Inquiry Investigations™
Cellular World MODULE – 1271974
Grades: 7-10

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Kentucky Standards
Science
Grade 7

CATEGORY	KY.PS.	Program of Studies 2006
GOAL/UNDERSTANDINGS/SUBDOMAIN	SC-7-STM.	Big Idea: Structure and Transformation of Matter (Physical Science) - A basic understanding of matter is essential to the conceptual development of other big ideas in science. During the middle years, physical and chemical changes in matter are observed, and students begin to relate these changes to the smaller constituents of matter - namely, atoms and molecules. The use of models (and an understanding of their scales and limitations) is an effective means of learning about the structure of matter. Looking for patterns in properties is also critical to comparing and explaining differences in matter. (Academic Expectations 2.1, 2.2, 2.4, 2.5)
AE/SKILLS & CONCEPTS/ORGANIZER	SC-7-STM-U-1.	Program of Studies: Understandings - Students will understand that equal volumes of different substances usually have different weights. • Cellular World Unit 6 Lab 6 Activity 1 Understanding Why Cells Aren't Big • Cellular World Unit 6 Lab 6 Activity 2 Investigating Cell Growth Curves
AE/SKILLS & CONCEPTS/ORGANIZER	SC-7-STM-U-3.	Program of Studies: Understandings - Students will understand that elements, as well as compounds, can be classified according to their similar properties, including how they react with each other and how they may be used. The patterns, which allow classification, can be used to infer or understand real life applications for those substances. • Cells and Energy: Teacher Resource CD • Cellular World Unit 4 Lab 4 Activity 1 Investigating Carbon Cycling • Cellular World Unit 4 Lab 4 Activity 2 A Closer Look at Catalase • Cellular World Unit 7 Lab 7 Activity 1 Developing a Biochemical Test for Catalase
AE/SKILLS & CONCEPTS/ORGANIZER	SC-7-STM-U-4.	Program of Studies: Understandings - Students will understand that many factors influence reaction rates, such as temperature, acidity and concentration. • Cells and Energy: Teacher Resource CD • Cellular World Unit 4 Lab 4 Activity 2 A Closer Look at Catalase • Cellular World Unit 7 Lab 7 Activity 1 Developing a Biochemical Test for Catalase

AE/SKILLS & CONCEPTS/ORGANIZER	SC-7-STM-S-4.	Program of Studies: Skills and Concepts - Students will observe reactions between substances that produce new substances very different from the reactants • Cells and Energy: Teacher Resource CD • Cellular World Unit 4 Lab 4 Activity 1 Investigating Carbon Cycling • Cellular World Unit 4 Lab 4 Activity 2 A Closer Look at Catalase • Cellular World Unit 7 Lab 7 Activity 1 Developing a Biochemical Test for Catalase
AE/SKILLS & CONCEPTS/ORGANIZER	SC-7-STM-S-5.	Program of Studies: Skills and Concepts - Students will test factors that influence reaction rates • Cells and Energy: Teacher Resource CD • Cellular World Unit 4 Lab 4 Activity 2 A Closer Look at Catalase • Cellular World Unit 7 Lab 7 Activity 1 Developing a Biochemical Test for Catalase
CATEGORY	**KY.PS.**	**Program of Studies 2006**
GOAL/UNDERSTANDINGS/SUBDOMAIN	SC-7-UD.	Big Idea: Unity and Diversity (Biological Science) - All matter is comprised of the same basic elements, goes through the same kinds of energy transformations, and uses the same kinds of forces to move. Living organisms are no exception. In middle school, students begin to compare, contrast, and classify the microscopic features of organisms - the cells, as well as investigate reproduction as the essential process to the continuation of all species. Expected patterns of genetic traits are predicted. Distinctions are made between learned behaviors and inherited traits. Emphasis at every level should be placed upon the understanding that while every living thing is composed of similar small constituents that combine in predictable ways, it is the subtle variations within these small building blocks that account for both the likenesses and differences in form and function that create the diversity of life. (Academic Expectations 2.1, 2.2, 2.3, 2.4)
AE/SKILLS & CONCEPTS/ORGANIZER	SC-7-UD-U-3.	Program of Studies: Understandings - Students will understand that asexual reproduction involves only the passing on of one parent's genes, resulting in offspring with genes identical to those of the parent. Sexual reproduction requires the combination of genes from male and female sex cells, creating offspring with a blend of traits. • Cell Growth: Teacher Resoruce CD • Cell Reproduction and the Cell Cycle: Teacher Resource CD • Cell Types and Organization: Teacher Resource CD • Cellular World Unit 5 Lab 5 Activity 4 Modeling Meiosis and Fertilization • Cellular World Unit 6 Lab 6 Activity 2 Investigating Cell Growth Curves
AE/SKILLS & CONCEPTS/ORGANIZER	SC-7-UD-U-5.	Program of Studies: Understandings - Students will understand that the observable differences among humans are minor compared to their internal similarity, as evidenced by the ability of people from all over the world to physically mix through reproduction, blood

		transfusions and organ transplants. • Cellular World Unit 1 Lab 1 Activity 2 Learning About Cell Organization
AE/SKILLS & CONCEPTS/ORGANIZER	SC-7-UD-S-1.	Program of Studies: Skills and Concepts - Students will describe and compare sexual and asexual reproduction, including advantages and disadvantages of each • Cell Growth: Teacher Resoruce CD • Cell Reproduction and the Cell Cycle: Teacher Resource CD • Cell Types and Organization: Teacher Resource CD • Cellular World Unit 5 Lab 5 Activity 4 Modeling Meiosis and Fertilization • Cellular World Unit 6 Lab 6 Activity 2 Investigating Cell Growth Curves
AE/SKILLS & CONCEPTS/ORGANIZER	SC-7-UD-S-5.	Program of Studies: Skills and Concepts - Students will compare the physiological similarities among people from geographically and culturally diverse origins • Cellular World Unit 1 Lab 1 Activity 2 Learning About Cell Organization
CATEGORY	**KY.PS.**	**Program of Studies 2006**
GOAL/UNDERSTANDINGS/SUBDOMAIN	SC-7-BC.	Big Idea: Biological Change (Biological Science) - The only thing certain is that everything changes. At the middle school level, students study relationships among populations and ecosystems that contribute to the success or demise of a specific population or species. Students construct basic explanations that can account for the great diversity among organisms. (Academic Expectations 2.1, 2.2, 2.5, 2.6)
AE/SKILLS & CONCEPTS/ORGANIZER	SC-7-BC-S-1.	Program of Studies: Skills and Concepts - Students will investigate parasitic and symbiotic relationships among organisms • Cell Structure and Function: Teacher Resource CD
AE/SKILLS & CONCEPTS/ORGANIZER	SC-7-BC-S-4.	Program of Studies: Skills and Concepts - Students will compare the results from a variety of investigations (based on similar hypotheses) to identify differences between their outcomes/conclusions and propose reasonable explanations for those discrepancies • Cellular World Unit 1 Lab 1 Activity 1 Learning About Cell Types • Cellular World Unit 1 Lab 1 Activity 2 Learning About Cell Organization • Cellular World Unit 2 Lab 2 Activity 1 Comparison of Plant and Animal Cell Organelles • Cellular World Unit 2 Lab 2 Activity 2 Identification of DNA and RNA in Plant Cells • Cellular World Unit 2 Lab 2 Activity 3 Identification of Mitochondria • Cellular World Unit 2 Lab 2 Activity 4 Plant Cell Structure and Function • Cellular World Unit 3 Lab 3 Activity 1

		Osmoregulation in Cells • Cellular World Unit 3 Lab 3 Activity 2 Osmosis and Diffusion in Model Cells • Cellular World Unit 4 Lab 4 Activity 1 Investigating Carbon Cycling • Cellular World Unit 4 Lab 4 Activity 2 A Closer Look at Catalase • Cellular World Unit 4 Lab 4 Activity 3 Investigating Plant Pigments • Cellular World Unit 5 Lab 5 Activity 1 Growth and Preparation of Onion Roots • Cellular World Unit 5 Lab 5 Activity 2 Observing the Cell Cycle in Onion Roots • Cellular World Unit 5 Lab 5 Activity 3 Modeling Mitosis • Cellular World Unit 5 Lab 5 Activity 4 Modeling Meiosis and Fertilization • Cellular World Unit 6 Lab 6 Activity 1 Understanding Why Cells Aren't Big • Cellular World Unit 6 Lab 6 Activity 2 Investigating Cell Growth Curves • Cellular World Unit 7 Lab 7 Activity 1 Developing a Biochemical Test for Catalase • Why Cells Aren't Big: Virtual Lab
CATEGORY	**KY.PS.**	**Program of Studies 2006**
GOAL/UNDERSTANDINGS/SUBDOMAIN	**SC-7-ET.**	Big Idea: Energy Transformations (Unifying Concepts) - Energy transformations are inherent in almost every system in the universe - from tangible examples at the elementary level, such as heat production in simple Earth and physical systems to more abstract ideas beginning at middle school, such as those transformations involved in the growth, dying and decay of living systems. The use of models to illustrate the often invisible and abstract notions of energy transfer will aid in conceptualization, especially as students move from the macroscopic level of observation and evidence (primarily elementary school) to the microscopic interactions at the atomic level (middle and high school levels). (Academic Expectations 2.1, 2.2, 2.3, 2.4)
AE/SKILLS & CONCEPTS/ORGANIZER	**SC-7-ET-U-6.**	Program of Studies: Understandings - Students will understand that systems tend to change until they become stable and remain that way unless conditions change. • Cell Process: Teacher Resource CD • Cell Structure and Function: Teacher Resource CD • Cellular World Unit 3 Lab 3 Activity 1 Osmoregulation in Cells • Cellular World Unit 3 Lab 3 Activity 2 Osmosis and Diffusion in Model Cells • Cellular World Unit 4 Lab 4 Activity 1 Investigating Carbon Cycling • Cellular World Unit 4 Lab 4 Activity 2 A Closer Look at Catalase • Cellular World Unit 4 Lab 4 Activity 3 Investigating Plant Pigments • Cellular World Unit 5 Lab 5 Activity 1 Growth and Preparation of Onion Roots • Cellular World Unit 5 Lab 5 Activity 2 Observing

