

Science Planned Course: Applied Biology I – Grade 10

Unit: Principles of Cell Biology

Content Standard: **Explain the importance of order in a system.**
Describe the effects of error in measurement.
Know that science uses both direct and indirect observation means to study the world and the universe.
Conduct a multiple step experiment.

State Curriculum Standard: **3.1.7A Explain the parts of a simple system and their relationship to each other.**
3.1.10B Describe concepts of models as a way to predict and understand science and technology.
3.1.10E Describe patterns of change in nature, physical and man made systems.
3.2.10A Apply knowledge and understanding about the nature of scientific and technological knowledge.
3.2.10B Apply process knowledge and organize scientific and technological phenomena in varied ways.
3.2.10C Apply the elements of scientific inquiry to solve problems.
3.3.10D Explain the mechanisms of the theory of evolution.

Course Content	Student Performance	Resources	Assessments
A. Themes of Biology. B. Biology in Your World. C. The Scientific Processes.	<ul style="list-style-type: none"> Read sections 1.1 – 1.3 Use applicable resource file worksheets Use applicable active readings Complete Quick Lab activities and lab activities View and summarize content related videos 	<ul style="list-style-type: none"> <u>Biology</u>, (Holt, Rinehart, Winston, 2006) <u>Biology – Chapter Resource File</u>, (Holt, Rinehart, Winston, 2006) Encyclopedia, Internet, and periodicals 	<ul style="list-style-type: none"> Note packet and review worksheets Discussion Formal lab reports to assess lab techniques and content knowledge PSSA Science Skill activities Enrichment activities Vocabulary review and concept mapping Quizzes Chapter test

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Unit: Principles of Cell Biology

Content Standard: **Describe how fundamental science and technology concepts are used to solve practical problems.**
Describe materials using precise quantitative and qualitative skills based on observations.
Evaluate the solution, test, redesign and improve as necessary.
Evaluate energy changes in chemical reactions.

State Curriculum Standard: **3.1.10E Describe patterns of change in nature, physical and man made systems.**
3.2.10B Apply process knowledge and organize scientific and technological phenomena in varied ways.
3.2.10C Apply the elements of scientific inquiry to solve problems.
3.2.10D Identify and apply the technological design process to solve problems.
3.3.10B Describe and explain the chemical and structural basis of living organisms.
3.4.10A Analyze energy sources and transfers of heat.

Course Content	Student Performance	Resources	Assessments
D. Nature of Matter. E. Water and Solutions. F. Chemistry of Cells. G. Energy and Chemical Reactions.	<ul style="list-style-type: none">• Read sections 2.1 – 2.4• Use applicable resource file worksheets• Use applicable active readings• Complete Quick Lab activities and lab activities• View and summarize content related videos	<ul style="list-style-type: none">• <u>Biology</u>, (Holt, Rinehart, Winston, 2006)• <u>Biology – Chapter Resource File</u>, (Holt, Rinehart, Winston, 2006)• Encyclopedia, Internet, and periodicals	<ul style="list-style-type: none">• Note packet and review worksheets• Discussion• Formal lab reports to assess lab techniques and content knowledge• PSSA Science Skill activities• Enrichment activities• Vocabulary review and concept mapping• Quizzes• Chapter test

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Unit: Principles of Cell Biology

Content Standard: **Describe a system as a group of related parts that work together to achieve a desired result.**
Convert one scale to another.
Evaluate the appropriateness of questions.
Explain the relationship between structure and function at the molecular and cellular levels.
Describe and use appropriate instruments to gather and analyze data.

State Curriculum Standard: **3.1.7A Explain the parts of a simple system and their relationship to each other.**
3.1.10D Apply scale as a way of relating concepts and ideas to one another by some measure.
3.1.10E Describe patterns of change in nature, physical and man made systems.
3.2.10C Apply the elements of scientific inquiry to solve problems
3.3.10A Explain the structural and functional similarities and differences found among living things.
3.3.10B Describe and explain the chemical and structural basis of living organisms.
3.7.10A Identify and safely use a variety of tools, basic machines, materials and techniques to solve problems and answer questions.
3.7.10B Apply appropriate instruments and apparatus to examine a variety of objects and processes.

