain, glow in the ultra-violet light. The children then wash their hands and repeat the exercise. On the second occasion the amount of bacteria is reduced (but not eliminated).

*Glo Germ equipment is available for use by students during this module. Details about resources and booking procedures can be found on the module page on Queen’s On Line.
There is useful resource material on effective hand-washing techniques on www.glogerm.com. Click on Education, then (dropdown) School Worksheets. USA Grade 6 is about the middle of our KS2. Activity Sheet S2: Saving my skin may be useful here for consolidation and revision.

4. How can we protect our skin from the sun, and keep it healthy?

Identify means of protecting the skin from dangers associated with the sun. *You can find several useful resources in the following websites:
- [www.careinthesun.org](http://www.careinthesun.org), managed by Cancer Focus Northern Ireland. Follow Resources, then (dropdown) Schools. This has downloadable resources, including teachers’ guides, background information and statistics, as well as activities for children.
- [www.bad.org.uk](http://www.bad.org.uk) (British Association of Dermatologists). Click on the Sun Awareness logo at the foot of the screen for information on the effects of the Sun on skin, including pdf leaflets and posters.

5. What else can we find out about our skin?

If you have time, other possible topics include: plastic surgery, aging, acne and eczema, fingerprinting. Use your expertise or enter these words or phrases into a search engine for more information and ideas.

**Developing cross-curricular skills in Healthy Skin**

**Communication:**
- using scientific words and phrases related to the units, for example, nerves, blood, insulate, thermometer, degrees Celsius, room temperature, body temperature.
- making posters to illustrate, for example, protection from the sun
- reporting on investigations, using a range of media including paper, electronic, verbal class presentations

**Using mathematics:**
- accurate thermometer reading,
- drawing tables and appropriate types of graph
- estimating the magnification of a lens

**Using ICT:**
- sensor measurement of temperature (if available),
- word processing and presentation of information,
- accessing information on websites, and choosing appropriate material

Notes
Medics in Primary Schools

Healthy Brain

Please discuss this guidance material with your class teacher before starting this unit, particularly in relation to practical activities, and act on her/his advice.

The Northern Ireland Curriculum, introduced in 2007, is clearly related to the processes of thinking and learning. See http://ccea.org.uk, follow Curriculum, then (drop down) Key Stage 1&2, then Personal Development and Mutual Understanding (PD&MU). See also the curriculum Big Picture. While teachers will have developed pupils’ thinking and learning capabilities, it is unlikely that they will have covered the science of the brain or mind in detail.

Some basic ideas about the brain are listed in this unit, with a series of questions for development. It should be emphasised that, in the science of the brain at this level, children are expected to understand what is happening inside their heads, so that they can improve their thinking and learning - but they are not expected to remember anatomical terms or reproduce information or diagrams. It should also be emphasised that much of the information to be provided here is simplified, and will be studied in more detail in Key Stage 3 and later. Note that the language used in this guide is aimed at you as an adult. Ask your teacher to help you simplify it for the pupils.

Week 1

1. How do I learn about the outside world?

Pupils should learn that we get information from the outside world 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: texture, hardness, pain, pleasure

Activity – The world around us
Ask pupils how we find out about the world around us. This can be developed through your questioning of the pupils. Encourage them to ask you questions. Develop the idea of perception. 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 they connect with our brains?
See http://en.wikipedia.org/wiki/Sense for background information

Activity - Finding out about the world around us
1. Ask five groups to discuss: 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, 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, 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 use of 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

Activity – Pinhole camera
You can show how an image of the world around us can be projected onto the retina using a pinhole camera (see www.exploratorium.edu/science_explorer/pringles_pinhole.html, or search ‘pinhole camera’ for instructions). 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, and the use of a lens increases the amount of light that can be gathered, and enables sharper focus.

