

Health Science 28

**South East Cornerstone School
Division**

April 2017

Table of Contents

Overview.....	p.3
Introduction.....	p.3
Using the Resource Package.....	p.3
Learning Theme Correlation.....	p.4
Adaptive Dimension.....	p.4
Aim and Goals.....	p.5-6
Inquiry.....	p.6
Outcomes and Indicators.....	p.6-7
Legend for Outcomes and Indicators.....	p.7
Outcomes at a Glance.....	p.8
Outcomes and Indicators.....	p.9-13
Assessment and Evaluation of Student Learning.....	p.14-15
Key Resources.....	p.16-17
References.....	p.18

Overview

The purpose of this document is to provide an introduction to the *Health Science 28 (2017)* course and supplementary resource package that were developed by teachers representing South East Cornerstone Public School Division #209.

If a student is being considered for *Health Science 28 (2017)*, or any other Alternate Education course of study, the student and the parents/caregivers of the student must be consulted prior to being enrolled in an Alternate Education Course of Study. Consult *Policy and Procedures for Alternate Education Course of Study* for further information.

Introduction

Science is a required area of study in Saskatchewan's Core Curriculum. Students graduating with an Altered Education certificate, require *Science 18* in order to meet graduation requirements.

Using the Resource Package

This resource package is divided into nine themes that will guide student learning and support meeting *Health Science 21 (2016)* learning outcomes. The first four themes: **Course Introduction, My Health Portfolio, My Nutrition and Health Care Philosophies** are core themes that introduce overarching concepts in *Health Science 28 (2017)*. Themes five through nine, including; **Communicable Diseases, Organ Donation, Musculoskeletal Injuries, Concussions and Reproductive Cancers** are supplementary themes that delve into specific human body systems, imaging techniques and careers related to the aforementioned themes.

Some outcomes are addressed in more than one of the suggested lessons within a learning theme; therefore teachers need not use all of the suggested lessons. Teachers may request an electronic version of this course package from their school division office so that they can modify the instructional documents to meet diverse needs.

Learning Theme Correlation

The table below show which outcomes each of the nine learning themes support.

Theme	CE1	HC1	HC2	HB1	HB2	NU1	NU2	DT1	DT2
Introduction to Health Science	X		X	X	X			X	
My Health Portfolio		X	X					X	X
My Nutrition				X		X	X		
Health Care Philosophies	X	X						X	
Communicable Diseases	X	X		X	X			X	
Organ Donation	X		X	X				X	
Musculoskeletal Injuries	X		X	X	X			X	X
Concussions	X		X	X	X			X	X
Reproductive Cancers	X			X	X			X	X

Adaptive Dimension

The Adaptive Dimension refers to the concept of making adjustments to any or all of the following variables: learning environment, instruction, assessment and resources. Adjustments to these variables are intended to make learning meaningful and appropriate and to support student achievement. Tomlinson (1999) states, “Differentiation is an organized yet flexible way of proactively adjusting teaching and learning to meet kids where they are and help them to achieve maximum growth as learners” (p.14). In the Saskatchewan context, differentiation is addressed through the Adaptive Dimension which enables all teachers to respond to student diversity, including their strengths and needs, interests, backgrounds, life experiences and motivations.

Within the context of the Adaptive Dimension, curricular outcomes are not changed; adaptive variables are adjusted so that the curricular outcomes can be achieved.

The Adaptive Dimension

- regards teachers as professionals who have the authority and the responsibility to make adaptations to the learning environment, instruction, assessment and resources to meet the needs of all students;

- encourages dialogue among professionals concerning the most appropriate support and effective means of responding to individual differences within the classroom;
- supports the understanding that decisions about adaptations are best made by professionals working with students on daily basis;
- does not change curricular outcomes; and,
- promotes environments that cultivate collegiality and interprofessional collaboration fostered through the leadership of school administrators.

Whenever possible, students should learn a regular curricula and be supported through the Adaptive Dimension. Some students may not be able to complete a particular regular provincial course even though adaptations to resources and assessments, instruction, and environment have been made. This may require the development of an Altered Education course (e.g., *Health Science 28*) to meet student needs to which the Adaptive Dimension may be applied.

