

## Biology 20 Work Plan

Units / Topics	Time Frame	Major Learning Outcomes	Resources / Possible Assessments
<p style="text-align: center;"><b>Unit 1</b></p> <p style="text-align: center;"><b>Intro to Biology</b></p>	<p style="text-align: center;"><b>7 Hrs.</b></p> <p style="text-align: center;"><b>1 week</b></p>	<ul style="list-style-type: none"> <li>• <b>Understand the nature and study of biology</b> <ul style="list-style-type: none"> <li>○ Examine the types of questions asked by biologists</li> <li>○ Explore the conditions about the conditions that support life</li> <li>○ Appreciate findings of scientific investigations</li> <li>○ Relationship between biology and daily life</li> </ul> </li>   <li>• <b>Use microscope to examine cells</b> <ul style="list-style-type: none"> <li>○ Develop techniques for proper handling of microscopes</li> <li>○ View prepared slides / prepare wet-mounts</li> <li>○ Sketch what is seen in the Field of view</li> <li>○ Estimate sizes of objects</li> <li>○ Electron vs. light microscopes</li> <li>○ How has the microscope changed what we know about science</li> </ul> </li>   <li>• <b>Explain the importance of theory in biology</b> <ul style="list-style-type: none"> <li>○ Outline key aspects of scientific theory</li> <li>○ Discuss the development of the cell theory and technology used to observe cells</li> <li>○ Significance of relating cell theory to the relatedness of all living organisms</li> <li>○ Principles of natural selection (Darwin &amp; Wallace)</li> <li>○ Natural selection as the basis for the theory of evolution</li> <li>○ Examples of how a theory might change</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• We will have a brief discussion during first week of class, however most of this will be discussed as we progress through the course</li> <li>• <b>Science in the News</b> blog posts will allow students to find new topics and topics in biology that affect daily life</li>   <li>• <b>MHR: Biology</b> <ul style="list-style-type: none"> <li>○ Chapter 1 and teacher resources</li> </ul> </li>   <li>• Microscope lab activity</li>   <li>• Students often have a vague understanding of evolution theory and what it means in terms of where we came from, we will look at the theory and examine why it is a theory and develop and overview illustrating why it still has “holes”</li> </ul>
<p style="text-align: center;"><b>Unit 2</b></p> <p style="text-align: center;"><b>Ecological Organization</b></p>	<p style="text-align: center;"><b>25 Hrs.</b></p> <p style="text-align: center;"><b>3-4 weeks</b></p>	<ul style="list-style-type: none"> <li>• <b>Explain how interactions among soil, climate and living organisms</b> <ul style="list-style-type: none"> <li>○ Identify components of soil / Sask. Soil types</li> <li>○ How do soil factors affect plant growth across Saskatchewan</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• Nelson Science 10, MHR Biology, Soil Ecology Textbook</li> </ul>