A useful website for further information on sight and hearing is http://www.bbc.co.uk/science/humanbody. Follow Human Body and Mind, then Nervous System, then Sight or Hearing. Wikipedia provides an interesting article on optical illusions (http://en.wikipedia.org/wiki/Optical_illusions). You might use some of these on the 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. You can find further information and activities on: http://faculty.washington.edu/chudler/chsense.html (Neuroscience for Kids)

Week 2

2. What does my brain do for me?

Pupils should learn that the brain (inside our head) is the part of our body that
- converts sense inputs into useful information
- instructs our muscles (including our voice muscles)

Start from where the children are, with questions:
- What enables us to process the information we get from our senses?
- How do we respond to what’s happening outside of us?
- What enables us to do things?

Activity – Brain in action
Find out what pupils already know about their brains. Ask them first in pairs, then in small groups to list as many things they do at school or at home that they can think of in two minutes. For example, clean their teeth in the morning, look and listen before crossing the road. Assemble a class list of about ten activities. After they present their responses, link their activities with senses and explain that these senses are related to brain structures.

The brain structure cannot be deduced by pupils, but might come from an internet / library search exercise, leading to a simplified diagram. See www.bbc.co.uk/science/humanbody/body/interactives/organs/brainmap/ for an interactive map of the brain. Click on Structure. Pupils should see from this diagram that there are effectively four main parts to the brain:
- the brain stem (which is responsible for instinctive reactions),
- the cerebellum (coordinating movement and balance),
- the limbic system (emotional responses, developing long term memory, routing information, controlling automatic functions), and
- the cortex or cerebrum (conscious thought, communication),

Note that pupils are not expected to remember the names of parts of the brain. Emphasise that this division is an oversimplification, but may be developed at secondary school.

**Activity – Use your fist**

With the BBC brain map (Structure) on the screen, ask pupils make a fist with their left hand. The wrist represents the brain stem and the base of the thumb is the cerebellum. Their closed hand represents the limbic system. Now ask them to place their right hand over the top of their fist to cover it: this represents the cortex or cerebrum. Ask pupils to compare this with the BBC brain map image.

Explain to pupils that parts of their brain are connected by nerves called neurons, like an electric circuit. There are about a hundred thousand million \(10^{11}\) of these, and they may each make thousands of connections to other neurons. Emphasise that, while neuroscientists are learning a lot about our brains, there is even more that we don’t know. But the more we know about how our brain works, the more effectively we can use it to think and learn.

You may find the following websites useful:
- [http://serendip.brynmawr.edu/bb/kinser/Structure1.html](http://serendip.brynmawr.edu/bb/kinser/Structure1.html) (Brain Structures and their Functions),

3. **How can I learn from the outside world?**

_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 (for example, open a door so that we can go through it, or 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).

We either adapt the world around us to suit ourselves, or we adapt or accommodate ourselves to the world. This is the process of learning, and so we learn from experience.

This is common sense, and should be developed from questioning the pupils about their experiences in learning: How did you learn to play 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).

**Activity – The best place to learn**

Discuss conditions for effective learning: challenging (but not stressful) environment, light and colour, temperature and humidity, food and drink, stimulus through the senses. What would be an ideal place to learn? Ask pupils in small groups to draw a picture or diagram of their ideal learning environment.

This may lead into the idea of learning styles (aural, visual, kinaesthetic – though not using these terms: hearing, seeing and feeling / doing may be more appropriate at this level). Show that a balance of all styles is good, because it will be important for children to learn through all their senses as they grow up. Emphasise that people are different: there is no general ‘best’ way, but there may be a best way for you or me. Also show that different people have different capabilities (music, sport, mathematics, language, for example). You can find further information on: [http://en.wikipedia.org/wiki/Multiple_intelligences](http://en.wikipedia.org/wiki/Multiple_intelligences).

Show the need for a variety of learning experiences using all the senses, that allows development of both the strength and the breadth of hearing, seeing and feeling / doing learning, because breadth will be needed in the future real world: “I learn best by working with my hands, and I'm also improving my ability to learn by seeing and listening”.

30
Ask what can go wrong (examples: injury, epilepsy, Alzheimer's disease etc). *You must be sensitive here: ask for and accept your class teacher’s direction regarding any pupil with a brain impairment, or may have a brain impaired relation or friend.