Adaptations include, but are not limited to:

- electronic text and various forms of technology
- peer helper, scribes, readers and tutors
- access to a computer for written assignments (example: use of word prediction software, speech to text software, text to speech software, spellchecker, idea generator, etc.)
- alternatives to written assignments and tests to demonstrate knowledge and understanding (example: oral presentations, conversations, observations, hands on activities, and individually adapted assignments, etc.)
- advanced organizers/graphic organizers and/or teacher notes to assist with classroom presentations
- extended time to complete assignments or test
- pre-teaching and re-teaching key vocabulary or concepts; multiple exposure to materials.

Aim and Goals

The aim of K-12 science education is to enable all Saskatchewan students to develop scientific literacy. Scientific literacy today embraces Euro-Canadian and Indigenous heritages, both of which have developed an empirical and rational knowledge of nature. A Euro-Canadian way of knowing about the natural and constructed world is called science, while First Nations and Métis ways of knowing nature are found within the broader category of Indigenous knowledge.

Diverse learning experiences based on the outcomes in this curriculum provide students with many opportunities to explore, analyze, evaluate, synthesize, appreciate and understand the interrelationships among science, technology, society and the environment (STSE) that will affect their personal lives, their careers and their future.

Goals are broad statements identifying what students are expected to know and be able to do upon completion of the learning in a particular area of study by the end of Grade 12. The four goals of K-12 science education are to:

- **Understand the Nature of Science and STSE Interrelationships:**
Students will develop an understanding of the nature of science and technology, their interrelationships and their social and environmental contexts, including interrelationships between the natural and constructed world.
- **Construct Scientific Knowledge:**
Students will construct an understanding of concepts, principles, laws and theories in life science, in physical science, in earth and space science and in Indigenous knowledge of nature and then apply these understandings to interpret, integrate and extend their knowledge.
- **Develop Scientific and Technological Skills:**
Students will develop the skills required for scientific and technological inquiry, problem solving and communicating, for working collaboratively, and for making informed decisions.
- **Develop Attitudes that Support Scientific Habits of Mind:**
Students will develop attitudes that support the responsible acquisition and application of scientific, technological and Indigenous knowledge to the mutual benefit of self, society and the environment.

Inquiry

Inquiry learning provides students with opportunities to build knowledge, abilities and inquiring habits of mind that lead to deeper understanding of their world and human experience. Inquiry is more than a simple instructional method. It is a philosophical approach to teaching and learning, grounded in constructivist research and methods, which engages students in investigations that lead to disciplinary and interdisciplinary understanding.

Inquiry builds on students' inherent sense of curiosity and wonder, drawing on their diverse backgrounds, interests and experiences. The process provides opportunities for students to become active participants in a collaborative search for meaning and understanding.

Outcomes and Indicators

Outcomes are statements that indicate what students are expected to know and be able to do by the end of a grade or secondary level course in a particular area of study. Therefore, all outcomes are required. The outcomes provide direction for assessment and evaluation, and for program, unit and lesson planning.

Critical characteristics of an outcome include the following:

- focus on what students will learn rather than what teachers will teach;
- specify the skills and abilities, understandings, knowledge and/or attitudes students are expected to demonstrate;
- are observable, assessable and attainable;
- are written using action-based verbs and clear professional language (educational and subject-related);
- are developed to be achieved in context so that learning is purposeful and interconnected;
- are grade and subject specific;
- are supported by indicators which provide the breadth and depth of expectations; and,
- have a developmental flow and connection to other grades where applicable.

Indicators are representative of what students need to know and/or be able to do in order to achieve an outcome. When teachers are planning for instruction, they must comprehend the set of indicators to understand fully the breadth and the depth of learning related to a particular outcome. Based on this understanding of the outcome, teachers may develop their own indicators that are responsive of students' interests, lives and prior learning. These teacher-developed indicators must maintain the intent of the outcome.

The outcomes and indicators in this Alternate Education course have been adapted from the renewed *Health Science 20* outcomes and indicators. The alternate outcomes and indicators are also identified in each of the resource packages that accompany this course. Further information about learning contexts and the Foundations of Scientific Literacy is available in the *Health Science 20* curriculum document.