		the Cell Cycle in Onion Roots • Cellular World Unit 5 Lab 5 Activity 3 Modeling Mitosis • Cellular World Unit 5 Lab 5 Activity 4 Modeling Meiosis and Fertilization • Cellular World Unit 6 Lab 6 Activity 1 Understanding Why Cells Aren't Big • Cellular World Unit 6 Lab 6 Activity 2 Investigating Cell Growth Curves • Cellular World Unit 7 Lab 7 Activity 1 Developing a Biochemical Test for Catalase
CATEGORY	**KY.AE.**	**Academic Expectation**
GOAL/UNDERSTANDINGS/SUBDOMAIN	**AE.1.**	Students are able to use basic communication and mathematics skills for purposes and situations they will encounter throughout their lives.
AE/SKILLS & CONCEPTS/ORGANIZER	**1.2.**	Students make sense of the variety of materials they read. • Cellular World Unit 2 Lab 2 Activity 1 Comparison of Plant and Animal Cell Organelles • Cellular World Unit 2 Lab 2 Activity 2 Identification of DNA and RNA in Plant Cells • Cellular World Unit 2 Lab 2 Activity 3 Identification of Mitochondria • Cellular World Unit 2 Lab 2 Activity 4 Plant Cell Structure and Function
AE/SKILLS & CONCEPTS/ORGANIZER	**1.3.**	Students make sense of the various things they observe. • Cellular World Unit 1 Lab 1 Activity 1 Learning About Cell Types • Cellular World Unit 1 Lab 1 Activity 2 Learning About Cell Organization • Cellular World Unit 2 Lab 2 Activity 1 Comparison of Plant and Animal Cell Organelles • Cellular World Unit 2 Lab 2 Activity 2 Identification of DNA and RNA in Plant Cells • Cellular World Unit 2 Lab 2 Activity 3 Identification of Mitochondria • Cellular World Unit 2 Lab 2 Activity 4 Plant Cell Structure and Function • Cellular World Unit 3 Lab 3 Activity 1 Osmoregulation in Cells • Cellular World Unit 3 Lab 3 Activity 2 Osmosis and Diffusion in Model Cells • Cellular World Unit 4 Lab 4 Activity 1 Investigating Carbon Cycling • Cellular World Unit 4 Lab 4 Activity 2 A Closer Look at Catalase • Cellular World Unit 4 Lab 4 Activity 3 Investigating Plant Pigments • Cellular World Unit 5 Lab 5 Activity 1 Growth and Preparation of Onion Roots • Cellular World Unit 5 Lab 5 Activity 2 Observing the Cell Cycle in Onion Roots • Cellular World Unit 5 Lab 5 Activity 3 Modeling

		Mitosis • Cellular World Unit 5 Lab 5 Activity 4 Modeling Meiosis and Fertilization • Cellular World Unit 6 Lab 6 Activity 1 Understanding Why Cells Aren't Big • Cellular World Unit 6 Lab 6 Activity 2 Investigating Cell Growth Curves • Cellular World Unit 7 Lab 7 Activity 1 Developing a Biochemical Test for Catalase • Why Cells Aren't Big: Virtual Lab
AE/SKILLS & CONCEPTS/ORGANIZER	**1.4.**	Students make sense of the various messages to which they listen. • Cellular World Unit 2 Lab 2 Activity 1 Comparison of Plant and Animal Cell Organelles • Cellular World Unit 2 Lab 2 Activity 2 Identification of DNA and RNA in Plant Cells • Cellular World Unit 2 Lab 2 Activity 3 Identification of Mitochondria • Cellular World Unit 2 Lab 2 Activity 4 Plant Cell Structure and Function
AE/SKILLS & CONCEPTS/ORGANIZER	**1.5-1.9.**	Students use mathematical ideas and procedures to communicate, reason, and solve problems. • Cellular World Unit 2 Lab 2 Activity 1 Comparison of Plant and Animal Cell Organelles • Cellular World Unit 2 Lab 2 Activity 2 Identification of DNA and RNA in Plant Cells • Cellular World Unit 2 Lab 2 Activity 3 Identification of Mitochondria • Cellular World Unit 2 Lab 2 Activity 4 Plant Cell Structure and Function • Cellular World Unit 3 Lab 3 Activity 1 Osmoregulation in Cells • Cellular World Unit 3 Lab 3 Activity 2 Osmosis and Diffusion in Model Cells • Cellular World Unit 4 Lab 4 Activity 1 Investigating Carbon Cycling • Cellular World Unit 4 Lab 4 Activity 2 A Closer Look at Catalase • Cellular World Unit 4 Lab 4 Activity 3 Investigating Plant Pigments • Cellular World Unit 5 Lab 5 Activity 1 Growth and Preparation of Onion Roots • Cellular World Unit 5 Lab 5 Activity 2 Observing the Cell Cycle in Onion Roots • Cellular World Unit 5 Lab 5 Activity 3 Modeling Mitosis • Cellular World Unit 5 Lab 5 Activity 4 Modeling Meiosis and Fertilization • Cellular World Unit 6 Lab 6 Activity 1 Understanding Why Cells Aren't Big • Cellular World Unit 6 Lab 6 Activity 2 Investigating Cell Growth Curves • Cellular World Unit 7 Lab 7 Activity 1 Developing

		a Biochemical Test for Catalase • Why Cells Aren't Big: Virtual Lab
AE/SKILLS & CONCEPTS/ORGANIZER	**1.11.**	Students write using appropriate forms, conventions, and styles to communicate ideas and information to different audiences for different purposes. • Cellular World Unit 2 Lab 2 Activity 1 Comparison of Plant and Animal Cell Organelles • Cellular World Unit 2 Lab 2 Activity 2 Identification of DNA and RNA in Plant Cells • Cellular World Unit 2 Lab 2 Activity 3 Identification of Mitochondria • Cellular World Unit 2 Lab 2 Activity 4 Plant Cell Structure and Function • Cellular World Unit 3 Lab 3 Activity 1 Osmoregulation in Cells • Cellular World Unit 3 Lab 3 Activity 2 Osmosis and Diffusion in Model Cells • Cellular World Unit 4 Lab 4 Activity 1 Investigating Carbon Cycling • Cellular World Unit 4 Lab 4 Activity 2 A Closer Look at Catalase • Cellular World Unit 4 Lab 4 Activity 3 Investigating Plant Pigments • Cellular World Unit 5 Lab 5 Activity 1 Growth and Preparation of Onion Roots • Cellular World Unit 5 Lab 5 Activity 2 Observing the Cell Cycle in Onion Roots • Cellular World Unit 5 Lab 5 Activity 3 Modeling Mitosis • Cellular World Unit 5 Lab 5 Activity 4 Modeling Meiosis and Fertilization • Cellular World Unit 6 Lab 6 Activity 1 Understanding Why Cells Aren't Big • Cellular World Unit 6 Lab 6 Activity 2 Investigating Cell Growth Curves • Cellular World Unit 7 Lab 7 Activity 1 Developing a Biochemical Test for Catalase
AE/SKILLS & CONCEPTS/ORGANIZER	**1.12.**	Students speak using appropriate forms, conventions, and styles to communicate ideas and information to different audiences for different purposes. • Cellular World Unit 2 Lab 2 Activity 1 Comparison of Plant and Animal Cell Organelles • Cellular World Unit 2 Lab 2 Activity 2 Identification of DNA and RNA in Plant Cells • Cellular World Unit 2 Lab 2 Activity 3 Identification of Mitochondria • Cellular World Unit 2 Lab 2 Activity 4 Plant Cell Structure and Function • Cellular World Unit 3 Lab 3 Activity 1 Osmoregulation in Cells • Cellular World Unit 3 Lab 3 Activity 2 Osmosis and Diffusion in Model Cells • Cellular World Unit 4 Lab 4 Activity 1

		Investigating Carbon Cycling • Cellular World Unit 4 Lab 4 Activity 2 A Closer Look at Catalase • Cellular World Unit 4 Lab 4 Activity 3 Investigating Plant Pigments • Cellular World Unit 5 Lab 5 Activity 1 Growth and Preparation of Onion Roots • Cellular World Unit 5 Lab 5 Activity 2 Observing the Cell Cycle in Onion Roots • Cellular World Unit 5 Lab 5 Activity 3 Modeling Mitosis • Cellular World Unit 5 Lab 5 Activity 4 Modeling Meiosis and Fertilization • Cellular World Unit 6 Lab 6 Activity 1 Understanding Why Cells Aren't Big • Cellular World Unit 6 Lab 6 Activity 2 Investigating Cell Growth Curves • Cellular World Unit 7 Lab 7 Activity 1 Developing a Biochemical Test for Catalase
AE/SKILLS & CONCEPTS/ORGANIZER	**1.16.**	Students use computers and other kinds of technology to collect, organize, and communicate information and ideas. • Cellular World Unit 1 Lab 1 Activity 1 Learning About Cell Types • Cellular World Unit 2 Lab 2 Activity 1 Comparison of Plant and Animal Cell Organelles • Cellular World Unit 2 Lab 2 Activity 2 Identification of DNA and RNA in Plant Cells • Cellular World Unit 2 Lab 2 Activity 3 Identification of Mitochondria • Cellular World Unit 2 Lab 2 Activity 4 Plant Cell Structure and Function • Cellular World Unit 3 Lab 3 Activity 1 Osmoregulation in Cells • Cellular World Unit 3 Lab 3 Activity 2 Osmosis and Diffusion in Model Cells • Cellular World Unit 4 Lab 4 Activity 2 A Closer Look at Catalase • Cellular World Unit 4 Lab 4 Activity 3 Investigating Plant Pigments • Cellular World Unit 5 Lab 5 Activity 1 Growth and Preparation of Onion Roots • Cellular World Unit 5 Lab 5 Activity 2 Observing the Cell Cycle in Onion Roots • Cellular World Unit 5 Lab 5 Activity 4 Modeling Meiosis and Fertilization • Cellular World Unit 6 Lab 6 Activity 1 Understanding Why Cells Aren't Big • Cellular World Unit 6 Lab 6 Activity 2 Investigating Cell Growth Curves • Cellular World Unit 7 Lab 7 Activity 1 Developing a Biochemical Test for Catalase • Why Cells Aren't Big: Virtual Lab
CATEGORY	**KY.AE.**	**Academic Expectation**

