



Prince Edward Island Science Curriculum

Education and Early
Childhood Development
English Programs

Human Biology

Biology
801A

CURRICULUM



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Course Overview

Introduction

Cells, tissues, organs, organ systems, and ultimately humans must maintain a biological balance despite changing external conditions. Homeostasis is the state of internal balance so critical to existence. It represents a dynamic equilibrium displaying constant interactions both within the human body organism and between humans and their environment. There are a variety of systems within living things responsible for the maintenance of this delicate balance, and this course will identify and introduce the role of the human systems: circulatory, respiratory, digestive, excretory, immune, skeletal, muscular, nervous, endocrine, and reproductive. The vital links that exist among them will be investigated.

Focus and Context

This course has its primary focus on decision making, as scientific, technological, societal, and environmental (STSE) issues are considered. These STSE components contribute to the development of scientific literacy and a sense of global citizenship. In addition, numerous opportunities for problem solving and scientific inquiry are incorporated into the discussion of the circulatory, respiratory, digestive, excretory, immune, skeletal, muscular, nervous, endocrine, and reproductive systems.

Science Curriculum Links

Biology students have studied the components of body systems at a number of different levels. Students in grade 2 are introduced to the importance of maintaining a healthy lifestyle. In grade 5 they begin to discuss the role of specific body systems in growth and reproduction. The major components of the structure and function of the digestive, excretory, respiratory, circulatory, and nervous systems are introduced. The contributions of the skeletal, muscular and nervous system to movement are integrated into their study. In addition, the body's defences against infection and the nutritional requirements for good health are discussed. When students reach grade 8, they begin to consider the basic factors that affect the functioning and efficiency of the human respiratory, circulatory, digestive, excretory, and nervous systems, and are encouraged to discover and describe examples of the interdependence of various systems of the human body. These courses prepare students for their study of the role that systems play in the maintenance of homeostasis—a subject which is discussed in more detail in Biology 801A.

Program Design and Components

Learning and Teaching Science

What students learn is fundamentally connected to how they learn it. The aim of scientific literacy for all has created a need for new forms of classroom organization, communication, and instruction. The teacher is a facilitator of learning whose major tasks include the following:

- creating a classroom environment to support the learning and teaching of science
- designing effective learning experiences that help students achieve designated outcomes
- stimulating and managing classroom discourse in support of student learning
- learning about and then using students' motivations, interests, abilities, and learning styles to improve learning and teaching
- assessing student learning, the scientific tasks and activities involved, and the learning environment to make ongoing instructional decisions
- selecting teaching strategies from a wide repertoire

Effective science learning and teaching take place in a variety of situations. Instructional settings and strategies should create an environment that reflects a constructive, active view of the learning process. Learning occurs through actively constructing one's own meaning and assimilating new information to develop a new understanding.

The development of scientific literacy in students is a function of the kinds of tasks they engage in, the discourse in which they participate, and the settings in which these activities occur. Students' disposition towards science is also shaped by these factors. Consequently, the aim of developing scientific literacy requires careful attention to all of these facets of curriculum.

Learning experiences in science education should vary and should include opportunities for group and individual work, discussion among students as well as between teacher and students, and hands-on/minds-on activities that allow students to construct and evaluate explanations for the phenomena under investigation. Such investigations and the evaluation of the evidence accumulated provide opportunities for students to develop their understanding of the nature of science and the nature and status of scientific knowledge.

Communicating in Science

Learning experiences should provide opportunities for students to use writing and other forms of representation as ways to learning. Students, at all grade levels, should be encouraged to use writing to speculate, theorize, summarize, discover connections, describe processes, express understandings, raise questions, and make sense of new information, using their own language as a step to the language of science. Science logs are useful for such expressive and reflective writing. Purposeful note making is an intrinsic part of learning in science, helping students better record, organize, and understand information from a variety of sources. The process of creating webs, maps, charts, tables, graphs, drawings, and diagrams to represent data and results helps students learn, and also provides them with useful study tools.

Learning experiences in science should also provide abundant opportunities for students to communicate their findings and understandings to others, both formally and informally, using a variety of forms for a range of purposes and audiences. Such experiences should encourage students to use effective ways of recording and conveying information and ideas, and to use the vocabulary of science in expressing their understandings. Through talking and writing about the concepts they need to learn, students come to better understand both the concepts and the related vocabulary.

Learners will need explicit instruction in, and demonstration of, the strategies they need to develop and apply in reading, viewing, interpreting, and using a range of science texts for various purposes. It will be equally important for students to have demonstrations of the strategies they need to develop and apply in selecting, constructing, and using various forms for communicating in science.

The Three Processes of Scientific Literacy

An individual can be considered scientifically literate when he/she is familiar with, and able to engage in, three processes: inquiry, problem solving, and decision making.

Inquiry

Scientific inquiry involves posing questions and developing explanations for phenomena. While there is general agreement that there is no such thing as the scientific method, students require certain skills to participate in the activities of science. Skills such as questioning, observing, inferring, predicting, measuring, hypothesizing, classifying, designing experiments, collecting data, analysing data, and interpreting data are fundamental to engaging in science. These activities provide students with opportunities to understand and practise the process of theory development in science and the nature of science.

Problem Solving

The process of problem solving involves seeking solutions to human problems. It consists of proposing, creating, and testing prototypes, products, and techniques to determine the best solution to a given problem.

Decision Making

The process of decision making involves determining what we, as citizens, should do in a particular context or in response to a given situation. Decision-making situations are important in their own right, and they also provide a relevant context for engaging in scientific inquiry and/or problem solving.

Meeting the Needs of All Learners

Foundation for the Atlantic Canada Science Curriculum stresses the need to design and implement a science curriculum that provides equitable opportunities for all students according to their abilities, needs, and interests. Teachers must be aware of, and make adaptations to accommodate, the diverse range of learners in their classes. To adapt instructional strategies, assessment practices, and learning resources to the needs of all learners, teachers must create opportunities that will permit them to address their various learning styles.

As well, teachers must not only remain aware of and avoid gender and cultural biases in their teaching; they must also actively address cultural and gender stereotyping (e.g., about who is interested in and who can succeed in science and mathematics). Research supports the position that when science curriculum is made personally meaningful and socially and culturally relevant, it is more engaging for groups traditionally under-represented in science, and indeed, for all students.

While this curriculum guide presents specific outcomes for each unit, it must be acknowledged that students will progress at different rates.

Teachers should provide materials and strategies that accommodate student diversity, and should validate students when they achieve the outcomes to the best of their abilities.

It is important that teachers articulate high expectations for all students and ensure that all students have equitable opportunities to experience success as they work toward achieving designated outcomes. Teachers should adapt classroom organization, teaching strategies, assessment practices, time, and learning resources to address students' needs and build on their strengths. The variety of learning experiences described in this guide provide access for a wide range of learners. Similarly, the suggestions for a variety of assessment practices provide multiple ways for learners to demonstrate their achievements.

Science for EAL Learners

The Prince Edward Island science curriculum is committed to the principle that learners of English as an additional language (EAL) should be full participants in all aspects of science education. English deficiencies and cultural differences must not be barriers to full participation. All students should study a comprehensive science curriculum with high-quality instruction and co-ordinated assessment.

To this end,

- schools should provide EAL learners with support in their dominant language and English language while learning science;
- teachers, counselors, and other professionals should consider the English-language proficiency level of EAL learners as well as their prior course work in science;
- the science proficiency level of EAL learners should be solely based on their prior academic record and not on other factors;
- science teaching, curriculum, and assessment strategies should be based on best practices and build on the prior knowledge and experiences of students and on their cultural heritage;
- the importance of science and the nature of the science program should be communicated with appropriate language support to both students and parents;
- to verify that barriers have been removed, educators should monitor enrolment and achievement data to determine whether EAL learners have gained access to, and are succeeding in, science courses.

Education for Sustainable Development

Education for sustainable development (ESD) involves incorporating the key themes of sustainable development - such as poverty alleviation, human rights, health, environmental protection, and climate change - into the education system. ESD is a complex and evolving concept and requires learning about these key themes from a social, cultural, environmental, and economic perspective, and exploring how those factors are interrelated and interdependent.

With this in mind, it is important that all teachers, including science teachers, attempt to incorporate these key themes in their subject areas. One tool that can be used is the searchable on-line database *Resources for Rethinking*, found at <http://r4r.ca/en>. It provides teachers with access to materials that integrate ecological, social, and economic spheres through active, relevant, interdisciplinary learning.

Assessment and Evaluation

The terms **assessment** and **evaluation** are often used interchangeably, but they refer to quite different processes. Science curriculum documents developed in the Atlantic region use these terms for the processes described below.

Assessment is the systematic process of gathering information on student learning.

Evaluation is the process of analysing, reflecting upon, and summarizing assessment information, and making judgments or decisions based upon the information gathered.

The assessment process provides the data, and the evaluation process brings meaning to the data. Together, these processes improve teaching and learning. If we are to encourage enjoyment in learning for students now and throughout their lives, we must develop strategies to involve students in assessment and evaluation at all levels. When students are aware of the outcomes for which they are responsible and of the criteria by which their work will be assessed or evaluated, they can make informed decisions about the most effective ways to demonstrate their learning.

The Atlantic Canada science curriculum reflects the three major processes of science learning: inquiry, problem solving, and decision making. When assessing student progress, it is helpful to know some activities/skills/actions that are associated with each process of science learning. Student learning may be described in terms of ability to perform these tasks.

Assessment Techniques

Assessment techniques should match the style of learning and instruction employed. Several options are suggested in this curriculum guide from which teachers may choose, depending on the curriculum outcomes, the class, and school/district policies. It is important that students know the purpose of an assessment, the method used, and the marking scheme being applied. In order that formative assessment support learning, the results, when reported to students, should indicate the improvements expected.

Observation (formal or informal)

This technique provides a way of gathering information fairly quickly while a lesson is in progress. When used formally, the student(s) would be made aware of the observation and the criteria being assessed. Informally, it could be a frequent, but brief, check on a given criterion. Observation may offer information about the participation level of a student in a given task, use of a piece of equipment, or application of a given process. The results may be recorded in the form of checklists, rating scales, or brief written notes. It is important to plan in order that specific criteria are identified, suitable recording forms are ready, and that all students are observed within a reasonable period of time.

Performance

The Biology 801A curriculum encourages learning through active participation. Many of the curriculum outcomes found in this guide promote skills and their application. There is a balance between scientific process and content. In order that students appreciate the importance of skill development, it is critical that assessment provide feedback as they develop various skills. These may include the correct use of a piece of equipment; the application of an experimental technique; or the ability to interpret and follow instructions, or to research, organize, and present information. Assessing performance is most often achieved through observing the process.

Journal

Although not assessed in a formal manner, journals provide opportunity for students to express thoughts and ideas in a reflective way. By recording feelings, perceptions of success, and responses to new concepts, a student may be helped to identify his or her most effective learning style.

Knowing how to learn in an effective way is powerful information. Journal entries also give indicators of developing attitudes to science concepts, processes, and skills, and how these may be applied in the context of society. Self-assessment, through a journal, permits a student to consider strengths and weaknesses, attitudes, interests, and new ideas. Developing patterns may help in career decisions and choices of further study.

Interview

This curriculum promotes understanding and applying scientific concepts. Interviewing a student allows the teacher to confirm that learning has taken place beyond factual recall. Discussion allows a student to display an ability to use information and clarify understanding. Interviews may be brief discussions between teacher and student or they may be more extensive and include student, parent, and teacher. Such conferences allow a student to be proactive in displaying understanding. It is helpful for students to know which criteria will be used to assess formal interviews. This assessment technique provides an opportunity to students whose verbal presentation skills are stronger than their writing skills.

**Paper and Pencil
(assignment or test)**

These techniques can be formative or summative. Several curriculum outcomes call for displaying ideas, data, conclusions, and the results of practical or literature research. These can be in written form for display or for direct teacher assessment. Whether an activity/product is part of learning, or a final statement, students should know the expectations for the exercise and the rubric by which it will be assessed. Written assignments and tests can be used to assess knowledge, understanding, and application of concepts. They are less effective in assessing skills, processes, and attitudes. The purpose of the assessment should determine what form of paper and pencil exercise is used.

Presentation

This biology curriculum includes outcomes that require students to analyse and interpret information; identify relationships among science, technology, society, and environment; work effectively in teams; and communicate information. Although they can be time consuming, presentations are best for the display and assessment of these skills. These can be given orally, in written/pictorial form, by project summary (science fair), or by using electronic systems such as video or computer software. Whatever the level of complexity or format used, it is important to consider the curriculum outcomes as a guide to assessing the presentation. The outcomes indicate the process, concepts, and context for which and about which a presentation is made.

Portfolio

Portfolios offer another option for assessing student progress in meeting curriculum outcomes over a more extended period of time. This form of assessment allows the student to be central in the process. Decisions about the portfolio and its contents can be made by the student. What is placed in the portfolio, the criteria for selection, how the portfolio is used, how and where it is stored, how it is evaluated, are some of the questions to consider when planning to collect and display student work in this way. The portfolio should provide a long-term record of growth in learning and skills. This record of growth is important for individual reflection and self-assessment, but it is also important to share with others. For many students, it is exciting to review a portfolio and see the record of development over time.

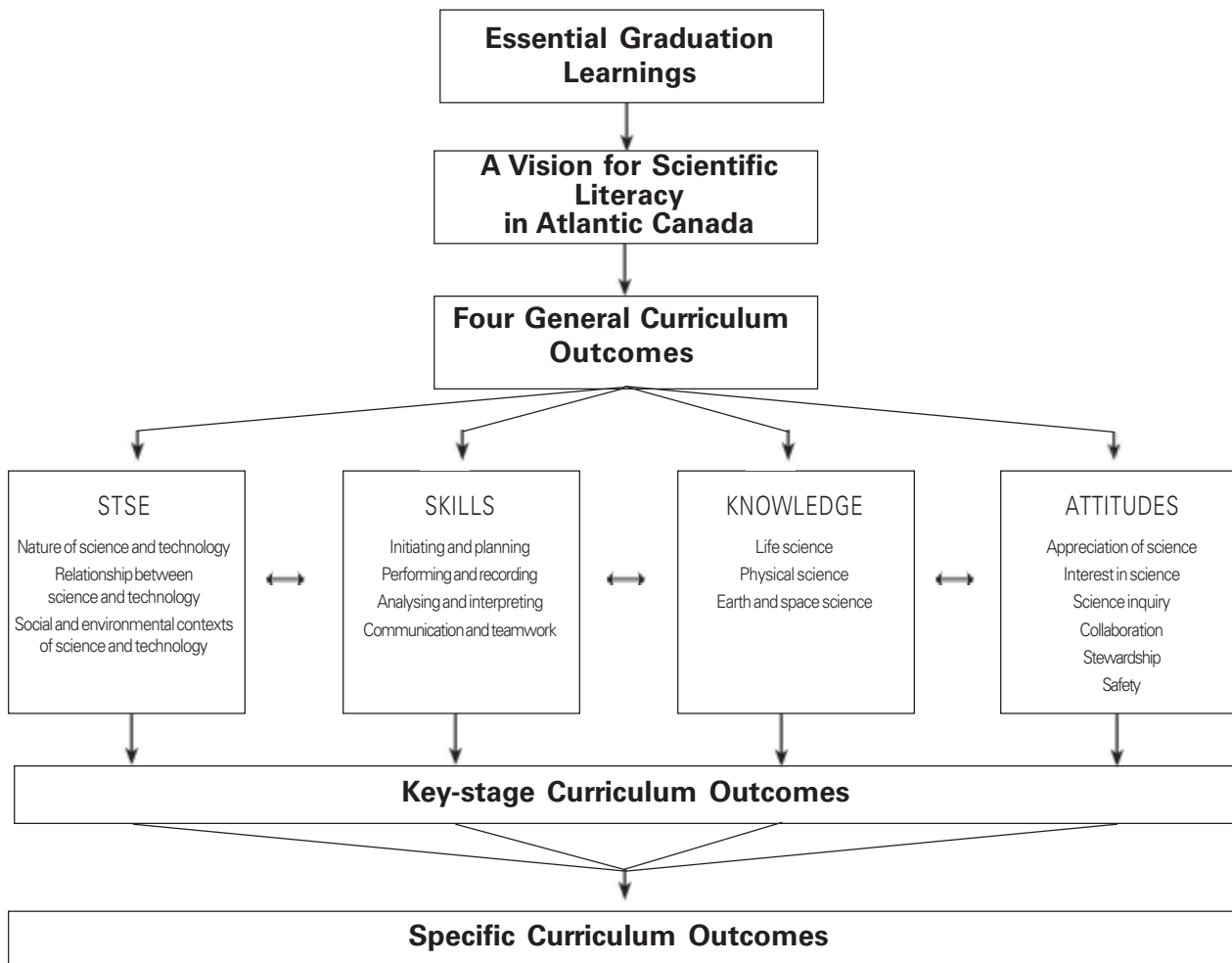
Curriculum Outcomes Framework

Overview

The science curriculum is based on an outcomes framework that includes statements of essential graduation learnings, general curriculum outcomes, key-stage curriculum outcomes, and specific curriculum outcomes. The general, key-stage, and specific curriculum outcomes reflect the pan-Canadian *Common Framework of Science Learning Outcomes K to 12*. The diagram below provides the blueprint of the outcomes framework.

Outcomes Framework

FIGURE 1



Essential Graduation Learnings

Essential graduation learnings are statements describing the knowledge, skills, and attitudes expected of all students who graduate from high school. Achievement of the essential graduation learnings will prepare students to continue to learn throughout their lives. These learnings describe expectations not in terms of individual school subjects but in terms of knowledge, skills, and attitudes developed throughout the curriculum. They confirm that students need to make connections and develop abilities across subject boundaries, and be ready to meet the shifting and ongoing opportunities, responsibilities, and demands of life after graduation. There are six essential graduation learnings:

Aesthetic Expression

Graduates will be able to respond with critical awareness to various forms of the arts and be able to express themselves through the arts.

Citizenship

Graduates will be able to assess social, cultural, economic, and environmental interdependence in a local and global context.

Communication

Graduates will be able to use the listening, viewing, speaking, reading, and writing modes of language(s), as well as mathematical and scientific concepts and symbols, to think, learn, and communicate effectively.

Personal Development

Graduates will be able to continue to learn and to pursue an active, healthy lifestyle.

Problem Solving

Graduates will be able to use the strategies and processes needed to solve a wide variety of problems, including those requiring linguistic, mathematical, and scientific concepts.

Technological Competence

Graduates will be able to use a variety of technologies, demonstrate an understanding of technological applications, and apply appropriate technologies for solving problems.

General Curriculum Outcomes

The general curriculum outcomes form the basis of the outcomes framework. They also identify the key components of scientific literacy. Four general curriculum outcomes have been identified to delineate the four critical aspects of students' scientific literacy. They reflect the wholeness and interconnectedness of learning and should be considered interrelated and mutually supportive.

Science, Technology, Society, and the Environment

Students will develop an understanding of the nature of science and technology, of the relationships between science and technology, and of the social and environmental contexts of science and technology.

Skills

Students will develop the skills required for scientific and technological inquiry, for problem solving, for communication of scientific ideas and results, for collaborative work, and for informed decision making.

Knowledge

Students will construct knowledge and understandings of concepts in life science, physical science, and Earth and space science, and apply these understandings to interpret, integrate, and extend their knowledge.

Attitudes

Students will be encouraged to develop attitudes that support the responsible acquisition and application of scientific and technological knowledge to the mutual benefit of self, society, and the environment.

Key-Stage Curriculum Outcomes

Key-stage curriculum outcomes are statements that identify what students are expected to know, be able to do, and value by the end of grades 3, 6, 9, and 12 as a result of their cumulative learning experiences in science. The key-stage curriculum outcomes are from the *Common Framework for Science Learning Outcomes K to 12*.

Specific Curriculum Outcomes

Specific curriculum outcome statements describe what students are expected to know and be able to do at each grade level. They are intended to help teachers design learning experiences and assessment tasks. Specific curriculum outcomes represent a framework for assisting students to achieve the key-stage curriculum outcomes, the general curriculum outcomes, and ultimately, the essential graduation learnings. Specific curriculum outcomes are organized in units for each grade level.

Attitude Outcomes

It is expected that the Atlantic Canada science program will foster certain attitudes in students throughout their school years. The STSE, skills, and knowledge outcomes contribute to the development of attitudes, and opportunities for fostering these attitudes are highlighted in the Elaborations—Strategies for Learning and Teaching sections of each unit.

Attitudes refer to generalized aspects of behaviour that teachers model for students by example and by selective approval. Attitudes are not acquired in the same way as skills and knowledge. The development of positive attitudes plays an important role in students' growth by interacting with their intellectual development and by creating a readiness for responsible application of what students learn.

Since attitudes are not acquired in the same way as skills and knowledge, outcomes statements for attitudes are written as key-stage curriculum outcomes for the end of grades 3, 6, 9, and 12. These outcome statements are meant to guide teachers in creating a learning environment that fosters positive attitudes.

The following pages present the attitude outcomes from the pan-Canadian *Common Framework of Science Learning Outcomes K to 12* for the end of grade 12.