Course Content	Student Performance	Resources	Assessments
H. Looking at Cells. I. Cell Features. J. Cell Organelles.	<ul style="list-style-type: none"> Read sections 3.1 – 3.3 Use applicable resource file worksheets Use applicable active readings Complete Quick Lab activities and lab activities View and summarize content related videos 	<ul style="list-style-type: none"> <u>Biology</u>, (Holt, Rinehart, Winston, 2006) <u>Biology – Chapter Resource File</u>, (Holt, Rinehart, Winston, 2006) Encyclopedia, Internet, and periodicals 	<ul style="list-style-type: none"> Note packet and review worksheets Discussion Formal lab reports to assess lab techniques and content knowledge PSSA Science Skill activities Enrichment activities Vocabulary review and concept mapping Quizzes Chapter test

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3.7.10B Apply appropriate instruments and apparatus to examine a variety of objects and processes.

Course Content	Student Performance	Resources	Assessments
K. Passive Transport. L. Active Transport.	<ul style="list-style-type: none"> Read sections 4.1 – 4.2 Use applicable resource file worksheets Use applicable active readings Complete Quick Lab activities and lab activities View and summarize content related videos 	<ul style="list-style-type: none"> <u>Biology</u>, (Holt, Rinehart, Winston, 2006) <u>Biology – Chapter Resource File</u>, (Holt, Rinehart, Winston, 2006) Encyclopedia, Internet, and periodicals 	<ul style="list-style-type: none"> Note packet and review worksheets Discussion Formal lab reports to assess lab techniques and content knowledge PSSA Science Skill activities Enrichment activities Vocabulary review and concept mapping Quizzes Chapter test

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Unit: Principles of Cell Biology

Content Standard: **Distinguish between system inputs, system processes and system outputs.**
Conduct a multiple step experiment.
Identify the specialized structures and regions of the cell and the functions of each.

State Curriculum Standard: **3.1.7A Explain the parts of a simple system and their relationship to each other.**
3.2.10C Apply the elements of scientific inquiry to solve problems.
3.3.10B Describe and explain the chemical and structural basis of living organisms.

Course Content	Student Performance	Resources	Assessments
M. Energy and Living Things. N. Photosynthesis. O. Cellular Respiration.	<ul style="list-style-type: none"> Read sections 5.1 – 5.3 Use applicable resource file worksheets Use applicable active readings Complete Quick Lab activities and lab activities View and summarize content related videos 	<ul style="list-style-type: none"> <u>Biology</u>, (Holt, Rinehart, Winston, 2006) <u>Biology – Chapter Resource File</u>, (Holt, Rinehart, Winston, 2006) Encyclopedia, Internet, and periodicals 	<ul style="list-style-type: none"> Note packet and review worksheets Discussion Formal lab reports to assess lab techniques and content knowledge PSSA Science Skill activities Enrichment activities Vocabulary review and concept mapping Quizzes Chapter test

Science Planned Course: Applied Biology I – Grade 10

Unit: Principles of Cell Biology

Content Standard: **Examine the advantages of using models to demonstrate processes and outcomes.**
Compare and contrast the function of mitosis.

State Curriculum Standard: **3.1.7A Explain the parts of a simple system and their relationship to each other.**
3.1.10B Describe concepts of models as a way to predict and understand science and technology.
3.3.10C Describe how genetic information is inherited and expressed.