GOAL/UNDERSTANDINGS/SUBDOMAIN	**AE.2.**	Students shall develop their abilities to apply core concepts and principles from mathematics, the sciences, the arts, the humanities, social studies, practical living studies, and vocational studies to what they will encounter throughout their lives.
AE/SKILLS & CONCEPTS/ORGANIZER	**2.1.**	Science: Students understand scientific ways of thinking and working and use those methods to solve real-life problems. • Cellular World Unit 5 Lab 5 Activity 2 Observing the Cell Cycle in Onion Roots • Cellular World Unit 7 Lab 7 Activity 1 Developing a Biochemical Test for Catalase
AE/SKILLS & CONCEPTS/ORGANIZER	**2.2.**	Science: Students identify, analyze, and use patterns such as cycles and trends to understand past and present events and predict possible future events. • Cell Reproduction and the Cell Cycle: Teacher Resource CD • Cellular World Unit 3 Lab 3 Activity 1 Osmoregulation in Cells • Cellular World Unit 7 Lab 7 Activity 1 Developing a Biochemical Test for Catalase
AE/SKILLS & CONCEPTS/ORGANIZER	**2.4.**	Science: Students use the concept of scale and scientific models to explain the organization and functioning of living and nonliving things and predict other characteristics that might be observed. • Cell Growth: Teacher Resoruce CD • Cell Types and Organization: Teacher Resource CD • Cellular World Unit 3 Lab 3 Activity 1 Osmoregulation in Cells • Cellular World Unit 3 Lab 3 Activity 2 Osmosis and Diffusion in Model Cells • Cellular World Unit 5 Lab 5 Activity 3 Modeling Mitosis • Cellular World Unit 5 Lab 5 Activity 4 Modeling Meiosis and Fertilization • Cellular World Unit 6 Lab 6 Activity 1 Understanding Why Cells Aren't Big • Cellular World Unit 6 Lab 6 Activity 2 Investigating Cell Growth Curves • Why Cells Aren't Big: Virtual Lab
AE/SKILLS & CONCEPTS/ORGANIZER	**2.5.**	Science: Students understand that under certain conditions nature tends to remain the same or move toward a balance. • Cell Process: Teacher Resource CD • Cell Structure and Function: Teacher Resource CD • Cellular World Unit 3 Lab 3 Activity 1 Osmoregulation in Cells • Cellular World Unit 3 Lab 3 Activity 2 Osmosis and Diffusion in Model Cells • Cellular World Unit 4 Lab 4 Activity 1 Investigating Carbon Cycling • Cellular World Unit 4 Lab 4 Activity 2 A Closer

		Look at Catalase • Cellular World Unit 4 Lab 4 Activity 3 Investigating Plant Pigments • Cellular World Unit 5 Lab 5 Activity 1 Growth and Preparation of Onion Roots • Cellular World Unit 5 Lab 5 Activity 2 Observing the Cell Cycle in Onion Roots • Cellular World Unit 5 Lab 5 Activity 3 Modeling Mitosis • Cellular World Unit 5 Lab 5 Activity 4 Modeling Meiosis and Fertilization • Cellular World Unit 6 Lab 6 Activity 1 Understanding Why Cells Aren't Big • Cellular World Unit 6 Lab 6 Activity 2 Investigating Cell Growth Curves • Cellular World Unit 7 Lab 7 Activity 1 Developing a Biochemical Test for Catalase
CATEGORY	**KY.CC.**	**Core Content for Assessment v.4.1**
GOAL/UNDERSTANDINGS/SUBDOMAIN	**SC-07-3.4.**	Unity and Diversity: In middle school, students begin to compare, contrast and classify the microscopic features of organisms - the cells, as well as investigate reproduction as the essential process to the continuation of all species. Expected patterns of genetic traits are predicted. Distinctions are made between learned behaviors and inherited traits.
AE/SKILLS & CONCEPTS/ORGANIZER	**SC-07-3.4.1.**	Biological Science: Students will describe the role of genes/chromosomes in the passing of information from one generation to another (heredity); compare inherited and learned traits. • Cell Reproduction and the Cell Cycle: Teacher Resource CD • Cell Structure and Function: Teacher Resource CD • Cellular World Unit 1 Lab 1 Activity 2 Learning About Cell Organization • Cellular World Unit 2 Lab 2 Activity 2 Identification of DNA and RNA in Plant Cells • Cellular World Unit 5 Lab 5 Activity 2 Observing the Cell Cycle in Onion Roots • Cellular World Unit 5 Lab 5 Activity 3 Modeling Mitosis • Cellular World Unit 5 Lab 5 Activity 4 Modeling Meiosis and Fertilization
AE/SKILLS & CONCEPTS/ORGANIZER	**SC-07-3.4.2.**	Biological Science: Students will describe and compare sexual and asexual reproduction. • Cell Growth: Teacher Resoruce CD • Cell Reproduction and the Cell Cycle: Teacher Resource CD • Cell Types and Organization: Teacher Resource CD • Cellular World Unit 5 Lab 5 Activity 4 Modeling Meiosis and Fertilization • Cellular World Unit 6 Lab 6 Activity 2 Investigating Cell Growth Curves

CATEGORY	KY.CC.	Core Content for Assessment v.4.1
GOAL/UNDERSTANDINGS/SUBDOMAIN	SC-07-4.6.	Energy Transformations: Energy transformations are inherent in almost every system in the universe - from tangible examples at the elementary level, such as heat production in simple earth and physical systems to more abstract ideas beginning at middle school, such as those transformations involved in the growth, dying and decay of living systems. The use of models to illustrate the often invisible and abstract notions of energy transfer will aid in conceptualization, especially as students move from the macroscopic level of observation and evidence (primarily elementary school) to the microscopic interactions at the atomic level (middle and high school levels).
AE/SKILLS & CONCEPTS/ORGANIZER	SC-07-4.6.1.	Unifying Concepts: Students will understand that Earth systems have sources of energy that are internal and external to the Earth. The Sun is the major external source of energy. • Cells and Energy: Teacher Resource CD

Grade 8

CATEGORY	KY.PS.	Program of Studies 2006
GOAL/UNDERSTANDINGS/SUBDOMAIN	SC-8-UD.	Big Idea: Unity and Diversity (Biological Science) - All matter is comprised of the same basic elements, goes through the same kinds of energy transformations, and uses the same kinds of forces to move. Living organisms are no exception. In middle school, students begin to compare, contrast, and classify the microscopic features of organisms - the cells, as well as investigate reproduction as the essential process to the continuation of all species. Expected patterns of genetic traits are predicted. Distinctions are made between learned behaviors and inherited traits. Emphasis at every level should be placed upon the understanding that while every living thing is composed of similar small constituents that combine in predictable ways, it is the subtle variations within these small building blocks that account for both the likenesses and differences in form and function that create the diversity of life. (Academic Expectations 2.1, 2.2, 2.3, 2.4)
AE/SKILLS & CONCEPTS/ORGANIZER	SC-8-UD-U-1.	Program of Studies: Understandings - Students will understand that all cells contain specialized parts that are structured to efficiently perform the cell's essential functions. • Cell Growth: Teacher Resoruce CD • Cell Process: Teacher Resource CD • Cell Reproduction and the Cell Cycle: Teacher Resource CD • Cell Structure and Function: Teacher Resource CD • Cell Types and Organization: Teacher Resource CD • Cells and Energy: Teacher Resource CD • Cellular World Unit 1 Lab 1 Activity 1 Learning About Cell Types • Cellular World Unit 1 Lab 1 Activity 2 Learning About Cell Organization • Cellular World Unit 2 Lab 2 Activity 1 Comparison of Plant and Animal Cell Organelles • Cellular World Unit 2 Lab 2 Activity 2 Identification of DNA and RNA in Plant Cells • Cellular World Unit 2 Lab 2 Activity 3 Identification of Mitochondria

		• Cellular World Unit 2 Lab 2 Activity 4 Plant Cell Structure and Function • Cellular World Unit 3 Lab 3 Activity 1 Osmoregulation in Cells • Cellular World Unit 3 Lab 3 Activity 2 Osmosis and Diffusion in Model Cells • Cellular World Unit 4 Lab 4 Activity 1 Investigating Carbon Cycling • Cellular World Unit 4 Lab 4 Activity 2 A Closer Look at Catalase • Cellular World Unit 4 Lab 4 Activity 3 Investigating Plant Pigments • Cellular World Unit 5 Lab 5 Activity 1 Growth and Preparation of Onion Roots • Cellular World Unit 5 Lab 5 Activity 2 Observing the Cell Cycle in Onion Roots • Cellular World Unit 5 Lab 5 Activity 3 Modeling Mitosis • Cellular World Unit 5 Lab 5 Activity 4 Modeling Meiosis and Fertilization • Cellular World Unit 6 Lab 6 Activity 1 Understanding Why Cells Aren't Big • Cellular World Unit 6 Lab 6 Activity 2 Investigating Cell Growth Curves • Cellular World Unit 7 Lab 7 Activity 1 Developing a Biochemical Test for Catalase • Why Cells Aren't Big: Virtual Lab
AE/SKILLS & CONCEPTS/ORGANIZER	**SC-8-UD-U-2.**	Program of Studies: Understandings - Students will understand that complex organisms can exist because their genes contain the information needed to create and reproduce cells with specialized functions. • Cell Types and Organization: Teacher Resource CD • Cellular World Unit 1 Lab 1 Activity 1 Learning About Cell Types • Cellular World Unit 6 Lab 6 Activity 1 Understanding Why Cells Aren't Big
AE/SKILLS & CONCEPTS/ORGANIZER	**SC-8-UD-S-1.**	Program of Studies: Skills and Concepts - Students will investigate, model and explain the functions of the specialized parts within the cell • Cell Process: Teacher Resource CD • Cell Reproduction and the Cell Cycle: Teacher Resource CD • Cell Structure and Function: Teacher Resource CD • Cell Types and Organization: Teacher Resource CD • Cells and Energy: Teacher Resource CD • Cellular World Unit 1 Lab 1 Activity 1 Learning About Cell Types • Cellular World Unit 1 Lab 1 Activity 2 Learning About Cell Organization • Cellular World Unit 2 Lab 2 Activity 1 Comparison of Plant and Animal Cell Organelles