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		<ul style="list-style-type: none"> <li>○ Variations of plant grown on slopes</li> <li>○ Microorganisms in soil &amp; their importance</li> <li>○ Discuss interrelationship between agriculture and soil</li> <li>○ Nutrient cycles: Carbon cycle, water cycle nitrogen cycle</li> <li>● <b>Analyze a variety of ecosystems</b> <ul style="list-style-type: none"> <li>○ Concept of niche and habitat</li> <li>○ Biotic / abiotic factors</li> <li>○ How is the human community dependent on soil, water and air?</li> <li>○ Formulate food chains and food webs involving human factors</li> <li>○ Symbiotic and competitive relationships among organisms</li> <li>○ Natural community in the neighbourhood of the school</li> <li>○ Natural vs. man-made communities</li> <li>○ Compare communities with other soil types</li> <li>○ Primary succession in communities</li> <li>○ Effects of human activity (agriculture and cities) on succession</li> </ul> </li> <li>● <b>Describe life in past ecosystems</b> <ul style="list-style-type: none"> <li>○ Examine evidence of life in the past</li> <li>○ Debate change and extinct theories</li> <li>○ Role of human in altering rate of ecological change</li> </ul> </li> <li>● <b>Explain how populations are counted</b> <ul style="list-style-type: none"> <li>○ Define populations of plants and animals.</li> <li>○ Population sampling methods used to estimate populations</li> </ul> </li> <li>● <b>Analyze population changes</b> <ul style="list-style-type: none"> <li>○ Factors that influence reproduction / death rates</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>● Develop posters of soil profiles</li> <li>● Weather permitting: Examine a real soil profile and soil samples to identify the components of soil</li> <li>● Posters of nutrient cycles</li> <li>● School community lab activity to examine biotic / abiotic factors</li> <li>● Populations sampling lab activity</li> <li>● Population dynamics lab activity</li> </ul>
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<b>Unit 3</b>  <b>Diversity of Life</b>	<b>25 Hrs.</b>  <b>3-4 weeks</b>	<ul style="list-style-type: none"> <li>• <b>Principle of classification</b> <ul style="list-style-type: none"> <li>○ Examples of classification systems</li> <li>○ 5 Kingdom classification system from Aristotle's 2 kingdom system (all groups)</li> <li>○ Binomial nomenclature</li> <li>○ Use dichotomous keys to identify organisms &amp; create dichotomous key for organisms / classmates</li> </ul> </li> <li>• <b>Roles of monera, protists and fungi in ecosystems</b> <ul style="list-style-type: none"> <li>○ Structure of viruses, and common diseases in Saskatchewan</li> <li>○ Classification of bacteria / bacterial diseases</li> <li>○ Structure of bacteria / roles of bacteria in ecosystems</li> <li>○ Prokaryotes vs. eukaryotes</li> <li>○ Kingdom Protista – collections and observation</li> <li>○ Characteristics of fungi</li> </ul> </li> <li>• <b>Diversity in Plants</b> <ul style="list-style-type: none"> <li>○ Collect samples and compare non-vascular vs. vascular plants</li> <li>○ Classification of plants (gymnosperms / angiosperms)</li> <li>○ Grain and forage crops grown in Saskatchewan</li> <li>○ Chart plants grown in Sask.</li> </ul> </li> <li>• <b>Diversity of animals</b> <ul style="list-style-type: none"> <li>○ Describe the major phyla of animals</li> <li>○ Identify major animals native to Sask. as well as their habitat and niche</li> <li>○ Contrast Innate behaviour in animals with learned behaviour / social behaviour</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• MHR: Biology, Botany, Elements of Ecology and other teacher resources</li> <li>• Dichotomous key lab activity</li> <li>• Create charts of the key differences between types of bacteria and prokaryotes vs. eukaryotes</li> <li>• Regular assignments</li> <li>• Plant dissection lab to compare the reproductive structures in angiosperms and gymnosperms</li> <li>• Possible animal dissection if time permits: <ul style="list-style-type: none"> <li>○ Earthworm, lobster / insect / frog</li> </ul> </li> <li>• Students will assist me providing their knowledge of local agriculture to further knowledge of the class as a whole</li> <li>• Unit test</li> </ul>

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<p><b>Unit 4</b></p> <p><b>Agricultural Botany of Saskatchewan</b></p>	<p><b>15 Hrs.</b></p> <p><b>2-3 weeks</b></p>	<ul style="list-style-type: none"> <li>• <b>Recognize biological processes associated with plant systems</b> <ul style="list-style-type: none"> <li>○ Sexual / asexual reproduction in plants</li> <li>○ Pollination, fertilization and seed production</li> <li>○ Flow of solutions through plants (by phloem and xylem)</li> <li>○ Biological influences on growth</li> <li>○ Major plant systems of various cereals, oilseed, pulse, forage, and native crops</li> <li>○ Effects of climate and pests on crop development</li> <li>○ Three major plant structures: Roots, shoots and leaves</li> <li>○ Broad tissue areas (terminology only)</li> </ul> </li>   <li>• <b>Relation of Sask. biogeographical regions and agricultural activity</b> <ul style="list-style-type: none"> <li>○ Biogeographical regions in Sask.</li> <li>○ Compare grain and forage crops</li> <li>○ Reasons and issues with land use and crop diversity</li> <li>○ ID species of trees, shrubs, plants and grasses</li> <li>○ Compare plant characteristics with biogeographical regions</li> </ul> </li>   <li>• <b>Internal / External influences on plant growth</b> <ul style="list-style-type: none"> <li>○ Describe the function of plant hormones: auxins, cytokinins, Gibberelins</li> <li>○ Contrast tropisms with responses due to changes in turgor pressure</li> <li>○ Explain how plants respond to chemicals like pesticides / fertilizers</li> <li>○ Effect on soil of the application of fertilizers and biofertilizers</li> <li>○ Impact of soil degradation</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• Comparison of reproductive parts of plants</li>   <li>• Plant growth lab activity if time permits</li>   <li>• Other plant growth labs may be done if time permits.</li>   <li>• Students will be aiding the teacher with specific agricultural details to be combined along with the biology concepts. The goal is to take advantage of the students' knowledge of local agriculture</li>   <li>• Regular assignments</li>   <li>• Unit test</li> </ul>
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<ul style="list-style-type: none"> <li>• Time will most likely be used to expand on existing unit</li> <li>• In addition, students will be completing weekly blog posting on topics of their choice which contribute to independent study</li> </ul>	<b>Remaining time</b>	<ul style="list-style-type: none"> <li>•</li> </ul>	

### Marking Scheme

Biology in the News (Weekly blog post)	15%	<b>Term 3</b>	35%
Assignments/ labs/ Research	30%	<b>Term 4</b>	40%
Unit Tests	30%	<b>Final Exam</b>	25%
Final Exam	25%		