Injured people may learn to walk and move again, and you can learn to write with your ‘other’ hand if your arm is in plaster. But why is this not the case if the spinal cord is severed? This leads to the idea of sensory-motor structures, and how these pathways serve electrochemical signals that may stimulate regeneration. You might mention that research is being done to help restore connections between the brain and limbs of people with paralysing spinal injuries (see www.spinal-research.org for information).

Tell the story of Phineas Gage (use a search engine for information about him) as an introduction to the idea that we learn a lot about how the brain works from how it doesn’t work properly when it’s damaged.

Play some mind games to indicate the complexity of the human brain: use a search engine for ‘mind games’. Check these in advance for appropriateness.

**Week 3**

4. How can I improve my memory and learning?

*Pupils should learn that reinforcing neuron connections develops memory and learning.*

What things do I need to remember?

**Activity – Effective learning**

Ask your teacher about a topic that the pupils have covered recently in class.

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) paper. Ask groups to organise their material into a map / spray diagram, or other means of presentation, so that they can remember it easily. They have to think about clustering material, connecting it to other material, using mnemonics, and presenting it so that others can understand it. See [http://systems.open.ac.uk/materials/T552](http://systems.open.ac.uk/materials/T552). Click on Spray diagrams.

However appreciate that some pupils may prefer to learn through prose rather than pictures.

**Activity – Types of memory**

Ask pupils to investigate different types of memory, from:

- short-term or working,
- episodic memory of experiences and events,
- semantic memory of facts and ideas,
- procedural (unconscious) memory for learned skills

Pupils need to get the ideas, rather than remember the names. Some emphasis on the importance of different ways of reinforcement of neuron connections in memory (which can be different for different people), for example: mnemonics, continued practice. You can find further information on: [http://en.wikipedia.org/wiki/Memory](http://en.wikipedia.org/wiki/Memory) and [www.human-memory.net/types.html](http://www.human-memory.net/types.html)

**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. Repeat this 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). 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.
How well you 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 ‘what was that paragraph 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. You may find the Activity Sheet Br3: Increasing Learning useful here.

5. How can I look after my brain?

*Pupils should learn how to look after physical aspects of their brains.*

Ask the children for answers to the question: How can I look after my brain? Then group ideas, possibly including:
- Have a broad, balanced diet. Identify diet fads and fashions. Emphasise the importance of factual research-based knowledge.
- 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 many things that we don’t understand about the brain and sleep.
- Protect it: Wear a cycle helmet and sports protection. Know that fire kills by suffocation more often than burning (so oxygen doesn’t get to the brain). Learn to swim.

6. What rules can I use to help me develop a healthy mind?

*Pupils should learn how to look after mental aspects of their brains, and*
- develop rules for healthy minds in themselves
- develop rules for healthy relationships with other people.

The Northern Ireland Curriculum PD&MU (Personal Development and Mutual Understanding) Year 7 Living Learning Together, Unit 2: Thinking and Feeling may be useful in this section. See www.nicurriculum.org.uk/curriculum_microsite/pdmu/living_learning_together/year7.asp. Follow Unit 2.

*Please discuss this with your teacher, and check if pupils have covered this unit.

**Activity – My healthy mind**

Ask the class to develop ten rules for a healthy mind related to themselves as individuals.
1. Ask each pupil to write down two rules. You might suggest one or two from the list below as examples.
2. Ask them to share their ideas in pairs, then small groups, to identify five important rules.
3. Then ask the class to organise their material into a list of ten agreed rules

Some possible responses to these activities are included below. There are others which pupils may propose (and the class agree). You may find Activity Sheet Br1: Rules for a healthy mind useful here.