		• Cellular World Unit 2 Lab 2 Activity 2 Identification of DNA and RNA in Plant Cells • Cellular World Unit 2 Lab 2 Activity 3 Identification of Mitochondria • Cellular World Unit 2 Lab 2 Activity 4 Plant Cell Structure and Function
AE/SKILLS & CONCEPTS/ORGANIZER	SC-8-UD-S-4.	Program of Studies: Skills and Concepts - Students will describe the role of genes/chromosomes in the passing of information from one generation to another (heredity) • Cell Reproduction and the Cell Cycle: Teacher Resource CD • Cell Structure and Function: Teacher Resource CD • Cellular World Unit 1 Lab 1 Activity 2 Learning About Cell Organization • Cellular World Unit 2 Lab 2 Activity 2 Identification of DNA and RNA in Plant Cells • Cellular World Unit 5 Lab 5 Activity 2 Observing the Cell Cycle in Onion Roots • Cellular World Unit 5 Lab 5 Activity 3 Modeling Mitosis • Cellular World Unit 5 Lab 5 Activity 4 Modeling Meiosis and Fertilization
CATEGORY	**KY.PS.**	**Program of Studies 2006**
GOAL/UNDERSTANDINGS/SUBDOMAIN	SC-8-BC.	Big Idea: Biological Change (Biological Science) - The only thing certain is that everything changes. At the middle school level, students study relationships among populations and ecosystems that contribute to the success or demise of a specific population or species. Students construct basic explanations that can account for the great diversity among organisms. (Academic Expectations 2.1, 2.2, 2.5, 2.6)
AE/SKILLS & CONCEPTS/ORGANIZER	SC-8-BC-U-2.	Program of Studies: Understandings - Students will understand that observations of the fossil record provide evidence that helps to explain why externally diverse organisms are so similar at the molecular level. • Cell Types and Organization: Teacher Resource CD • Cells and Energy: Teacher Resource CD • Cellular World Unit 1 Lab 1 Activity 2 Learning About Cell Organization • Cellular World Unit 2 Lab 2 Activity 1 Comparison of Plant and Animal Cell Organelles • Cellular World Unit 2 Lab 2 Activity 2 Identification of DNA and RNA in Plant Cells • Cellular World Unit 2 Lab 2 Activity 3 Identification of Mitochondria • Cellular World Unit 2 Lab 2 Activity 4 Plant Cell Structure and Function • Cellular World Unit 5 Lab 5 Activity 1 Growth and Preparation of Onion Roots • Cellular World Unit 6 Lab 6 Activity 1 Understanding Why Cells Aren't Big
AE/SKILLS & CONCEPTS/ORGANIZER	SC-8-	Program of Studies: Understandings - Students will understand that

	BC-U-3.	scientists cannot always control experimental conditions to obtain evidence. When that is not possible, they try to observe as wide a range of natural occurrences as possible to be able to identify patterns. • Cellular World Unit 5 Lab 5 Activity 2 Observing the Cell Cycle in Onion Roots • Cellular World Unit 7 Lab 7 Activity 1 Developing a Biochemical Test for Catalase
CATEGORY	**KY.PS.**	**Program of Studies 2006**
GOAL/UNDERSTANDINGS/SUBDOMAIN	**SC-8-ET.**	Big Idea: Energy Transformations (Unifying Concepts) - Energy transformations are inherent in almost every system in the universe - from tangible examples at the elementary level, such as heat production in simple Earth and physical systems to more abstract ideas beginning at middle school, such as those transformations involved in the growth, dying and decay of living systems. The use of models to illustrate the often invisible and abstract notions of energy transfer will aid in conceptualization, especially as students move from the macroscopic level of observation and evidence (primarily elementary school) to the microscopic interactions at the atomic level (middle and high school levels). (Academic Expectations 2.1, 2.2, 2.3, 2.4)
AE/SKILLS & CONCEPTS/ORGANIZER	**SC-8-ET-U-7.**	Program of Studies: Understandings - Students will understand that many systems contain feedback mechanisms that serve to keep changes within specified limits. • Cell Growth: Teacher Resoruce CD • Cell Process: Teacher Resource CD • Cell Structure and Function: Teacher Resource CD • Cellular World Unit 3 Lab 3 Activity 1 Osmoregulation in Cells • Cellular World Unit 3 Lab 3 Activity 2 Osmosis and Diffusion in Model Cells • Cellular World Unit 5 Lab 5 Activity 3 Modeling Mitosis • Cellular World Unit 5 Lab 5 Activity 4 Modeling Meiosis and Fertilization • Cellular World Unit 6 Lab 6 Activity 1 Understanding Why Cells Aren't Big • Cellular World Unit 6 Lab 6 Activity 2 Investigating Cell Growth Curves • Cellular World Unit 7 Lab 7 Activity 1 Developing a Biochemical Test for Catalase • Why Cells Aren't Big: Virtual Lab
AE/SKILLS & CONCEPTS/ORGANIZER	**SC-8-ET-S-2.**	Program of Studies: Skills and Concepts - Students will identify the energy transformations that occur in the 'production', transmission and use of energy by people in everyday life (e.g., electric power, automotive fuels, food) • Cells and Energy: Teacher Resource CD
AE/SKILLS & CONCEPTS/ORGANIZER	**SC-8-ET-S-8.**	Program of Studies: Skills and Concepts - Students will graphically represent energy flow within an ecosystem to identify the existing relationships

		• Cells and Energy: Teacher Resource CD • Cellular World Unit 4 Lab 4 Activity 1 Investigating Carbon Cycling
CATEGORY	**KY.PS.**	**Program of Studies 2006**
GOAL/UNDERSTANDINGS/SUBDOMAIN	**SC-8-I.**	Big Idea: Interdependence (Unifying Concepts) - It is not difficult for students to grasp the general notion that species depend on one another and on the environment for survival. But their awareness must be supported by knowledge of the kinds of relationships that exist among organisms, the kinds of physical conditions that organisms must cope with, the kinds of environments created by the interaction of organisms with one another and their physical surroundings, and the complexity of such systems. In middle school, students should be guided from specific examples of the interdependency of organisms to a more systematic view of the interactions that take place among organisms and their surroundings. Students growing understanding of systems in general will reinforce the concept of ecosystems. Stability and change in ecosystems can be considered in terms of variables such as population size, number and kinds of species, productivity, and the effect of human intervention. (Academic Expectations 2.1, 2.2, 2.3, 2.4)
AE/SKILLS & CONCEPTS/ORGANIZER	**SC-8-I-U-1.**	Program of Studies: Understandings - Students will understand that organisms both cooperate and compete in ecosystems. Balanced patterns of cooperation and competition may generate ecosystems that are relatively stable for hundreds or thousands of years. • Cell Structure and Function: Teacher Resource CD
AE/SKILLS & CONCEPTS/ORGANIZER	**SC-8-I-U-3.**	Program of Studies: Understandings - Students will understand that it is important to consider what population will benefit and what population (not necessarily the same one) will bear the cost when deciding among alternative courses of action. • Cellular World Unit 6 Lab 6 Activity 2 Investigating Cell Growth Curves
CATEGORY	**KY.AE.**	**Academic Expectation**
GOAL/UNDERSTANDINGS/SUBDOMAIN	**AE.1.**	Students are able to use basic communication and mathematics skills for purposes and situations they will encounter throughout their lives.
AE/SKILLS & CONCEPTS/ORGANIZER	**1.2.**	Students make sense of the variety of materials they read. • Cellular World Unit 2 Lab 2 Activity 1 Comparison of Plant and Animal Cell Organelles • Cellular World Unit 2 Lab 2 Activity 2 Identification of DNA and RNA in Plant Cells • Cellular World Unit 2 Lab 2 Activity 3 Identification of Mitochondria • Cellular World Unit 2 Lab 2 Activity 4 Plant Cell Structure and Function
AE/SKILLS & CONCEPTS/ORGANIZER	**1.3.**	Students make sense of the various things they observe. • Cellular World Unit 1 Lab 1 Activity 1 Learning About Cell Types

		• Cellular World Unit 1 Lab 1 Activity 2 Learning About Cell Organization • Cellular World Unit 2 Lab 2 Activity 1 Comparison of Plant and Animal Cell Organelles • Cellular World Unit 2 Lab 2 Activity 2 Identification of DNA and RNA in Plant Cells • Cellular World Unit 2 Lab 2 Activity 3 Identification of Mitochondria • Cellular World Unit 2 Lab 2 Activity 4 Plant Cell Structure and Function • Cellular World Unit 3 Lab 3 Activity 1 Osmoregulation in Cells • Cellular World Unit 3 Lab 3 Activity 2 Osmosis and Diffusion in Model Cells • Cellular World Unit 4 Lab 4 Activity 1 Investigating Carbon Cycling • Cellular World Unit 4 Lab 4 Activity 2 A Closer Look at Catalase • Cellular World Unit 4 Lab 4 Activity 3 Investigating Plant Pigments • Cellular World Unit 5 Lab 5 Activity 1 Growth and Preparation of Onion Roots • Cellular World Unit 5 Lab 5 Activity 2 Observing the Cell Cycle in Onion Roots • Cellular World Unit 5 Lab 5 Activity 3 Modeling Mitosis • Cellular World Unit 5 Lab 5 Activity 4 Modeling Meiosis and Fertilization • Cellular World Unit 6 Lab 6 Activity 1 Understanding Why Cells Aren't Big • Cellular World Unit 6 Lab 6 Activity 2 Investigating Cell Growth Curves • Cellular World Unit 7 Lab 7 Activity 1 Developing a Biochemical Test for Catalase • Why Cells Aren't Big: Virtual Lab
AE/SKILLS & CONCEPTS/ORGANIZER	**1.4.**	Students make sense of the various messages to which they listen. • Cellular World Unit 2 Lab 2 Activity 1 Comparison of Plant and Animal Cell Organelles • Cellular World Unit 2 Lab 2 Activity 2 Identification of DNA and RNA in Plant Cells • Cellular World Unit 2 Lab 2 Activity 3 Identification of Mitochondria • Cellular World Unit 2 Lab 2 Activity 4 Plant Cell Structure and Function
AE/SKILLS & CONCEPTS/ORGANIZER	**1.5-1.9.**	Students use mathematical ideas and procedures to communicate, reason, and solve problems. • Cellular World Unit 2 Lab 2 Activity 1 Comparison of Plant and Animal Cell Organelles • Cellular World Unit 2 Lab 2 Activity 2 Identification of DNA and RNA in Plant Cells • Cellular World Unit 2 Lab 2 Activity 3 Identification of Mitochondria