Common Framework of Science Learning Outcomes K to 12

Attitude Outcome Statements

By the end of grade 12, it is expected that students will be encouraged to

Appreciation of Science	Interest in Science	Scientific Inquiry
<p>436 value the role and contribution of science and technology in our understanding of phenomena that are directly observable and those that are not</p> <p>437 appreciate that the applications of science and technology can raise ethical dilemmas</p> <p>438 value the contributions to scientific and technological development made by women and men from many societies and cultural backgrounds</p> <p><i>Evident when students, for example,</i></p> <ul style="list-style-type: none"> • consider the social and cultural contexts in which a theory developed • use a multi-perspective approach, considering scientific, technological, economic, cultural, political, and environmental factors when formulating conclusions, solving problems, or making decisions on STSE issues • recognize the usefulness of being skilled in mathematics and problem solving • recognize how scientific problem solving and the development of new technologies are related • recognize the contribution of science and technology to the progress of civilizations • carefully research and openly discuss ethical dilemmas associated with the applications of science and technology • show support for the development of information technologies and science as they relate to human needs • recognize that western approaches to science are not the only ways of viewing the universe • consider the research of both men and women 	<p>439 show a continuing and more informed curiosity and interest in science and science-related issues</p> <p>440 acquire, with interest and confidence, additional science knowledge and skills using a variety of resources and methods, including formal research</p> <p>441 consider further studies and careers in science- and explore where further science- and technology-related fields</p> <p><i>Evident when students, for example,</i></p> <ul style="list-style-type: none"> • conduct research to answer their own questions • recognize that part-time jobs require science- and technology-related knowledge and skills • maintain interest in or pursue further studies in science • recognize the importance of making connections between various science disciplines • explore and use a variety of methods and resources to increase their own knowledge and skills • are interested in science and technology topics not directly related to their formal studies • explore where further science- and technology-related studies can be pursued • are critical and constructive when considering new theories and techniques • use scientific vocabulary and principles in everyday discussions • readily investigate STSE issues 	<p>442 confidently evaluate evidence and consider alternative perspectives, ideas, and explanations</p> <p>443 use factual information and rational explanations when analysing and evaluating</p> <p>444 value the processes for drawing conclusions</p> <p><i>Evident when students, for example,</i></p> <ul style="list-style-type: none"> • insist on evidence before accepting a new idea or explanation, and ask questions and conduct research to confirm and extend their understanding • criticize arguments based on the faulty, incomplete, or misleading use of numbers • recognize the importance of reviewing the basic assumptions from which a line of inquiry has arisen • expend the effort and time needed to make valid inferences • critically evaluate inferences and conclusions, cognizant of the many variables involved in experimentation • critically assess their opinion of the value of science and its applications • criticize arguments in which evidence, explanations, or positions do not reflect the diversity of perspectives that exist • insist that the critical assumptions behind any line of reasoning be made explicit so that the validity of the position taken can be judged • seek new models, explanations, and theories when confronted with discrepant events or evidence

Common Framework of Science Learning Outcomes K to 12

Attitude Outcome Statements (*continued*)

By the end of grade 12, it is expected that students will be encouraged to

Collaboration	Stewardship	Safety in Science
<p>445 work collaboratively in planning and carrying out investigations, as well as in generating and evaluating ideas</p> <p><i>Evident when students, for example,</i></p> <ul style="list-style-type: none"> • willingly work with any classmate or group of individuals regardless of their age, gender, or physical and cultural characteristics • assume a variety of roles within a group, as required • accept responsibility for any task that helps the group complete an activity • give the same attention and energy to the group's product as they would to a personal assignment • are attentive when others speak • are capable of suspending personal views when evaluating suggestions made by a group • seek the points of view of others and consider diverse perspectives • accept constructive criticism when sharing their ideas or points of view • criticize the ideas of their peers without criticizing the persons • evaluate the ideas of others objectively • encourage the use of procedures that enable everyone, regardless of gender or cultural background, to participate in decision making • contribute to peaceful conflict resolution • encourage the use of a variety of communication strategies during group work • share the responsibility for errors made or difficulties encountered by the group 	<p>446 have a sense of personal and shared responsibility for maintaining a sustainable environment</p> <p>447 project the personal, social, and environmental consequences of proposed action</p> <p>448 want to take action for maintaining a sustainable environment</p> <p><i>Evident when students, for example,</i></p> <ul style="list-style-type: none"> • willingly evaluate the impact of their own choices or the choices scientists make when they carry out an investigation • assume part of the collective responsibility for the impact of humans on the environment • participate in civic activities related to the preservation and judicious use of the environment and its resources • encourage their peers or members of their community to participate in a project related to sustainability • consider all perspectives when addressing issues, weighing scientific, technological, and ecological factors • participate in social and political systems that influence environmental policy in their community • examine/recognize both the positive and negative effects on human beings and society of environmental changes caused by nature and by humans • willingly promote actions that are not injurious to the environment • make personal decisions based on a feeling of responsibility toward less privileged parts of the global community and toward future generations • are critical-minded regarding the short- and long-term consequences of sustainability 	<p>449 show concern for safety and accept the need for rules and regulations</p> <p>450 be aware of the direct and indirect consequences of their actions</p> <p><i>Evident when students, for example,</i></p> <ul style="list-style-type: none"> • read the labels on materials before using them, interpret the WHMIS symbols, and consult a reference document if safety symbols are not understood • criticize a procedure, a design, or materials that are not safe or that could have a negative impact on the environment • consider safety a positive limiting factor in scientific and technological endeavours • carefully manipulate materials, cognizant of the risks and potential consequences of their own actions • write into a laboratory procedure safety and waste-disposal concerns • evaluate the long-term impact of safety and waste disposal on the environment and the quality of life of living organisms • use safety and waste disposal as criteria for evaluating an experiment • assume responsibility for the safety of all those who share a common working environment by cleaning up after an activity and disposing of materials in a safe place • seek assistance immediately for any first-aid concerns such as cuts, burns, or unusual reactions • keep the work station uncluttered, with only appropriate lab materials present

Curriculum Guide Organization

Specific curriculum outcomes are organized in units for each grade level. Each unit is organized by topic. Suggestions for learning, teaching, assessment, and resources are provided to support student achievement of the outcomes. Suggested times for each topic are also provided. Although Biology 801A is 110 hours (~90 classes) in duration, the cumulative topic time allocated is 90 hours (~74 classes), or 45 hours (~37 classes) per term. The remaining 10 hours each term allows for summative assessment considerations.

The order in which the units appear in the guide is meant to suggest a sequence. In some cases, the rationale for the recommended sequence is related to the conceptual flow across the year. Some units or certain aspects of units may also be combined or integrated. This is one way of assisting students as they attempt to make connections across topics in science or between science and the real world.

The numbering system used is from the pan-Canadian document:

- 100s—Science-Technology-Society-Environment (STSE) outcomes
- 200s—Skills outcomes
- 300s—Knowledge outcomes
- 400s—Attitude outcomes (see pages 12-14)

These code numbers appear in brackets after each specific curriculum outcome (SCO).

The Four-Column Spread

All units have a two-page layout of four columns as illustrated below. In some cases, the four-column spread continues to the next two-page layout. Outcomes are grouped by a topic indicated at the top of the left page.

Two-Page, Four-Column Spread

Page One		Page Two	
Topic			
Outcomes	Elaborations—Strategies for Learning and Teaching	Tasks for Instruction and/or Assessment	Resources/Notes
<p>Students will be expected to</p> <ul style="list-style-type: none"> • Specific curriculum outcome based on the pan-Canadian outcomes (outcome number) • Specific curriculum outcome based on the pan-Canadian outcomes (outcome number) 	<p>elaboration of outcome and strategies for learning and teaching</p> <p>elaboration of outcome and strategies for learning and teaching</p>	<p><i>Informal/Formal Observation</i></p> <p><i>Performance</i></p> <p><i>Journal</i></p> <p><i>Interview</i></p> <p><i>Paper and Pencil</i></p> <p><i>Presentation</i></p> <p><i>Portfolio</i></p>	<p>Provincial responsibility</p>

Column One: Outcomes

The first column provides the specific curriculum outcomes. These are based on the pan-Canadian *Common Framework of Science Learning Outcomes K to 12*. The statements involve the Science-Technology-Society-Environment (STSE), skills, and knowledge outcomes indicated by the outcome number(s) that appears in parenthesis after the outcome. It should be noted that select outcomes contain a list of directives to further delineate the outcome for instruction and assessment purposes. Furthermore, select STSE and skills outcomes have been written in a context that shows how these outcomes should be addressed.

Specific curriculum outcomes have been grouped by topic. Other groupings of outcomes are possible and in some cases may be necessary in order to take advantage of local situations. The grouping of outcomes provides a suggested teaching sequence. Teachers may prefer to plan their own teaching sequence to meet the learning needs of their students.

Column one and column two define what students are expected to learn, and be able to do.

*Column Two:
Elaborations—Strategies
for Learning and Teaching*

The second column may include elaborations of outcomes listed in column one, and describes learning environments and experiences that will support students' learning.

The strategies in this column are intended to provide a holistic approach to instruction. In some cases, they address a single outcome; in other cases, they address a group of outcomes.

*Column Three:
Tasks for Instruction
and/or Assessment*

The third column provides suggestions for ways that students' achievement of the outcomes could be assessed. These suggestions reflect a variety of assessment techniques and materials that include, but are not limited to, informal/formal observation, performance, journal, interview, paper and pencil, presentation, and portfolio. Some assessment tasks may be used to assess student learning in relation to a single outcome, others to assess student learning in relation to several outcomes. The assessment item identifies the outcome(s) addressed by the outcome number in brackets after the item.

*Column Four:
Resources/Notes*

This column provides an opportunity for teachers to make note of useful resources.

Unit Overviews/Specific Curriculum Outcomes

<p>Unit: Homeostasis (~3 Classes)</p> <ul style="list-style-type: none"> • identify the eight characteristics of living things (304-4) • explain the relationship among cells, tissues, organs, organ systems, and organisms (304-7) • describe examples of the interdependence of various systems of the human body (304-10) <p>Unit: Nutrition (~10 Classes)</p> <ul style="list-style-type: none"> • identify diseases/disorders that may result from insufficient essential nutrients (214-15) • explain the importance of nutrition to the maintenance of homeostasis (317-3) <ul style="list-style-type: none"> – identify the six nutrients in food and their roles in the human body – read and interpret nutritional labels – explain the relationship between energy input, energy output and body weight • select and use apparatus and materials safely (213-8) • compile and organize data using appropriate formats and data treatments to facilitate interpretation (213-5) <ul style="list-style-type: none"> – perform an experiment to test for the presence of fats, starches, and sugars – perform a calorimetry experiment <p>Unit: Digestive System (~6 classes)</p> <ul style="list-style-type: none"> • explain how the human digestive system helps maintain homeostasis (317-1) <ul style="list-style-type: none"> – explain the purpose of the digestive system and how it functions – explain physical and chemical digestion – identify the major glands involved in digestion, and their main secretions, and investigate their role in the digestive process 	<ul style="list-style-type: none"> • evaluate the impact of viral, bacterial, genetic, and environmental diseases on an organism's homeostasis (317-4) <ul style="list-style-type: none"> – evaluate disorders linked to the digestive system • identify and describe science- and technology-based careers related to nutrition/digestion (117-7) <p>Unit: Circulatory System (~10 classes)</p> <ul style="list-style-type: none"> • explain how the human circulatory system helps maintain homeostasis (317-1) <ul style="list-style-type: none"> – explain the purpose of the “transportation” system in humans – describe the structure of the human heart – trace the flow of blood through the human heart and describe the pulmonary and systemic pathways – describe the structure and function of blood vessels, and factors that influence the flow of blood • describe how the use of prescription and nonprescription drugs, and environmental factors, can disrupt or help maintain homeostasis (317-6, 317-7) • design an experiment and identify specific variables (212-6) • compile and organize data using appropriate formats and data treatments to facilitate interpretation (213-5) • select and use appropriate numeric, symbolic, graphical, and linguistic modes of representation to communicate ideas, plans, and results (215-2) • evaluate the impact of viral, bacterial, genetic, and environmental diseases on an organism's homeostasis (317-4) <ul style="list-style-type: none"> – evaluate disorders linked to the circulatory system 	<ul style="list-style-type: none"> • propose alternative solutions to a given practical problem (disease/disorder) that may result from lifestyle choices, and select one as a basis for a plan. (214-15) • analyse why and how a particular technology related to the treatment of circulatory disorders was developed and improved over time (115-5) <p>Unit: Blood and Immunity (~8 classes)</p> <ul style="list-style-type: none"> • explain how blood in the human circulatory system helps maintain homeostasis (317-1) <ul style="list-style-type: none"> – explain the role of the main components of blood • evaluate the impact of viral, bacterial, genetic, and environmental diseases on an organism's homeostasis (317-4) <ul style="list-style-type: none"> – evaluate disorders associated with blood • analyse from a variety of perspectives the risks and benefits of blood storage, disposal, and transfusions (118-2) • identify and describe science- and technology-based careers related to blood and circulation (117-7) • explain how the human immune system helps maintain homeostasis (317-1) <ul style="list-style-type: none"> – identify the first and second lines of defence – in general, explain how the immune system recognizes and destroys foreign agents • predict the impact of environmental factors such as allergens on the homeostasis within an organism (317-6) • evaluate the impact of viral, bacterial, genetic, and environmental diseases on an organism's homeostasis (317-4) <ul style="list-style-type: none"> – evaluate disorders linked to the immune system
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Unit Overviews/Specific Curriculum Outcomes

<ul style="list-style-type: none"> analyse from a variety of perspectives the benefits to society and the environment of applying scientific knowledge or introducing a particular technology (118-2) <p>Unit: Respiratory System (~5 classes)</p> <ul style="list-style-type: none"> explain how the human respiratory system helps maintain homeostasis (317-1) <ul style="list-style-type: none"> explain the need for a respiratory surface describe features that provide for efficient gas exchange in humans, including nasal hair, cilia, mucous membranes, large surface area of alveoli, cartilaginous rings in airway, and epiglottis investigate the mechanics of inhalation/exhalation and regulation of the breathing cycle design an experiment and identify specific variables (212-6) select and use apparatus and materials safely (213-8) compile and organize data using appropriate formats and data treatments to facilitate interpretation (213-5) evaluate the impact of viral, bacterial, genetic, and environmental diseases on an organism's homeostasis (317-4) <ul style="list-style-type: none"> evaluate disorders linked to the respiratory system predict the impact of environmental factors such as allergens on homeostasis within an organism (317-6) construct arguments to support a decision or judgment, using examples and evidence and recognizing various perspectives (118-6) distinguish between questions that can be answered by science and those that cannot, and between problems that can be solved by technology and those that cannot (118-8) identify and describe science- and technology-based careers related to respiration (117-7) 	<p>Unit: Excretory System (~3 classes)</p> <ul style="list-style-type: none"> explain how the human excretory system helps maintain homeostasis (317-1) <ul style="list-style-type: none"> describe the main structures of the human urinary system explain the role of the kidney as an excretory organ in removing metabolic waste explain the role of the skin an excretory organ in removing metabolic waste evaluate the impact of viral, bacterial, genetic, and environmental diseases on an organism's homeostasis (317-4) <ul style="list-style-type: none"> evaluate disorders linked to the excretory system analyse why and how a particular technology related to the treatment of excretory disorders was developed and improved over time (115-5) <ul style="list-style-type: none"> describe the role technology has in kidney treatment describe how the use of prescription and nonprescription drugs can disrupt or help maintain homeostasis (317-7) <ul style="list-style-type: none"> describe the success of kidney transplants in relation to the development and use of present anti-rejection drugs. identify multiple perspectives that influence a science-related decision or issue (215-4) <p>Unit: Skeletal System (~4 classes)</p> <ul style="list-style-type: none"> explain how the human skeletal system helps maintain homeostasis (371-1) <ul style="list-style-type: none"> describe the functions of the skeletal system identify the major bones, using common and scientific names describe how bones grow identify and describe the types of bone tissue describe the types of joints evaluate the impact of viral, bacterial, genetic, and environmental diseases on an organism's homeostasis (317-4) 	<ul style="list-style-type: none"> describe the disorders linked to the skeletal system analyse why and how a particular technology related to the treatment of skeletal disorders was developed and improved over time (115-5) <p>Unit: Muscular System (~3 classes)</p> <ul style="list-style-type: none"> explain how the human muscular system helps maintain homeostasis (317-1) <ul style="list-style-type: none"> compare the three types of muscles explain how the muscles move the body evaluate the impact of viral, bacterial, genetic, and environmental diseases on an organism's homeostasis (317-4) <ul style="list-style-type: none"> describe disorders and injuries linked to the muscular system debate the merits of a drug related technological endeavour and how it impacts muscular performance (117-4) develop, present, and defend a position or course of action, based on findings (215-5) identify and describe science- and technology-based careers related to movement (117-7) <p>Unit: Nervous System (~6 classes)</p> <ul style="list-style-type: none"> explain how the human nervous system helps maintain homeostasis (317-1) <ul style="list-style-type: none"> describe the basic structure and function of neurons explain the role of sensory neurons, motor neurons, and interneurons describe the transmission of an impulse along the length of a neuron and across a synapse identify the three main parts of the nervous system explain the basic structure and function of the central nervous system analyse reflex actions and their role in homeostasis
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Unit Overviews/Specific Curriculum Outcomes

<ul style="list-style-type: none"> • evaluate the impact of viral, bacterial, genetic, and environmental diseases on an organism's homeostasis (317-4) <ul style="list-style-type: none"> – describe disorders linked to the nervous system • analyse why and how technologies related to the treatment of nervous system disorders were developed and improved over time (115-5) • describe how the use of prescription and non-prescription drugs can disrupt or help maintain homeostasis (317-7) <p>Unit: Endocrine System (~2 classes)</p> <ul style="list-style-type: none"> • explain how the human endocrine system helps maintain homeostasis (317-1) <ul style="list-style-type: none"> – understand the general concept of a hormone and target cell or organ – identify the location and function of principal endocrine glands, including pituitary, thyroid, parathyroid, adrenal, pancreas, ovaries, and testes – describe the regulation of blood sugar by controlled release of insulin and glucagon, and explain the consequences of any malfunction • analyse examples of Canadian contributions to science and technology (117-11) <ul style="list-style-type: none"> – investigate the role played by Frederick Banting and Charles Best in the discovery of insulin • evaluate the impact of viral, bacterial, genetic, and environmental diseases on an organism's homeostasis (317-4) <ul style="list-style-type: none"> – describe the disorders linked to the endocrine system 	<p>Unit: Reproductive System (~6 classes)</p> <ul style="list-style-type: none"> • analyse and describe the structure and function of female and male reproductive systems (313-3) <ul style="list-style-type: none"> – define sexual reproduction and identify the differences between egg and sperm – identify the structures of the male reproductive system, and describe their functions – identify testosterone as the principal reproductive hormone in males and describe its roles – identify the structures of the female reproductive system, and describe their functions – identify estrogen and progesterone as the principal reproductive hormones of females and describe their roles • identify and describe science and technology based careers related to reproduction (117-7) • explain the human reproductive cycle (313-4) <ul style="list-style-type: none"> – explain the female menstrual cycle • evaluate the impact of viral, bacterial, genetic, and environmental diseases on an organism's homeostasis (317-4) <ul style="list-style-type: none"> – identify possible causes of infertility • research and evaluate the potential health risks associated with exposure to sexually transmitted infections (213-7, 214-18) • evaluate the use of reproductive technologies for humans (313-6) • explain the human reproductive cycle (313-4) <ul style="list-style-type: none"> – explain how fraternal and identical offspring are produced 	<p>Unit: Embryonic Development (~2 classes)</p> <ul style="list-style-type: none"> • explain the human reproductive cycle (313-4) <ul style="list-style-type: none"> – sequence the changes that take place in a fertilized egg until it attaches to the uterus – explain how the needs of an embryo are met as it develops – describe the stages of human development from the first month until birth • research and evaluate conditions that could arise during pregnancy and delivery (213-7, 214-18) <p>Unit: Genetics (~6 classes)</p> <ul style="list-style-type: none"> • describe and illustrate the role of chromosomes in the transmission of hereditary information from one cell to another (315-2) <ul style="list-style-type: none"> – define chromosomes, genes, and inherited traits – compare the number of chromosomes in sex cells and body cells – distinguish between autosomes and sex chromosomes – distinguish between dominant and recessive genes – describe how different gene combinations result from fertilization, and how traits are passed to offspring – predict trait outcomes through the use of the Punnett Square • explain circumstances that lead to genetic diseases (315-8) <ul style="list-style-type: none"> – explain why sex-linked defects are more common in males than females – explain how cells can have an improper number of chromosomes, and discuss consequences
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Homeostasis (~3 Classes)

Outcomes

Students will be expected to

- identify the eight characteristics of living things (304-4)

- explain the relationship among cells, tissues, organs, organ systems, and organisms (304-7)
- describe examples of the interdependence of various systems of the human body (304-10)

Elaborations—Strategies for Learning and Teaching

Students should recognize that the cell is the smallest unit that exhibits all characteristics of life (e.g., made of cells, needs food, reproduces, grows, develops, uses energy, responds to stimuli, adapts, to its environment).

As an opener to this section, students could discuss a scenario in which they are visiting another planet and must decide if a “thing” is living or not. Students would brainstorm how they would determine the difference.

Answers generated by the students could include the following:

- made of cells
- needs food
- grows
- reproduces
- senses and responds to environment
- has a life span
- eliminates waste
- uses energy

Students could brainstorm the types of cells in the human body and explain the relationship between cells → tissues → organs → organ systems → human organism.

Students could investigate scenarios that show the interdependence of body systems and their importance in the maintenance of homeostasis. For example, students could be asked, “What organ system(s) is (are) involved in the achievement of health and fitness?” Students may suggest that a balanced diet is important and propose a connection with the digestive system, (to break down the food), and circulatory system (to distribute nutrients). In preparation for this activity, teachers may want to spend time reviewing the organ systems.

Homeostasis

Tasks for Instruction and/or Assessment

Students may, for example,

Paper and Pencil

- complete the “Characteristics of Living Things” activity (304-4)
See **Appendix 1**.
- complete the “Living Things” assignment by comparing the characteristics of a living thing to characteristics of the organism in the handout (304-4)
See **Appendix 2**.
- use the list of characteristics of living things to identify the organ system(s) most directly related to each characteristic (e.g. getting rid of waste, excretory system). (304-4, 304-7, 304-10)
- complete the “Name the System” game by identifying the terms in the envelope and matching them to each system.
(304-7, 304-10)
See **Appendix 3**.
- complete the “Analogy of a School” poster assignment by comparing the body systems to rooms or areas in their school.
(304-7, 304-10)
See **Appendix 4**.
- use a scenario and select a graphic organizer to illustrate how the human body reacts to a change, and describe how each body system is involved in the maintenance of homeostasis.
Possible scenarios might include the following:
 - What happens to your body when you are frightened?
 - What happens to your body when you have a cold? Or the flu? (304-10)
 See **Appendix 5**.