**To develop a healthy mind, I should:**
- experience a range of feelings, and express these sensitively
- know that I am a worthwhile person, and different to everybody else
- identify what I can do well, and what I want to improve
- exercise both my mind and body
- set aims and achieve them, but get over it when things go wrong
- learn from my mistakes
- expect to be able to do things, and then get on with the job
- understand the difference between right and wrong
- realise that I am changing as I grow up
- be creative: do something creative every day
- be able to enjoy myself, and do things on my own
You can find useful activities on feelings and emotions on www.enchantedlearning.com/themes/feelings.shtml

Activity – Relating to other people
Ask the class to develop ten rules for a healthy mind related to their relationships with other people.
1. Ask each pupil to write down two rules.
2. Ask them to share their ideas in pairs, then small groups, to identify five important rules.
3. Then ask the class to organise their material into a list of ten agreed rules
Some possible responses to these activities are included below. There are others. You may find Activity Sheet Br2: Rules for healthy relationships useful here.

To develop a healthy relationship with others, I should:
- express my feelings sensitively
- accept that other people are different, and may express their feelings differently
- make promises, and then keep them
- assert myself without being unpleasant: recognise other people’s points of view
- have good relations with my family, friends and other people.
- make time for my family, friends and other people
- share problems with my family, friends and other people
- accept and give thanks, congratulations and apologies when appropriate
- accept support from, and give support to my family, friends and other people
- get involved in something that makes me work or play with people outside my family

Developing cross-curricular skills in Healthy Brain

Communication:
- using scientific words and phrases related to the units, for example, brain stem, cerebellum, limbic system
- making posters to illustrate, for example, to show the simple structure of the brain
- reporting on what they have learned, using a range of media including paper, electronic, verbal class presentations

Using ICT:
- word processing and presentation of information,
- accessing information on websites, and choosing appropriate material

Notes
Medics in Primary Schools

Assessment Appendix

There are two summative and one formative assessment for this module. The format of each is outlined below:

**Practical assessment of teaching skills**

This formative assessment will be undertaken by the classroom teacher. See page 40 of this appendix for a copy of the proforma used for this assessment. No weighting has been assigned to this assessment component. However, you must include the completed pro-forma with your reflective written commentary. You must also reflect on the comments made by the teacher and indicate how they will inform future teaching practice.

**Reflective Commentary**

Reflective written commentary on experience (maximum number of words 2,000). Please see below for guidelines on completion of the reflective commentary. The marking scheme used to assess your work can also be found below.

Weighting: 70%

**Submission Date:**
Details will be provided at first class.
Completed assessments must be submitted to The Centre for Medical Education Office, Whitla Medical Building by the published submission date

**Teaching Resource**

One teaching resource developed and used during the module must be submitted for assessment. This may be:

- a lesson plan
- a resource developed specifically for the module, for example an interactive quiz
- other

Weighting: 30%

**Submission Date:**
This must be submitted as an Appendix to your Reflective Commentary
Guidelines for Completing Reflective Commentary

Reflective Commentary

The aim of this assignment is to provide you with an opportunity to reflect on the learning opportunities offered during the module.

The commentary should include details about the development of your communication, presentation, computing and IT skills during this special study module.

You should also comment on your perceptions of the pupils' knowledge and understanding of physiology and health related issues. Did this differ from your expectations? If so why?

The techniques that you developed to deliver the material should also be discussed. You should comment on how this changed during the semester.

You may find the following framework useful when reflecting on your experience in the classroom:

- did you always deliver the lessons as you had planned; if not why not:
- did you modify your style of delivery as the module progressed? For example, did you present information in a more simplistic manner?
- your observations of the pupils' motivation, enthusiasm. Were pupils more enthusiastic about some topics than others?
- did you find it easier to prepare and deliver material on some topics than others?
- what knowledge and skills have you gained as a result of completing this module?

To ensure that this reflective commentary is an accurate reflection of the work you undertake during the module you should complete the log-book** after each session. You can refer to this book when you are completing your reflective commentary. **You should also ask the teacher to sign the log book when you have completed each section.

**Marks will not be awarded for completion of the log-book, however you should submit it to the Centre for Medical Education Office when you are submitting your reflective commentary. The information that you have recorded in the log-book will be used by the module co-ordinators when evaluating the content and format of the module.