		• Cellular World Unit 2 Lab 2 Activity 4 Plant Cell Structure and Function • Cellular World Unit 3 Lab 3 Activity 1 Osmoregulation in Cells • Cellular World Unit 3 Lab 3 Activity 2 Osmosis and Diffusion in Model Cells • Cellular World Unit 4 Lab 4 Activity 1 Investigating Carbon Cycling • Cellular World Unit 4 Lab 4 Activity 2 A Closer Look at Catalase • Cellular World Unit 4 Lab 4 Activity 3 Investigating Plant Pigments • Cellular World Unit 5 Lab 5 Activity 1 Growth and Preparation of Onion Roots • Cellular World Unit 5 Lab 5 Activity 2 Observing the Cell Cycle in Onion Roots • Cellular World Unit 5 Lab 5 Activity 3 Modeling Mitosis • Cellular World Unit 5 Lab 5 Activity 4 Modeling Meiosis and Fertilization • Cellular World Unit 6 Lab 6 Activity 1 Understanding Why Cells Aren't Big • Cellular World Unit 6 Lab 6 Activity 2 Investigating Cell Growth Curves • Cellular World Unit 7 Lab 7 Activity 1 Developing a Biochemical Test for Catalase • Why Cells Aren't Big: Virtual Lab
AE/SKILLS & CONCEPTS/ORGANIZER	**1.11.**	Students write using appropriate forms, conventions, and styles to communicate ideas and information to different audiences for different purposes. • Cellular World Unit 2 Lab 2 Activity 1 Comparison of Plant and Animal Cell Organelles • Cellular World Unit 2 Lab 2 Activity 2 Identification of DNA and RNA in Plant Cells • Cellular World Unit 2 Lab 2 Activity 3 Identification of Mitochondria • Cellular World Unit 2 Lab 2 Activity 4 Plant Cell Structure and Function • Cellular World Unit 3 Lab 3 Activity 1 Osmoregulation in Cells • Cellular World Unit 3 Lab 3 Activity 2 Osmosis and Diffusion in Model Cells • Cellular World Unit 4 Lab 4 Activity 1 Investigating Carbon Cycling • Cellular World Unit 4 Lab 4 Activity 2 A Closer Look at Catalase • Cellular World Unit 4 Lab 4 Activity 3 Investigating Plant Pigments • Cellular World Unit 5 Lab 5 Activity 1 Growth and Preparation of Onion Roots • Cellular World Unit 5 Lab 5 Activity 2 Observing the Cell Cycle in Onion Roots • Cellular World Unit 5 Lab 5 Activity 3 Modeling Mitosis • Cellular World Unit 5 Lab 5 Activity 4 Modeling

		Meiosis and Fertilization • Cellular World Unit 6 Lab 6 Activity 1 Understanding Why Cells Aren't Big • Cellular World Unit 6 Lab 6 Activity 2 Investigating Cell Growth Curves • Cellular World Unit 7 Lab 7 Activity 1 Developing a Biochemical Test for Catalase
AE/SKILLS & CONCEPTS/ORGANIZER	**1.12.**	Students speak using appropriate forms, conventions, and styles to communicate ideas and information to different audiences for different purposes. • Cellular World Unit 2 Lab 2 Activity 1 Comparison of Plant and Animal Cell Organelles • Cellular World Unit 2 Lab 2 Activity 2 Identification of DNA and RNA in Plant Cells • Cellular World Unit 2 Lab 2 Activity 3 Identification of Mitochondria • Cellular World Unit 2 Lab 2 Activity 4 Plant Cell Structure and Function • Cellular World Unit 3 Lab 3 Activity 1 Osmoregulation in Cells • Cellular World Unit 3 Lab 3 Activity 2 Osmosis and Diffusion in Model Cells • Cellular World Unit 4 Lab 4 Activity 1 Investigating Carbon Cycling • Cellular World Unit 4 Lab 4 Activity 2 A Closer Look at Catalase • Cellular World Unit 4 Lab 4 Activity 3 Investigating Plant Pigments • Cellular World Unit 5 Lab 5 Activity 1 Growth and Preparation of Onion Roots • Cellular World Unit 5 Lab 5 Activity 2 Observing the Cell Cycle in Onion Roots • Cellular World Unit 5 Lab 5 Activity 3 Modeling Mitosis • Cellular World Unit 5 Lab 5 Activity 4 Modeling Meiosis and Fertilization • Cellular World Unit 6 Lab 6 Activity 1 Understanding Why Cells Aren't Big • Cellular World Unit 6 Lab 6 Activity 2 Investigating Cell Growth Curves • Cellular World Unit 7 Lab 7 Activity 1 Developing a Biochemical Test for Catalase
AE/SKILLS & CONCEPTS/ORGANIZER	**1.16.**	Students use computers and other kinds of technology to collect, organize, and communicate information and ideas. • Cellular World Unit 1 Lab 1 Activity 1 Learning About Cell Types • Cellular World Unit 2 Lab 2 Activity 1 Comparison of Plant and Animal Cell Organelles • Cellular World Unit 2 Lab 2 Activity 2 Identification of DNA and RNA in Plant Cells • Cellular World Unit 2 Lab 2 Activity 3 Identification of Mitochondria

		• Cellular World Unit 2 Lab 2 Activity 4 Plant Cell Structure and Function • Cellular World Unit 3 Lab 3 Activity 1 Osmoregulation in Cells • Cellular World Unit 3 Lab 3 Activity 2 Osmosis and Diffusion in Model Cells • Cellular World Unit 4 Lab 4 Activity 2 A Closer Look at Catalase • Cellular World Unit 4 Lab 4 Activity 3 Investigating Plant Pigments • Cellular World Unit 5 Lab 5 Activity 1 Growth and Preparation of Onion Roots • Cellular World Unit 5 Lab 5 Activity 2 Observing the Cell Cycle in Onion Roots • Cellular World Unit 5 Lab 5 Activity 4 Modeling Meiosis and Fertilization • Cellular World Unit 6 Lab 6 Activity 1 Understanding Why Cells Aren't Big • Cellular World Unit 6 Lab 6 Activity 2 Investigating Cell Growth Curves • Cellular World Unit 7 Lab 7 Activity 1 Developing a Biochemical Test for Catalase • Why Cells Aren't Big: Virtual Lab
CATEGORY	**KY.AE.**	**Academic Expectation**
GOAL/UNDERSTANDINGS/SUBDOMAIN	**AE.2.**	Students shall develop their abilities to apply core concepts and principles from mathematics, the sciences, the arts, the humanities, social studies, practical living studies, and vocational studies to what they will encounter throughout their lives.
AE/SKILLS & CONCEPTS/ORGANIZER	**2.1.**	Science: Students understand scientific ways of thinking and working and use those methods to solve real-life problems. • Cellular World Unit 5 Lab 5 Activity 2 Observing the Cell Cycle in Onion Roots • Cellular World Unit 7 Lab 7 Activity 1 Developing a Biochemical Test for Catalase
AE/SKILLS & CONCEPTS/ORGANIZER	**2.2.**	Science: Students identify, analyze, and use patterns such as cycles and trends to understand past and present events and predict possible future events. • Cell Reproduction and the Cell Cycle: Teacher Resource CD • Cellular World Unit 3 Lab 3 Activity 1 Osmoregulation in Cells • Cellular World Unit 7 Lab 7 Activity 1 Developing a Biochemical Test for Catalase
AE/SKILLS & CONCEPTS/ORGANIZER	**2.4.**	Science: Students use the concept of scale and scientific models to explain the organization and functioning of living and nonliving things and predict other characteristics that might be observed. • Cell Growth: Teacher Resoruce CD • Cell Types and Organization: Teacher Resource CD

		• Cellular World Unit 3 Lab 3 Activity 1 Osmoregulation in Cells • Cellular World Unit 3 Lab 3 Activity 2 Osmosis and Diffusion in Model Cells • Cellular World Unit 5 Lab 5 Activity 3 Modeling Mitosis • Cellular World Unit 5 Lab 5 Activity 4 Modeling Meiosis and Fertilization • Cellular World Unit 6 Lab 6 Activity 1 Understanding Why Cells Aren't Big • Cellular World Unit 6 Lab 6 Activity 2 Investigating Cell Growth Curves • Why Cells Aren't Big: Virtual Lab
AE/SKILLS & CONCEPTS/ORGANIZER	**2.5.**	Science: Students understand that under certain conditions nature tends to remain the same or move toward a balance. • Cell Process: Teacher Resource CD • Cell Structure and Function: Teacher Resource CD • Cellular World Unit 3 Lab 3 Activity 1 Osmoregulation in Cells • Cellular World Unit 3 Lab 3 Activity 2 Osmosis and Diffusion in Model Cells • Cellular World Unit 4 Lab 4 Activity 1 Investigating Carbon Cycling • Cellular World Unit 4 Lab 4 Activity 2 A Closer Look at Catalase • Cellular World Unit 4 Lab 4 Activity 3 Investigating Plant Pigments • Cellular World Unit 5 Lab 5 Activity 1 Growth and Preparation of Onion Roots • Cellular World Unit 5 Lab 5 Activity 2 Observing the Cell Cycle in Onion Roots • Cellular World Unit 5 Lab 5 Activity 3 Modeling Mitosis • Cellular World Unit 5 Lab 5 Activity 4 Modeling Meiosis and Fertilization • Cellular World Unit 6 Lab 6 Activity 1 Understanding Why Cells Aren't Big • Cellular World Unit 6 Lab 6 Activity 2 Investigating Cell Growth Curves • Cellular World Unit 7 Lab 7 Activity 1 Developing a Biochemical Test for Catalase
CATEGORY	**KY.CC.**	**Core Content for Assessment v.4.1**
GOAL/UNDERSTANDINGS/SUBDOMAIN	**SC-08-3.4.**	Unity and Diversity: In middle school, students begin to compare, contrast and classify the microscopic features of organisms - the cells, as well as investigate reproduction as the essential process to the continuation of all species. Expected patterns of genetic traits are predicted. Distinctions are made between learned behaviors and inherited traits.
AE/SKILLS & CONCEPTS/ORGANIZER	**SC-08-3.4.1.**	Biological Science: Students will explain the relationship between structure and function of the cell components using a variety of representations. • Cell Growth: Teacher Resoruce CD