Course Content	Student Performance	Resources	Assessments
P. Chromosomes. Q. The Cell Cycle. R. Mitosis and Cytokinesis.	<ul style="list-style-type: none"> • Read sections 6.1 – 6.3 • Use applicable resource file worksheets • Use applicable active readings • Complete Quick Lab activities and lab activities • View and summarize content related videos 	<ul style="list-style-type: none"> • <u>Biology</u>, (Holt, Rinehart, Winston, 2006) • <u>Biology – Chapter Resource File</u>, (Holt, Rinehart, Winston, 2006) • Encyclopedia, Internet, and periodicals 	<ul style="list-style-type: none"> • Note packet and review worksheets • Discussion • Formal lab reports to assess lab techniques and content knowledge • PSSA Science Skill activities • Enrichment activities • Vocabulary review and concept mapping • Quizzes • Chapter test

Science Planned Course: Applied Biology I – Grade 10

Unit: Principles of Ecology

Content Standard: **Explain the water cycle.**
Identify the major biomes and explain their similarities and differences.
Explain the consequences of interrupting natural cycles.

State Curriculum Standard: **4.1.7A Explain the role of the water cycle within a watershed.**
4.6.4B Understand the concept of cycles.
4.6.10A Explain the biotic and abiotic components of an ecosystem and their interaction.
4.6.10B Explain how cycles affect the balance in an ecosystem.

Course Content	Student Performance	Resources	Assessments
<p>A. What Is an Ecosystem?</p> <p>B. Energy Flow in Ecosystems.</p> <p>C. Cycling of Materials in Ecosystems.</p>	<ul style="list-style-type: none"> Read sections 16.1 – 16.3 Use applicable resource file worksheets Use applicable active readings Complete Quick Lab activities and lab activities View and summarize content related videos 	<ul style="list-style-type: none"> <u>Biology</u>, (Holt, Rinehart, Winston, 2006) <u>Biology – Chapter Resource File</u>, (Holt, Rinehart, Winston, 2006) Encyclopedia, Internet, and periodicals 	<ul style="list-style-type: none"> Note packet and review worksheets Discussion Formal lab reports to assess lab techniques and content knowledge PSSA Science Skill activities Enrichment activities Vocabulary review and concept mapping Quizzes Chapter test

Science Planned Course: Applied Biology I – Grade 10

Unit: Principles of Ecology

Content Standard: **Explain the water cycle.**
Identify the major biomes and explain their similarities and differences.
Explain the consequences of interrupting natural cycles.

State Curriculum Standard: **4.1.7.A Explain the role of the water cycle within a watershed.**
4.6.4B Understand the concept of cycles.
4.6.10A Explain the biotic and abiotic components of an ecosystem and their interaction.
4.6.10B Explain how cycles affect the balance in an ecosystem.

Course Content	Student Performance	Resources	Assessments
D. How Organisms Interact in Communities. E. How Competition Shapes Communities. F. Major Biological Communities.	<ul style="list-style-type: none"> • Read sections 17.1 – 17.3 • Use applicable resource file worksheets • Use applicable active readings • Complete Quick Lab activities and lab activities • View and summarize content related videos 	<ul style="list-style-type: none"> • <u>Biology</u>, (Holt, Rinehart, Winston, 2006) • <u>Biology – Chapter Resource File</u>, (Holt, Rinehart, Winston, 2006) • Encyclopedia, Internet, and periodicals 	<ul style="list-style-type: none"> • Note packet and review worksheets • Discussion • Formal lab reports to assess lab techniques and content knowledge • PSSA Science Skill activities • Enrichment activities • Vocabulary review and concept mapping • Quizzes • Chapter test

Science Planned Course: Applied Biology I – Grade 10

Unit: Principles of Evolution

Content Standard: Describe a system as a group of related parts that work together to achieve a desired result.
 Convert one scale to another. Evaluate the appropriateness of questions.
 Explain the relationship between structure and function at the molecular and cellular levels.
 Describe and use appropriate instruments to gather and analyze data.