Resources

Text

pp. 26-29

Text

pp. 40-41

In-School Video

The Ultimate Human Body

Animation

<http://health.howstuffworks.com/medical-animation-channel.htm>

Graphic Organizers

<http://www.ncrel.org/sdrs/areas/issues/students/learning/lr1grorg.htm>

<http://www.eduplace.com/graphicorganizer/>

Nutrition (~10 Classes)

Outcomes

Students will be expected to

- identify diseases/disorders that may result from insufficient essential nutrients (214-15)
- explain the importance of nutrition to the maintenance of homeostasis (317-3)
 - identify the six nutrients in food and their roles in the human body
- read and interpret nutritional labels
- explain the relationship between energy input, energy output and body weight
- select and use apparatus and materials safely (213-8)
- compile and organize data using appropriate formats and data treatments to facilitate interpretation (213-5)
 - perform an experiment to test for the presence of fats, starches, and sugars
 - perform a calorimetry experiment

Elaborations—Strategies for Learning and Teaching

Students should discuss the value of eating well and brainstorm the nutrients found in foods and liquids.

In groups, students could research the diseases or disorders that can occur should a nutrient be missing from a human's diet.

Answers could include the following:

- carbohydrate—anemia, low energy, lack of cell structure
- protein—amino acids not available for cell structure, resulting in weakened bones and muscles; lack of enzymes; absence of antibodies; slow healing and repair
- fat—low energy, lack of insulation, no cushion against injury, absence of hormones, deficiency in fat-soluble vitamins (A, D, E, K)
- mineral—calcium (osteoporosis), iron (anemia)
- vitamins—vitamin A (loss of night vision), vitamin C (scurvy)
- water—dehydration, fewer chemical reactions

Using Canada's Food Guide, answer the question, "How does my nutritional lifestyle choices link to health issues?" Disorders recommended to students could include the following:

- obesity
- anorexia/bulimia
- diabetes
- heart disease

Students should refer to the Canadian Nutrition Labelling System for help, then read a label and answer the question, "What is the nutrient information, nutrient amount, and % of daily value?" for a specified amount of food.

Students should understand the relationship among the number of calories found in foods, required calorie intake, and the way in which the body burns calories. Students are expected to compare foods with high nutritional value with empty-calorie foods, and understand their relationship to good health.

Given a variety of common foods (cooking oil, water, butter, carrots, cheese, apples, onions, bread) students should perform a laboratory investigation to test for the presence of fats, starches, and sugars. Students should organize their data in appropriate formats to facilitate data interpretation.

Given a food (cheesies) students should perform a calorimetry investigation to determine the quantity of stored energy in the food.

Nutrition

Tasks for Instruction and/or Assessment

Students may, for example,

Performance

- complete the “Nutrients” lab. (317-3, 213-5, 213-8)
See **Appendix 6.**
- complete the “Nutrition” Internet assignment. (317-3)
See **Appendix 8.**
- complete the “Energy from a cheesie” lab. (317-3, 213-5, 213-8)
See **Appendix 10.**

Journal

- select one of the above activities on nutrition and write a reflection assigned from the appendix. (317-3, 214-15, 213-5, 213-8)
See **Appendix 11.**

Paper and Pencil

- complete a graphic organizer to identify the six nutrients, naming three functions and three food sources for each. (317-3, 214-15, 213-5)
- complete the “Nutrition” assignment. (317-3, 213-5)
See **Appendix 7.**
- working in groups, gather nutritional information on a minimum of three fast-food/restaurant menus. (Some possible sources of this information would be the restaurants themselves, hospital dietitians, or the Internet). Then design what you think is the healthiest “take-out” meal plan for three days. How does your plan compare to the recommendations in Canada’s Food Guide? (317-3, 214-15, 213-5)
- complete the “Evaluating the Nutritional Content of Cereals” assignment. (317-3)
See **Appendix 9.**

Resources

Text

pp. 182-201

Health

pp.161-229

Health

pp.452-456

Diabetes

Health

pp. 486-489

Diet for Disease Prevention

Media Centre Videos

Breakfast: Most Important Meal of the Day

Carbs

Rental Video

Supersize Me

Canada’s Food Guide

http://www.hc-sc.gc.ca/fn-an/food-guide-aliment/fg_rainbow-arc_en_ciel_ga_e.html

Nutrition Labelling System

http://www.hc-sc.gc.ca/ahc-asc/media/nr-cp/2003/2003_01bk1_e.html

Medical Terminology

<http://kidshealth.org/kid/word/>

Calories

<http://home.howstuffworks.com/calorie.htm>

PEI Healthy Eating Alliance

<http://www.gov.pe.ca/peihea/index.php3?number=1006282&lang=E>

Graphic Organizers

<http://www.ncrel.org/sdrs/areas/issues/students/learning/lr1grorg.htm>

<http://www.eduplace.com/graphicorganizer/>

Digestive System (~6 Classes)

Outcomes

Students will be expected to

- explain how the human digestive system helps maintain homeostasis (317-1)
 - explain the purpose of the digestive system and how it functions
 - explain physical and chemical digestion
 - identify the major glands involved in digestion, and their main secretions, and investigate their role in the digestive process
- evaluate the impact of viral, bacterial, genetic, and environmental diseases on an organism's homeostasis (317-4)
 - evaluate disorders linked to the digestive system
- identify and describe science- and technology-based careers related to nutrition/digestion (117-7)

Elaborations—Strategies for Learning and Teaching

Students should explain the purpose of the digestive system, which is to convert large molecules into smaller ones capable of being utilized by the cells in the body. They should explore the meaning of body functions, and explain the pathway of food and organs involved in each:

- ingestion
- digestion
- absorption
- elimination

Students should explain similarities and differences between a physical change and a chemical change in food during digestion, giving examples of each.

Students could create a concept map identifying the following glands and/or glandular tissue and the main secretion(s) of each:

- salivary glands—secrete amylase for preliminary starch digestion
- glands in stomach lining—secrete mucus and gastric juice (contains pepsin and hydrochloric acid) for initial protein digestion
- liver—secretes bile to emulsify fats
- pancreas—secretes sodium bicarbonate to neutralize stomach acids and enzymes to act on proteins (proteases), carbohydrates (amylase) and fats (lipases)
- walls of small intestine—secrete juices that complete the digestion of carbohydrates, fats and proteins

Students should evaluate one of the following conditions and provide information on causes and possible cures/reliefs:

- | | |
|--------------------------|-----------------------------|
| - ulcers | - heartburn |
| - celiac | - lactose intolerance |
| - constipation/ diarrhea | - colitis, ileitis, Crohn's |
| - choking | - appendicitis |
| - salmonella | |

Students could research a career related to nutrition and digestion (e.g. nutritionist, dietitian, chef, herbalist, resident care worker, early childhood care educator).

Digestive System

Tasks for Instruction and/or Assessment

Students may, for example,

Performance

- complete the “Digestive Activities” lab. (317-1)
See **Appendix 12**.
- perform an activity to reinforce understanding of the steps in the digestive process. Students should imagine that they are eating a meal containing starches, proteins, and fats. They should think about what happens to each of these food molecules as they pass through the digestive tract. Choose one student to begin the process by naming the first digestive compartment (the mouth) and describing what happens to one of the food molecules in that location (e.g., chunks of protein are chewed by the teeth). Ask the next student to describe what happens to another type of food molecule in that same location (e.g., starch is broken down by amylase). Continue around the room naming compartments and processes until the end of the digestive tract is reached. (317-1)

Paper and Pencil

- create a flow chart of the digestive system (317-1)
See **Study Guide p. 56**.
- complete the “Digestive System Envelope” activity (317-1)
See **Appendix 13**.
- complete the “Digestive System Disorders” pamphlet. (317-1, 317-4)
See **Appendix 14 and Appendix 15**.
- explain how it is possible that individuals who have had much or even all of their digestive systems damaged or diseased can still survive. (317-1, 317-4)
- explain how a patient would have to modify his/her diet after having surgery to remove the gall bladder. (317-1, 317-3)

Presentation

- in a photo essay, demonstrate how nutrition relates to the career you researched. (117-7)

Resources

Text

pp. 202-219

Study Guide

p. 56

Health

pp. 142-143

Health

pp. 411

Salmonella

Medical Terminology

<http://kidshealth.org/kid/word/>

Career Research

<http://www.hollandcollege.com/FactSheets/FullTimePrograms.htm>

<http://jobfutures.ca/fos/browse-programs-alphabet.shtml>

<http://skills.edu.gov.on.ca/OSPWeb/jsp/en/NOCListing.jsp?sort=N>

Circulatory System (~10 Classes)

Outcomes

Students will be expected to

- explain how the human circulatory system helps maintain homeostasis (317-1)
 - explain the purpose of the “transportation” system in humans
 - describe the structure of the human heart
 - trace the flow of blood through the human heart and describe the pulmonary and systemic pathways

- describe the structure and function of blood vessels, and factors that influences the flow of blood

- describe how the use of prescription and nonprescription drugs and environmental factors can disrupt or help maintain homeostasis (317-6, 317-7)

Elaborations—Strategies for Learning and Teaching

Students should understand that all organisms have some mechanism to circulate materials and dispose of wastes. Humans require a specialized transport system in order to ensure that all cells have access to materials required for survival and for the removal of wastes, so that they maintain equilibrium.

Students should observe the principal features of the circulatory system, utilizing models, dissections, or computer simulations, and identify those structures through the use of drawings or photographs. In addition, during this process they should observe and appreciate how the structures control the direction of blood flow through a human heart; observe a mammalian heart, using preserved specimens, models, or computer simulations to clarify how the structure of the heart allows it to function as a mechanical pump; and discuss the mechanics and sounds of the heartbeat in relation to its role.

To further understand the structure and function of the human heart, students could be engaged in a dissection of a pig’s heart. Along with other learning opportunities, this activity will help students better understand how the structure and texture of heart tissue facilitate its function.

Students should identify the difference in the physical structure of an artery, a vein, and a capillary, as well as the unique role each has in blood circulation.

Students should describe the effects of external factors (temperature, caffeine, smoking) on peripheral blood flow. For example, smoking causes increased heart rate and heightened blood pressure due to decreased amounts of oxygen reaching the heart.

Circulatory System

Tasks for Instruction and/or Assessment

Students may, for example,

Performance

- perform a pig's heart dissection. (317-1, 213-5, 213-8)
Note: A local abattoir can provide sample hearts.

Paper and Pencil

- use a "K-W-L" graphic organizer as an introduction to the study of the heart. (317-1, 213-5)
- investigate the human heart by using the "Circulatory System" Internet assignment. (317-1)
See Appendix 16.
- play "The Pathway of Blood" board game to review the circulatory system. (317-1)
See Appendix 17.
- use a "T-Chart" graphic organizer to compare arteries and veins. (317-1, 213-5)

Resources

Text

pp. 222-241

Health

pp. 144-145

Media Centre Video:

*Human Body Series:
Circulation System*

Graphic Organizers

<http://www.ncrel.org/sdrs/areas/issues/students/learning/lr1grorg.htm>

<http://www.eduplace.com/graphicorganizer/>

Web sites

<http://health.howstuffworks.com/adam-200083.htm>

<http://science.howstuffworks.com/heart.htm>

<http://health.howstuffworks.com/blood1.htm>

Circulatory System *(continued)*

Outcomes

Students will be expected to

- design an experiment and identify specific variables (212-6)
- compile and organize data using appropriate formats and data treatments to facilitate interpretation (213-5)
- select and use appropriate numeric, symbolic, graphical, and linguistic modes of representation to communicate ideas, plans, and results (215-2)

- evaluate the impact of viral, bacterial, genetic, and environmental diseases on an organism's homeostasis (317-4)
 - evaluate disorders linked to the circulatory system

- propose alternative solutions to a given practical problem (disease/disorder) that may result from lifestyle choices, and select one as a basis for a plan (214-15)

- analyse why and how a particular technology related to the treatment of circulatory disorders was developed and improved over time (115-5)

Elaborations—Strategies for Learning and Teaching

Outcomes 212-6, 213-5, and 215-2 can be addressed as a group by having students design an experiment in which they measure the blood pressure of their classmates (systolic and diastolic) to investigate the effects of variables such as posture, exercise, or other factors on blood pressure. Group or class data can be organized and displayed in graph or table form.

Please note: The following three outcomes (317-4, 214-15, 115-5) may be addressed as a group.

Students should investigate disorders related to the circulatory system, such as varicose veins, heart murmur, aneurysm, blood clots, heart attack, stroke, arrhythmia, hypertension, atherosclerosis, high blood pressure, and elevated cholesterol.

Students should research, assess, and debate the short-term and long-term effects of lifestyle choices on the circulation system. Topics to consider may include: steroids, energy drinks (Red Bull, Mountain Dew), lack of exercise, stress, sleep loss, and high-cholesterol foods.

Student should research the specific pathologies of the circulatory system caused by circulatory disorders, along with the capability of technology to diagnose, treat, or cure the problem (stethoscope, angioplasty, clot-busting drugs). They should also discuss the role technology plays in enhancing performance, such as in blood doping.

Circulatory System *(continued)*

Tasks for Instruction and/or Assessment

Students may, for example,

Performance

- complete the “Investigating Pulse Rate” lab to explore the concepts of heart rate and maintenance of equilibrium. (212-6, 213-5, 215-2, 317-1)

See Appendix 18.

- perform a lab activity that measures blood pressure, and illustrate the relationship between blood pressure and activity. Also, students can compare their blood pressure to the normal range. (212-6, 213-5, 215-2, 317-1)

Presentation

- research and present, in a variety of formats, information about disorders linked to the circulatory system, and modern methods of diagnosis and treatment. (317-4)
- invite to the classroom individuals knowledgeable in circulatory pathologies such as physicians, representatives from relevant organizations (e.g. Heart and Stroke Foundation), sufferers of circulation disorders, or transplant recipients. (214-15, 317-1, 317-4)
- research and prepare questions related to the topic being presented by a guest speaker. Working in groups, review and revise the questions and select some to be asked during the presentation. Following the presentation, prepare a brief summary of it, or of the answers to your question(s). (214-15, 317-1, 317-4)

Paper and Pencil

- explain why some doctors recommend that heart patients take one tablet of ASA a day. (214-15, 115-5)

Resources

Text

pp. 222-241

Health

pp. 458-471
Disorders

Animation

[http://
health.howstuffworks.com/
medical-animation-channel.htm](http://health.howstuffworks.com/medical-animation-channel.htm)

Blood and Immunity (~8 Classes)

Outcomes

Students will be expected to

- explain how blood in the human circulatory system helps maintain homeostasis (317-1)
 - explain the role of the main components of blood

- evaluate the impact of viral, bacterial, genetic, and environmental diseases on an organism's homeostasis (317-4)
 - evaluate disorders associated with blood

- analyse from a variety of perspectives the risks and benefits of blood storage, disposal, and transfusions (118-2)

- identify and describe science- and technology-based careers related to blood and circulation (117-7)

Elaborations— Strategies for Learning and Teaching

Students should discuss and explain the functions of blood and each of its components.

- red blood cells
- white blood cells
- platelets
- plasma

Students should evaluate several blood disorders or diseases:

- leukemia
- anemia
- hepatitis
- malaria
- hemophilia
- HIV
- West Nile virus

Students should research the role blood typing plays in blood transfusions, and why specific blood types are not compatible. They should understand the importance of blood screening, analyse the dangers associated with improper screening and disposal of blood, and recognize the need for protection from bio-hazards.

Students should research a career related to blood circulation (e.g. cardiovascular technologist, medical laboratory technician or technologist, electrocardiographic technician, licensed practical nurse or nurses aide, orderly).

Blood and Immunity

Tasks for Instruction and/or Assessment

Students may, for example,

Performance

- complete the “How Can Blood Disease Be Identified” lab. (317-1, 317-4)
See Lab Manual p. 95.
- complete the “Who’s Blood Type Can’t Be Mixed” lab. (317-1, 118-2)
See Lab Manual p. 99.
- visit Canadian Blood Services in Charlottetown to investigate the blood and plasma donation process. (117-7, 118-2, 317-1, 317-4)

Journal

- be asked, “Would you ever consider being a blood donor?” Explain. (118-2)

Presentation

- research and present, in a variety of formats, information about disorders linked to blood, and modern methods of diagnosis and treatment. (317-1, 317-4, 213-5)
- invite to the classroom individuals knowledgeable in blood disorders, such as physicians, representatives from relevant organizations (e.g., AIDSPEI), or sufferers of blood disorders/diseases. (317-1, 317-4)
- research and prepare questions related to the topic being presented by a guest speaker. (317-1, 317-4)
- present on the education /training and job prospects for the careers they selected. (317-1, 117-7)

Resources

Text

pp. 244-255

Health

pp. 404-405

Disorders/diseases

Health

pp. 473

Cancer

Health

pp. 433-439

AIDS

Health

pp. 192

Anemia

Media Centre Video

Circulatory System: The Plasma Pipeline

AIDSPEI

<http://www.aidspei.com/staff.htm>

The Nobel Prize in Physiology on Medicine – Educational:
<http://nobelprize.org/medicine/educational/index.html>

Web sites

<http://health.howstuffworks.com/blood2.htm>

Public Health Agency of Canada

<http://www.phac-aspc.gc.ca/id-mi/index.html>

Canadian Blood Services

Prince Edward Island:

85 Fitzroy Street

Charlottetown, Prince Edward Island

C1A 1R6

Tel.: (902) 892-3700

Blood and Immunity (*continued*)

Outcomes

Students will be expected to

- explain how the human immune system helps maintain homeostasis (317-1)
 - identify the first and second lines of defence
 - in general, explain how the immune system recognizes and destroys foreign agents

- predict the impact of environmental factors such as allergens on the homeostasis within an organism (317-6)
- evaluate the impact of viral, bacterial, genetic, and environmental diseases on an organism's homeostasis (317-4)
 - evaluate disorders linked to the immune system

- analyse from a variety of perspectives the benefits to society and the environment of applying scientific knowledge or introducing a particular technology (118-2)

Elaborations—Strategies for Learning and Teaching

Students should identify the non-specific first line defences, including both physical and chemical barriers such as skin, tears, sweat, and stomach acids. Also, they should explain how the second line of defence—white blood cells, with the production of antibodies in reaction to antigens, and various forms of acquired immunity, both passive (breast milk) and active (actual exposure, vaccines) or—second line defenses—contributes to a person's well-being.

Students should examine how a properly functioning immune system is essential for health and well-being, and recognize the consequences when the immune system does not function properly. They should become aware of the sequence of general physiological events that result in an allergic reaction, and identify the resulting symptoms. The typical symptoms of runny nose, swollen eyes, sneezing, coughing, and rash are caused by a release of highly active substances, including histamine, from body cells at the site of the immune reaction (production of special antibodies against the allergen). Histamine induces an inflammatory reaction, as it does whenever there is an injury or infection. Students should be able to describe how allergic responses affect the maintenance of homeostasis within an organism. This may be accomplished by answering the following questions: How would the body of a non-allergic or non-sensitive individual respond to the presence of an allergen (pollen)? How would an allergic individual respond?

Analyse how vaccines make use of the workings of the immune system in order to be effective. Studying the requirements (interest and financial resources) that society has to support the prevention or the spread of disease-causing organisms/viruses such as HIV, staphylococcus, and smallpox. Some herbal supplements (e.g., Echinacea) claim that they boost the immune system. Investigate these claims. Research the antioxidant (chemical altering of free radicals) nature of vitamins E, and C, and beta-carotene, and the relevance of this to the health of the human population (e.g., links with cancer and cardiovascular disease).

Blood and Immunity (*continued*)

Tasks for Instruction and/or Assessment

Students may, for example,

Performance

- perform an activity to reinforce the importance of the first line of defence (handwashing activity with Glo Germ Gel or Glitter). (317-1)

Journal

- reflect on what you have learned about immunity, and speculate about how future behaviour may be influenced. (317-1, 317-4, 317-6, 118-2)

Presentation

- investigate the natural response of the body to a bacterial infection or a viral disease, such as a cold or the flu or investigate the mechanism of transplant rejection. Present findings. (317-1, 317-4, 317-6)
- create a visual display (chart or sketch) to illustrate the role of each of the components of the body's defence system. (317-1, 317-4, 317-6, 213-5)

Paper and Pencil

- investigate the family kitchen, bathroom, and laundry room and list all antibacterial products in each. (118-2)
- conduct a survey of the prevalence and variety of allergies within the school population, and the remedies used to alleviate symptoms. Data could be tabulated, graphed by hand or by utilizing available technology, and presented via a bulletin board display for the school population. (118-2, 213-5, 214-15, 317-1, 317-6)
- select an herbal supplement or vitamin and investigate its effect on the functioning of the immune system. Prepare a poster for display. Include both natural and synthetic sources of these products. (213-5, 317-1, 118-2)

Resources

Text

pp. 256-261

Health

pp. 150-151

Health

pp. 400-414
Disorders/diseases

In-School Video

The Ultimate Human Body

Glo Germ Products

<http://germwise.com/glogermproducts.html>

Web sites

<http://health.howstuffworks.com/immune-system.htm>

<http://health.howstuffworks.com/adam-200095.htm>

Respiratory System (~5 Classes)

Outcomes

Students will be expected to

- explain how the human respiratory system helps maintain homeostasis (317-1)
 - explain the need for a respiratory surface
 - describe features that provide for efficient gas exchange in humans, including nasal hair, cilia, mucous membranes, large surface area of alveoli, cartilaginous rings in airway, and epiglottis
 - investigate the mechanics of inhalation-exhalation and regulation of the breathing cycle
- design an experiment and identify specific variables (212-6)
- select and use apparatus and materials safely (213-8)
- compile and organize data using appropriate formats and data treatments to facilitate interpretation (213-5)

Elaborations—Strategies for Learning and Teaching

Students should understand that all organisms require a respiratory surface for gas exchange and the provision of oxygen for respiration at the cellular level. They should observe the principal features of the respiratory system, utilizing models or computer simulations, and identify the structures.