		• Cell Process: Teacher Resource CD • Cell Reproduction and the Cell Cycle: Teacher Resource CD • Cell Structure and Function: Teacher Resource CD • Cell Types and Organization: Teacher Resource CD • Cells and Energy: Teacher Resource CD • Cellular World Unit 1 Lab 1 Activity 1 Learning About Cell Types • Cellular World Unit 1 Lab 1 Activity 2 Learning About Cell Organization • Cellular World Unit 2 Lab 2 Activity 1 Comparison of Plant and Animal Cell Organelles • Cellular World Unit 2 Lab 2 Activity 2 Identification of DNA and RNA in Plant Cells • Cellular World Unit 2 Lab 2 Activity 3 Identification of Mitochondria • Cellular World Unit 2 Lab 2 Activity 4 Plant Cell Structure and Function • Cellular World Unit 3 Lab 3 Activity 1 Osmoregulation in Cells • Cellular World Unit 3 Lab 3 Activity 2 Osmosis and Diffusion in Model Cells • Cellular World Unit 4 Lab 4 Activity 1 Investigating Carbon Cycling • Cellular World Unit 4 Lab 4 Activity 2 A Closer Look at Catalase • Cellular World Unit 4 Lab 4 Activity 3 Investigating Plant Pigments • Cellular World Unit 5 Lab 5 Activity 1 Growth and Preparation of Onion Roots • Cellular World Unit 5 Lab 5 Activity 2 Observing the Cell Cycle in Onion Roots • Cellular World Unit 5 Lab 5 Activity 3 Modeling Mitosis • Cellular World Unit 5 Lab 5 Activity 4 Modeling Meiosis and Fertilization • Cellular World Unit 6 Lab 6 Activity 1 Understanding Why Cells Aren't Big • Cellular World Unit 6 Lab 6 Activity 2 Investigating Cell Growth Curves • Cellular World Unit 7 Lab 7 Activity 1 Developing a Biochemical Test for Catalase • Why Cells Aren't Big: Virtual Lab
AE/SKILLS & CONCEPTS/ORGANIZER	**SC-08-3.4.2.**	Biological Science: Students will understand that in the development of multicellular organisms, cells multiply (mitosis) and differentiate to form many specialized cells, tissues, and organs • Cell Growth: Teacher Resoruce CD • Cell Reproduction and the Cell Cycle: Teacher Resource CD • Cell Types and Organization: Teacher Resource CD • Cellular World Unit 1 Lab 1 Activity 2 Learning About Cell Organization

		• Cellular World Unit 2 Lab 2 Activity 2 Identification of DNA and RNA in Plant Cells • Cellular World Unit 5 Lab 5 Activity 2 Observing the Cell Cycle in Onion Roots • Cellular World Unit 5 Lab 5 Activity 3 Modeling Mitosis • Cellular World Unit 5 Lab 5 Activity 4 Modeling Meiosis and Fertilization • Cellular World Unit 6 Lab 6 Activity 1 Understanding Why Cells Aren't Big
AE/SKILLS & CONCEPTS/ORGANIZER	SC-08-3.4.4.	Biological Science: Students will describe and explain patterns found within groups of organisms in order to make biological classifications of those organisms. • Cellular World Unit 7 Lab 7 Activity 1 Developing a Biochemical Test for Catalase

Grade 9

CATEGORY	KY.PS.	Program of Studies 2006
GOAL/UNDERSTANDINGS/SUBDOMAIN	H-STM.	Big Idea: Structure and Transformation of Matter (Physical Science) - A basic understanding of matter is essential to the conceptual development of other big ideas in science. By high school, students will be dealing with evidence from both direct and indirect observations (microscopic level and smaller) to consider theories related to change and conservation of matter. The use of models (and an understanding of their scales and limitations) is an effective means of learning about the structure of matter. Looking for patterns in properties is also critical to comparing and explaining differences in matter. (Academic Expectations 2.1, 2.2, 2.4, 2.5)
AE/SKILLS & CONCEPTS/ORGANIZER	SC-H-STM-U-7.	Program of Studies: Understandings - Students will understand that chemical reactions have a variety of essential real-world applications, such as oxidation and various metabolic processes. • Cells and Energy: Teacher Resource CD • Cellular World Unit 4 Lab 4 Activity 1 Investigating Carbon Cycling • Cellular World Unit 4 Lab 4 Activity 2 A Closer Look at Catalase • Cellular World Unit 7 Lab 7 Activity 1 Developing a Biochemical Test for Catalase
AE/SKILLS & CONCEPTS/ORGANIZER	SC-H-STM-S-1.	Program of Studies: Skills and Concepts - Students will classify samples of matter from everyday life as being elements, compounds, or mixtures • Cells and Energy: Teacher Resource CD • Cellular World Unit 4 Lab 4 Activity 3 Investigating Plant Pigments
AE/SKILLS & CONCEPTS/ORGANIZER	SC-H-STM-S-5.	Program of Studies: Skills and Concepts - Students will identify and test variables that affect reaction rates • Cells and Energy: Teacher Resource CD • Cellular World Unit 4 Lab 4 Activity 2 A Closer

		Look at Catalase • Cellular World Unit 7 Lab 7 Activity 1 Developing a Biochemical Test for Catalase
AE/SKILLS & CONCEPTS/ORGANIZER	SC-H-STM-S-6.	Program of Studies: Skills and Concepts - Students will use evidence/data from chemical reactions to predict the effects of changes in variables (concentration, temperature, properties of reactants, surface area and catalysts) • Cells and Energy: Teacher Resource CD • Cellular World Unit 4 Lab 4 Activity 2 A Closer Look at Catalase • Cellular World Unit 7 Lab 7 Activity 1 Developing a Biochemical Test for Catalase
AE/SKILLS & CONCEPTS/ORGANIZER	SC-H-STM-S-9.	Program of Studies: Skills and Concepts - Students will investigate the role of intermolecular or intramolecular interactions on the physical properties (solubility, density, polarity, boiling/melting points) of compounds • Cellular World Unit 6 Lab 6 Activity 2 Investigating Cell Growth Curves
AE/SKILLS & CONCEPTS/ORGANIZER	SC-H-STM-S-14.	Program of Studies: Skills and Concepts - Students will explore real-life applications of a variety of chemical reactions (e.g., acids and bases, oxidation, rusting, tarnishing) and communicate findings/present evidence in an authentic form (transactive writing, public speaking, multimedia presentations) • Cells and Energy: Teacher Resource CD • Cellular World Unit 4 Lab 4 Activity 1 Investigating Carbon Cycling • Cellular World Unit 4 Lab 4 Activity 2 A Closer Look at Catalase • Cellular World Unit 7 Lab 7 Activity 1 Developing a Biochemical Test for Catalase
CATEGORY	**KY.PS.**	**Program of Studies 2006**
GOAL/UNDERSTANDINGS/SUBDOMAIN	SC-H-UD.	Big Idea: Unity and Diversity (Biological Science) - All matter is comprised of the same basic elements, goes through the same kinds of energy transformations, and uses the same kinds of forces to move. Living organisms are no exception. At the high school level, an in-depth study of the specialization and chemical changes occurring at the cellular level builds upon the foundational ideas developed earlier to investigate deoxyribonucleic acid (DNA) and effects of alterations in DNA for an individual organism as well as for a species. Emphasis at every level should be placed upon the understanding that while every living thing is composed of similar small constituents that combine in predictable ways, it is the subtle variations within these small building blocks that account for both the likenesses and differences in form and function that create the diversity of life. (Academic Expectations 2.1, 2.3, 2.4, 2.5)
AE/SKILLS & CONCEPTS/ORGANIZER	SC-H-UD-U-1.	Program of Studies: Understandings - Students will understand that the many body cells in an individual can be very different from one another even though they are all descended from a single cell and thus have essentially identical genetic instructions. Different parts of the instructions are used in different types of cells.

		• Cell Types and Organization: Teacher Resource CD • Cellular World Unit 1 Lab 1 Activity 2 Learning About Cell Organization • Cellular World Unit 2 Lab 2 Activity 2 Identification of DNA and RNA in Plant Cells
AE/SKILLS & CONCEPTS/ORGANIZER	**SC-H-UD-U-2.**	Program of Studies: Understandings - Students will understand that within every cell are specialized parts for the transport of materials, energy transfer, protein building, waste disposal, information feedback and even movement. In addition, most cells in multi-cellular organisms perform specialized functions that others do not. • Cell Process: Teacher Resource CD • Cell Reproduction and the Cell Cycle: Teacher Resource CD • Cell Structure and Function: Teacher Resource CD • Cell Types and Organization: Teacher Resource CD • Cells and Energy: Teacher Resource CD • Cellular World Unit 1 Lab 1 Activity 1 Learning About Cell Types • Cellular World Unit 1 Lab 1 Activity 2 Learning About Cell Organization • Cellular World Unit 2 Lab 2 Activity 1 Comparison of Plant and Animal Cell Organelles • Cellular World Unit 2 Lab 2 Activity 2 Identification of DNA and RNA in Plant Cells • Cellular World Unit 2 Lab 2 Activity 3 Identification of Mitochondria • Cellular World Unit 2 Lab 2 Activity 4 Plant Cell Structure and Function
AE/SKILLS & CONCEPTS/ORGANIZER	**SC-H-UD-U-3.**	Program of Studies: Understandings - Students will understand that DNA, composed of 4 nucleic acids, serves as the blueprint for the production of a variety of proteins. These dynamic and complicated proteins facilitate practically every function/process that occurs within the cell. • Cell Structure and Function: Teacher Resource CD • Cell Types and Organization: Teacher Resource CD • Cellular World Unit 1 Lab 1 Activity 2 Learning About Cell Organization • Cellular World Unit 2 Lab 2 Activity 2 Identification of DNA and RNA in Plant Cells
AE/SKILLS & CONCEPTS/ORGANIZER	**SC-H-UD-U-4.**	Program of Studies: Understandings - Students will understand that the information passed from parents to offspring is coded in DNA molecules. The sorting and recombination of genes through sexual reproduction results in a great variety of gene combinations that can be used to make predictions about the potential traits of offspring. • Cell Growth: Teacher Resoruce CD • Cell Reproduction and the Cell Cycle: Teacher Resource CD • Cell Types and Organization: Teacher Resource