Legend for Outcomes and Indicators (Health Science)

Learning Contexts to Support Outcomes

CP	Cultural Perspectives
DM	Decision Making
SI	Scientific Inquiry
TPS	Technological Problem Solving

Foundations of Scientific Literacy

A	Attitudes
K	Scientific Knowledge
S	Safety
STSE	Science, Technology, Society, and the Environment

Health Science 28 (2017) Outcomes at a Glance

Career Exploration

HS28-CI1 Investigate career paths related to various branches and sub-branches of science.

Health Care Philosophies and Ethics

HS28-HC1 Compare how Western, Indigenous, traditional, complementary and alternative approaches to health care contribute to a holistic perspective (e.g., mental, emotional, physical and spiritual) of health.

HS28-HC2 Examine the role of personal and societal beliefs in making ethical decisions regarding health care.

Human Body

HS28-HB1 Explain the anatomy and physiology of a healthy human.

HS28-HB2 Explore the effects of various pathologies and ailments on human body systems.

Nutrition

HS28-NU1 Explain the role of micro and macronutrients (i.e., carbohydrates, proteins and fats) in supporting normal health and body functions.

HS28-NU2 Analyze dietary choices based on personal and cultural beliefs and scientific understanding of nutrition.

Diagnostics and Treatment

HS28-DT1 Describe the function of tools and procedures used to diagnose and monitor medical conditions.

HS28-DT2 Recognize the importance of interpreting diagnostic findings to support treatment options.

Health Science 28 (2017) - Career Investigation	
All outcomes contribute to the development of all K-12 science goals.	
Outcomes	Indicators
HS28-CE1 Explore health science related career paths in Saskatchewan, Canada and the world. [DM]	<ul style="list-style-type: none"> a. Generate a list of occupations that require a background in health science. (K, S) b. Research a chosen career, using criteria such as: <ul style="list-style-type: none"> i. the training program, including on the job training ii. the work they are trained to do iii. the types of facilities in which they are employed iv. hours/shifts worked v. current wages received in Saskatchewan vi. physical and mental stresses experienced vii. workplace hazards and safety considerations viii. other professionals they interact with ix. your personal suitability for this career (K, S, A, STSE) c. Communicate research findings related to health science careers through a display, video, presentation software, website or orally. (K, S, A, STSE) d. Interview or connect with others (e.g., family members, community members, elders and knowledge keepers, experts in various disciplines) to discuss relevant health science careers. (K, S, A, STSE)

Health Science 28 (2017) – Health Care Philosophies and Ethics	
All outcomes contribute to the development of all K-12 science goals.	
Outcomes	Indicators
HS28-HC1 Compare how Western, Indigenous, traditional, complementary and alternative approaches to health care contribute to a holistic perspective (e.g., mental, emotional, physical and spiritual) of health.	<ul style="list-style-type: none"> a. Indicate how humanity's beliefs about health, wellness, illness, disease, and treatment have changed over time. (STSE) b. Differentiate between holistic and analytical approaches to health care. (K) c. Identify examples of Western, Indigenous, traditional, complementary, and alternative approaches to health care and where they are offered in your community and elsewhere in Saskatchewan. (K, A, S, STSE) d. Investigate the intended results of using natural products (e.g., herbs, vitamins, minerals, probiotics, and essential oils), mind and body practices (e.g., acupuncture, various massage therapies, yoga, spinal manipulation, relaxation techniques, meditation, and movement therapies) and other complementary