As an engaging activity, students could construct an animated video to illustrate the functioning of the diaphragm during respiration. A popular design involves the use of a bell jar, balloons to represent lungs, and a membrane for the diaphragm.

The adjacent outcomes can be addressed as a group by having students design and perform experiments to investigate the variables associated with respiratory volume and vital capacity—using a spirometer and/or measurement of breathing rates at different times, often rest or activity. Student could research the design of a spirometer and construct a spirometer from available materials (plastic tray, 2 L plastic container, tubing, etc.)

Students should compile individual and class data and organize it in tabular and graphic form by hand or by using available technology. They can compare the lung capacities of different groups of individuals in the class depending upon the class demographics: smokers and non-smokers, athletes and non-athletes, asthmatics and non-asthmatics, males and females.

Ensure that students are aware that interpretation of statistical data from small sample sizes may not reflect the true nature of the general population.

Respiratory System

Tasks for Instruction and/or Assessment

Students may, for example,

Performance

- perform activities designed to illustrate some features of the respiratory system. Activities may include the following:
 - development of an animated video illustrating the effect of the diaphragm (317-1, 215-2)
 - completion of the “Human Respiratory System” lab on lung volume and vital capacity (317-1, 212-6, 213-8, 213-5)**See Appendix 19.**

Resources

Text

pp. 267-273

Health

pp. 148-149

Media Centre Video

*Respiratory System:
Intake and Exhaust*

Web sites

[http://
health.howstuffworks.com/
adam-200020.htm](http://health.howstuffworks.com/adam-200020.htm)

Respiratory System (continued)

Outcomes

Students will be expected to

- evaluate the impact of viral, bacterial, genetic, and environmental diseases on an organism's homeostasis (317-4)
 - evaluate disorders linked to the respiratory system
- predict the impact of environmental factors such as allergens on homeostasis within an organism (317-6)
- construct arguments to support a decision or judgment, using examples and evidence and recognizing various perspectives (118-6)
- distinguish between questions that can be answered by science and those that cannot, and between problems that can be solved by technology and those that cannot (118-8)
- identify and describe science- and technology-based careers related to respiration (117-7)

Elaborations—Strategies for Learning and Teaching

Students should evaluate the specific pathologies of the respiratory system caused by respiratory disorders, and research the capability of technology to diagnose, treat, or cure the problems. Disorders to investigate could include bronchitis, emphysema, lung cancer, asthma, cystic fibrosis, and pneumonia.

Students should discuss the impact of environmental factors on the respiratory system of an asthmatic. Factors to consider may include cigarette smoke, allergens (pollen, dust, mold, food), petrochemical fumes, carbon monoxide, and perfumes. Discuss other environmental concerns related to respiratory difficulties, such as sick building syndrome and smog, and examine the positive impact of scent-free policies and anti-smoking legislation.

Students should research, construct arguments and debate social, technological, and scientific questions that relate to the respiratory system. Should smoking be allowed in public places? Should tobacco companies be permitted to sponsor sporting events? Should tobacco advertising be permitted? Should schools provide their students with a smoking area?

Students should research a career related to respiratory issues (e.g., microbiologist, respiratory therapist, environmental technician).

Respiratory System (continued)

Tasks for Instruction and/or Assessment

Students may, for example,

Performance

- complete the “Breathing” Lab. (317-4, 317-6)
See Appendix 20.
- complete the “Respiratory Diseases and Disorders” Internet activity. (317-4, 317-6, 213-5)
See Appendix 21.

Journal

- identify what factors might be responsible for differences in the incidence of respiratory ailments such as bronchitis (bronchitis is much more prevalent in urban than rural environments). (317-4, 317-6)
- complete reflections on the careers researched. (117-7)

Presentation

- within a debate format, display the results of research and “argue” against other stakeholders about selected issues. Should smoking be allowed in public places? Should tobacco companies be permitted to sponsor sporting events? Should tobacco advertising be permitted? In some provinces, young people cannot purchase cigarettes until the age of 19, yet it is not illegal to smoke at a younger age. Is this hypocritical? Should schools provide their students with a smoking area? Sectors of society that will be considered may include lung cancer victims, executives from a tobacco company, students, smokers, and/or clean air activists. Assess the participation of selected students, preparation of the argument, and thoroughness of the research. (118-6, 118-8, 317-6, 317-4)
- invite to the classroom individuals knowledgeable in respiratory pathologies, such as physicians, representatives of relevant organizations (e.g., Lung Association, Canadian Cancer Society), or sufferers of respiratory disorders. (317-1, 317-4, 317-6, 117-7, 118-6, 118-8)

Resources

Text

pp. 267-273

P.E.I. Lung Association Video

Barb Tarbox

PEI Lung Association

<http://www.pei.lung.ca/>

PEI Cancer Society

http://www.pei.cancer.ca/ccs/internet/frontdoor/0,,3596___langId-en,00.html

Cystic Fibrosis Kit

<http://www.cysticfibrosis.ca>

Web site

<http://www.lung.ca>

Excretory System (~3 Classes)

Outcomes

Students will be expected to

- explain how the human excretory system helps maintain homeostasis (317-1)
 - describe the main structures of the human urinary system
 - explain the role of the kidney as an excretory organ in removing metabolic waste
 - explain the role of the skin as an excretory organ in removing metabolic waste

- evaluate the impact of viral, bacterial, genetic, and environmental diseases on an organism's homeostasis (317-4)
 - evaluate disorders linked to the excretory system
- analyse why and how a particular technology related to the treatment of excretory disorders was developed and improved over time (115-5)
 - describe the role technology has in kidney treatment
- describe how the use of prescription and nonprescription drugs can disrupt or help maintain homeostasis (317-7)
 - describe the success of kidney transplants in relation to the development and use of present anti-rejection drugs.

- identify multiple perspectives that influence a science-related decision or issue (215-4)

Elaborations—Strategies for Learning and Teaching

Students should understand that the excretory system maintains homeostasis with respect to water, salt, and metabolite concentrations within the blood. They should observe the principal features of the human excretory system, utilizing models, dissection, or computer simulations, and learn to identify those structures in drawings or photographs. Structures to be examined include the kidney, nephron, ureter, bladder, and urethra. Students should explain the role of excretory organs (kidney and skin) in removing metabolic waste.

The adjacent three outcomes can be addressed as a group. Students should discuss disorders related to kidney function including diabetes, nephritis, antibiotic resistance, kidney stones, kidney infection, bladder infection, and skin cancer. They should discuss the impact of diabetes on kidney function, and understand how kidney shutdown or renal failure may result from a variety of conditions and can lead to many deleterious effects—including abnormal concentrations of salt and water, altered pH and general deterioration of homeostasis.

Ideally, dialysis is a temporary measure used to replace normal kidney functioning until damaged kidneys begin to function again on their own, or in more serious cases, until a transplant becomes available.

Students should understand that recent successes in organ transplantation are due, in part, to developments in the production of effective anti-rejection drugs.

Teachers may want to engage students in one or both case studies from the *Organ & Tissue Donation and Transplantation* resource: “Transplantation Assessment (Kidney)” and “Commercialization (Kidney)”. These activities would also address, in part, outcome 115-5.

Excretory System

Tasks for Instruction and/or Assessment

Students may, for example,

Performance

- complete the “What Chemicals Can Be Detected in Your Urine” lab. (317-1, 213-5, 213-8)
See Text p. 278, and Appendix 22 (for urine making instructions).
- given a case study, debate which of two individuals should first receive a kidney transplant. (215-4, 115-5, 317-4, 317-7)
See the *Organ & Tissue Donation and Transplantation* resource for case studies, background documents, and assessment tools.

Journal

- explain the effect a non-functioning bladder would have on your lifestyle. (317-1, 317-4)
- explain what concerns you would expect a potential kidney donor to have. (115-5, 317-7)
- explain why the consumption of alcohol or caffeine induces more trips to the washroom than does the consumption of water alone. (317-1)

Paper and Pencil

- research information about kidney dialysis. Why is it used? What type of person is a dialysis candidate? What different methods are available? What complications are possible? (317-4, 115-5, 317-7)

Presentation

- invite to the classroom individuals knowledgeable in excretory pathologies, such as physicians, representatives from relevant organizations, (e.g, Kidney Foundation), sufferers of excretory disorders, dialysis patients, and/or transplant recipients. Research and prepare questions for the guest speaker. Work in a group to review and revise the questions to be asked during the presentation. Following the presentation, prepare a brief summary of the presentation, or of the answers to questions. (317- 1, 317-4, 117-7)

Resources

Text

pp. 274-283

Health

pp. 146-147

Media Centre Video

Human Body: Excretory System

Organ and Tissue Donation and Transplantation

<http://www.transplant.ca/CATwebpresentation.ppt>

Organ & Tissue Donation and Transplantation

case study: “Transplantation Assessment (Kidney)”

case study: “Commercialization (Kidney)”

Skeletal System (~4 classes)

Outcomes

Students will be expected to

- explain how the human skeletal system helps maintain homeostasis (371-1)
 - describe the functions of the skeletal system
 - identify the major bones, using common and scientific names
 - describe how bones grow
 - identify and describe the types of bone tissue
 - describe the types of joints

- evaluate the impact of viral, bacterial, genetic, and environmental diseases on an organism's homeostasis (317-4)
 - describe disorders linked to the skeletal system

- analyse why and how a particular technology related to the treatment of skeletal disorders was developed and improved over time (115-5)

Elaborations— Strategies for Learning and Teaching

Students should observe the principal features of the human skeletal system, utilizing models or computer simulations, and learn to identify those structures in drawings or photographs.

Students should explain the function of the skeletal system and identify the major bones (cranium, mandible, clavicle, scapula, sternum, humerus, rib, vertebrae, ulna, radius, carpals, phalanges, ilium, sacrum, ischium, femur, patella, fibula, tibia, tarsals), using common and scientific names. They should compare the growth of bone throughout the stages of life, and describe the role of each of the following types of bone tissue:

cartilage	spongy bone	solid bone
ligaments	marrow	outer membrane

Students should describe the types of joints and their role in movement.

Students should investigate skeletal disorders such as stress fractures, osteoporosis, and arthritis. They should analyse treatments for such disorders (e.g., artificial joints, casts, bone marrow transplants, nutritional changes, supplements).

Skeletal System

Tasks for Instruction and/or Assessment

Students may, for example,

Performance

- complete the “What Causes Sports Injuries” activity. (317-4)
See **Lab Manual pp. 111-114.**

Journal

- explain how the need for movement in humans led to the development of treatments for skeletal disorders. (317-4, 115-5)

Paper and Pencil

- complete the “Role of the Skeleton” activity. (317-1)
See **Study Guide p. 80.**
- complete the “Name These Bones” activity using both scientific and common names. (317-1)
See **Appendix 23.**
- create a skeletal model which replicates the body’s major bones. (317-1, 214-3)

Presentation

- view the slide show presentation “Joints” and create a chart listing characteristics of each type of joints. (317-1)
See **TR-CD.**

Resources

Text

pp. 285-291

Health

pp. 136-137

Health

p. 253
Disorders

In-School Video

The Ultimate Human Body

Media Centre Videos

The Human Body: Skeletal System

Skeletal System: The Infrastructure

Muscular System (~3 Classes)

Outcomes

Students will be expected to

- explain how the human muscular system helps maintain homeostasis (317-1)
 - compare the three types of muscles
 - explain how the muscles move the body

- evaluate the impact of viral, bacterial, genetic, and environmental diseases on an organisms homeostasis (muscular system) (317-4)
 - describe the disorders and injuries linked to the muscular system

- debate the merits of a drug related technological endeavour and how it impacts muscular performance (117-4)
- develop, present, and defend a position or course of action, based on findings (215-5)

- identify and describe science- and technology-based careers related to movement (117-7)

Elaborations—Strategies for Learning and Teaching

Students should describe the structure and function of each type of muscle—skeletal, smooth, and cardiac. They should identify which types are voluntary, and which are involuntary, and discuss the importance of the cardiac muscle in maintaining homeostasis.

By exploring contractions and extensions of complementary muscles, as well as the role of tendons and ligaments, students should come to understand how the skeletal and muscular systems work together.

Students should investigate disorders/injuries of the muscular system:

muscular dystrophy	tendonitis	cramps
strains	shin splints	muscle tears
gout	dehydration	heat stroke
lactic acid build-up		

They should brainstorm the importance of fitness and the impact of cardio- and weight-training on movement and the prevention of injury.

The two adjacent outcomes can be addressed as a group by having students select a particular performance-enhancing drug and complete a presentation on the drug and its effects on muscular performance and homeostasis in general.

Students should identify and describe science- and technology-based careers related to movement. They could interview a person in a career related to physical fitness such as physical education teacher, physical fitness instructor, sport and leisure manager, recreation administrator, personal trainer, golf course technician, or physiotherapist.

Muscular System

Tasks for Instruction and/or Assessment

Students may, for example,

Performance (Laboratory)

- visit a weight room and design a workout of 10 different lifts targeting 10 different muscles. (317-1, 213-8, 215-5)
See **Health p. 249.**
- complete the “Muscle Lab: Muscle Fatigue” activity. (317-1, 213-8, 215-5)
See **Appendix 25.**

Journal

- consider why a doctor might say “A broken ankle is better than a sprained ankle”. (317-4)

Paper and Pencil

- complete the “Skeletal and Muscular” assignment. (317-1)
See **Appendix 24.**
- complete the “Bone and Muscle Problem” activities. (317-1)
See **Study Guide p. 83.**

Presentation

- explain a body movement by describing the muscles involved in the power phase and relaxation phase. (317-1, 215-5)
- invite a guest to speak on fitness, or complete a field trip to a fitness centre. (317-1, 317-4)
- design a poster containing the information discovered about performance enhancing drugs. (117-4, 215-5)
- complete an oral presentation on the skills needed to be successful in the career of a person interviewed. (117-7, 215-5)

Resources

Text

pp. 292-297

Health

pp. 231-263

Fitness

Health

pp. 253-255

Sports injuries

Media Centre Videos

The Human Body: Muscular System

Human Physiology: Muscular System

Web site

<http://>

[health.howstuffworks.com/](http://health.howstuffworks.com/muscle.htm)

[muscle.htm](http://health.howstuffworks.com/muscle.htm)

Nervous System (~6 classes)

Outcomes

Students will be expected to

- explain how the human nervous system helps maintain homeostasis (317-1)
 - describe the basic structure and function of neurons
 - explain the role of sensory neurons, motor neurons, and interneurons
 - describe the transmission of an impulse along the length of a neuron and across a synapse
 - identify the three main parts of the nervous system
 - explain the basic structure and function of the central nervous system

- analyse reflex actions and their role in homeostasis

Elaborations—Strategies for Learning and Teaching

Students should recognize that the nervous system is responsible for receiving information from internal and external stimuli and for responding quickly to that information.

Students should describe the four requirements that are necessary for a nervous response to occur: sensory receptors to detect a stimulus (skin, eye, ear); a system for impulse transmission (neurons); the capacity to interpret and analyse of impulses (brain, spinal cord); and an effector (muscle, gland) to carry out the response.

Students should observe the principal features of the brain, using models, dissected mammalian brains, or computer simulations. They should identify and label major physical structures in drawings or photos (e.g., cerebrum, cerebellum, medulla, spinal cord), and understand the function of each.

Students could investigate the physiology of reflex arcs (pupil dilation, knee-jerk reaction, reaction time, Babinsky effect, Achilles reflex) and describe the four common features of reflexes (involuntary, quick, may or may not involve the brain, helpful).

Nervous System

Tasks for Instruction and/or Assessment

Students may, for example,

Performance

- Complete the “Which Brain Side Is Dominant?” lab. (317-1, 213-5)
See Lab Manual, p. 119.
- Complete the “The Eye” lab. (317-1, 213-5)
See Appendix 26.
- Complete the “How Can You Test Your Senses?” lab. (317-1, 213-5)
See Lab Manual, p. 127.
- Complete the “Testing Reflexes and Reaction Time” lab. (317-1, 213-5, 213-6)
See Appendix 27.
- Complete the “Nervous System” Internet assignment. (317-1, 213-3)
See Appendix 28.

Paper and Pencil

- Construct a flowchart that shows the path of a reflex arc. (317-1, 213-5)

Resources

Text

pp. 312-319

Health

pp. 140-141

Nervous System *(continued)*

Outcomes

Students will be expected to

- evaluate the impact of viral, bacterial, genetic, and environmental diseases on an organism's homeostasis (317-4)
 - describe disorders linked to the nervous system
- analyse why and how technologies related to the treatment of nervous system disorders were developed and improved over time (115-5)
- describe how the use of prescription and non-prescription drugs can disrupt or help maintain homeostasis (317-7)

Elaborations—Strategies for Learning and Teaching

Students should investigate the physiological basis and causes of neurological diseases (e.g., Alzheimer's, Parkinson's, epilepsy, Tourette syndrome, ALS, Huntington's, multiple sclerosis, polio, stroke, and Bell's palsy). They should also evaluate the consequences of damage or injury to the nervous system (e.g., stroke, spinal injury, hearing and vision loss).

Students should investigate the research being done on innovative treatments for stroke and spinal injury, and the potential these have for the improvement of the lifestyle of victims of these conditions. They could also investigate the neurological and physiological basis for the effectiveness of acupuncture, and for the production of a "runner's high".

Students should investigate how nerve poisons interfere with synaptic transmission (e.g., curare, botulism, tetanus, organophosphate sticides, nerve gas). They should also analyse evidence concerning the influence of anaesthetics, drugs, and chemicals (natural and synthetic) on the functioning of the nervous system.

Nervous System *(continued)*

Tasks for Instruction and/or Assessment

Students may, for example,

Paper and Pencil

- select a nervous system injury. Research the modern treatments for it. Make a brief presentation to the class and submit a written report. (115-5, 317-1, 317-4, 317-7)
 - select a particular pharmaceutical or drug to investigate. Include the sources of the chemical, medical or non-medical uses, effects and any other appropriate information. Present information to the class. (115-5, 317-7)
 - view the movie *Awakenings* and complete the response sheet. (317-4, 317-7)
- See Appendix 29.**
- research the effects of drugs (e.g. codeine, heroin, caffeine) on the synapse. Discuss findings in the form of a magazine article. (317-1, 317-7)

Presentation

- research neurological disorders by using community resources such as physicians, organizations (e.g., Alzheimer's Society, Parkinson's Foundation, Heart and Stroke Foundation, Canadian Mental Health Association, Multiple Sclerosis Society), sufferers of neurological disorders, or caregivers of those who suffer these disorders. (317-1, 317-4, 317-7)
- research and prepare questions for an individual knowledgeable in the role played by drugs (prescription and non-prescription, legal and illegal) in the maintenance of homeostasis within the human system. Use community resources such as physicians, pharmacists, and representatives from available organizations. (317-1, 317-4, 317-7)
- working within their assigned groups, research a selected substance (chocolate, nerve gas, chemical drug) or procedure (acupuncture) that affects the nervous system.
Report to the class on the physiological effects of the substance or procedure on the nervous system, using an overhead, a slide presentation, or a jigsaw activity. (317-1, 317-4, 317-7)
- invite a radiologist/X-ray technologist to give a presentation on MRI, CAT scan, or EEG. Research and prepare questions related to the topic. Working in groups, review and revise questions to be asked during the presentation. Following the presentation, prepare a brief summary of the answers given. (115-5)

Resources

Text

pp. 312-319

Health

pp. 140-141

Speakers

Department of Education and
Early Childhood Development
Specialists
HEAR
Visually Impaired

Media Center Video

W-Five Series: Deadly Prescription
(topic—OxyContin)

Rental Video

Awakenings

Endocrine System (~2 Classes)

Outcomes

Students will be expected to

- explain how human endocrine systems help maintain homeostasis (317-1)
 - understand the general concept of a hormone and target cell or organ
 - identify the location and function of principal endocrine glands including pituitary, thyroid, parathyroid, adrenal, pancreas, ovaries, and testes
 - describe the regulation of blood sugar by controlled release of insulin and glucagon, and explain the consequences of any malfunction

- analyse examples of Canadian contributions to science and technology (117-11)
 - investigate the role played by Frederick Banting and Charles Best in the discovery of insulin

- evaluate the impact of viral, bacterial, genetic, and environmental diseases on an organism's homeostasis (317-4)
 - describe disorders linked to the endocrine system

Elaborations—Strategies for Learning and Teaching

Students should recognize that the human endocrine system releases chemical hormones into the blood to be circulated to help maintain homeostasis by causing or preventing change in specific organs or tissues of the body. The endocrine system is slower in producing an effect than the nervous system. However, it has a more sustained effect. It is important to recognize that the nervous system and endocrine system work together in a co-ordinated fashion.

Students should observe the principal organs of the endocrine system, utilizing models or computer simulations. They should be able to identify and label these glands, using drawings or photographs.

Students could research and summarize the main hormonal and nervous components of reactions to stress, and discuss why some individuals may experience the following symptoms when they are nervous: cool hands, knots in the stomach, dilated pupils, dry mouth, and/or rapid heart rate.

Students should describe Canadian contributions to the understanding of the endocrine system, such as the research of Frederick Banting and Charles Best and their discovery of insulin for the control of diabetes.

Students could evaluate and compare juvenile diabetes and adult-onset diabetes, considering such factors as age of onset, cause, severity, and method of treatment. They could research and present finding on methods used in the detection, treatment, and control of diabetes—e.g., the roles played by diet, exercise, and culture (some populations).