		CD • Cellular World Unit 5 Lab 5 Activity 4 Modeling Meiosis and Fertilization • Cellular World Unit 6 Lab 6 Activity 2 Investigating Cell Growth Curves
AE/SKILLS & CONCEPTS/ORGANIZER	**SC-H-UD-S-1.**	Program of Studies: Skills and Concepts - Students will analyze the parts within a cell responsible for particular processes and create analogous models for those processes • Cell Process: Teacher Resource CD • Cell Reproduction and the Cell Cycle: Teacher Resource CD • Cell Structure and Function: Teacher Resource CD • Cell Types and Organization: Teacher Resource CD • Cells and Energy: Teacher Resource CD • Cellular World Unit 1 Lab 1 Activity 1 Learning About Cell Types • Cellular World Unit 1 Lab 1 Activity 2 Learning About Cell Organization • Cellular World Unit 2 Lab 2 Activity 1 Comparison of Plant and Animal Cell Organelles • Cellular World Unit 2 Lab 2 Activity 2 Identification of DNA and RNA in Plant Cells • Cellular World Unit 2 Lab 2 Activity 3 Identification of Mitochondria • Cellular World Unit 2 Lab 2 Activity 4 Plant Cell Structure and Function
AE/SKILLS & CONCEPTS/ORGANIZER	**SC-H-UD-S-2.**	Program of Studies: Skills and Concepts - Students will identify a variety of specialized cell types and describe how these differentiated cells contribute to the function of an individual organism as a whole • Cell Types and Organization: Teacher Resource CD • Cellular World Unit 1 Lab 1 Activity 2 Learning About Cell Organization • Cellular World Unit 2 Lab 2 Activity 2 Identification of DNA and RNA in Plant Cells
AE/SKILLS & CONCEPTS/ORGANIZER	**SC-H-UD-S-3.**	Program of Studies: Skills and Concepts - Students will investigate the role of genes/chromosomes in the passing of information from one generation to another (heredity) • Cell Reproduction and the Cell Cycle: Teacher Resource CD • Cell Structure and Function: Teacher Resource CD • Cellular World Unit 1 Lab 1 Activity 2 Learning About Cell Organization • Cellular World Unit 2 Lab 2 Activity 2 Identification of DNA and RNA in Plant Cells • Cellular World Unit 5 Lab 5 Activity 2 Observing the Cell Cycle in Onion Roots • Cellular World Unit 5 Lab 5 Activity 3 Modeling Mitosis

		• Cellular World Unit 5 Lab 5 Activity 4 Modeling Meiosis and Fertilization
AE/SKILLS & CONCEPTS/ORGANIZER	SC-H-UD-S-6.	Program of Studies: Skills and Concepts - Students will describe the structure of DNA and explain its role in protein synthesis, cell replication and reproduction • Cell Growth: Teacher Resoruce CD • Cell Reproduction and the Cell Cycle: Teacher Resource CD • Cell Structure and Function: Teacher Resource CD • Cell Types and Organization: Teacher Resource CD • Cellular World Unit 1 Lab 1 Activity 2 Learning About Cell Organization • Cellular World Unit 2 Lab 2 Activity 2 Identification of DNA and RNA in Plant Cells • Cellular World Unit 5 Lab 5 Activity 2 Observing the Cell Cycle in Onion Roots • Cellular World Unit 5 Lab 5 Activity 3 Modeling Mitosis • Cellular World Unit 5 Lab 5 Activity 4 Modeling Meiosis and Fertilization • Cellular World Unit 6 Lab 6 Activity 2 Investigating Cell Growth Curves
AE/SKILLS & CONCEPTS/ORGANIZER	SC-H-UD-S-7.	Program of Studies: Skills and Concepts - Students will describe and classify a variety of chemical reactions required for cell functions • Cell Growth: Teacher Resoruce CD • Cell Process: Teacher Resource CD • Cell Reproduction and the Cell Cycle: Teacher Resource CD • Cell Structure and Function: Teacher Resource CD • Cells and Energy: Teacher Resource CD • Cellular World Unit 3 Lab 3 Activity 1 Osmoregulation in Cells • Cellular World Unit 3 Lab 3 Activity 2 Osmosis and Diffusion in Model Cells • Cellular World Unit 4 Lab 4 Activity 1 Investigating Carbon Cycling • Cellular World Unit 4 Lab 4 Activity 2 A Closer Look at Catalase • Cellular World Unit 4 Lab 4 Activity 3 Investigating Plant Pigments • Cellular World Unit 5 Lab 5 Activity 1 Growth and Preparation of Onion Roots • Cellular World Unit 5 Lab 5 Activity 2 Observing the Cell Cycle in Onion Roots • Cellular World Unit 5 Lab 5 Activity 3 Modeling Mitosis • Cellular World Unit 5 Lab 5 Activity 4 Modeling Meiosis and Fertilization • Cellular World Unit 6 Lab 6 Activity 1 Understanding Why Cells Aren't Big • Cellular World Unit 6 Lab 6 Activity 2

		Investigating Cell Growth Curves • Cellular World Unit 7 Lab 7 Activity 1 Developing a Biochemical Test for Catalase • Why Cells Aren't Big: Virtual Lab
AE/SKILLS & CONCEPTS/ORGANIZER	**SC-H-UD-S-8.**	Program of Studies: Skills and Concepts - Students will describe the processes by which cells maintain their internal environments within acceptable limits • Cell Growth: Teacher Resoruce CD • Cell Process: Teacher Resource CD • Cell Structure and Function: Teacher Resource CD • Cellular World Unit 1 Lab 1 Activity 2 Learning About Cell Organization • Cellular World Unit 3 Lab 3 Activity 1 Osmoregulation in Cells • Cellular World Unit 3 Lab 3 Activity 2 Osmosis and Diffusion in Model Cells • Cellular World Unit 5 Lab 5 Activity 3 Modeling Mitosis • Cellular World Unit 5 Lab 5 Activity 4 Modeling Meiosis and Fertilization • Cellular World Unit 6 Lab 6 Activity 1 Understanding Why Cells Aren't Big • Cellular World Unit 6 Lab 6 Activity 2 Investigating Cell Growth Curves • Cellular World Unit 7 Lab 7 Activity 1 Developing a Biochemical Test for Catalase • Why Cells Aren't Big: Virtual Lab
CATEGORY	**KY.PS.**	**Program of Studies 2006**
GOAL/UNDERSTANDINGS/SUBDOMAIN	**SC-H-BC.**	Big Idea: Biological Change (Biological Science) - The only thing certain is that everything changes. At the high school level, students evaluate the role natural selection plays in the diversity of species. Modern ideas of evolution provide a scientific explanation for three main sets of observable facts about life on Earth: the enormous number of different life forms we see about us, the systematic similarities in anatomy and molecular chemistry we see within that diversity, and the sequence of changes in fossils found in successive layers of rock that have been formed over more than a billion years. (Academic Expectations 2.1, 2.2, 2.5, 2.6)
AE/SKILLS & CONCEPTS/ORGANIZER	**SC-H-BC-U-3.**	Program of Studies: Understandings - Students will understand that some organisms have greater adaptive capabilities than others, giving them a greater chance of survival under changing environmental conditions. These adaptations may be patterns of behavior as well as physical characteristics. • Cells and Energy: Teacher Resource CD
CATEGORY	**KY.PS.**	**Program of Studies 2006**
GOAL/UNDERSTANDINGS/SUBDOMAIN	**SC-H-ET.**	Big Idea: Energy Transformations (Unifying Concepts) - Energy transformations are inherent in almost every system in the universe - from tangible examples at the elementary level, such as heat production in simple Earth and physical systems to more abstract ideas beginning at middle school, such as those transformations involved in the growth, dying and decay of living systems. The use of models to illustrate the often

		invisible and abstract notions of energy transfer will aid in conceptualization, especially as students move from the macroscopic level of observation and evidence (primarily elementary school) to the microscopic interactions at the atomic level (middle and high school levels). Students in high school expand their understanding of constancy through the study of a variety of phenomena. Conceptual understanding and application of the laws of thermodynamics connect ideas about matter with energy transformations within all living, physical and Earth systems. (Academic Expectations 2.1, 2.2, 2.3, 2.4, 2.5)
AE/SKILLS & CONCEPTS/ORGANIZER	**SC-H-ET-U-5.**	Program of Studies: Understandings - Students will understand that radiant energy from the sun is stored in a chemical form in plants as a result of photosynthesis. This energy transformation allows plants to use simple molecules, such as carbon dioxide and water, to assemble the complex molecules needed to increase their mass. • Cells and Energy: Teacher Resource CD • Cellular World Unit 4 Lab 4 Activity 1 Investigating Carbon Cycling • Cellular World Unit 4 Lab 4 Activity 3 Investigating Plant Pigments • Cellular World Unit 5 Lab 5 Activity 1 Growth and Preparation of Onion Roots • Cellular World Unit 5 Lab 5 Activity 2 Observing the Cell Cycle in Onion Roots
AE/SKILLS & CONCEPTS/ORGANIZER	**SC-H-ET-U-6.**	Program of Studies: Understandings - Students will understand that energy stored in food is released by a series of internal chemical reactions that reorganize the molecules into a form useable by the organism. • Cell Structure and Function: Teacher Resource CD • Cells and Energy: Teacher Resource CD • Cellular World Unit 4 Lab 4 Activity 1 Investigating Carbon Cycling • Cellular World Unit 4 Lab 4 Activity 2 A Closer Look at Catalase
AE/SKILLS & CONCEPTS/ORGANIZER	**SC-H-ET-S-6.**	Program of Studies: Skills and Concepts - Students will explain the metabolic process of photosynthesis and describe the molecules it assembles to store solar energy • Cells and Energy: Teacher Resource CD • Cellular World Unit 4 Lab 4 Activity 1 Investigating Carbon Cycling • Cellular World Unit 4 Lab 4 Activity 3 Investigating Plant Pigments
AE/SKILLS & CONCEPTS/ORGANIZER	**SC-H-ET-S-7.**	Program of Studies: Skills and Concepts - Students will describe the metabolic processes that allow energy stored in food to be made available to the organism • Cell Structure and Function: Teacher Resource CD • Cellular World Unit 4 Lab 4 Activity 1 Investigating Carbon Cycling • Cellular World Unit 4 Lab 4 Activity 2 A Closer