State Curriculum Standard: 3.1.7A Explain the parts of a simple system and their relationship to each other.
 3.1.10D Apply scale as a way of relating concepts and ideas to one another by some measure.
 3.1.10E Describe patterns of change in nature, physical and man made systems.
 3.2.10C Apply the elements of scientific inquiry to solve problems
 3.3.10A Explain the structural and functional similarities and differences found among living things.
 3.3.10B Describe and explain the chemical and structural basis of living organisms.
 3.7.10A Identify and safely use a variety of tools, basic machines, materials and techniques to solve problems and answer questions.
 3.7.10B Apply appropriate instruments and apparatus to examine a variety of objects and processes.

Course Content	Student Performance	Resources	Assessments
A. Categories of Biological Classification. B. How Biologists Classify Organisms.	<ul style="list-style-type: none"> Read sections 14.1 – 14.2 Use applicable resource file worksheets Use applicable active readings Complete Quick Lab activities and lab activities View and summarize content related videos 	<ul style="list-style-type: none"> <u>Biology</u>, (Holt, Rinehart, Winston, 2006) <u>Biology – Chapter Resource File</u>, (Holt, Rinehart, Winston, 2006) Encyclopedia, Internet, and periodicals 	<ul style="list-style-type: none"> Note packet and review worksheets Discussion Formal lab reports to assess lab techniques and content knowledge PSSA Science Skill activities Enrichment activities Vocabulary review and concept mapping Quizzes Chapter test

Science Planned Course: Applied Biology I – Grade 10

Unit: Principles of Evolution

Content Standard: **Distinguish between different types of models and modeling techniques and apply their appropriate use in specific applications.**
Explain the relationship among DNA, genes and chromosomes.
Explain the role of mutations and gene recombination in changing a population of organisms.

State Curriculum Standard: **3.1.10B Describe concepts of models as a way to predict and understand science and technology.**
3.2.10A Apply knowledge and understanding about the nature of scientific and technological knowledge.
3.2.10C Apply the elements of scientific inquiry to solve problems.
3.3.10B Describe and explain the chemical and structural basis of living organisms.
3.3.10C Describe how genetic information is inherited and expressed.
3.3.10D Explain the mechanisms of the theory of evolution.

Course Content	Student Performance	Resources	Assessments
C. The Theory of Evolution by Natural Selection. D. Evidence of Evolution. E. Examples of Evolution.	<ul style="list-style-type: none"> • Read sections 13.1 – 13.3 • Use applicable resource file worksheets • Use applicable active readings • Complete Quick Lab activities and lab activities • View and summarize content related videos 	<ul style="list-style-type: none"> • <u>Biology</u>, (Holt, Rinehart, Winston, 2006) • <u>Biology – Chapter Resource File</u>, (Holt, Rinehart, Winston, 2006) • Encyclopedia, Internet, and periodicals 	<ul style="list-style-type: none"> • Note packet and review worksheets • Discussion • Formal lab reports to assess lab techniques and content knowledge • PSSA Science Skill activities • Enrichment activities • Vocabulary review and concept mapping • Quizzes • Chapter test

Science Planned Course: Applied Biology I – Grade 10

Unit: **Exploring Plants**

Content Standard: **Explain the relationship between structure and function at the molecular and cellular levels.**

State Curriculum Standard: **3.3.10A Explain the structural and functional similarities and differences found among living things.**

Course Content	Student Performance	Resources	Assessments
A. The Vascular Plant Body. B. Transport in Plants.	<ul style="list-style-type: none">• Read sections 25.1 – 25.2• Use applicable resource file worksheets• Use applicable active readings• Complete Quick Lab activities and lab activities• View and summarize content related videos	<ul style="list-style-type: none">• <u>Biology</u>, (Holt, Rinehart, Winston, 2006)• <u>Biology – Chapter Resource File</u>, (Holt, Rinehart, Winston, 2006)• Encyclopedia, Internet, and periodicals	<ul style="list-style-type: none">• Note packet and review worksheets• Discussion• Formal lab reports to assess lab techniques and content knowledge• PSSA Science Skill activities• Enrichment activities• Vocabulary review and concept mapping• Quizzes• Chapter test

