



zoo school



OUTLINE OF COURSE OF STUDY 2019

School Name:	Toronto Zoo School
Department:	Science
Course Developer:	Toronto Zoo
Classroom Program teacher:	Nia Gibson
Development Date:	2010
Revision Date:	2019
Course Title:	Biology
Grade:	11
Course Type:	University Preparation
Course Code:	SBI3U
Credit Value:	1.0
Prerequisite:	Science, Grade 10, Academic (SNC2D)
Curriculum Policy Document:	Science, The Ontario Curriculum, Grades 11 and 12, 2008 (revised)

Course Description/Rationale

This course furthers students' understanding of the processes that occur in biological systems. Through interactive lessons, behind-the-scenes tours, and discussions with Zoo staff, students will not only learn the complexities of biological systems, but will see them in practice at the Toronto Zoo. Students will study theory and conduct investigations in the areas of diversity of living things; evolution; genetic processes; the structure and function of animals; and the anatomy, growth, and function of plants. The course focuses on the theoretical aspects of the topics under study and helps students refine their skills related to scientific investigation. Students will also have an opportunity to meet several Zoo staff to understand the scope of careers that the study of biology can lead to.

Zoo School takes an experiential approach to learning. We pride ourselves in offering engaging, dynamic lessons, with a hands-on approach. Our teaching tools will include Zoo Staff discussions, behind-the-scenes tours, debates, practical investigations, research, class discussions, and individual and group assignments.

Overall Curriculum Expectations, Outline of Course Content, and Teaching and Learning Strategies

Unit	Unit description	Time
Unit A	<p style="text-align: center;"><u>Scientific Investigation Skills and Career Exploration</u></p> <p>Overall Expectations:</p> <ul style="list-style-type: none"> • A1. demonstrate scientific investigation skills (related to both inquiry and research) in the four areas of skills (initiating and planning, performing and recording, analysing and interpreting, and communicating); • A2. identify and describe careers related to the fields of science under study, and describe the contributions of scientists, including Canadians, to those fields. <p>At the Zoo Students will:</p> <ul style="list-style-type: none"> • Use their investigation skills to examine scientific theory, throughout units B-F. • Get the opportunity to meet and question various Zoo staff to discuss their career choices. 	Incorporated throughout all units of study
Unit B	<p style="text-align: center;"><u>Diversity of Living Things</u></p> <p>Overall Expectations:</p> <ul style="list-style-type: none"> • B1. analyse the effects of various human activities on the diversity of living things; • B2. investigate, through laboratory and/or field activities or through simulations, the principles of scientific classification, using appropriate sampling and classification techniques; • B3. demonstrate an understanding of the diversity of living organisms in terms of the principles of taxonomy and phylogeny. <p>At the Zoo Students will:</p> <ul style="list-style-type: none"> • Visit examples of endangered animals in the Zoo collection, and analyse the effects of various human activities on the diversity of living things. • Investigate, through laboratory and Zoo site activities, the principles of scientific classification, using appropriate sampling and classification techniques. • Investigate the vast array of animals at the Zoo to gain an understanding of the diversity of living organisms in terms of the principles of taxonomy and phylogeny. 	30 hours

<p>Unit C</p>	<p style="text-align: center;"><u>Evolution</u></p> <p>Overall Expectations:</p> <ul style="list-style-type: none"> • C1. analyse the economic and environmental advantages and disadvantages of an artificial selection technology, and evaluate the impact of environmental changes on natural selection and endangered species; • C2. investigate evolutionary processes, and analyse scientific evidence that supports the theory of evolution; • C3. demonstrate an understanding of the theory of evolution, the evidence that supports it, and some of the mechanisms by which it occurs. <p>At the Zoo students will:</p> <ul style="list-style-type: none"> • Analyse the economic and environmental advantages and disadvantages of artificial selection technology, and evaluate the impact of environmental changes on natural selection and endangered species. • Investigate evolutionary processes, and analyse scientific evidence and Zoo animal characteristics that support the theory of evolution. 	<p style="text-align: center;">22 hours</p>
<p>Unit D</p>	<p style="text-align: center;"><u>Genetic Processes</u></p> <p>Overall Expectations:</p> <ul style="list-style-type: none"> • D1. evaluate the importance of some recent contributions to our knowledge of genetic processes, and analyse social and ethical implications of genetic and genomic research; • D2. investigate genetic processes, including those that occur during meiosis, and analyse data to solve basic genetics problems involving monohybrid and dihybrid crosses; • D3. demonstrate an understanding of concepts, processes, and technologies related to the transmission of hereditary characteristics. <p>At the Zoo students will:</p> <ul style="list-style-type: none"> • Evaluate the importance of some recent contributions to our knowledge of genetic processes, and how these can be used in Zoo breeding programs. • Analyse social and ethical implications of genetic and genomic research. • Investigate genetic processes, including those that occur during meiosis, and analyse data to solve basic genetics problems involving monohybrid and dihybrid crosses. • Demonstrate an understanding of concepts, processes, and technologies related to the transmission of hereditary characteristics. 	<p style="text-align: center;">22 hours</p>