See page 40 for a copy of the pro-forma used to assess this piece of work.

Referencing your Work

Use the Vancouver system.
Extracts from University Regulations 2017-2018

Attendance

100% attendance is normally required at all classes. A minimum of 75% attendance is acceptable for absences with a valid reason e.g. illness. In accordance with University Regulations, students must inform the medical school of any absences. A student considering being absent for any part of a module must apply by e-mail using the pro-forma (which can be found on the medical education portal) as far in advance as possible, with a minimum of 3 weeks in advance for planned leave, and by the start of the leave period for unplanned leave. The application should be sent by email to the curriculum lead for Year 2, Professor Mary-Frances McMullin m.mcnullin@qub.ac.uk, and copied to the SSC semester lead, Dr David Bell d.bell@qub.ac.uk, and administrative support lead for the year, Ms Sarah Hagan, s.hagan@qub.ac.uk, who will collate applications. Students who do not satisfy attendance requirements will normally be required to undertake additional work during the summer before the module mark will be given to the Examination Board. Students must submit medical certificates or other evidence of extenuating circumstances (including self-certification for short periods of illness) to Mrs Perpetua Lewis via the Centre for Medical Education General Office (Ground Floor, WMB) within 3 days of returning to their studies. Students should sign attendance sheets provided by their SSC co-ordinator at each formal SSC session. A head count of the number of students present will also be made. If there is a discrepancy between the two, the issue of additional names, and who signed in absent colleagues, will be resolved before anyone leaves the room, as the University cannot take action retrospectively. Students who sign attendance sheets on behalf of their absent friends should be aware that this is a fraudulent act and brings their ‘fitness to practice’ as a medical doctor into jeopardy.

Late submission of work

Students who submit work late will be penalised. Coursework signed in after the published submission deadline will be automatically penalised at the rate of 5% marks for each day late, up to a maximum of 5 working days late, after which a mark of zero will be awarded for that element. NOTE: exemption from late penalties will be the exception rather than the rule (please refer to the Notes for Undergraduate Medical Students Booklet for guidance regarding extenuating circumstances). Application for late submission of coursework should be made using the approved form available from the Centre for Medical Education General Office (Ground Floor, WMB) and submitted to the member(s) of staff designated by the School (Mrs Perpetua Lewis) within 3 days after the deadline for submission of the work.

Professionalism

The General Medical Council and the University expect you to understand that your behaviour at all times both in the clinical environment and outside of your studies must justify the trust that patients and the public have in you as a future member of the medical profession. As an undergraduate medical student you are studying to become a member of a trusted profession and will come into contact with patients and members of the public. Queen’s University Belfast will only graduate students who are fit to practise.

You will throughout the undergraduate medical programme receive support, feedback, teaching and assessment on professionalism across 4 domains:

Knowledge, skills and performance
Safety and quality
Communication, partnership and teamwork
Maintaining trust

and are required to reflect on your practice in your Personal and Professional Development Portfolio. You will find more information and resources on professionalism and fitness to practise in the Professionalism area of the medical education portal www.med.qub.ac.uk/portal
Plagiarism

Plagiarism can be defined as one author using another's exact words without acknowledgement as though they were his/her own. This is a serious offence and the University's policy can be found in the General Regulations of the University.

Turnitin Submission

This autumn, all written SSC coursework must be subjected to a plagiarism check via the Turnitin website—your co-ordinator will explain the logistical arrangements in place for this. This will apply to dissertations, essays, reflective journals, portfolios etc. but not to PowerPoint or poster presentations. However, in regard to PowerPoint presentations and posters, please note that you are still expected to attribute sources of factual information, published data, graphs and images used within your slides or on your poster. Not to do so could amount to plagiarism. For copyright reasons, it will be necessary for you to submit your work to Turnitin yourself; Staff are not permitted to do this for you. Your individual SSC module co-ordinators will advise you which assignment(s) need to be submitted to Turnitin and when; they will also provide you with the Class ID and enrolment password needed to enable you to submit your work for each assignment. Please note that submission to Turnitin is an additional requirement to submission of paper/e-copies of your work to your module co-ordinator for marking NOT an alternative method of submission. You should retain a copy of the receipt generated by Turnitin when you have successfully uploaded your work and be prepared to show this to your co-ordinator if requested. If Turnitin does not generate a receipt this could mean that your attempt to upload your assignment has not been successful.