Endocrine System

Tasks for Instruction and/or Assessment

Students may, for example,

Paper and Pencil

- complete the “Role of the Endocrine System” activity. (317-1)
See **Study Guide, p. 58.**
- select a hormone and investigate the effects of its oversecretion and undersecretion in the body. Prepare a visual display to illustrate findings. Include HGH, aldosterone, cortisol, thyroxine, insulin and glucagon. (317-1, 317-4)
- research steroid use and do a presentation showing how this technology is helpful, how, it is harmful, and when it is banned. (317-1, 317-4)
- prepare a short report on the role played by Canadian researchers Frederick Banting and Charles Best in the discovery of insulin. (117-11, 317-1)

Presentation

- debate one or all of the following questions:
“Should doctors prescribe HGH as a treatment for individuals who have normal levels of human growth hormone in their system, yet are genetically shorter than average?”
“Should steroids be legalized for use by all athletes?”
“Should random drug testing of workers be permitted, or is it an invasion of privacy?”
“Should hormones be used in the food industry to increase yield or size?”
“What are the advantages and disadvantages of stress?”
(117-4, 118-6, 118-8, 317-1, 317-4)

Resources

Text

pp. 320-324

Health

pp. 152-153

Health

Steroids

pp. 252

National Institute on Drug Abuse (Steroids)

<http://teens.drugabuse.gov/utilities/resources.asp>

Canadian Diabetes Association

http://www.diabetes.ca/section_about/index.asp

Reproductive Systems (~6 Classes)

Outcomes

Students will be expected to

- analyse and describe the structure and function of female and male reproductive systems (313-3)
 - define sexual reproduction and identify the differences between egg and sperm
 - identify the structures of the male reproductive systems and describe their functions
 - identify testosterone as the principal reproductive hormone in males, and describe its roles
 - identify the structures of the female reproductive system, and describe their functions
 - identify estrogen and progesterone as the principal reproductive hormones of females, and describe their roles
- identify and describe science- and technology-based careers related to reproduction (117-7)

Elaborations—Strategies for Learning and Teaching

Please note: The structure and function of the male and female reproduction system is addressed in the grade 7-9 health curriculum; however, it is a component of the curriculum in which students elect to engage. Therefore, not all students would be expected to have background knowledge of these systems.

Students should compare the structure of egg cells and sperm cells. The following characteristics should be included: relative size, energy reserves, motility, and numbers produced. The importance of the enzyme cap and the numerous mitochondria within a sperm cell should be included in the analysis.

Students should observe and discuss the function of the principal features of the male reproductive system, using models or computer simulations. They should identify and label the major structures in drawings or photos and understand the role of the principal structures (testis, scrotum, seminiferous tubules, epididymis, vas deferens, urethra) and glands (Cowper's gland, seminal vesicle, prostate).

Students should describe the development of primary and secondary male characteristics:

- primary—sperm development
- secondary—facial hair, body hair, deepening voice, and muscle mass development

Students should observe and discuss the function of the principal features of the female reproductive systems, using models or computer simulations. They should identify and label the major structures using drawings or photos and understand the role of the following structures: ovary, follicles, oviduct (Fallopian tube), uterus, cervix, and vagina.

Students should describe the development of primary and secondary female characteristics:

- primary—egg development, preparation and maintenance in case of pregnancy
- secondary—body hair, breast development, broadening of hips, redistribution of fat

Students should research a career related to reproduction (e.g., licenced mid-wife, geneticist, neonatal nurse, medical assistant radiology technologist).

Reproductive Systems

Tasks for Instruction and/or Assessment

Students may, for example,

Journal

- view *The Miracle of Life* video and complete a reflection on the material presented. (313-3)

Paper and pencil

- compare and contrast egg cells and sperm cells. (313-3)
See Text, pp. 474-475.
- label a diagram of the male reproductive system. (313-3)
See Study Guide p. 141.
- trace the pathway of a sperm cell from where it is formed to where it fertilizes an egg. (313-3)
- label a diagram of the female reproductive system. (313-3)
See Study Guide p. 141.
- trace the pathway of an egg from its formation to its release (unfertilized) from the body. (313-3)

Presentation

- complete a slide show presentation on information found during career research. (117-7)

Resources

Text

pp. 513-522

Health

pp. 154-156, 551-553

In-school Video

The Miracle of Life

Reproductive Systems *(continued)*

Outcomes

Students will be expected to

- explain the human reproductive cycle (313-4)
 - explain the female menstrual cycle
- evaluate the impact of viral, bacterial, genetic, and environmental diseases on an organism’s homeostasis (317-4)
 - identify possible causes of infertility
- research and evaluate the potential health risks associated with exposure to sexually transmitted infections (213-7, 214-18)
- evaluate the use of reproductive technologies for humans (313-6)
- explain the human reproductive cycle (313-4)
 - explain how fraternal and identical offspring are produced

Elaborations—Strategies for Learning and Teaching

Students should describe the stages of the menstrual cycle, and consider possible irregularities.

Students should research a variety of STIs, such as chlamydia, herpes, HIV, human papillomavirus, syphilis, gonorrhea, or hepatitis, and consider not only immediate health concerns, but also societal impacts (effects on future children, impact on health care systems). They should research the causes of infertility in males and females, which may include the following:

<u>Male</u>	<u>Female</u>
fever	hormonal imbalance
viruses	endometriosis
medication	blocked fallopian tubes
high blood pressure	
steroids	

Some environmental factors (e.g., pollution, smoking, alcohol and tight clothing) may affect fertility in both sexes.

As an interesting introduction to a discussion of reproductive technologies, students could research folklore about reproductive success/control and identification of the sex of the child. They should identify the following technologies and their uses: egg donation, sperm donation, *in vitro* fertilization (IVF), artificial insemination (AI), and transfer of embryo to surrogate. They should evaluate the relative effectiveness of various methods of contraception, such as the Pill, Norplant, Depo-Provera, vasectomy, tubal ligation, morning after pill, male and female condoms, abstinence, rhythm, patch, IUD, spermicides, diaphragm, and ring.

Students should recognize that fertilization and initial embryonic development are different when identical and fraternal twins result and should discuss the mechanism by which multiple births (triplet, quadruplets) may result naturally. Students could consider the question, “Why are fraternal twins no more alike than any set of brothers or sisters?”

Reproductive Systems *(continued)*

Tasks for Instruction and/or Assessment

Students may, for example,

Performance (Laboratory)

- complete the “STI Learning Station” activity. (317-4, 213-7, 214-18)

See Appendix 30.

- complete the “Reproductive System” Internet activity (313-4)

See Appendix 31.

Journal

- answer the questions, “Do you agree with the use of reproductive technologies? Which ones and why? Why not?” (313-6)
- discuss the ethical and practical issues involved when fertility techniques result in multiple births? Is there an argument within society for fetal selection when a multiple birth pregnancy places the fetuses and/or mother at risk? (313-6)

Presentation

- address a variety of aspects of human reproductive health and sexually transmitted infections by using community resources such as physicians or community health nurses. (317-4, 213-7, 214-18)
- research a suitable article on a reproductive technology and present a summary. (313-6)

Resources

Text

pp. 513-522

Health

pp. 551-553, 419-445

STI Pamphlets from Public Agency of Health Canada

What You Need To Know About STI

(Make a print copy from

http://www.phac-aspc.gc.ca/publicat/std-mts/pdf/sti_e.pdf)

Embryonic Development (~2 Classes)

Outcomes

Students will be expected to

- explain the human reproductive cycle (313-4)
 - sequence the changes that take place in a fertilized egg until it attaches to the uterus
 - explain how the needs of an embryo are met as it develops
 - describe the stages of human development from the first month until birth
- research and evaluate conditions that could arise during pregnancy and delivery (213-7, 214-18)

Elaborations—Strategies for Learning and Teaching

Students should identify and describe the early stages of development and the four main needs of an embryo (protection, food, oxygen, waste elimination). They should also describe the role of the placenta and the umbilical cord.

Students should research the three trimesters of pregnancy. Their research focus could include some of the following details:

- organ development
- size
- factors that affect embryonic development:
 - nutrition (mother)
 - drug use (alcohol, nicotine, caffeine, antibiotics, cocaine, LSD, marijuana, thalidomide)
 - radiation
 - viruses
 - lack of medical supervision
 - exercise
 - age of mother
 - blood pressure
- miscarriage
- tubal pregnancies
- techniques for monitoring the health and well-being of the fetus

Embryonic Development

Tasks for Instruction and/or Assessment

Students may, for example,

Paper and Pencil

- complete the “How Does the Human Fetus Change during Development” activity. (313-4)
See **Lab Manual**, pp. 211-214.
- complete the “Development inside the Female” activity (313-4)
See **Study Guide**, pp. 145-147.
- in pairs, research and present one factor that affects embryonic development. (313-4, 213-7, 214-18)
- collect information on techniques used for monitoring the health and well-being of a fetus. Techniques to consider may include blood tests, non-stress fetal monitoring, ultrasound, and fetoscopy. Present a brief summary to the class. (313-4, 213-7, 214-18)
- invite to the classroom a FASD speaker to give a presentation on the physical and social aspects of FASD. Following the presentation, write a journal entry in response to the question, “What responsibilities come with becoming sexually active?” (213-7, 214-18)

Resources

Text

pp. 524-531

Health

pp. 556-562

Genetics (~6 Classes)

Outcomes

Students will be expected to

- describe and illustrate the role of chromosomes in the transmission of hereditary information from one cell to another (315-2)
 - define chromosomes, genes, and inherited traits
 - compare the number of chromosomes in sex cells and body cells
 - distinguish between autosomes and sex chromosomes
 - distinguish between dominant and recessive genes
 - describe how different gene combinations result from fertilization and how traits are passed to offspring
 - predict trait outcomes through the use of the Punnett Square

- explain circumstances that lead to genetic diseases (315-8)
 - explain why sex-linked defects are more common in males than females
 - explain how cells can have an improper number of chromosomes and discuss consequences

Elaborations—Strategies for Learning and Teaching

Students should compare chromosomes, genes, and inherited traits, and show how they are related through comparison. They should explain the significance of the difference in chromosome numbers in a sex cell versus the human body cell, and the difference between autosomes and sex chromosomes

Students should describe differences between dominant and recessive genes, including how they are represented by using letters, and explain the difference between genotype and phenotype.

Students should identify the pair of sex chromosomes for females (XX) and males (XY) and understand that sex-linked inheritance involves pairs of genes on the X chromosomes in the female, and on the X chromosome in the male.

Students should describe how different gene combinations result from fertilization, and how traits are passed to offspring, and predict trait outcomes through the use of the Punnett Square

Students should explain the inheritance of certain characteristics (e.g., red-green colourblindness, hemophilia, muscular dystrophy) through the sex chromosomes. Colour blindness analysis charts are useful to identify this sex-linked characteristic. Students should discuss circumstances that lead to conditions/problems related to the number of chromosomes, and consider some specific consequences, such as Downs syndrome.

Genetics

Tasks for Instruction and/or Assessment

Students may, for example,

Performance

- investigate their own individual dominant and recessive visual/sensory traits (widow's peak, dimples, tongue rolling, attached/free ear lobe, the ability/lack of ability to taste PTC). Data on dominant and recessive characteristics can be collected, and students can discuss the prevalence of various traits within this restricted population sample, and in the population in general. (315-2, 315-8)
- complete the "What Will I Look Like?" lab. (315-2)
See Appendix 32.
- complete a "Forensic Investigation" on-line. (315-2, 315-8)

Journal

- explain why males are never carriers of sex-linked defects? (315-8)
- reflect and respond to the statement, "Males are biologically stronger than females." Defend your position. (315-2, 315-8)

Paper and Pencil

- complete a "K-W-L" organizer on chromosomes, genes, and inherited traits. (315-2)
- complete the "Expected and Observed Results" activity. (315-2)
See Study Guide, pp. 152-154.
- complete Punnett Squares on blood type, etc. (315-2)
- complete a Punnett Square to predict the sex of a child. (315-2)
- research career restrictions associated with color-blindness and/or hemophilia. (117-7)

Resources

Text

pp. 546-557
pp. 568-571
pp. 575-576

Health

pp. 563-565

Rental Video

Gattaca

Forensic Investigation lesson plan

<http://www.teachersfirst.com/lessons/forensics/index.html>

APPENDICES

Characteristics of Living Things Activity

- ❑ Students are arranged at tables numbered 1-8.
- ❑ Each group will be given one of the eight characteristics of living things. They are to create **three** visual clues to describe the characteristic. For example, for 'Living Things Use Energy' a windmill could be built, a lightbulb drawn, etc.
- ❑ The groups will have access to a variety of materials to use for the construction of their clues (e.g., plastic cups, pipe cleaners, markers, Bristol board, popsicle sticks, toothpicks, glue, construction paper, pencil crayons).
- ❑ Once the clues are completed, each group will take a blank piece of paper and number it from 1-8. The groups will rotate through the stations and look over the clues at each table.
- ❑ The students will be given two to three minutes to record what they think the clues are meant to portray.
- ❑ Once the groups complete all stations, they will report to the class their interpretations of the clues.

Living things reproduce.

Living things grow.

Living things develop.

Living things need food.

Living things use energy.

Living things are made of cells.

Living things respond.

**Living things are adapted to
their environments.**

Living Things Assignment

DATA is a humanoid old android (a robot that looks and behaves like a human) on the television show *Star Trek: The Next Generation*

DATA has the following features:

1. A brain which allows DATA to think, understand, and problem solve at a very high level
2. A body that from the outside looks human
3. A respiratory system that facilitates air exchange
4. A circulatory system (veins and arteries containing special fluids that are pumped around DATA's body)
5. Hair that is capable of growth
6. An "emotion" chip which allows DATA to feel emotion

In addition, we know these things about DATA:

7. He needs to eat a special nutrient mixture of man-made chemicals.
8. He can have sexual relations with other humanoid androids.
9. He has a pet named "Spot".
10. He has constructed an android daughter, LAL, by duplicating his own body features.

Your assignment is to write a half- to one-page paper.

Decide whether DATA is living or non-living.

Explain your reasoning by using the characteristics of living things you have learned about in class.

(You may decide that you cannot tell for sure without more information. In this case explain what is missing and how it will help you decide.)

Name The System Game

This activity can be used as an introduction to the systems of the body and some of the structures associated with them.

★ Students are arranged in groups.

★ Each group will be given an envelope containing the names of the systems of the body, as well as a number of cell terms, names of organs, and words associated with each system.

★ The groups will be asked to match the parts with the systems they belong to. Students can be helped by informing them that there are nine terms for each system.

★ When the activity has been completed, students and teacher can discuss the systems and their matching terms.

★ Students could then complete a K-W-L chart of the human body ... what they Know ... Want to know or Wonder about ... and what they hope to Learn throughout the semester.

K-W-L CHART

What do I

KNOW	WANT or WONDER	LEARN

REPRODUCTIVE SYSTEM

VAGINA

OVARY

UTERUS

OVIDUCT

VAS
DEFERENS

PENIS

URETHRA

TESTIS

SCROTUM

DIGESTIVE SYSTEM

SMALL INTESTINE	LARGE INTESTINE	SALIVARY GLANDS
MOUTH	TEETH	LIVER
STOMACH	PANCREAS	GALL BLADDER
EXCRETORY SYSTEM		
KIDNEYS	URETER	BLADDER
SWEAT GLANDS	CAPILLARY	SKIN

URETHRA	UREA	NEPHRON
NERVOUS SYSTEM		
NEURONS	NERVE	BRAIN
DENDRITE	AXON	SPINAL CORD
MEDULLA	REFLEX	SYNAPSE

RESPIRATORY SYSTEM

LUNGS	TRACHEA	BRONCHI
ALVEOLI	INHALATION/ EXHALATION	DIAPHRAGM
EPIGLOTTIS	CARBON DIOXIDE/ OXYGEN	NASAL CHAMBER

CIRCULATORY SYSTEM

ATRIUM	VENTRICLE	AORTA
ARTERY	VEIN	CAPILLARY
VENA CAVA	BICUSPID VALVE	CORONARY BLOOD VESSELS
ENDOCRINE GLAND		
PITUITARY GLAND	HORMONES	THYROID GLAND
TESTIS	ADRENAL GLAND	PANCREAS

OVARIES	ADRENALIN	INSULIN
SKELETAL SYSTEM		
STERNUM	HUMERUS	PHALANGES
BALL AND SOCKET JOINT	CLAVICLE	FEMUR
CRANIUM	VERTEBRA E	LIGAMENTS

MUSCULAR SYSTEM

VOLUNTARY/ INVOLUNTARY	LACTIC ACID	CARDIAC
SMOOTH	STRIATED	MOVEMENT
TENDONS	BICEPS/ TRICEPS	CONTRACT / RELAX

Analogy of a School **Poster Assignment**

Create a poster with a drawing of a school. Next label each of the rooms or areas inside and outside your school with a term which you feel matches the job description of each of the human body systems listed below. Finally, write a brief definition as to why you feel that particular room or area of the school matches the body system.

Example: In the school drawing, the main office could be labelled the Nervous System.

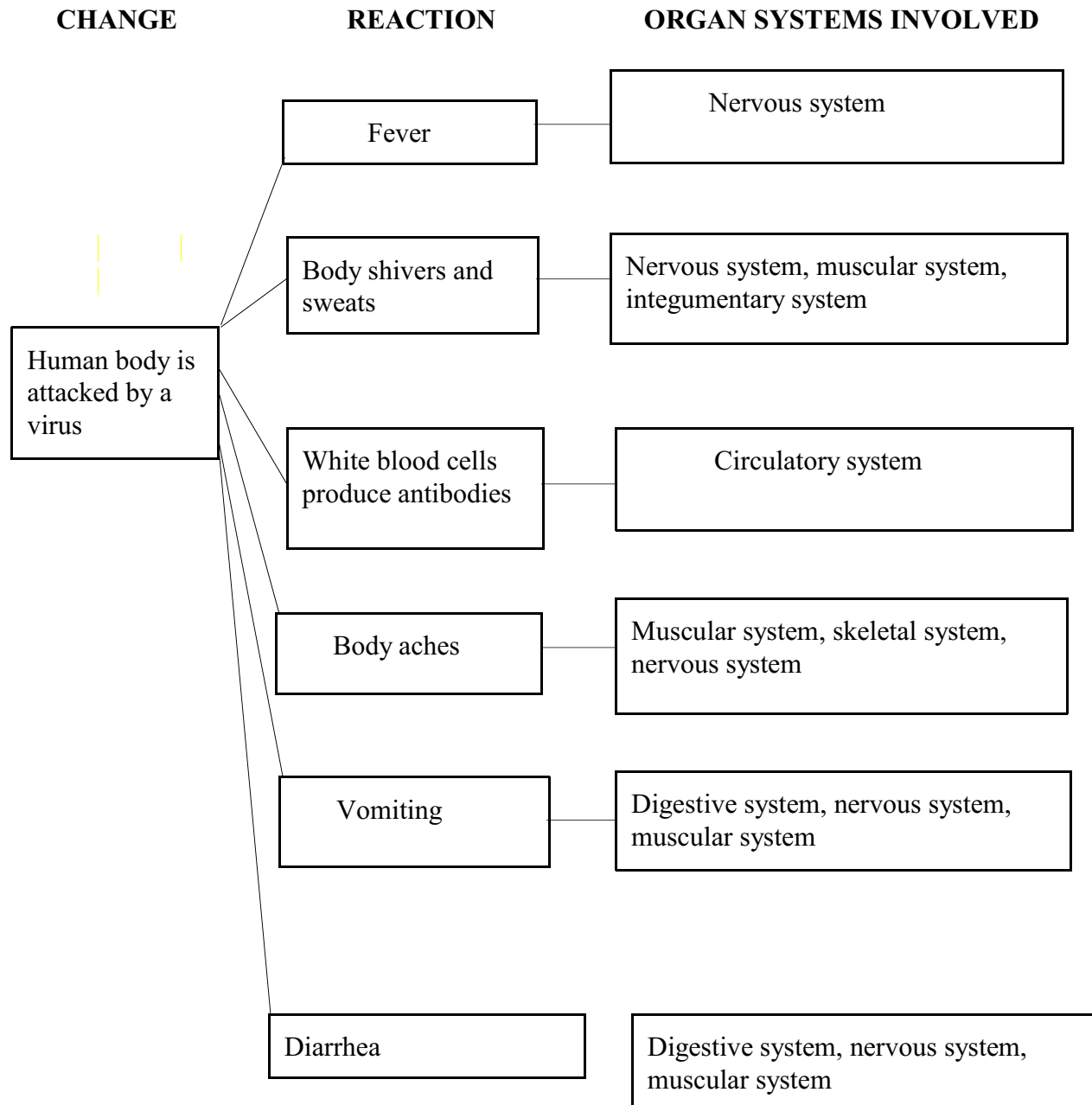
Definition: The school's main office is the control centre of the school and directs all of the school's activities.

Body Systems

1. Digestive System
2. Circulatory System
3. Respiratory System
4. Excretory System
5. Skeletal System
6. Muscular System
7. Nervous System
8. Endocrine System
9. Reproductive System
10. Immune System

HOW THE HUMAN BODY REACTS TO CHANGE AND THE ORGAN SYSTEMS INVOLVED IN THIS REACTION

SCENARIO: The flu is a disease caused by a virus that infects the body. The flu attacks the cells in your body and your body reacts to the resulting changes. Each reaction in your body involves at least one organ system. Complete a concept map to illustrate the reaction your body has to the flu and to identify the organ system(s) involved in this reaction.



Note: Another box could branch off from each system to indicate how the system responds. This could include such information as...

Fever...Nervous System....Body temperature is elevated to reduce the growth rate of an infection.

Body shivers and sweats...Nervous system causes the muscular system to make the body shake and shiver. This movement causes the body to warm back up to its normal temperature. The nervous system causes the sweat glands in the skin of the integumentary system to sweat and release water. This cools the body temperature back to its state of equilibrium.