Unit E	<p style="text-align: center;"><u>Animals: Structure and Function</u></p> <p>Overall Expectations:</p> <ul style="list-style-type: none"> • E1. analyse the relationships between changing societal needs, technological advances, and our understanding of internal systems of humans; • E2. investigate, through laboratory inquiry or computer simulation, the functional responses of the respiratory and circulatory systems of animals, and the relationships between their respiratory, circulatory, and digestive systems; • E3. demonstrate an understanding of animal anatomy and physiology, and describe disorders of the respiratory, circulatory, and digestive systems. <p>At the Zoo students will:</p> <ul style="list-style-type: none"> • Investigate, through laboratory inquiry the functional responses of the respiratory and circulatory systems of animals, and the relationships between their respiratory, circulatory, and digestive systems. • Demonstrate an understanding of animal anatomy and physiology, and describe disorders of the respiratory, circulatory, and digestive systems. 	21 hours
	Unit F	
Total		114 hours

TEACHING AND LEARNING STRATEGIES

In addition to the strategies identified in the assessment for, as, and of learning charts below, teaching and learning strategies will include (but not be limited to):

- Scientific Investigations
- Microscope work
- Class discussions
- One-on-one help
- Socratic teaching
- Group work
- Student-centred lessons
- Real-world examples
- Peer discussions
- Behind-the-scenes tours
- Hands-on activities
- Individual assignments

Strategies for Assessment & Evaluation of Student Performance

Evaluation

Student performance will be continually assessed throughout the course based on practices outlined in the Growing Success: Assessment, Evaluation, and Reporting in Ontario Schools, 2010, document. This includes individual assignments, group assignments, quizzes, teacher-student discussions, observations, a mid-term test, and a final exam. Every effort is made to include the co-construction of success criteria in student assessment.

The categories of knowledge and skills are described as follows:

Knowledge and Understanding. Subject-specific content acquired in each course (knowledge), and the comprehension of its meaning and significance (understanding).

Thinking and Investigation. The use of critical and creative thinking skills and inquiry, research, and problem-solving skills and/or processes.

Communication. The conveying of meaning through various forms.

Application. The use of knowledge and skills to make connections within and between various contexts.

Teachers will ensure that student work is assessed and/or evaluated in a balanced manner with respect to the four categories and that achievement of particular expectations is considered within the appropriate categories. The balance of the weighting of the categories of the achievement chart throughout the course is approximately:

<i>Knowledge & Understanding:</i>	25%	<i>Communication:</i>	15%
<i>Thinking & Inquiry:</i>	35%	<i>Application:</i>	25%

Student work will be assessed with reference to the achievement chart:

Achievement Chart		
Percentage Grade Range	Achievement Level	Summary Description
80–100%	Level 4	A very high to outstanding level of achievement. Achievement is <i>above</i> the provincial standard.
70–79%	Level 3	A high level of achievement. Achievement is <i>at</i> the provincial standard.
60–69%	Level 2	A moderate level of achievement. Achievement is <i>below, but approaching</i> , the provincial standard.
50–59%	Level 1	A passable level of achievement. Achievement is <i>below</i> the provincial standard.
below 50%	Level R	Insufficient achievement of curriculum expectations. A credit will not be granted.

Individual students' needs will be taken into account for assessment. The requirements of Individual Education Plans (IEPs) for assessment accommodations will be followed wherever applicable.

The tools highlighted in yellow will be used for the three different types of assessments:

