



north vancouver Distributed Learning School

Course Plan: Anatomy and Physiology 12

COURSE DESCRIPTION:

Anatomy and Physiology 12 focuses on human biology (digestive, circulatory, respiratory and reproductive systems), fostering student interest in and understanding of science by looking at themselves (human body) and seeing the diversity of body systems and how they work together. Students will explore cell structure and biochemical processes to the organ systems of the human body with an emphasis on homeostasis and control mechanisms. An understanding of human systems and the integrated nature of the human body will be emphasized. Microscope work, laboratory activities and dissections will provide hands-on experience.

For the complete Ministry curriculum Science document, go to:

<https://curriculum.gov.bc.ca/curriculum/science/12/anatomy-and-physiology>

BIG IDEAS:

The Big Ideas consist of generalizations and principles, and the key concepts important in an area of learning. They reflect the “Understand” component of the Know-Do-Understand model of learning. The big ideas represent what students will understand at the completion of the curriculum for their grade. They are intended to endure beyond a single grade and contribute to future understanding.

BIG IDEAS

Homeostasis is maintained through physiological processes

Gene expression through protein synthesis is an interaction between genes and the environment

Organ systems have complex interrelationships to maintain homeostasis

CORE COMPETENCIES:

A Core Competency is a skill that all learners need to have to be successful in all aspects of their life. There are 3 core competencies: Communication (Communicating & Collaborating), Thinking (Critical Thinking, Creative and Reflective Thinking), Personal (Personal Awareness and Responsibility, Social Awareness and Responsibility and Positive Personal and Cultural Identity).



COURSE EXPECTATIONS:

- The self-paced nature of this course requires that students manage their time effectively to complete the course by the deadline (typically a year from the date of registration). Successful students make a weekly schedule to plan out the completion of the course.
- Students must read all the information and attempt all activities in the course in order to be successful in the course.
- Students must take care that their communication with the teacher and with other students through email, Moodle message, or in person, is course related, clear and respectful.
- It should be clear from the assignment submissions that the student has personally engaged with the course material and submitted only work that is his or her own. Course work must be original. Communicate with the teacher if you would like to complete a project with a partner or group.
- Before you write a unit exam, you must complete the practice quiz in the unit, as well as submit your learning guide. If you cannot figure out a question, you should be researching, and then asking for help.
- The core of this course is content and research based. Therefore, students are encouraged to make use of other resources on the internet, but they must cite their sources. A variety of quality resources in the creation of your projects is a sign of academic depth, just make sure that you check the credibility of each source and acknowledge its use in your work.

LEARNING STANDARDS: Curricular Competencies

Using oral, written, visual, and digital texts, students are expected individually and collaboratively to be able to:

Questioning and predicting

- Demonstrate a sustained intellectual curiosity about a scientific topic or problem of personal, local, or global interest
- Make observations aimed at identifying their own questions, including increasingly abstract ones, about the natural world
- Formulate multiple hypotheses and predict multiple outcomes

Planning and conducting

- Collaboratively and individually plan, select, and use appropriate investigation methods, including field work and lab experiments, to collect reliable data (qualitative and quantitative)
- Assess risks and address ethical, cultural, and/or environmental issues associated with their proposed methods
- Use appropriate SI units and appropriate equipment, including digital technologies, to systematically and accurately collect and record data
- Apply the concepts of accuracy and precision to experimental procedures and data:
 - significant figures
 - uncertainty
 - scientific notation

Processing and analyzing data and information

- Experience and interpret the local environment
- Apply First Peoples perspectives and knowledge, other ways of knowing, and local knowledge as sources of information
- Seek and analyze patterns, trends, and connections in data, including describing relationships between variables, performing calculations, and identifying inconsistencies
- Construct, analyze, and interpret graphs, models, and/or diagrams
- Use knowledge of scientific concepts to draw conclusions that are consistent with evidence
- Analyze cause-and-effect relationships

Evaluating

- Evaluate their methods and experimental conditions, including identifying sources of error or uncertainty, confounding variables, and possible alternative explanations and conclusions
- Describe specific ways to improve their investigation methods and the quality of their data
- Evaluate the validity and limitations of a model or analogy in relation to the phenomenon modelled
- Demonstrate an awareness of assumptions, question information given, and identify bias in their own work and in primary and secondary sources
- Consider the changes in knowledge over time as tools and technologies have developed
- Connect scientific explorations to careers in science

- Exercise a healthy, informed skepticism and use scientific knowledge and findings to form their own investigations to evaluate claims in primary and secondary sources
- Consider social, ethical, and environmental implications of the findings from their own and others' investigations
- Critically analyze the validity of information in primary and secondary sources and evaluate the approaches used to solve problems
- Assess risks in the context of personal safety and social responsibility

Applying and innovating

- Contribute to care for self, others, community, and world through individual or collaborative approaches
- Cooperatively design projects with local and/or global connections and applications
- Contribute to finding solutions to problems at a local and/or global level through inquiry
- Implement multiple strategies to solve problems in real-life, applied, and conceptual situations
- Consider the role of scientists in innovation

Communicating

- Formulate physical or mental theoretical models to describe a phenomenon
- Communicate scientific ideas and information, and perhaps a suggested course of action, for a specific purpose and audience, constructing evidence-based arguments and using appropriate scientific language, conventions, and representations
- Express and reflect on a variety of experiences, perspectives, and worldviews through **place**

Unit 1 will cover the following Learning Outcomes (Curricular Competencies)