White blood cells produce antibodies..... Circulatory system.... White blood cells produce antibodies that attack the foreign invader in the body.

Vomiting...Nervous system causes the digestive system to expel the contents of the stomach. The diaphragm (part of the muscular system) helps in the process. The result is to rid the body of viruses or bacteria that may be in the stomach.

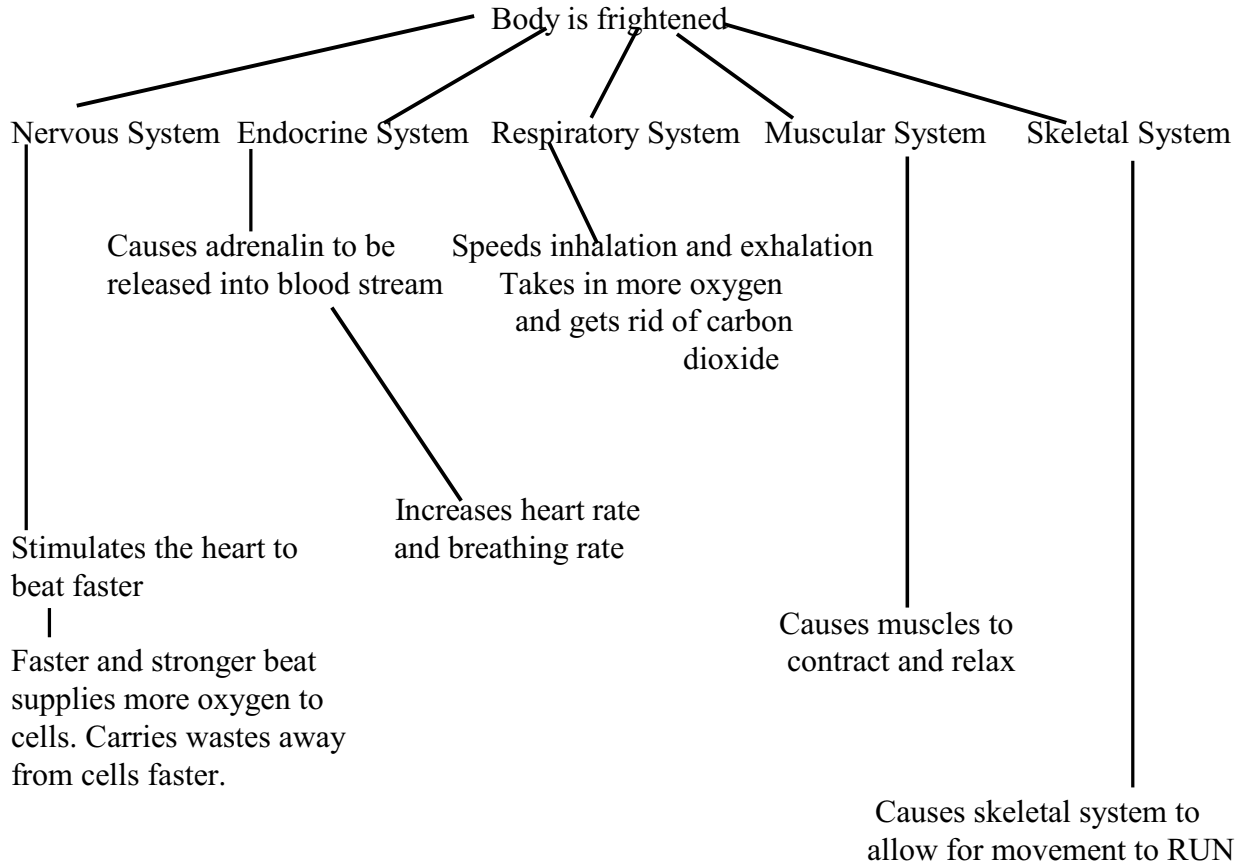
The following Web-sites may be useful in designing a graphic organizer for this scenario.

<http://www.ncrel.org/sdrs/areas/issues/students/learning/lr1grorg.htm>

<http://www.eduplace.com/graphicorganizer/>

HOW THE HUMAN BODY RESPONDS TO BEING FRIGHTENED

SCENARIO: You are walking through the trails in Fundy National Park in New Brunswick. Not far ahead, a black bear stands in your path. Complete a concept map to indicate the systems in your body that play a role in maintaining homeostasis and how each is involved.



Note: Graphic organizers can be found at the following Web-site:
<http://www.eduplace.com/graphicorganizer/>

NUTRIENT LAB

In this lab, you will be learning how to test for fats, starches (a type of carbohydrate), and sugar (a type of carbohydrate). After learning how to perform the specific test, you will then carry it out on certain foods. **Caution: Do not taste the foods as they could be contaminated with chemicals.**

Procedure:

Part A. Comparing a Fat and a Non-fat

1. Use a dropper to place a small drop of cooking oil (fat) onto a piece of brown paper. Label the drop **fat**.
2. Rub the drop around on the paper, making a circular area.
3. Use a different dropper to place one small drop of water onto the piece of brown paper away from the oil spot. Label the spot **non-fat**.
4. Rub the drop around on the paper, making a circular area. Don't use the same finger that you used for the oil.
5. Wait 5 to 10 minutes for the liquid to dry, or speed up the process by using a hand dryer.
6. Hold the paper up toward the light.
7. Light passes through the oil spot. This spot is said to be translucent. Fat forms a translucent spot on brown paper.
8. Record your results in the table provided.

Part B. Testing Foods for the Presence of Fat

1. Test the following foods for fat : butter, potato, carrot, cheese, apple, onion, and bread. Apply a small amount of each food to a piece of brown paper. Make sure you label each circular area on the paper with the name of the food used. **Caution: Do not taste the foods as chemicals may have touched them.**
2. Wait 5 to 10 minutes, and then check to see if a translucent spot appears.
3. Record the results in the table.

Part C. Testing for the Presence of Starch

Starches are a type of carbohydrate. They are made up of many sugar units linked together.

Test for the presence of starch. A solution of iodine is the reagent used to test for the presence of starch. The iodine solution is a yellow-brown color. However, it reacts with starch to form a blue-black substance called iodide of starch.

HOW TO TEST FOR THE PRESENCE OF STARCH

1. With a glass-marking pencil, label a clean test tube “S” for starch. Pour dry cornstarch into the test tube until there is about 1 cm in the bottom of the test tube. Next, add water to the test tube so that the total material in the test tube has a depth of about 3 cm.

2. Mix the starch and water by stirring them carefully with a glass stirring rod. Then set the test tube in a test tube rack.

What colour is the mixture of starch and water? _____

3. Label another clean test tube “C” for control. Pour water into the test tube until it fills the tube to a depth of 3 cm. Set it in the test tube rack.

4. Observe the color of iodine solution in the bottle. What colour is it? _____

5. Add one drop of iodine solution to the starch and water mixture. Do not stir the mixture. **Caution: Use care when using the iodine solution; it is a stain and will stain both clothing and hands.** What colour is the mixture around the drop of iodine solution? _____

6. Stir the mixture with the stirring rod. Then observe it. What colour is the mixture after stirring? _____

7. Add five more drops of iodine solution to the mixture. Then stir thoroughly. Observe the colour. What is the colour of the mixture? _____

8. Add one drop of the iodine solution to the control test tube. Do not stir. What colour is the water around the drop of iodine solution? _____

9. Stir the contents of the control test tube solution with a clean glass stirring rod. Observe it. What colour is the solution? _____

10. Add five more drops of the iodine solution. Stir, and then observe the solution. What colour is it? _____

Part D. Testing Foods for the Presence of Starch

1. Place a piece of each of the following foods on a piece of paper towel that is folded over a couple of times to make it thick:

carrot, potato, apple, onion, cheese, bread

- Place one or two drops of iodine solution on each of the foods. Remember that if starch is present a certain colour will appear, and if starch is not present, the iodine will stay the original colour.
- Record “present” or “not present” in the table provided.

Part E. Testing Foods for the Presence of Sugars

Benedict’s solution is used to test foods for the presence of simple sugars (a type of carbohydrate made up of single sugar units). When Benedict’s solution is used in the procedure described below, the following will indicate the results of the test:

solution remains blue----- no simple sugars
 solution turns green ----- small amount of simple sugars
 solution turns yellow-----moderate amount of simple sugars
 solution turns orange or red ---- high amount of simple sugars

- Using a wax pencil, label test tubes using the following code:

C = carrot	P = potato	A= apple
O = onion	B = bread	S = syrup

- Using a scalpel or knife, cut each food sample into tiny pieces (obviously this does not apply to the syrup). Place each food in the appropriately labelled test tube(there should be about 1-2 cm of the food in the bottom of the test tube).
- Use a graduated cylinder to measure out 3 mL of water to be added to each test tube.
- Use another graduated cylinder to measure out 3 mL of Benedict’s solution, which you will also add to the test tubes. Swirl the test tubes.
- Place the test tubes in a boiling water bath for three minutes. Observe them for the presence of simple sugars, using the information in step 1.
- Record the results in the table provided. Use the words “none,” “small amount,” “moderate amount,” “high amount.”

Part F. Clean-up

Make sure all test tubes and other materials are washed out and returned to their original location. Food and paper towel goes in the compost bin (green garbage can).

Part G. Passing in Your Work

Make sure you have completed the tables and answered the questions posed. Pass in this set of instructions, the tables, and the answered questions to your instructor.

TABLE ONE: Testing Foods for the Presence of Fat

Material	Present	Absent
Cooking oil		
Water		
Butter		
Potato		
Carrot		
Cheese		
Apple		
Onion		
Bread		

TABLE TWO: Testing Foods for the Presence of Starch

Material	Present	Absent
Carrot		
Potato		
Apple		
Onion		
Cheese		
Bread		

TABLE THREE Testing Foods for the Presence of Sugar

Material	Amount of Simple Sugar Present
Carrot	
Onion	
Potato	
Bread	
Apple	

Syrup	
-------	--

Questions

1. Name the reagent or testing material used to detect the presence of the following:

A) fat _____

B) starch _____

C) simple sugars _____

2. Describe how you knew that each of the following was present in the material (be specific with your answers):

A) fat _____

B) starch _____

C) simple sugars _____

3. Which of the foods tested would give you the quickest source of energy for your body ?

4. Which of the foods tested would be unhealthy for your body if you consumed large amounts of them? _____

END OF LAB

Nutrition Assignment

The purpose of this assignment is to compare your diet to the recommended daily allowances for the major nutrients, vitamins, and minerals.

In this assignment, you will be asked to record **everything** you eat and drink for two weekdays and one weekend day. You do not have to record any vitamin supplements. Record the information in the chart provided. You will also be asked to estimate the serving size. To help approximate the serving size, use these equivalents:

- | | | | |
|--------------------------|--------------------------|---|---|
| <input type="checkbox"/> | size of a dice | ↔ | equals a tablespoon |
| <input type="checkbox"/> | one thumb nail | ↔ | equals a teaspoon |
| <input type="checkbox"/> | deck of cards | ↔ | equals one serving of meat |
| <input type="checkbox"/> | fist | ↔ | equals one cup |
| <input type="checkbox"/> | size of a computer mouse | ↔ | equals one grain serving |
| <input type="checkbox"/> | size of a light bulb | ↔ | equals two servings of fresh, frozen or canned vegetables |

A resource for completing the chart on the nutrients found in each food can be found at http://www.hc-sc.gc/fn-an/nutrition/fiche-nutri-data/nutrient_value-valeurs_nutritives_e.html.

Click on “Nutrient Value of Some Common Foods.”

Name _____

Daily Analysis: Day # _____ Date _____

Food/Drink	Serving Size	Calories	Protein (g)	Carbs (g)	Fat (g)	Vit A	Vit B	Vit C	Vit D	Vit E	Calcium	Iron
Total	****											

Name _____

Summary of Data

	Calories	Protein (g)	Carbs (g)	Fat (g)	Vit A	Vit B	Vit C	Vit D	Vit E	Calcium	Iron
Day One											
Day Two											
Day Three											
Average											
Recommended Amount											
Difference (+/-)											
% above recommended											
% below recommended											

NUTRITION INTERNET ASSIGNMENT

NAME _____

Answer the following questions in the space provided. If not enough room is provided, continue on the back of the page. Read all directions CAREFULLY, and FOLLOW STEP-BY-STEP. Pass this in to your teacher.

PART ONE

- Type in **http://www.google.ca**
- Do a search with the following words (include the quotation marks):
 "PEI Healthy Eating Alliance"
- Choose "Our partners in promoting healthy eating"

Answer the following questions:

1. What is the Prince Edward Island Healthy Eating Alliance and what is their main goal? _____

2. From the side menu, choose "Eat Well" and "Be Active."

A) How can 30-35% of all cancers be prevented? _____

B) What are the benefits of eating well and being more active? _____

3. Choose "Make Healthy Eating Choices"

A) How many servings of fruits and vegetables should you have each day? _____

B) How does eating at home provide more control over what you are eating?

C) How long does it take for your brain to get the message that your stomach is full?

_____ Does this mean
you should eat quickly or slowly? _____

4. Choose "Get Started."

A) List the factors that affect your weight.

5. Choose “Eat Well.”

- A) Why is it important to drink water ? _____
- B) How many glasses of water should you have every day? _____

6. Choose “Canada’s Food Guide to Healthy Eating”

- A) What are the four major food groups in Canada’s Food Guide? Give examples of foods in each group, and state the number of servings you should have each day.

- B) State the size of one serving of each of the following: (include units)

bread _____	spaghetti _____
salad _____	juice _____
milk _____	peanut butter _____

- C) What affects how much food a person needs each day?

7. Return to the PEI Healthy Eating Alliance (you may have to return to the instructions at the beginning of this assignment in order to return to the site).

- Select “Be Active” from the side menu.

- A) What are people who are overweight at a greater risk of? _____

PART TWO

1. Type the following in the address bar:

<http://www.weightwatchers.com/index.aspx>.

On the home screen, choose “Find Out How.”

Name two approaches of the Momentum™ program and describe what each one involves.

PART THREE

In Google, type “What is the Atkins diet.” According to the Web definitions, the Atkins diet recommends that we eat a lot of which two nutrients? _____
What nutrient do they say to greatly reduce? _____ How does this compare to what Chapter 9 in our text book suggests we need the most of each day, and the least of each day? _____

PART FOUR

Type in <http://www.faddiet.com/>

1. Choose the side bar menu to find answers to the following questions:

A) What types of foods are in the cabbage soup diet? _____

B) How much and how often can cabbage soup be eaten if a person is following this diet? _____

C) Do you eat anything else besides the cabbage soup? _____

2. List (briefly) the diet tips Numbers 1–10.

PART FIVE

Do a Google search on “Subway diet.”
Select “CBS News/ the Subway diet”(or others available).
Read the article.

A) How many pounds did Jared lose? _____

B) What comments do you have about this article? _____

PART SIX

Enter http://kidshealth.org/parent/nutrition_fit/nutrition/bmi_charts.html.

Determine your body mass index number and read the information about your calculation to see if you are overweight.

To see what they suggest for adults, and to see how your information compares, try the following Web address (but keep in mind that it is for ADULTS—18 AND OVER):

<http://nhlbisupport.com/bmi/bmicalc.htm>

State the BMI numbers for the following categories for ADULTS:

underweight _____ overweight _____
normal weight _____ obesity _____

PART SEVEN

Search for information on pedometers.

A) What are these devices? _____

B) What should the numbers associated with these devices register for activity if a person is to benefit in terms of their physical health? _____

C) What is the value of these devices? _____

END OF ASSIGNMENT

Assignment: Evaluating the Nutritional Content of Cereals

Purpose

- to evaluate a variety of cereals in order to compare their nutritional value.
- to appreciate that the nutritional value of a cereal cannot be judged from the packaging, advertising, or “target” consumer, and that reading the labels is the best way to compare nutritional values

Complete steps one and two on a sheet of paper to be passed in. Then answer the questions that follow.

1. Collect at least three different breakfast cereal labels. Try to make them as different as you can (consider picking cereals that appeal to consumers of different age groups). Make a table similar to the one shown below. Include nutrients that are listed for each of the cereals you have chosen. Write the specific names of the cereals you have chosen in the table.

NUTRIENT CONTENT OF CEREALS

NUTRIENT	CEREAL A	CEREAL B	CEREAL C
calories			
protein			
fat			
carbohydrates			
fibre			
sugars			
vitamin A			

2. Complete the table by examining the labels on your selected products and recording all the ingredients. Check to see that the lists are using similar-size servings. If not, try to find a way to make your figures comparable.

Answer the following questions **in sentence form**, and include the answers with your report.

1. A) Which of the products you have used has the most sugar per serving?
 B) Is there a big difference in sugar content between your products?
 C) Would this influence your decision to purchase the product?

2. Which product has the most protein?
3. Which product has the most fat?
4. Which product has the most dietary fibre? This is a material that gives us little, if any, nutritional food value, but it is still important. Why?
5. Evaluate which product is the best buy for vitamins? Remember to look at both variety and quantity.
6. Evaluate which product is the best buy for minerals.
7. Which type of cereal provides your body with the greatest number of calories? Why would some consumers be particularly interested in this number?
8. For each of the cereals you have chosen, what type of consumer or what age group is being targeted?
9. Given the information in your previous answers, which cereal do you think is the best buy for you? Are your findings different than what you would have expected, based on the packaging or “taste appeal” of the cereal? Discuss in a paragraph.

End of Assignment

Energy from a Cheesie Lab

Name _____

Partner _____

Introduction

The food that we eat is 'burned' in our cells to release energy. This process takes place in the mitochondria and is called respiration.

Instead of eating the cheesie we will burn it in the lab and find out how much energy is released. We will use the heat energy to heat some water.

Purpose

To determine the energy given off when a cheesie burns.

Procedure

1. Cover the top of a cork with aluminum foil.
2. Carefully insert the eye end of a needle into the top of the cork.
3. Carefully impale a small cheesie onto the end of the needle.
4. Find the mass of the cheesie, needle, cork and foil together
- Record the mass in the data table #1
5. Use a graduated cylinder and measure out 20 mL of water.
- Record the exact volume to the nearest 0.5 mL in the data table #2.
6. Put the water into a large test tube and place the test tube in a clamp stand.
7. Place the cheesie and cork under the test tube.
8. Adjust the test tube height so that it is 2 cm above the top of the cheesie.
9. Place a thermometer in the water and record the temperature to the nearest 0.5°C.
- Record the temperature in the data table #3
10. Light the cheesie, using a lighted wooden splint. Allow the cheesie to burn itself out.
11. Stir the water gently (do not break the thermometer !!) and record the temperature of the water to the nearest 0.5°C.
-Record this temperature in the data table #4.
12. Mass again the cheesie, needle, cork, and foil.
- Record the mass in the data table #5.

Data table

1. Initial mass of cheesie, needle, foil and cork	
2. Volume of water	_____
3. Initial temperature of water	_____
4. Final temperature of water	_____
5. Final mass of cheesie, needle, foil, and cork	_____

Calculations**Density of Water is 1g/mL.****A calorie is the amount of heat needed to raise the temperature of 1000g of water by 1°C (1000 science calories=1 nutritional Calorie)**

Description	Work	Final Answer
8. Mass of cheesie		
9. Increase in temperature of water		
10. Mass of water	density \times volume ____ g/mL \times ____ mL	
11. Heat gained by water	mass \times specific heat \times temp change ____ g \times 0.001 Cal/(g \times °C) \times ____ Δ T	____ Cal (Nutritional Calorie)
12. Heat released by cheesie	-----	____ Cal (Nutritional Calorie)
13. Heat given off by 1g of cheesie		

Conclusion

The heat energy released when 1 g of cheesie is burned (or eaten) is

1. Some researchers suggest that a 180–200 lb. adult burns one calorie for every 20 steps he/she walks. Based on the heat released by your cheesie, how many steps would you have to walk to use that energy?

2. How many calories would a 90 g bag of cheesies contain?

3. How many steps would you have to walk to use that energy?

Portfolio Reflection Suggestions

Each entry in a portfolio must have a reflection that elaborates on the reason for its selection, and its meaning and value. This page contains questions and starters to help with the construction of the reflections.

- Why have you chosen this piece to include from this class?
- What are its strengths? Weaknesses?
- Why is it important to include this piece in your portfolio?
- How and where does this fit in with prior knowledge?
- How do you think that others will react to this product?
- Does this product meet the standard set in this class? Why or why not?
- How do you really feel about this?
- What process did you use to complete the product?
- What did you learn by doing this assignment?
- What did you learn?
- How did you grow or develop?
- Of what are you most proud?
- How does the portfolio product illustrate the connection(s) you've made between yourself and the course material?
- In what ways would you do things differently if you could do it over again?
- What did you discover about yourself?
- How does it relate to your future?
- How does it illustrate your strengths and/or weaknesses?
- How does the portfolio product indicate changes in your worldview and/or awareness of global issues?
- What obstacles and challenges did you have to deal with, and how did this struggle change you?
- How does the portfolio product show that your perspective on the world has deepened?
- How does it relate to your understanding of the world around you?
- How does it show that you are ready to enter the next step of your life after high school?
- This product was my greatest challenge because...
- What did you learn about yourself when you compiled the information?
- Which of your accomplishments makes you feel most proud?
- What would you do differently if you did it again?
- I will remember this piece twenty years from now because...
- This piece may surprise people because...
- On a scale of 1-10, I give it a ___ because...

Digestive Activities Lab

Activity 1: How Long Is the Digestive System?

Materials: Four different balls of yarn

Directions: Cut four lengths of different coloured yarn, using the measurements given below, then tie them together to show how long each part of the digestive system is relative to each other part.

Esophagus	25 cm
Stomach	20 cm
Small Intestine	700 cm
Large Intestine	150 cm

Activity 2: Digestion

Materials: sugar cubes
granulated sugar
clear cups filled with water

Directions: Place a sugar cube in one cup of water, a teaspoon of granulated sugar in the other cup of water, and observe.

Activity 3: Carbohydrate Digestion

Materials: unsalted crackers

Directions: Chew two unsalted crackers for two minutes without swallowing.