Science Planned Course: Applied Biology I – Grade 10

Unit: **Exploring Plants**

Content Standard: **Explain the relationship between structure and function at the molecular and cellular levels.**

State Curriculum Standard: **3.3.10A Explain the structural and functional similarities and differences found among living things.**

Course Content	Student Performance	Resources	Assessments
C. Sexual Reproduction in Seed Plants.	<ul style="list-style-type: none">• Read sections 24.2• Use applicable resource file worksheets• Use applicable active readings• Complete Quick Lab activities and lab activities• View and summarize content related videos	<ul style="list-style-type: none">• <u>Biology</u>, (Holt, Rinehart, Winston, 2006)• <u>Biology – Chapter Resource File</u>, (Holt, Rinehart, Winston, 2006)• Encyclopedia, Internet, and periodicals	<ul style="list-style-type: none">• Note packet and review worksheets• Discussion• Formal lab reports to assess lab techniques and content knowledge• PSSA Science Skill activities• Enrichment activities• Vocabulary review and concept mapping• Quizzes• Chapter test

Science Planned Course: Applied Biology I – Grade 10

Unit: Principles of Genetics

Content Standard: **Examine the advantages of using models to demonstrate processes and outcomes.**
Compare and contrast the function of mitosis.

State Curriculum Standard: **3.1.7A Explain the parts of a simple system and their relationship to each other.**
3.1.10B Describe concepts of models as a way to predict and understand science and technology.
3.3.10C Describe how genetic information is inherited and expressed.

Course Content	Student Performance	Resources	Assessments
<p>A. Meiosis.</p> <p>B. Sexual Reproduction.</p>	<ul style="list-style-type: none"> • Read sections 7.1 – 7.2 • Use applicable resource file worksheets • Use applicable active readings • Complete Quick Lab activities and lab activities • View and summarize content related videos 	<ul style="list-style-type: none"> • <u>Biology</u>, (Holt, Rinehart, Winston, 2006) • <u>Biology – Chapter Resource File</u>, (Holt, Rinehart, Winston, 2006) • Encyclopedia, Internet, and periodicals 	<ul style="list-style-type: none"> • Note packet and review worksheets • Discussion • Formal lab reports to assess lab techniques and content knowledge • PSSA Science Skill activities • Enrichment activities • Vocabulary review and concept mapping • Quizzes • Chapter test

Science Planned Course: Applied Biology I – Grade 10

Unit: Principles of Genetics

Content Standard: **Examine the advantages of using models to demonstrate processes and outcomes.**
Explain different types of inheritance.

State Curriculum Standard: **3.1.10B Describe concepts of models as a way to predict and understand science and technology.**
3.3.10C Describe how genetic information is inherited and expressed.

Course Content	Student Performance	Resources	Assessments
C. The Origins of Genetics. D. Mendel's Theory. E. Studying Heredity. F. Complex Patterns of Heredity.	<ul style="list-style-type: none"> • Read sections 8.1 – 8.4 • Use applicable resource file worksheets • Use applicable active readings • Complete Quick Lab activities and lab activities • View and summarize content related videos 	<ul style="list-style-type: none"> • <u>Biology</u>, (Holt, Rinehart, Winston, 2006) • <u>Biology – Chapter Resource File</u>, (Holt, Rinehart, Winston, 2006) • Encyclopedia, Internet, and periodicals 	<ul style="list-style-type: none"> • Note packet and review worksheets • Discussion • Formal lab reports to assess lab techniques and content knowledge • PSSA Science Skill activities • Enrichment activities • Vocabulary review and concept mapping • Quizzes • Chapter test

Science Planned Course: Applied Biology I – Grade 10

Unit: Principles of Genetics

Content Standard: **Distinguish between different types of models and modeling techniques and apply their appropriate use in specific applications.**
Explain the relationship among DNA, genes and chromosomes.
Explain the role of mutations and gene recombination in changing a population of organisms.