Turnitin will be configured in such a way that you will not be able to view the similarity index generated; scrutiny of the Turnitin report is used by the assessors alongside their own academic judgement of the written work submitted, we have not specified a cut-off level of similarity index which by itself is deemed (un)acceptable. Please submit only the final version of your assignment to Turnitin, including your bibliography and any figures/tables.

If you are in any doubt regarding the definition of plagiarism or have any questions regarding the use of Turnitin please ask your individual SSC co-ordinator or alternatively contact the SSC Co-ordinator for Year 2 Dr David Bell (d.bell@qub.ac.uk) or the SSC Programme Administrator Mrs Frances Price (f.price@qub.ac.uk).

For further information on regulations, please read the Pathway Specific Regulations for Medicine issued to all students at the start of each academic year.

Information about Student Support and Guidance

SSC Co-ordinator for Year 2:
Telephone: 028 9097 2244
Email d.bell@qub.ac.uk

Overall SSC Programme Co-ordinator:
Telephone: 028 9097 2160
Email v.crawford@qub.ac.uk

SSC Programme Administrator:
Telephone: 028 9097 5770
Email f.price@qub.ac.uk

Head of Student Support and Guidance:
Telephone: 028 9097 1438
Email m.harbinson@qub.ac.uk

Support Lead/Advisor of Studies for Year 2:
Telephone: 028 9097 2244
Email d.bell@qub.ac.uk

Student Support and Guidance Officer:
Telephone: 028 9097 2453
Email p.lewis@qub.ac.uk
Curriculum Enquiries: Mrs Linda McGuinness  
Telephone: 028 9097 2239  
Email l.mcguinness@qub.ac.uk

Progress and Assessment Enquiries: Mrs Carolanne Smith  
Telephone: 028 9097 2452  
Email c.smith@qub.ac.uk

Disability Officer: Dr Neil Kennedy  
Telephone: 028 9097 1621  
Email: n.kennedy@qub.ac.uk

Electronic Support  
www.med.qub.ac.uk/portal

For further information on regulations, please read the Pathway Specific Regulations for Medicine issued to all students at the start of each academic year.

Information about Student Support and Guidance

SSC Co-ordinator for Year 2: Dr David Bell  
Telephone: 028 9097 2244  
Email d.bell@qub.ac.uk

Overall SSC Programme Co-ordinator: Dr Vivienne Crawford  
Telephone: 028 9097 2160  
Email v.crawford@qub.ac.uk

SSC Programme Administrator: Mrs Frances Price  
Telephone: 028 9097 5770  
Email f.price@qub.ac.uk

Head of Student Support and Guidance: Dr Mark Harbinson  
Telephone: 028 9097 1438  
Email m.harbinson@qub.ac.uk

Support Lead/Advisor of Studies for Year 2: Dr David Bell  
Telephone: 028 9097 2244  
Email d.bell@qub.ac.uk

Student Support and Guidance Officer: Mrs Perpetua Lewis  
Telephone: 028 9097 2453  
Email p.lewis@qub.ac.uk

Curriculum Enquiries: Mrs Linda McGuinness  
Telephone: 028 9097 2239  
Email l.mcguinness@qub.ac.uk

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Telephone: 028 9097 2452  
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Marking Scheme for Reflective Commentary

Reflective commentaries are marked out of **100**.
Candidates must achieve a mark of **fifty** to pass this component of the assessment.