Activity 4: Hands-On Digestion

Materials: lump of hamburger (meatball size)
one plastic baggie
1M HCL
digestive juice A (pepsin, trypsin, and water)
digestive juice B (bile salts, pancreatin enzyme and water)

Directions: Place hamburger, three eyedroppers full of HCL, one tablespoon of digestive juice A, and two tablespoons of digestive juice B in the plastic bag. Knead the bag with your hands for 10 minutes (simulating the stomach) and the mixture will be reduced to liquid with a definite odor.

Activity 5: How do Villi aid the Small Intestine in Absorption?

Materials: paper towels
 four cups with equal amounts of water
 graduated cylinder

Directions: Compare how one, two, three, and then four folds of paper towels absorb. Dip each fold of paper towel into a cup of water (same amount of water in each cup). Record the volume of water left in each cup (using the graduated cylinder).

Activity 6: The Digestive System Story

Materials: none

Directions: Students will act as different parts of the digestive system, with one student acting as food. As the food student moves past each digestive system part, the student labelled as that part must describe what they are doing to the food (e.g., teeth - tear food apart)

Assessment

1. What system in your body is the same length as the completed piece of yarn?
2. In Activity 2, what can you conclude must be done to food before digestion begins?
3. What physical and chemical changes occurred to the soda crackers?
4. What caused the physical and chemical changes to the crackers?
5. Did you notice a taste change in the crackers?
6. How is mechanical digestion simulated in Activity 4?
7. What evidence was there that chemical digestion occurred in the hamburger?
8. Which paper towel had the largest surface area?
9. What relationship can you see between the largest surface area and how villi aid in absorption?
10. Using Activity 6, create a sequential diagram to demonstrate the passing of food through the digestive system.

See: <http://www.eduplace.com/graphicorganizer/pdf/sequence.pdf>.

Digestive System Envelope Activity

- Students are arranged in groups.
- Each group will be given an envelope containing the names of the digestive structures, functions, and secretions.
- The groups will be asked to create a flowchart by matching the correct structure with the appropriate function.
- The students will arrange the structures in the proper order starting with ingestion, and place each secretion alongside the structure in which the secretion originates.

Mouth

Grinds the food

**Saliva breaks down
carbohydrates**

Esophagus

**Tube that carries food to the
stomach**

Stomach

**Mixes and churns food as
well as chemically changes
protein (chyme)**

**Enzymes and Hydrochloric
Acid produced**

Small Intestine

**Site for movement of digested
food into the blood**

Receives bile from liver

**Receives enzymes from
pancreas to break down
protein, fats, and
carbohydrates**

Large Intestine

**Removes water from
undigested food**

Digestive System Envelope Activity
(Structure ↔ Function ↔ Secretion)

DIGESTIVE SYSTEM DISORDERS

Design an educational pamphlet on one of the topics listed below.

- anorexia nervosa
- bulimia
- ulcers
- irritable bowel syndrome
- some other topic approved by your teacher

Create folds in your pamphlet before placing text or designs on it.

Your target audience is a grade 6 student, so be sure to explain the topics in terminology that he or she can understand.

The following headings should appear in your pamphlet and relevant information should be included for each topic:

- What is
- Symptoms and Effects
- Causes
- Diagnosis
- Treatment/Cures
- Did You Know? (or Interesting Facts)
- References

Include an appropriate title on your pamphlet.

Design and decorate your pamphlet so that it will appeal to the reader.

Remember, you are creating an educational pamphlet similar to ones you might find in a pharmacy.

BROCHURE RUBRIC

	EXCELLENT - 4	GOOD - 3	ALMOST - 2	KEEP TRYING - 1
Attractiveness and Organization (Overall Design)	Overall appearance of pages is pleasing and contributes to understanding of the content. There is a nice balance of easy to read titles, text, colours and graphics ,which results in a pleasant and comfortable reading experience. Graphic elements contribute to the experience without being cluttered or confusing.	Layout of most pages is clear and easy to follow, and uses a consistent design theme. Headers and fonts contribute to the overall clarity and flow of the information, and help to move the eye from main topics to supporting details.	Layout of most pages is simple enough to follow the information. Titles and fonts are usually appropriately used. Most pages follow the same or similar design.	Layout is cluttered or confusing, or so simple that the benefits of the brochure are lost. It looks more like a term paper than a brochure.
Ideas and Content	Brochure has all the important information and leaves no questions.	Brochure has most of the important information, but questions are raised.	Brochure seems to be missing large pieces of critical information.	Information presented is unclear and not consistent.
Writing and Grammar	Writing is done in complete sentences. Grammar is all correct.	Most of the writing is done in complete sentences, and there are few mistakes in grammar.	Some of the writing is done in complete sentences, but there are some mistakes in grammar.	Little or none of the writing is done in complete sentences, and there are many mistakes in grammar
Graphics and Picture	Images and other graphics are valuable to the text and enhance the information presented.	Images and other graphical elements make a contribution to the appearance, are used consistently on most pages, and contribute to the overall flow of the information.	Graphical elements sometime help the reader to understand the layout or flow of information, but sometimes they are used inconsistently, or are confusing, or are unnecessary or distracting decorations.	Graphical elements don't seem to serve any useful purpose other than for decoration, and often they are confusing or clutter up the pages. The site would have been better without many of the graphics and icons.
Sources	A variety of sources are cited and listed on the back of brochure.	A few sources are cited and listed on the brochure.	Only one source is listed on the brochure, and the citation is incomplete.	No sources are cited or listed anywhere on the brochure.
			Total	/ 20

Presentation Handout Rubric Evaluation

	EXCELLENT - 4	GOOD - 3	ALMOST - 2	KEEP TRYING - 1	POINTS
Class Involvement	Handout got class actively participating through a game, trivia, or other group activity	Handout had class engaged through a follow-up activity, Activity showed thought and effort in order to have organized participation.	Handout made class think about presentation through clues or questions in a question period or crossword. Required some thought and effort to organize.	Handout was very basic with minimal amount of organization or effort required. (e.g., word search with answer key provided).	-----
Content Related to Presentation	Activity closely matched the presentation and reinforced or expanded on concepts presented.	Concepts and questions were all related to presentation but not all were explained during presentation.	Concepts or questions were mostly related to presentation, but not all were explained.	Words used are not all connected to presentation.	-----
Introduction and Instructions to Handout	Handout or activity was fully explained and demonstrated. Time was allotted for completion with a wrap-up or conclusion to finish.	Handout or activity was explained, with time provided for completion but it was not brought to a close.	Handout or activity was briefly explained, and activity started, but it was left to be finished individually. There was no conclusion	Handout was simply passed out without explanation of terms or use. Individual completion was expected.	-----
				Total	/ 12

“Circulatory System” INTERNET ASSIGNMENT

Name _____

Complete the answers to the following questions.

Visit the following eb site and explore it and its links (the highlighted words).

<http://sln.fi.edu/biosci/biosci.html>

1. What is the size of the human heart? _____
2. What is the average number of heartbeats per minute in
 - A) a baby? _____
 - B) a seven-year old child ? _____
 - C) an eighteen-year old? _____
3. On which side do you feel your heart beat more strongly ? _____
Why? _____
4. When the heart is developing in the fetus (developing baby in the mother), it resembles the heart of other animals. When and in what way does it resemble
 - A) a fish? _____
 - B) a frog? _____
 - C) a reptile? _____
 - D) a human? _____
5. What is the prescription for a healthy heart? _____

6. What is the # 1 killer in North America? _____
7. Who has the highest rate of heart disease?
 - A) males or females? _____
 - B) white people or black people ? _____
8. How long do over half of all heart attack victims wait before they seek help? _____
9. What is the leading contributor to heart disease? _____
10. What is the other name for high blood pressure? _____
11. What is the range for a safe reading for your blood pressure? _____
12. Describe how and why hypertension may lead to a heart attack. _____

13. A)When does a heart attack occur? _____
B) What is one of the most common causes of this? _____

14. What is angina pectoris? _____

15. What are the warning signs of a heart attack? _____

16. Listen to a heart murmur if possible.

17. Observe the *Open Heart Surgery* movie.

18. What is the heart-lung machine? _____

19. How can doctors locate arterial blockages (blockages in the arteries)? _____

20. What is angioplasty? _____

21. What is a coronary bypass and what does it involve? _____

22. Who was Baby Fae? _____

23. How many litres of blood are in the human body? _____

24. Go to <http://www.queendom.com/mindgames/quizdom/quiz175.html> and complete the "Have a Heart Trivia."

25. Go to <http://science.howstuffworks.com/heart3.htm>. Scroll down and click on the movie.

26. Go to <http://smm.org/heart/heart/top.html>. Click on the images and explore the information and diagrams. Be sure to check out the surgery movies.

“THE PATHWAY OF BLOOD” BOARD GAME

Objective

To learn the pathway of human circulation by

1. Designing and creating a board game.
2. Playing the game and/or games of classmates.

Instructions for teacher

Create an overhead showing the pathway of the human circulation of blood (this may not be necessary if students already have a reasonable grasp of the topic or will not experience too much frustration in designing the pathway themselves).

Give each group of students (two to four students/group) a sheet of Bristol board.

Have the following available for students to use, as necessary: markers, colouring pencils, index cards (or sheets of paper cut into pieces about the size of index cards), tape, glue, and construction paper.

Instructions for students

Tape Bristol board to the wall and outline the pathway on the Bristol board.

Take Bristol board back to your station and colour in squares on the pathway to represent the spaces along which tokens will be moved during the game.

Create an appropriate title for your game and include it in your game (on the Bristol board).

Create the tokens.

Create the cards.

1. One deck of cards (using the index cards) will have the title on one side and instructions on the other. Your instructions could include the following:

“ Move 5 beats”

“ Miss a beat-skip a turn”

“ Move back one beat”

Etc.,

Every so often there will be a card that has a single word, such as “Blood Clot.” This is where a second deck of cards will be used.

2. A second deck of cards will have a word/term on the top of each card that relates to the human circulatory system (e.g., Blood Clot). On the flip side of each card will be a trivia question having to do with transport and the circulatory system. It may say something like “ What is the name of the vessel labelled 4? Answer correctly and move ahead five beats.”

(Note: The answer will be placed on the same card so it is necessary that the question be ready by another player.)

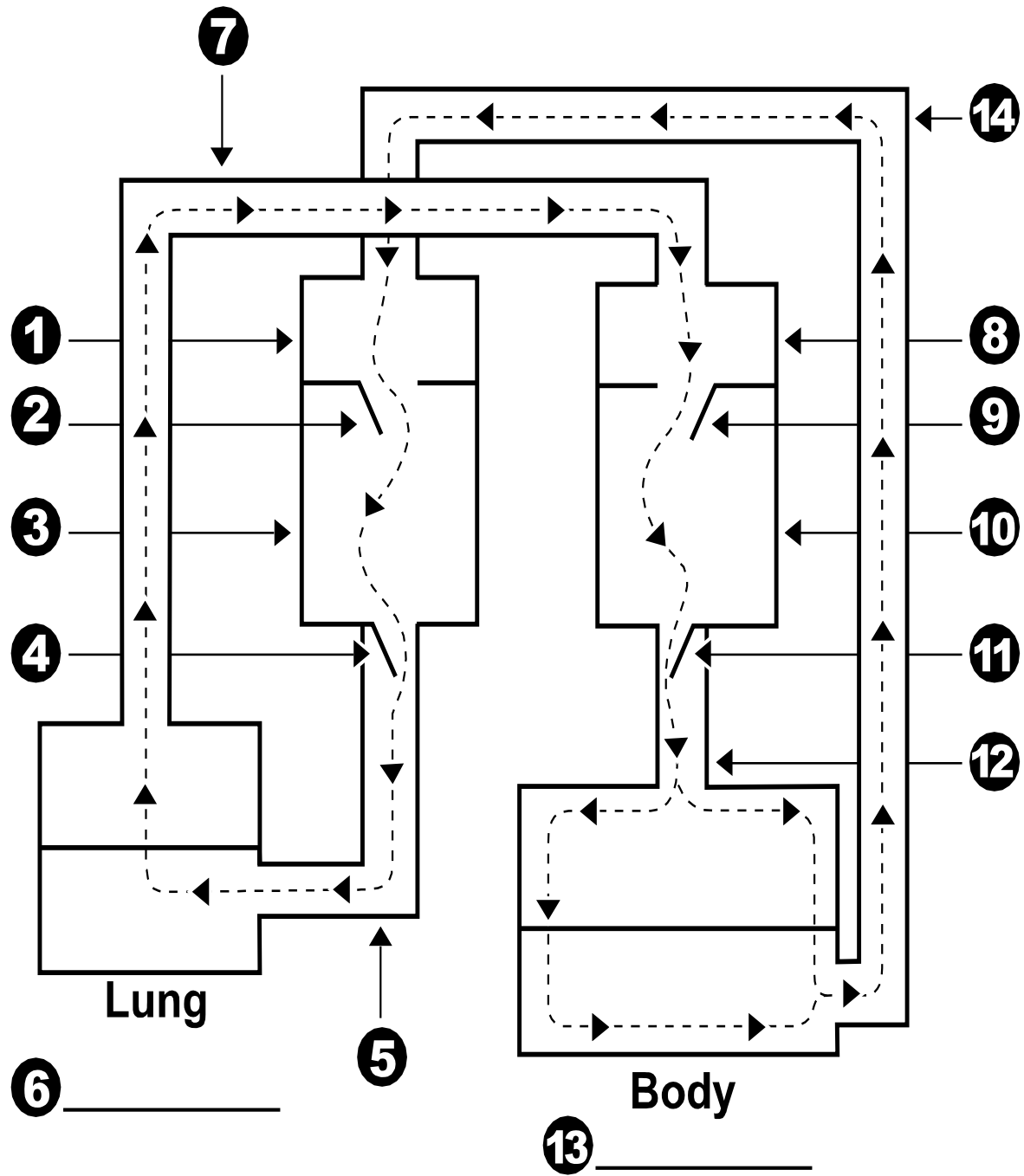
Decorate your game board to make it attractive. Draw two squares the size of index cards so that the cards used can be placed on the board in the appropriate areas. You may also choose to have a discard pile.

Try playing your game to see if you have an appropriate number of cards in each deck, or to see what changes should be made so that the average length of the game is 20—30 minutes.

Playing the game

All tokens are placed at the start (i.e., the right atrium).

A player draws a card from the deck labelled with the title of the game, and then follows instructions. If the card drawn has the name that corresponds to the second deck of cards, then another player picks up a card from that deck and reads it to the player whose turn it actually was. Instructions on that trivia card are followed. Once a player has moved his/her token (or failed to do so), then play continues clockwise.



LAB: INVESTIGATING PULSE RATE

Name _____

Background

As the heart pumps blood out into the arteries, the arteries expand under the pressure as blood is pressed against the walls. This surge of pressure is felt in the arteries as the pulse. The pulse can be felt at certain places in the body where an artery is close to the surface.

The pulse rate is exactly equal to the heart rate. By taking one's pulse, the heart rate can be determined. This rate will be affected by many things, such as age, sex, temperature, physical activity, and psychological state. In this activity, you will investigate your pulse rate and examine the factors that influence it.

Objectives

1. Determine how to take the pulse and calculate its rate.
2. Determine how the following factors affect the pulse rate.
3. Make a line graph to determine the effect of exercise on pulse rate.

Materials

Clock or watch with a second hand
Paper bags

Procedures and Observations

Work in pairs so that you and your partner can take turns being the subject and the experimenter. Before you begin this activity, make sure you know how to take your partner's pulse. Using your second and third finger, press firmly against the inside of your partner's wrist in the area that is closest to the thumb.

1. After you have sat quietly for one minute, have your partner count your pulse for 15 seconds. Record this number in Table 1. Determine your pulse rate for one minute by multiplying the number by four. Then record your pulse rate per minute in Table 1. Repeat step one two more times. Using the three measurements of pulse rate per minute, calculate your average pulse rate per minute. Record your average resting pulse rate in Table 2, and on the chart on the board according to your sex.
2. Switch roles with your partner and repeat the experiment, recording results.
3. You (subject) should stand stiffly at attention for two minutes. Then, while you are still standing at attention, your pulse should be taken by the experimenter for 15 seconds. Determine your pulse rate per minute by multiplying this number by four. Record your at-attention pulse rate in Table 2 and on the board. Switch roles and repeat.
4. While seated, you (subject) should take a deep breath, exhale part of it, and then hold your breath as long as possible. While you are holding your breath your pulse should be taken by the experimenter for 15 seconds. Determine your pulse rate per minute by multiplying this number by four. Record your breath-holding pulse rate in Table 2 and on the board. Switch roles and repeat.

5. While seated, you (subject) should hold an open paper bag tightly over your mouth. Do not breathe through the nose. You should breathe through your mouth from the air in the bag for two minutes. Toward the end of the second minute, your pulse should be taken by the experimenter for 15 seconds. Determine your pulse rate per minute by multiplying this number by four. Record your breathing-into-bag rate in Table 2 and on the board. Switch roles and repeat.

6. While seated, you (subject) should take deep breaths regularly for 30 seconds. After the first 15 seconds, your pulse should be taken by the experimenter for the remaining 15 seconds of deep breathing. If you become lightheaded while taking deep breathes, hold your breath for a few seconds. Determine your pulse rate per minute by multiplying this number by four. Record your deep-breathing pulse rate in Table 2 and on the board. Switch roles and repeat.

7. The time needed for your pulse to return to the sitting pulse rate is called recovery time. You (subject) should run on the spot for one minute, or do jumping jacks for one minute. Immediately after exercise, you should sit and your pulse should be taken for 15 seconds. Then it should be taken again at one minute intervals, so that a 15 second pulse is taken every minute for six minutes. Determine each pulse rate per minute by multiplying the numbers by four. Record your after-exercise pulse rates in Table 2 and on the board. Switch roles and repeat.

8. Determine the class average pulse rates for males and females in each activity and record them in Table 2.

Analysis and Interpretation

1. How does your resting pulse rate compare with the average for your sex? _____

2. Why did you take a resting pulse rate? _____

3. Why do you think that holding your breath or breathing into a bag affects the pulse rate? _____

4. Which activity increased your pulse rate the most? What does this increase indicate? _____

5. What do you think is the relationship between physical condition and pulse rate after exercise? Between physical condition and recovery time? _____

6. Construct a line graph to show what happens to your pulse rate after exercise. Put pulse rate per minute on the vertical axis and time in minutes on the horizontal axis.

7. Why do athletes often have a lower pulse rate than nonathletes? _____

Table 1: Determining Resting Pulse Rate

Trial	Pulse rate/15 seconds	Pulse rate/minute

Table 2: Effect of Activity on Pulse Rate

Activity	Your pulse rate per minute	Average female pulse rate/min.	Average male pulse rate/min.
resting			
standing at attention			
holding breath			
breathing into paper bag			
breathing deeply			
exercise			
exercise (1 min after)			
exercise (2 min after)			
exercise (3 min after)			
exercise (4 min after)			
exercise (5 min after)			
exercise (6 min after)			

Human Respiratory System

Lung Capacity

In this lab, the vital capacity of the lungs will be measured using a device called a wet spirometer. The vital capacity of the lungs is the total amount of air that can be forcibly exhaled following a maximal inhalation. It is not the total capacity (volume) of the lungs, since there is always a certain volume of air (approx. 1 L) that cannot be removed from the lungs.

Also the vital capacity can vary from person to person.

Determining Volumes of Air Involved in Breathing

- (1) TIDAL VOLUME (TV)—The amount of air exhaled (or inhaled) during normal relaxed breathing.

After inhaling a normal breath, exhale into the spirometer in a normal unforced manner. Do this three times and average the volumes.

1	2	3	Average

Average TV = _____ litres

- (2) EXPIRATORY RESERVE VOLUME (ERV)—The total amount of air that can forcibly be exhaled after a normal TV exhalation.

After exhaling normally, forcibly exhale as much air as possible into the spirometer. Do this three times, and average the volumes.

1	2	3	Average

Average ERV = _____ litres

Breathing Lab

Part 1: Tar Jar Demonstration

Purpose: To show students the amount of tar taken into a smoker's lungs in 4 months.

Materials: one wide-mouthed plastic (not glass) jar approximately .5 L
.315 L of dark molasses

Directions: Slowly swirl the "tar" in the jar while offering the following explanation:

The tar in a cigarette smoke contains many carcinogens, cancer-causing chemicals. This jar contains approximately .3 L of "tar". This is how much a smoker would take into his/her lungs in four months if s/he smoked one pack of cigarettes a day. Tar affects the cilia on the lungs— which are tiny hairs that help move fluid, in the form of mucus, out of your lungs. When you cough, the cilia help you clear your lungs. While a smoker's cough is annoying, the ability to clear the lungs through coughing helps to get the contaminants out of the body and postpone more serious illness. Tar and its poisons harm the cilia so they can no longer help clear the lungs of mucus and smoke-borne chemicals. This is why smokers tend to get serious respiratory infections, leading to bronchitis, pneumonia, and possibly emphysema.

Part 2: Straw Lab

Purpose: To demonstrate that breathing through the straw would be similar to breathing with emphysema or cystic fibrosis.

Materials: Class set of straws (from Cystic Fibrosis Package or corner store)

Directions:

- 1) In a seated position, pinch your nose and breathe through the straw for 60 seconds.
- 2) Walking around the classroom, repeat.
- 3) Walking up a set of stairs, repeat.

Have student complete a journal reflection on how breathing problems could affect their lifestyle.