Assessment as Learning	Assessment for Learning	Assessment of Learning
<p>Student Product</p> <ul style="list-style-type: none"> <input type="checkbox"/> Journals/Letters/Emails <input type="checkbox"/> Learning Logs <input type="checkbox"/> Entrance tickets <input type="checkbox"/> Exit tickets 	<p>Student Product</p> <ul style="list-style-type: none"> <input type="checkbox"/> Assignments <input type="checkbox"/> Journals/Letters/Emails <input type="checkbox"/> Pre-tests <input type="checkbox"/> Quizzes <input type="checkbox"/> Rough drafts <input type="checkbox"/> Portfolios <input type="checkbox"/> Posters <input type="checkbox"/> Graphic organizers <input type="checkbox"/> Peer feedback <input type="checkbox"/> Reports <input type="checkbox"/> Essays <input type="checkbox"/> Webbing/Mapping <input type="checkbox"/> Entrance ticket <input type="checkbox"/> Vocabulary notebooks <input type="checkbox"/> Visual Thinking Networks 	<p>Student Product</p> <ul style="list-style-type: none"> <input type="checkbox"/> Assignments <input type="checkbox"/> Journals/Letters/Emails <input type="checkbox"/> Tests <input type="checkbox"/> Exam <input type="checkbox"/> Rough drafts <input type="checkbox"/> Portfolio <input type="checkbox"/> Posters <input type="checkbox"/> Graphic organizers <input type="checkbox"/> Reports <input type="checkbox"/> Essays <input type="checkbox"/> Visual Thinking Networks

<p>Observation</p> <ul style="list-style-type: none"> <input type="checkbox"/> Whole class discussions <input type="checkbox"/> Self-proofreading 	<p>Observation</p> <ul style="list-style-type: none"> <input type="checkbox"/> Class discussions <input type="checkbox"/> Debate <input type="checkbox"/> PowerPoint presentations <input type="checkbox"/> Performance tasks 	<p>Observation</p> <ul style="list-style-type: none"> <input type="checkbox"/> Debate <input type="checkbox"/> PowerPoint presentations <input type="checkbox"/> Performance tasks
<p>Conversation</p> <ul style="list-style-type: none"> <input type="checkbox"/> Student teacher conferences <input type="checkbox"/> Small Group Discussions <input type="checkbox"/> Pair work <input type="checkbox"/> Debate 	<p>Conversation</p> <ul style="list-style-type: none"> <input type="checkbox"/> Student teacher conferences <input type="checkbox"/> Small group discussions <input type="checkbox"/> Pair work <input type="checkbox"/> Peer-feedback <input type="checkbox"/> Peer-editing <input type="checkbox"/> Oral pre-tests <input type="checkbox"/> Oral quizzes 	<p>Conversation</p> <ul style="list-style-type: none"> <input type="checkbox"/> Student teacher conferences <input type="checkbox"/> Question and Answer Session <input type="checkbox"/> Oral tests

Final Grade

The percentage grade represents the quality of the student's overall achievement of the expectations of the course and reflects the corresponding level of achievement described in The Ontario Curriculum Grades 11 and 12 Achievement Chart for Science. A credit is granted for this course if the student's final grade is 50% or higher. The final grade for this course will be determined as follows:

- 70% of the grade will be based on the student's performance throughout the course including, individual assignments, group assignments, quizzes, teacher-student discussions, observations, a mid-term test.
- 30% of the grade will be based upon a final examination.

Disclosure Policy

Students will complete a mid-term test at the end of the second week of Zoo School. Upon receiving their grade students will have the option to drop the course; however, no refund will be available. Dropping the course at this stage would result in no record of this course appearing on their Ontario Student Transcript and a "W" for withdrawal with no associated grade appearing on the report card issued subsequent to the withdrawal. Withdrawals from the Zoo School course must be made in writing to the school by end-of-day, two instructional days, following issue of the mid-term report card. For all students continuing after this point, Zoo School is required to disclose student's performance and final grade on their Ontario Student Transcript.

Considerations for Program Planning

Zoo School incorporates, as appropriate, considerations for program planning that align with ministry and board policy and initiatives.

Assessment and Evaluation

- Assessment and evaluation are performed in accordance with "Growing Success: Assessment, Evaluation and Reporting in Ontario's Schools, First Edition Covering Grades 1 to 12".

Environmental Education

- The preservation of the environment is valued highly by Zoo School. Lesson plans have been developed with special consideration of the expectations listed in "The Ontario Curriculum, grades 9-12, Environmental Education Scope and Sequence of Expectations, 2011 edition" document.

Career Exploration

- Students are given numerous opportunities to explore and discuss career options in the field of science and wildlife conservation with various members of Zoo staff. Including but not limited to nutritionist, reproductive physiologist, veterinarian and veterinarian technician, conservation field biologist, wildlife keepers.

Health and Safety of Students

- Zoo School takes every effort to ensure the health and safety of students. Policies and procedures are in place to prevent students from adverse health effects. A registered nurse, as well as first aid trained Safety and Security staff, will be on duty at all times and available to any student requiring attention/assistance.

Resources

Textbooks are not essential for the delivery of the Zoo School SBI3U course. Course programming is designed to be student-centered, engaging students in their learning and achievement within the practical setting of the Toronto Zoo.

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