Guide to Using the Scale

6. **Excellent:** as for 5 but greater evidence of use of relevant source material and has highlighted some difficulties experienced when applying some of the concepts and ideas

5. **Very good:** the portfolio is very well written and presented; candidate has accessed additional source material and integrated material from other modules. Candidate has reflected on the relevance of the module content for his/her own personal development and future professional practice. Provides examples of changes to practice. Use of source materials, personal experiences, incorporation of materials from other modules, inclusion of appropriate references to theory and principles

4. **Good:** the candidate has reflected on all of the major topics discussed during the module, there is some evidence of integration across the module; there may be some factual inaccuracies. Discussion may lack focus. The candidate has accessed some source material other than that recommended in the module guide

3. **Average:** the candidate demonstrates some evidence of reflection and has made reference to the recommended source material. The portfolio has not addressed the breadth of topics covered in the module. Some information in places about how the knowledge acquired during the module will impact on personal and professional development. There may be a few factual inaccuracies. Discussion may lack focus in some places.

2. **Poor:** the candidate demonstrates little evidence of reflection and has made insufficient use of the recommended source material. The portfolio may focus on only one or a few topics or aspects of the module. Very little information about how the knowledge acquired during the module will impact on personal and professional development. Significant factual inaccuracies. Discussion lacks focus throughout.

1. **Very poor:** the candidate has completed a portfolio however the information presented is either not relevant to the module or mere repetition of the factual information presented during the teaching sessions.

0. **Missing:** the candidate did not submit a portfolio
## Competences relevant to students in the Medics in Primary School (MIPS) programme

<table>
<thead>
<tr>
<th>Student:</th>
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<tbody>
<tr>
<td>School:</td>
<td></td>
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Descriptors: 6 Outstanding  5 Very Good  4 Good  3 Satisfactory  2 Inadequate  1 Unsatisfactory

Please tick as appropriate

### Competence: The student is a person who

<table>
<thead>
<tr>
<th>Competence</th>
<th>6</th>
<th>5</th>
<th>4</th>
<th>3</th>
<th>2</th>
<th>1</th>
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<tbody>
<tr>
<td>… shows a willingness to learn</td>
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<td>… can communicate easily and effectively</td>
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<td>… can establish and maintain constructive relationships with children</td>
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<tr>
<td>… can integrate a wide range of knowledge and skills and apply these appropriately and effectively in practical situations</td>
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<td>… plans and employs a variety of teaching strategies to the topic</td>
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<td>… encourages pupils to develop powers of observation and inquiry</td>
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<td>… captures and maintains pupils’ attention, interaction and involvement</td>
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<td>… makes appropriate use of the range of available resources</td>
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<td>… seeks advice when necessary</td>
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<td>… consistently displays a professional attitude</td>
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**Total (out of 60)**

Additional comments by teacher (optional)
MIPS Learning Outcomes – Self-check

Please tick in the ‘Yes’ box those learning outcomes you feel you have successfully achieved, and comment or record evidence for this in the third column. You can then use this as a starting point for your reflective commentary. An electronic landscape version is available on the MIPS area of the Sentinus website www.sentinus.co.uk. The Comments / Evidence box in this will expand to take your text.

<table>
<thead>
<tr>
<th>Learning Outcome: I can</th>
<th>Yes</th>
<th>Comments / Evidence</th>
</tr>
</thead>
<tbody>
<tr>
<td>… communicate effectively with young children on a one to one basis</td>
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<tr>
<td>… communicate effectively with young children in groups</td>
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<tr>
<td>… provide young children with concise explanations about health and scientific concepts</td>
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<td>… communicate with teachers about lesson planning and content</td>
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<td>… present ideas in a ‘front of group’ situation</td>
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<td>… use ICT to convey health and scientific concepts appropriately to young children</td>
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<tr>
<td>… prepare lesson plans to manage and organise teaching and learning material</td>
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<td>… employ appropriate pedagogic strategies to convey medical and scientific concepts appropriately to young children</td>
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<td>… reflect on positive and negative aspects of teaching activity</td>
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<td>… improve performance following feedback from others and personal reflection</td>
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<td>… manage time effectively</td>
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Medics in Primary Schools
A Queen’s / Sentinus Programme

For Information Contact:

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