Respiratory Diseases and Disorders Internet Activity

- Open the Web site: http://www.lung.ca/home-accueil_e.php
- Click on 'Lung Diseases'.
- From the given list, we will investigate the following diseases:
 - Asthma
 - Lung Cancer
 - Sleep Apnea
 - Tuberculosis
- For each of the above, answer the following questions (Chart I):
 - What is it?
 - What are the signs and symptoms?
 - How is it diagnosed?
 - What is (are) the treatment(s)?
 - Are there any preventative measures a person can take?
- Then click on 'Diseases from A-Z'. Pick four of your choice and answer the above questions. (Chart II)

Chart I

Disease/ Disorder	Asthma	Lung Cancer	Sleep Apnea	Tuberculosis
Definition				
Signs and Symptoms				
Diagnosis				
Treatment				
Prevention Methods				

Chart II

Disease/ Disorder	Asthma	Lung Cancer	Sleep Apnea	Tuberculosis
Definition				
Signs and Symptoms				
Diagnosis				
Treatment				
Prevention Methods				

What chemicals can be detected in urine? Lab**Teacher preparation for lab**

These solutions must be made prior to the lab:

Normal Urine

- Add 1 tsp of sodium chloride (table salt) and four drops of yellow food colouring to 500 mL of tap water.

Abnormal Urine

- Use normal urine solution plus 1 tsp of glucose or table sugar.

Silver Nitrate

- Add 4g silver nitrate to 250 mL distilled water.

Glucose

- Add 1 tsp glucose or table sugar to 250 mL tap water.

Salt Water

- Add 1 tsp sodium chloride to 500 mL tap water.

* Prepare solutions in dropper bottles for safety and ease.

- Purchase one package of diastix from a local pharmacy.

Lab: What chemicals can be detected in urine?

Procedure

1. Label the test tubes 1 through 4 and place them on the rack.
2. Half fill each tube with the following solutions:
Tube 1: water Tube 3: normal urine
Tube 2: salt water Tube 4: abnormal urine
3. Add five drops of silver nitrate to each tube. If a white haze appears, this means that salt is present. **CAUTION: Do not spill silver nitrate on skin or clothing. Rinse with water if spillage occurs.**
4. Record your before silver nitrate and after results in the table.
5. Use labels to number four slides 1, 2, 3, and 4.
6. Add one drop of the following to each slide.
Slide 1: water Slide 3: normal urine
Slide 2: glucose Slide 4: abnormal urine
7. Touch a diastix to each drop. If the blue colour at the tip turns greenish-brown, it means that the sugar glucose is present.
8. Record your before and after results in the table.
9. Clean your test tubes and slides.

Data

Group Members: _____

Tube	Tube Contents	Haze present before?	Haze present after?	Salt Present
1				
2				
3				
4				

Slide	Slide Contents	Colour of paper before?	Colour of paper after?	Glucose Present
1				
2				
3				
4				

Answer the following questions on a sheet of paper to be handed in with the above tables.

1. How can you tell if a liquid contains salt?
2. How can you tell if a liquid contains glucose?
3. Based on your data, does the normal urine contain glucose or salt?
4. Using your knowledge, would you say that urine from your body contains glucose or salt? Why?
5. Based on your data, does the abnormal urine contain glucose?
6. Why is it useful to know if urine contains salt or glucose?

Name These Bones

Name _____

Match:

- | | |
|-------------------|----------------------------------|
| _____ tarsals | 1. Ribs |
| _____ cranium | 2. Knee bone |
| _____ sternum | 3. Ankles |
| _____ phalanges | 4. Lower leg bone (large) |
| _____ patella | 5. Lower leg bone (small) |
| _____ scapula | 6. Thigh bone |
| _____ vertebrae | 7. Hip bone |
| _____ humerus | 8. Lower fused spine |
| _____ mandible | 9. Spine |
| _____ ribs | 10. Collar bone |
| _____ radius | 11. Shoulder blade |
| _____ ulna | 12. Breast bone |
| _____ tibia | 13. Lower arm bone (thumb side) |
| _____ fibula | 14. Lower arm bone (pinkie side) |
| _____ femur | 15. Wrist bone |
| _____ pelvis | 16. Jaw bone |
| _____ carpals | 17. Skull |
| _____ sacrum | 18. Fingers |
| _____ metatarsals | 19. Toes |
| _____ clavical | 20. Upper arm bone |

Skeletal and Muscular Systems Assignment

Answer the following questions:

1. What is the skeletal system made up of?
2. What are the five major functions of the skeletal system?
 - a.
 - b.
 - c.
 - d.
 - e.
3. How many bones are babies born with? _____
4. How many bones do adults have? _____
5. Why is there a difference between the number of bones in a baby and in an adult?
6. The area where two bones come together is called a _____.
7. Describe the material that covers the ends of bones. What is this material called?

8. What keeps the ends of bones apart?
9. Bones are held together by a stretchy tissue called _____.

10. How many bones are there in the skull and upper jaw alone? _____
11. What are the individual backbones called? _____
12. How many bones are there in the back, or spinal column? _____
13. How many ribs does a person have? _____
14. There are _____ bones in a person's hand and fingers, and _____ in the feet and toes. (State number.)
15. About how much of a person's body weight is made up of muscle? _____
16. The main purpose of the muscular system is _____
_____.

17. Muscles are made up of special tissue that can _____ or _____ when they receive a signal from the brain.
18. Muscles are attached to bone by stretchy tissue called _____.
19. Describe how a muscle is able to move a bone.

20. The human body contains how many different muscles? _____
21. Muscles work in pairs because muscles can only _____; they cannot _____.
22. The muscle that makes up the heart is called the _____ muscle.

23. Muscles which are controlled by your deliberate thoughts are called _____.
Two examples are the muscles in your _____ and in your _____.
24. Muscles which are controlled by the brain automatically are called _____.
Two examples of these muscles are _____ and _____.

Muscle Lab: Muscle Fatigue

Name _____ Partner _____

Problem: How does muscle fatigue affect the muscles' ability to contract?

Materials: 2 kg dumb-bell
stopwatch

Trial Results

Procedure

	Trial	Time
1. Stand up at a wall or the chalkboard facing it and raise one arm to the side, with the palm down, until it is horizontal. Have your partner mark the height of your palm on the wall (use a piece of masking tape) or chalkboard.	1.	_____
2. Facing perpendicular to the wall, pick up the dumb-bell and prepare to lift your arm to the side to a horizontal position.	2.	_____
3. Have another student begin timing as your arm is raised.	3.	_____
4. Keep the arm horizontal for as long as possible. The timer will note the time elapsed as soon as your arm drops below the mark on the board, and tell you to rest.	4.	_____
5. The timer will record the time elapsed in the chart provided. <u>You rest for exactly 10 seconds.</u>	5.	_____
6. Repeat the trial five times. <u>Make sure you only rest for 10 seconds between trials.</u>		
7. Graph your results on a time vs. trial number graph on graphing paper.		

Questions

1. How does repeated use affect your ability to hold your arm up?

2. What do you think would happen if you continued with further trials?

3. How can you explain these results?

THE EYE LAB

A. Sharpness of Your Sense of Sight

The sharpness of your sense of sight can be tested using an eye test chart (charts can be found at <http://www.i-see.org/snellen.pdf> or <http://www.i-see.org/eyecharts.html> or CD).

Work in pairs. Students should remove glasses in order to test their vision. They may want to repeat this procedure with their glasses on and notice the different results.

Obtain an eye test chart from your teacher. Have your partner hold it and stand exactly 6.1 meters (20 feet) away from you. Cover your left eye and read the rows of letters starting at the top. Read down as far as you can.

Record the number on the chart that corresponds to the row in which sight becomes uncertain.

Cover your right eye and repeat the procedure.

Record the number on the chart that corresponds to the row in which sight becomes uncertain.

Switch roles with your partner.

An eye with normal vision can read the bottom row from 20 feet away. This is called 20-20 vision. If for example, you could just read to the row labelled 30, this means that you would read at 20 feet what a normal eye could read at 30 feet. Your vision would be 20-30.

Estimate your vision for each eye and state your answer below.

Right eye _____ Left eye _____

B. Dominant Eye

Every person has a dominant eye. The dominant eye takes over when focussing on something. In most people, the right eye is dominant.

Make a circle with your right thumb and forefinger. With both eyes open, look at an object across the room through the circle. Have your arm extended fully. First, close your left eye and look at the object.

Does the object appear to be in the center of the circle? _____

Next close your right eye and look at the object. Does the object appear to be in the center of the circle? _____ The dominant eye will be the one for which the object remains in the center of the circle. Which is your dominant eye? _____

C. Focussing

The lens of the eye changes shape, allowing you to focus on nearby or distant objects. Hold your hand 15 cm from your face, and spread your fingers apart. Look through your fingers at a distant object. Then, look back at your fingers. Repeat this several times. Record whether the background and fingers are in focus at the same time. _____

D. The Blind Spot

Discuss the blind spot.

Cover your left eye. Then, while holding a piece of paper (containing a plus sign and dot to the right) about 10 cm away, focus on the plus sign. Continue looking at the plus sign while slowly moving the paper away from you.

1. What happens to the dot to the right of the plus sign as you move your book away?

Now cover your right eye and stare at the dot with your left.

2. What happens to the plus sign as you move your book away? At about what distance?

E. After-images

Discuss receptors in the eye becoming fatigued.

Use the figure on page 338 of your textbook.

Stare for 30 seconds at the center of the triangle. Then stare at a sheet of white, unlined paper for 5-10 seconds. Draw the triangle and colors that you see when the after-image appears.

F. Colour blindness

Colour blindness is a problem in which red and green look like shades of gray or other colours.

Test to see if you are colour blind by looking at figure 27-10 on page 576 of your biology textbook. What number do you see? _____ Ask other students what number they see. If you are not able to see the number that should be obvious, you possess the trait of colour blindness.

END OF LAB ON THE EYES

TESTING REFLEXES AND REACTION TIME LAB

A. Knee-Jerk

The subject should sit on a chair with one leg crossed over the other. The top leg must be free to swing. With the side of the hand, the experimenter should tap the subject's top knee on the tendon just below the kneecap. It may take several taps before the proper part of the tendon is stimulated.

Questions: Knee-Jerk Reaction

1. What is the response of the leg when one leg is crossed over the other and the tendon just below the knee cap on the top leg is struck? _____

2. What is the response of the leg when the top leg is held out straight and is struck? _____

3. In which leg position is the response the greatest? _____

Switch roles with your partner.

B. Pupil Size

Instructor : Discuss what the iris and the pupil are.

The subject should close over his or her eyes for at least one minute. At the end of one minute, the experimenter should watch the subject's pupils as the eyes open.

Question: Pupil Size

1. Describe the response of the iris and its effect on the pupil.

Switch roles with your partner.

C. Blinking Response

The subject should hold a clear plastic sheet in front of his/her face. The experimenter should toss a crumpled sheet of paper at the subject to try to make him/her blink.

Question: Blinking Response

1. Describe the response of the subject's eyes.

Switch roles with your partner.

D. Reaction Time

The subject should rest his or her elbow on the table, with the arm extending over the side. The experimenter should hold a metre stick in the air, with the 0 cm line between the subject's open index finger and thumb. The experimenter then should drop the metre stick and the subject should catch it between the index finger and thumb as quickly as possible. Note the measurement in cm of the metre stick where it was caught (the distance it fell).

Questions : Reaction Times

1. Do you think the metre stick will fall longer if you catch it with your right hand or left hand. State this hypothesis.

2. Do five trial drops and record the results in centimetres.

Trial 1 _____ Trial 2 _____ Trial 3 _____
Trial 4 _____ Trial 5 _____

Switch roles with your partner.

3. Calculate the average distance the metre stick fell.

Average (trial 1 + trial 2 + trial 3 + trial 4 + trial 5) / 5

Average _____ cm

4. Calculate the time it takes for the object to fall.

(time = $\sqrt{2d/a}$ Where "d" is the distance in centimeters and "a" is equal to 980cm/s²)
Time _____ seconds.

5. Repeat the above procedure for your left hand. Complete the information below.

Calculate the distance the meter stick fell.

Trial 1 _____ Trial 2 _____ Trial 3 _____
Trial 4 _____ Trial 5 _____

Switch roles with your partner.

Average distance the metre stick fell _____ cm

Time the metre stick fell _____ seconds

6. Did you catch the metre stick faster with your left hand or your right hand? _____
Which hand is your writing hand? _____
Was your original hypothesis correct? _____

7. Repeat the dropping experiment but have the experimenter ask the subject to answer simple math calculations before and during the drops so a distraction is provided as he/she tries to catch the metre stick. Complete the information below.

Record the results in centimetres.

Trial 1 _____ Trial 2 _____ Trial 3 _____
Trial 4 _____ Trial 5 _____

Switch roles with your partner.

Average distance stick fell _____ cm

Time it took the stick to fall _____ seconds

Did you find that the person's reaction time in this set of trials was slower or quicker than with your very first set of trials? _____ Explain why you may have found a difference between the two reaction times. _____

How does this experiment relate to what you have heard about people talking on cell phones as they are driving their vehicles? _____

Summary Questions: Reflex Lab

1. What is a reflex?

2. How is the iris-pupil response to light a protective reflex?

3. How is the blinking response a protective reflex?

4. What is the definition of "reaction time"?

5. Why were you asked to do five trials at a time? _____

6. Name three sports and three occupations in which reaction time is important. _____

7. What things may increase reaction time? _____

THE NERVOUS SYSTEM INTERNET ASSIGNMENT

NAME _____

PART ONE

Go to <http://faculty.washington.edu/chudler/chgames.html>.

Select "Colors, Colors?" Read the introduction on the Stroop Effect.

Select "Interactive Stroop Effect Experiment" and run the experiment. Complete the activity for the two word sets.

How long did it take you to read the word set #1? _____

How long did it take you to read the word set # 2? _____

Choose "Back to Stroop Effect." Describe the two theories that may explain the interference between what the words say and the actual colors of the words. _____

Why might younger children have faster times for saying the colours in word set #2? _____

Scroll down and choose the "Interactive Directional Stroop Effect Experiment". Run the tests.

How long did it take for set #1? _____ How long did it take for set # 2? _____

Describe what you found happened during set # 2. _____

Select the "Number Stroop Effect Experiment."

How long did set # 1 take? _____ How long did set # 2 take? _____

Are the tests that involve directions and numbers (i.e., the last two experiments) easier or harder than the original coloured word Stroop Effect? _____ Why? _____

PART TWO

Go back to GAMES.

Scroll down and choose " On-line Brain Jigsaw Puzzle" and complete the puzzle that has the various areas of the brain labelled (e.g., frontal lobe, occipital lobe)

PART THREE

Go to <http://faculty.washington.edu/chudler/flash/million.html>.

Play the "Mill-Neuron-Aire" game and state the answer to each of the following questions:

1. Where is your brain located? _____
2. How much does an average human brain weigh? _____
3. About how many neurons are in an average human brain? _____
4. What are the two parts of the central nervous system? _____
5. What is the name of the junction (space) between two neurons? _____
6. What lobe of the brain is most important for vision ? _____

7. Which of the following is NOT a neurotransmitter (a chemical that travels from one neuron to the next neuron)? _____
8. What disease is characterized by an “electrical storm in the brain” ? _____
9. Which drug comes from a plant called *cannabis sativa*? _____
10. What do the arrows point to in this diagram? _____
11. What connects the left and right hemispheres (halves of the cerebrum) ? _____
12. What part of the eye contains cells that respond to light ? _____
13. Which of the following is NOT a layer of the meninges (the membrane that surrounds the brain and spinal cord)? _____
14. Which brain imaging method uses radioactive-labelled glucose (a suga)? _____
15. Who won the Nobel Prize in 1981 for his discoveries about the functions of the right and left hemispheres of the brain? _____

PART FOUR

Go to <http://faculty.washington.edu/chudler/flash/nill.html>.

Enter the “Gallery of Visual Illusions” and work through the optical illusions.

Which optical illusion was the hardest to believe (i.e., Which would you be most likely to be fooled by)? _____

PART FIVE

Go to <http://www.michaelbach.de/ot/> and check out the illusions at this site.

***AWAKENINGS* RESPONSE SHEET**

1. What is meant when it is said that a person is catatonic?
2. A) What is encephalitis?
B) What happened to the people in this movie who had encephalitis when they were young?
3. What was Dr. Sayer trying to do with the drug known as L-dopa?
4. What were some of the signs that led Dr. Sayer to believe that there was some degree of awareness—some part that was still alive—in these patients, even before he started giving them the medications?
5. These catatonic patients were brought back to society for a short time, only to revert back to their previous state. Do you think this was a positive move for the patients, or are they now worse off?
6. Explain why *Awakenings* is an appropriate title for this movie.

STI Learning Station Activity

- Go to http://www.phac-aspc.gc.ca/publicat/std-mts/pdf/sti_e.pdf.
- Using information collected from the above site, develop into stations and create questions/work to be completed at each station.

Reproductive System “Internet Assignment”

Complete the answers to the following questions.

Visit the following web site and explore it and its links:

<http://www.sexualityandu.ca/eng/teens>

On the left of the screen, click on What is Sex and then ‘Take a Look at Your Body’. Go to the female sexual organs.

1. What is the size of a human ovary? _____ Uterus? _____
2. The ovaries produce _____ and female hormones _____ and _____.
3. What is the purpose of the Fallopian tubes? _____
4. In which structure does the egg usually get fertilized? _____
5. What is the function of the uterus? _____

6. When a woman has a pap smear taken, the cells come from the _____.
7. The structure which is made of very elastic walls which can expand to accommodate a penis or allow a baby to be delivered is the _____.

Go back to the male sexual organs.

8. The male reproductive glands are called _____ or _____.
9. They produce _____ and the hormone _____.
10. Sperm are stored in the long, convoluted duct on the testis called the _____.
11. What is the purpose of the vas deferens? _____

12. The structure which provides the bulk of the semen is the _____.
13. What is the purpose of the secretions produced by the prostate gland? _____

14. Two functions of the urethra in males include _____
_____.

Click on Contraception and go to 'Contraceptive methods'

15. Five benefits for a woman choosing to use the pill as a form of contraception include the following: _____

16. When used correctly, the pill is _____ effective. The main disadvantage of the pill is _____

_____.

17. How does the patch prevent pregnancy? _____
It is _____ effective and the main disadvantage is _____

_____.

18. Depo-Provera is a _____ . It is _____ effective. It works by _____ .
One of the main advantages is _____ .
Two disadvantages are _____ and _____ .

19. A new birth control method available in Canada is the _____ . It works by _____ .

20. Condoms are _____ effective and the only form of contraception which can _____

21. Three disadvantages of using a condom include _____

_____.

22. Condoms offer protection against most STI's but do not protect against _____ and _____ .

23. Permanent surgery to block a man's sperm duct to prevent sperm from entering the ejaculation is called _____ . It does not protect a man from _____ . Permanent surgery to disconnect the Fallopian tubes and prevent eggs from being fertilized by sperm is called _____ . This provides no protection against _____ .

24. Briefly explain two other forms of birth control available to sexually active individuals.

Click on *Sexually Transmitted Infections* and go to 'What are They'







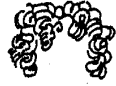





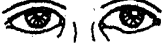
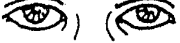
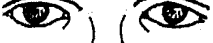
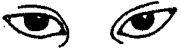

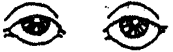

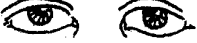
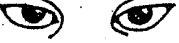
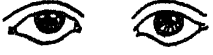
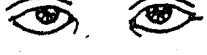
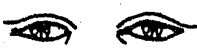
25. Complete the following charts on Sexually Transmitted Infections

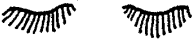

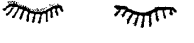
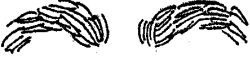
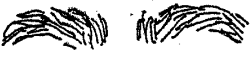
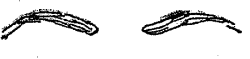

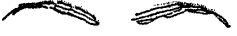



















	Chlamydia	Gonorrhea	Syphilis	Trichomoniasis
What is it?				
How do you get it?				
How do you prevent it?				
What are the symptoms?				
How do you test for this?				
What is the treatment?				

	Human Papillomavirus	Genital Herpes	Human Immunodeficiency Virus	Hepatitis B Virus
What is it?				
How do you get it?				
How do you prevent it?				
What are the symptoms?				
How do you test for this?				
What is the treatment?				

What Will I Look Like???

- Have students work in pairs. Provide them with two coins, the trait sheets, and a blank piece of paper.
- They will be flipping two coins representing traits—one from each parent.
- Students will flip the pair of coins for each trait and circle the image which reflects the results.
- When they have completed the trait selection, have them draw the facial features of the created offspring.
- Students can observe the different variations from other pairs in the class and discuss how siblings in a family can look similar, yet different?

Traits	Dominant (both heads)	Hybrid (one head, one tail)	Recessive (both tails)
Shape of face	 round (RR)	 round (Rr)	 square (rr)
Cleft in chin	 absent (CC)	 absent (Cc)	 present (cc)
Hair	 curly (HH)	 wavy (Hh)	 straight (hh)
Widow's peak	 present (WW)	 present (Ww)	 absent (ww)
Spacing of eyes	 close together (EE)	 normal distance (Ee)	 far apart (ee)
Shape of eyes	 almond (AA)	 almond (Aa)	 round (aa)
Position of eyes	 straight (SS)	 straight (Ss)	 slant upwards (ss)
Size of eyes	 large (LL)	 medium (Ll)	 small (ll)

Traits	Dominant (both heads)	Hybrid (one head, one tail)	Recessive (both tails)
Length of eyelashes	 long (LL)	 long (Ll)	 short (ll)
Shape of eyebrows	 bushy (BB)	 bushy (Bb)	 fine (bb)
Position of eyebrows	 not connected (CC)	 not connected (Cc)	 connected (cc)
Size of nose	 large (LL)	 medium (Ll)	 small (ll)
Shape of lips	 thick (TT)	 normal (Tt)	 thin (tt)
Size of ears	 large (LL)	 normal (Ll)	 small (ll)
Size of mouth	 large (LL)	 medium (Ll)	 small (ll)
Freckles	 present (FF)	 present (Ff)	 absent (ff)
Dimples	 present (DD)	 present (Dd)	 absent (dd)