- Formulate multiple hypotheses and predict multiple outcomes
- Analyze cause-and-effect relationships
- Connect scientific explorations to careers in science
- Formulate physical or mental theoretical models to describe a phenomenon

These are 4 of the 31 learning outcomes in the course curriculum, which comprises 13% of the course Learning Outcomes/Activities. (4/31 = 13%)

LEARNING STANDARDS: Course Content

Students are expected to know the following:

- DNA:
 - the cell's genetic information
 - replication
- **gene expression**
- proteins and their relationship to the **structure and function of all cells**
- **genomics** and **biotechnology**
- micro to macro **organization**
- **organ systems:**
 - structure and function
 - structural and functional interdependence
 - maintenance of homeostasis
- **lifestyle differences** and their effects on human health
- **holistic approach** to health
- **disease** as an imbalance in homeostasis

UNIT OVERVIEWS AND LEARNING ACTIVITIES:

Module 1: Molecules and processes of homeostasis

This module encompasses two course units: Molecules; cell structure

Big Idea: Homeostasis is maintained through physiological processes

Core Competency Focus: Communication, Personal and Social, Thinking

Essential Questions: How do you know something is alive?

First Peoples Principle of Learning: Learning is embedded in memory, history and story and Learning involves patience and time.

Module Overview: Students will explore the biochemistry of biological molecules (and water) that ensure the normal, healthy functioning of the human body. They will investigate the structure and ultrastructure of cells as well as the role of the cell membrane in controlling the movement of biological molecules throughout the body. The students will also learn about the chemistry of enzymatic reactions and the importance of feedback regulatory loops in maintaining homeostasis.

Module 2: *The role of DNA in homeostasis*

This module encompasses two course units: Molecules; cell structure

Big Idea: Gene expression through protein synthesis is an interaction between genes and the environment

Core Competency Focus: Communication, Personal and Social, Thinking

Essential Questions:

First Peoples Principle of Learning: Learning is embedded in memory, history and story and Learning involves patience and time.

Module Overview: In this unit, the student will investigate how DNA through replication, gene expression and protein synthesis is the ultimate factor maintaining homeostatic conditions within the body.

Module 3: *Systems*

Big Idea: Organ systems have complex interrelationships to maintain homeostasis

Core Competency Focus: Communication, Personal and Social, Thinking

Essential Question: Where do we belong?

First Peoples Principle of Learning: Learning is embedded in memory, history and story and Learning involves patience and time.

Module Overview: Students will explore the various systems of the human body including their anatomy physiology, their interdependency and how lifestyle choices can lead to imbalances and diseases. In the last unit of this module, students will examine the reproductive system of males and females as well as the development of a new born from time of conception.

STUDENT LEARNING ACTIVITIES AND STRATEGIES:

Students may engage in the following learning activities and strategies:

- Apply the scientific method to design and carry out experiments (real or virtual)
- Make inferences and generalizations
- Interpret data from a variety of types of sources
- Draw conclusions
- Communicate information and results (e.g., graphs, diagrams, models, formulae, technological presentation tools)
- Course readings, online notes
- Online quizzes and tests
- Projects
- Interactive videos, worksheets
- Unit learning guides
- Practice quizzes
- Interactive videos/activities
- Communicate information and results (e.g., graphs, diagrams, models, formulae)
- Projects
- Unit exams, midterm exam, final exam

ASSESSMENT:

The course will include formative assessment opportunities where students will receive teacher feedback and also have the opportunity to incorporate self-reflection and self-assessment tools. The formative tasks are designed to help students correct, hone and improve on their work before being assessed. After each submission of work, the teacher will provide feedback based on criteria and standards that can then be incorporated into the final summative assignment. Summative assessment will take place after formative assessments and be used on final performance tasks and tests throughout each unit. This course will be using specific rubrics for different tasks and students will have access to these rubrics before submission of the assignments. The North Vancouver Assessment and Evaluation Handbook will be used as a guideline for assessment.- <http://nvsd44curriculumhub.ca/assessment/>

Formative may include:

- Learning guides and self-assessment (checking for understanding of lessons)
- Practice quizzes (checking for completion and understanding of lessons)

Quizzes can be done on your own (not supervised). Use them as practice – ie. give them a try first, then refer to notes if you need a little extra help. Keep track of where you needed help and review prior to attempting your unit exams or module exams.

Summative may include:

- Projects – (written feedback, rubric assessment):

You will be selecting projects after each of the module sections in this course. In each of the module, you will have some choice on assignments (found in the Module Assignments – green book icon). These projects allow you to make some choices on how you wish to enhance your understanding. Please submit your projects at the end of each modules in the Module Assignment Dropbox

- Unit Exams, Midterm Exam and Final Exam

All exams are "closed book" and require supervision at a North Vancouver Distributed Learning (DL) Centre.

EVALUATION:

Based on performance standards and criteria as outlined in each assignment:

Evaluation	Percentage of Final Mark
Substantive Student Course Activity	5%
Formative assessments	20%
<i>Learning Guides</i>	
<i>Practice Quizzes</i>	
Summative assessments	75%
<i>Unit Tests</i>	
<i>Projects</i>	
<i>Final Exam</i>	
Course Total	100%

RESOURCES:

There are some required texts for this course, which will be available either online or can be signed out from the teacher. Resources for readings and assignments are listed in the instructions of each lesson. These include websites maintained by government and non-profit organizations, as well as individuals. Students need access to a computer with Internet capabilities. Throughout the course, students will have the choice to engage with a variety of applications and online digital tools. The DL Centre is available for students who do not have computer access at home or who would like to meet with the teacher for academic and tech support.