[CP, DM, SI]	<p>and/or alternative approaches to health care. (K, A, STSE)</p> <ul style="list-style-type: none"> e. Explain the importance of rituals, place based ceremonies, plants and traditional herbs in Indigenous and traditional approaches to health care. (K, A, STSE) f. Provide examples of ways in which one or more of the approaches to health care might be implemented together to support the health and wellbeing of an individual. (K, A, STSE) g. Discuss potential hazards that may arise from combining different approaches to health care. (K, A, STSE)
HS28-HC2 Examine the role of personal and societal beliefs in making ethical decisions regarding health care. [CP, DM, SI]	<ul style="list-style-type: none"> a. Identify questions about, and provide example of, ethical dilemmas within health care. (K, S, A, STSE) b. Understand the core ethical questions to be considered, with support from a medical professional, when making personal and family care health care decisions: <ul style="list-style-type: none"> i. What can be done for the patient? (Intervention technologies) ii. Does the patient understand the options? (informed consent) iii. What does the patient want? (autonomy) iv. What are the benefits? (beneficence) v. Will it harm the patient? (non-maleficence) vi. Are the patient's requests fair and able to be satisfied? (justice) c. Recognize how procedures designed to prevent illness, such as immunizations, vitamin supplements, physical activity, nutrition and prayer can influence your health. (K, STSE, A) d. Examine ethical considerations related to a specific treatment or practice (e.g., chemotherapy, radiation, acupuncture, sweat lodge, blood transfusions, and hirudotherapy). (K) e. Examine individual, community and cultural beliefs regarding issues related to life and death such as home birthing, blood transfusions, contraception, abortions, organ donation, autopsies, euthanasia, cremation and burials. (K, A, STSE) f. Understand a patient's rights in Saskatchewan and in Canada concerning health care decisions such as developing an advance care directive, refusal of treatment, informed consent and the role of a proxy or substitute decision-maker. (K)

Health Science 28 (2017) – Human Body	
All outcomes contribute to the development of all K-12 science goals.	
Outcomes	Indicators
HS28-HB1 Explain the anatomy and physiology of a healthy human. [CP, SI]	<ul style="list-style-type: none"> a. Describe the anatomy (structure) and physiology (function) of at least five human body systems (i.e., cardiovascular, endocrine, lymphatic, digestive, urinary, muscular, nervous, respiratory, reproductive, integumentary and skeletal). (K) b. Identify the normal value or range for the common vital signs (e.g., heart rate, blood pressure, temperature, O₂ saturation and respiratory rate) of a healthy human. (K) c. Discuss the ABO and Rh blood types and how an individual's blood type affects their ability to donate blood or accept blood from others. (K, STSE) d. Investigate benefits of having normal flora, or normal microbiota, in the body (e.g., swab skin and examine results). (K, S)
HS28-HB2 Explore the effects of various pathologies and ailments on human body systems. [SI, DM]	<ul style="list-style-type: none"> a. Differentiate among the ways in which medical practitioners and the public describe pathologies using terms such as disease, illness, ailment, disorder, infection and syndrome. (STSE, K) b. Examine how the body responds to pathogens. (K) c. Compare how bacteria and viruses differ with respect to how they are transmitted, their impact on the human body and how each is treated or prevented. (K) d. Describe the symptoms, possible causes, stages and prevention of a pathology that affects one or more body systems. (K)

Health Science 28 (2017) - Nutrition	
All outcomes contribute to the development of all K-12 science goals.	
Outcomes	Indicators
HS28-NU1 Explain the role of micro and macronutrients (i.e., carbohydrates, proteins and fats) in supporting normal health and body functions. [CP, SI]	<ul style="list-style-type: none"> a. Identify which macronutrients and micronutrients are found in common food groups (i.e., grains, milk and alternatives, meat and alternatives, vegetables and fruits and fats and oils). (K) b. Explain how micronutrients (e.g., vitamins A, B, D, C, E, K, and iron, calcium and phosphorous) are necessary for health. (K) c. Examine the role of simple and complex carbohydrates as being the main source of short term energy, role of fiber, critical role of fats (e.g., saturated, unsaturated and trans fats), and the role of protein (K) d. Recognize problems (e.g., hypo/hyperglycemia, high/low

	cholesterol and denaturation of proteins) that may result from acquiring too many or too few macromolecules. (optional)
HS28-NU2 Analyze dietary choices based on personal and cultural beliefs and scientific understanding of nutrition. [SI, CP]	<ul style="list-style-type: none"> a. Investigate the role of nutrition in supporting healthy eating practices. (K, S, A, STSE) b. Determine factors (e.g., activity levels, age, weight and height) that affect personal energy requirements. (K) c. Calculate and analyze personal energy requirements and record personal caloric and macronutrient intake. (S) d. Design an appropriate diet representation based on personal lifestyle choices. (K, S, A) e. Discuss various indicators of health (e.g., food labels, body mass index [BMI], <i>Eating Well with Canada's Food Guide</i>, <i>Eating Well with Canada's Food Guide – First Nations, Inuit and Métis</i>, and food guides from other countries). (S, STSE)