State Curriculum Standard: **3.1.10B Describe concepts of models as a way to predict and understand science and technology.**
3.2.10A Apply knowledge and understanding about the nature of scientific and technological knowledge.
3.2.10C Apply the elements of scientific inquiry to solve problems.
3.3.10B Describe and explain the chemical and structural basis of living organisms.
3.3.10C Describe how genetic information is inherited and expressed.
3.3.10D Explain the mechanisms of the theory of evolution.

Course Content	Student Performance	Resources	Assessments
G. Identifying the Genetic Material. H. The Structure of DNA. I. The Replication of DNA.	<ul style="list-style-type: none"> Read sections 9.1 – 9.3 Use applicable resource file worksheets Use applicable active readings Complete Quick Lab activities and lab activities View and summarize content related videos 	<ul style="list-style-type: none"> <u>Biology</u>, (Holt, Rinehart, Winston, 2006) <u>Biology – Chapter Resource File</u>, (Holt, Rinehart, Winston, 2006) Encyclopedia, Internet, and periodicals 	<ul style="list-style-type: none"> Note packet and review worksheets Discussion Formal lab reports to assess lab techniques and content knowledge PSSA Science Skill activities Enrichment activities Vocabulary review and concept mapping Quizzes Chapter test

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3.3.10C Describe how genetic information is inherited and expressed.
3.3.10D Explain the mechanisms of the theory of evolution.

Course Content	Student Performance	Resources	Assessments
J. From Genes to Proteins. K. Gene Regulation and Structure.	<ul style="list-style-type: none"> Read sections 10.1 – 10.2 Use applicable resource file worksheets Use applicable active readings Complete Quick Lab activities and lab activities View and summarize content related videos 	<ul style="list-style-type: none"> <u>Biology</u>, (Holt, Rinehart, Winston, 2006) <u>Biology – Chapter Resource File</u>, (Holt, Rinehart, Winston, 2006) Encyclopedia, Internet, and periodicals 	<ul style="list-style-type: none"> Note packet and review worksheets Discussion Formal lab reports to assess lab techniques and content knowledge PSSA Science Skill activities Enrichment activities Vocabulary review and concept mapping Quizzes Chapter test

Science Planned Course: Applied Biology I – Grade 10

Unit: Principles of Genetics

Content Standard: **Apply models to predict specific results and observations.**
Organize experimental information using a variety of analytic methods.
Describe the role of DNA in protein synthesis as it relates to gene expression.
Describe and evaluate social change as a result of technological developments.

State Curriculum Standard **3.1.10A Explain the structural and functional similarities and differences found among living things.**
3.1.7B Describe the use of models as an application of scientific or technological concepts.
3.2.10C Apply the elements of scientific inquiry to solve problems.
3.3.10C Describe how genetic information is inherited and expressed.
3.8.10A Analyze the relationship between societal demands and scientific and technological enterprises.

Course Content	Student Performance	Resources	Assessments
L. Genetic Engineering. M. Human Applications of Genetic Engineering. N. Genetic Engineering in Agriculture.	<ul style="list-style-type: none"> Read sections 11.1 – 11.3 Use applicable resource file worksheets Use applicable active readings Complete Quick Lab activities and lab activities View and summarize content related videos 	<ul style="list-style-type: none"> <u>Biology</u>, (Holt, Rinehart, Winston, 2006) <u>Biology – Chapter Resource File</u>, (Holt, Rinehart, Winston, 2006) Encyclopedia, Internet, and periodicals 	<ul style="list-style-type: none"> Note packet and review worksheets Discussion Formal lab reports to assess lab techniques and content knowledge PSSA Science Skill activities Enrichment activities Vocabulary review and concept mapping Quizzes Chapter test