Health Science 28 (2017) – Diagnostics and Treatment	
All outcomes contribute to the development of all K-12 science goals.	
Outcomes	Indicators
HS28-DT1 Describe the function of tools and procedures used to diagnose and monitor medical conditions. [CP, SI, TPS]	<ul style="list-style-type: none"> a. Identify the importance of diagnosis. (S) b. Explore the significance of monitoring vital signs in health care, including accurate medical history and patient perception of pain. (K, S) c. Identify examples of tools and procedures (e.g., stethoscope, octoscope, sphygmomanometer and visual inspection) used for non-invasive observations in health care. (K) d. Perform observations and record vital signs (e.g., heart rate, breathing rate, temperature, blood type and blood pressure) of self and/or others. (S) e. Identify the operation, risks and benefits of medical imaging tools, such as X-ray, magnetic resonance imaging [MRI], computerized tomography [CT], ultrasound and positron emission tomography [PET]). (K, A, STSE) f. Explain why medical practitioners often use multiple tools and procedures to establish a medical diagnosis and identify the operation, risks and benefits of medical imaging tools, such as X-ray, magnetic resonance imaging [MRI], computerized tomography [CT], ultrasound and positron emission tomography [PET]). (K, A, STSE).
HS28-DT2 Recognize the importance of interpreting diagnostic findings to	<ul style="list-style-type: none"> a. Identify tools and procedures health care providers use to monitor the progression of a specific pathology. (K) b. Suggest explanations based on interpretation of data from

<p>support treatment options. [DM, SI, CP]</p>	<p>diagnostic assessment tools (e.g. identifying a broken bone in an x-ray, ultrasound of a pregnancy to determine number of fetuses and identifying high blood pressure based on given values). (K, S)</p> <p>c. Describe a treatment option which may be prescribed in Western, Indigenous, traditional, complementary or alternative approaches to health care with respect to a specific pathology. (K)</p>
--	---

Assessment and Evaluation of Student Learning

Assessment and evaluation require thoughtful planning and implementation to support the learning process and to inform teaching. All assessment and evaluation of student achievement must be based on the outcomes in the provincial curriculum.

Assessment involves the systematic collection of information about student learning with respect to:

- achievement of provincial curriculum outcomes;
- effectiveness of teaching strategies employed; and,
- student self-reflection on learning.

Evaluation compares assessment information against criteria based on curriculum outcomes for the purpose of communicating to students, teachers, parents/caregivers and others about student progress and to make informed decisions about the teaching and learning process.

There are three interrelated purposes of assessment. Each type of assessment, systematically implemented, contributes to an overall picture of an individual student's achievement.

Assessment for learning involves the use of information about student progress to support and improve student learning, inform instructional practices, and:

- is teacher-driven for student, teacher and parent use;
- occurs throughout the teaching and learning process, using a variety of tools; and,
- engages teachers in providing differentiated instruction, feedback to students to enhance their learning and information to parents in support of learning.

Assessment as learning actively involves student reflection on learning, monitoring of her/his own progress, and:

- supports students in critically analyzing learning related to curricular outcomes;
- is student-driven with teacher guidance; and,
- occurs throughout the learning process.

Assessment of learning involves teachers' use of evidence of student learning to make judgements about student achievement and:

- provides opportunity to report evidence of achievement related to curricular outcomes;
- occurs at the end of a learning cycle, using a variety of tools; and,
- provides the foundation for discussions on placement or promotion.

Assessment options include, but not limited to:

Pre-assessment	During Assessment	Post Assessment
Brainstorming Word Search KWL charts Webs Wonder Boards	Observations Discussions Conversations Comprehension Questions Journals PowerPoint/Prezi's Quizlet Checklists Rating Scales makebeliefscomix.com experiments Think Pair Share Demonstrations Interviews Dioramas	Exit Slips Self-Assessment Peer Assessment Crossword Puzzles Bookmarks Bumper stickers Collages Baseball Cards T-shirt Design Graffiti walls Rubrics Portfolios Board Games Observations Discussions Conversations Comprehension Questions Journals Final Assessments/Tests
Technology – the following sites could be used under all areas: Padlet, Kahoot, Quizlet,		

Key Resources

Many resources that were reviewed and recommended for *Health Science 20* are also suggested for use in *Health Science 28 (2017)*. It should be noted that the teacher may need to adapt and modify the resources to meet the diverse needs of the students. For further information (including order numbers) for these resources refer to the *Health Science 20* tab at www.curriculum.gov.sk.ca.

- *Anatomy & Physiology for Health Professionals: An Interactive Journey (2nd ed.)* (2011)
– Pearson
- *DHO Health Science (8th ed.)* (2014) – Nelson
- *Essentials of Human Anatomy & Physiology (10th ed.)* – Pearson
- *Healthcare Science Technology* (2013) – McGraw-Hill Ryerson
- *Introduction to Anatomy and Physiology* (2014) – Oxford University Press
- *Nutrition: A Functional Approach (3rd Canadian ed.)* (2014) – Pearson
- *Nutrition and Health* (2014) – Pacific Educational Press

Career Exploration

Career Job Bank- Explore Careers <https://www.jobbank.gc.ca>

Career Cruising <https://public.careercruising.com/en/>

My Blueprint Careers <https://myblueprint.ca/>

SaskCareers <https://saskcareers.ca/>

Health Care Philosophies and Ethics

Ethical Decision-Making Framework, Evidence Informed Practice Tool <http://www.mbsphen.ca/files/EthicsEIPT.pdf>

PLEA Legal Information for Everyone
http://plea.org/legal_resources/?a=341&searchTxt=&cat=18&pCat=4

Pearson Saskatchewan Science 5. (2014). Toronto, ON: Pearson Canada Inc.

Saskatchewan Archeology Society <http://thesas.ca/saskatoon-archaeological-society/>

Teaching The Medicine Wheel <http://www.cea-ace.ca/education-canada/article/teaching-medicine-wheel>

Human Body

Lindsay, K. & Swann Cordova, K. (2007). Life Science. San Antonio, Texas: PCI Education

Pearson Saskatchewan Science 8. (2014). Toronto, ON: Pearson Canada Inc.

The Living Body – Our Extraordinary Life <https://www.youtube.com/watch?v=kvprxzfsYQU>

Walker, R. (2005). Body: An Amazing Tour of Human Anatomy. New York, New York: DK Publishing,

Nutrition

Learn to be Healthy <http://www.learntobehealthy.org/#learnMore>

Choose my Plate <https://www.choosemyplate.gov/>

Canada's Food Guide For First Nations, Inuit, and Metis <http://allaboutfoodaitc.ca/article/canadas-food-guide-for-first-nations.php>

Diagnostics and Treatment

Common Medical Services <https://www.youtube.com/watch?v=RUrBR6UmyDo>

Maller, N. (2013). Diagnosis for Classroom Success: Making Anatomy and Physiology Come Alive. Arlington, Virginia: NSTA Press, National Science Teachers Association

Booth, K. (2013). Health Care Science Technology: Career Foundations, Student Edition. Canada: McGraw Hill

Cobert, B, Ankney, J, & Lee, K. (2010). Anatomy & Physiology for Health Professions: An Interactive Journey, 2nd Edition. Toronto, ON: Pearson Canada Inc.

References

- Kluger-Bell, B. (2000). *Recognizing inquiry: Comparing three hands-on teaching techniques*. In Inquiry—Thoughts, Views, and Strategies for the K-5 Classroom (Foundations - A monograph for professionals in science, mathematics and technology education. Vol. 2). Washington, DC: National Science Foundation.
- National Research Council. (1996). *National science education standards*. Washington, DC: National Academy Press.
- National Research Council. (2000). *Inquiry and the national science education standards: A guide for teaching and learning*