		Look at Catalase
AE/SKILLS & CONCEPTS/ORGANIZER	SC-H-ET-S-8.	Program of Studies: Skills and Concepts - Students will explore the composition and function of the carbon compounds involved in metabolism • Cell Structure and Function: Teacher Resource CD • Cellular World Unit 4 Lab 4 Activity 1 Investigating Carbon Cycling • Cellular World Unit 4 Lab 4 Activity 2 A Closer Look at Catalase
CATEGORY	**KY.PS.**	**Program of Studies 2006**
GOAL/UNDERSTANDINGS/SUBDOMAIN	SC-H-I.	Big Idea: Interdependence (Unifying Concepts) - It is not difficult for students to grasp the general notion that species depend on one another and on the environment for survival. But their awareness must be supported by knowledge of the kinds of relationships that exist among organisms, the kinds of physical conditions that organisms must cope with, the kinds of environments created by the interaction of organisms with one another and their physical surroundings, and the complexity of such systems At the high school level, the concept of an ecosystem should bring coherence to the complex array of relationships among organisms and environments that students have encountered. Students growing understanding of systems in general will reinforce the concept of ecosystems. Stability and change in ecosystems can be considered in terms of variables such as population size, number and kinds of species, productivity and the effect of human intervention. (Academic Expectations 2.1, 2.2, 2.3, 2.4)
AE/SKILLS & CONCEPTS/ORGANIZER	SC-H-I-U-4.	Program of Studies: Understandings - Students will understand that every ecosystem contains natural checks and balances, both biotic and abiotic, that serve to limit the size and range of the populations contained within it. • Cellular World Unit 6 Lab 6 Activity 2 Investigating Cell Growth Curves
AE/SKILLS & CONCEPTS/ORGANIZER	SC-H-I-S-4.	Program of Studies: Skills and Concepts - Students will examine existing models of global population growth and the factors affecting population change (e.g., geography, diseases, natural events, birth/death rates). Propose and defend solutions to identified problems of population change • Cellular World Unit 6 Lab 6 Activity 2 Investigating Cell Growth Curves
CATEGORY	**KY.AE.**	**Academic Expectation**
GOAL/UNDERSTANDINGS/SUBDOMAIN	AE.1.	Students are able to use basic communication and mathematics skills for purposes and situations they will encounter throughout their lives.
AE/SKILLS & CONCEPTS/ORGANIZER	1.2.	Students make sense of the variety of materials they read. • Cellular World Unit 2 Lab 2 Activity 1 Comparison of Plant and Animal Cell Organelles • Cellular World Unit 2 Lab 2 Activity 2 Identification of DNA and RNA in Plant Cells

		• Cellular World Unit 2 Lab 2 Activity 3 Identification of Mitochondria • Cellular World Unit 2 Lab 2 Activity 4 Plant Cell Structure and Function
AE/SKILLS & CONCEPTS/ORGANIZER	**1.3.**	Students make sense of the various things they observe. • Cellular World Unit 1 Lab 1 Activity 1 Learning About Cell Types • Cellular World Unit 1 Lab 1 Activity 2 Learning About Cell Organization • Cellular World Unit 2 Lab 2 Activity 1 Comparison of Plant and Animal Cell Organelles • Cellular World Unit 2 Lab 2 Activity 2 Identification of DNA and RNA in Plant Cells • Cellular World Unit 2 Lab 2 Activity 3 Identification of Mitochondria • Cellular World Unit 2 Lab 2 Activity 4 Plant Cell Structure and Function • Cellular World Unit 3 Lab 3 Activity 1 Osmoregulation in Cells • Cellular World Unit 3 Lab 3 Activity 2 Osmosis and Diffusion in Model Cells • Cellular World Unit 4 Lab 4 Activity 1 Investigating Carbon Cycling • Cellular World Unit 4 Lab 4 Activity 2 A Closer Look at Catalase • Cellular World Unit 4 Lab 4 Activity 3 Investigating Plant Pigments • Cellular World Unit 5 Lab 5 Activity 1 Growth and Preparation of Onion Roots • Cellular World Unit 5 Lab 5 Activity 2 Observing the Cell Cycle in Onion Roots • Cellular World Unit 5 Lab 5 Activity 3 Modeling Mitosis • Cellular World Unit 5 Lab 5 Activity 4 Modeling Meiosis and Fertilization • Cellular World Unit 6 Lab 6 Activity 1 Understanding Why Cells Aren't Big • Cellular World Unit 6 Lab 6 Activity 2 Investigating Cell Growth Curves • Cellular World Unit 7 Lab 7 Activity 1 Developing a Biochemical Test for Catalase • Why Cells Aren't Big: Virtual Lab
AE/SKILLS & CONCEPTS/ORGANIZER	**1.4.**	Students make sense of the various messages to which they listen. • Cellular World Unit 2 Lab 2 Activity 1 Comparison of Plant and Animal Cell Organelles • Cellular World Unit 2 Lab 2 Activity 2 Identification of DNA and RNA in Plant Cells • Cellular World Unit 2 Lab 2 Activity 3 Identification of Mitochondria • Cellular World Unit 2 Lab 2 Activity 4 Plant Cell

		Structure and Function
AE/SKILLS & CONCEPTS/ORGANIZER	**1.5-1.9.**	Students use mathematical ideas and procedures to communicate, reason, and solve problems. • Cellular World Unit 2 Lab 2 Activity 1 Comparison of Plant and Animal Cell Organelles • Cellular World Unit 2 Lab 2 Activity 2 Identification of DNA and RNA in Plant Cells • Cellular World Unit 2 Lab 2 Activity 3 Identification of Mitochondria • Cellular World Unit 2 Lab 2 Activity 4 Plant Cell Structure and Function • Cellular World Unit 3 Lab 3 Activity 1 Osmoregulation in Cells • Cellular World Unit 3 Lab 3 Activity 2 Osmosis and Diffusion in Model Cells • Cellular World Unit 4 Lab 4 Activity 1 Investigating Carbon Cycling • Cellular World Unit 4 Lab 4 Activity 2 A Closer Look at Catalase • Cellular World Unit 4 Lab 4 Activity 3 Investigating Plant Pigments • Cellular World Unit 5 Lab 5 Activity 1 Growth and Preparation of Onion Roots • Cellular World Unit 5 Lab 5 Activity 2 Observing the Cell Cycle in Onion Roots • Cellular World Unit 5 Lab 5 Activity 3 Modeling Mitosis • Cellular World Unit 5 Lab 5 Activity 4 Modeling Meiosis and Fertilization • Cellular World Unit 6 Lab 6 Activity 1 Understanding Why Cells Aren't Big • Cellular World Unit 6 Lab 6 Activity 2 Investigating Cell Growth Curves • Cellular World Unit 7 Lab 7 Activity 1 Developing a Biochemical Test for Catalase • Why Cells Aren't Big: Virtual Lab
AE/SKILLS & CONCEPTS/ORGANIZER	**1.11.**	Students write using appropriate forms, conventions, and styles to communicate ideas and information to different audiences for different purposes. • Cellular World Unit 2 Lab 2 Activity 1 Comparison of Plant and Animal Cell Organelles • Cellular World Unit 2 Lab 2 Activity 2 Identification of DNA and RNA in Plant Cells • Cellular World Unit 2 Lab 2 Activity 3 Identification of Mitochondria • Cellular World Unit 2 Lab 2 Activity 4 Plant Cell Structure and Function • Cellular World Unit 3 Lab 3 Activity 1 Osmoregulation in Cells • Cellular World Unit 3 Lab 3 Activity 2 Osmosis and Diffusion in Model Cells • Cellular World Unit 4 Lab 4 Activity 1

		Investigating Carbon Cycling • Cellular World Unit 4 Lab 4 Activity 2 A Closer Look at Catalase • Cellular World Unit 4 Lab 4 Activity 3 Investigating Plant Pigments • Cellular World Unit 5 Lab 5 Activity 1 Growth and Preparation of Onion Roots • Cellular World Unit 5 Lab 5 Activity 2 Observing the Cell Cycle in Onion Roots • Cellular World Unit 5 Lab 5 Activity 3 Modeling Mitosis • Cellular World Unit 5 Lab 5 Activity 4 Modeling Meiosis and Fertilization • Cellular World Unit 6 Lab 6 Activity 1 Understanding Why Cells Aren't Big • Cellular World Unit 6 Lab 6 Activity 2 Investigating Cell Growth Curves • Cellular World Unit 7 Lab 7 Activity 1 Developing a Biochemical Test for Catalase
AE/SKILLS & CONCEPTS/ORGANIZER	**1.12.**	Students speak using appropriate forms, conventions, and styles to communicate ideas and information to different audiences for different purposes. • Cellular World Unit 2 Lab 2 Activity 1 Comparison of Plant and Animal Cell Organelles • Cellular World Unit 2 Lab 2 Activity 2 Identification of DNA and RNA in Plant Cells • Cellular World Unit 2 Lab 2 Activity 3 Identification of Mitochondria • Cellular World Unit 2 Lab 2 Activity 4 Plant Cell Structure and Function • Cellular World Unit 3 Lab 3 Activity 1 Osmoregulation in Cells • Cellular World Unit 3 Lab 3 Activity 2 Osmosis and Diffusion in Model Cells • Cellular World Unit 4 Lab 4 Activity 1 Investigating Carbon Cycling • Cellular World Unit 4 Lab 4 Activity 2 A Closer Look at Catalase • Cellular World Unit 4 Lab 4 Activity 3 Investigating Plant Pigments • Cellular World Unit 5 Lab 5 Activity 1 Growth and Preparation of Onion Roots • Cellular World Unit 5 Lab 5 Activity 2 Observing the Cell Cycle in Onion Roots • Cellular World Unit 5 Lab 5 Activity 3 Modeling Mitosis • Cellular World Unit 5 Lab 5 Activity 4 Modeling Meiosis and Fertilization • Cellular World Unit 6 Lab 6 Activity 1 Understanding Why Cells Aren't Big • Cellular World Unit 6 Lab 6 Activity 2 Investigating Cell Growth Curves • Cellular World Unit 7 Lab 7 Activity 1 Developing a Biochemical Test for Catalase

AE/SKILLS & CONCEPTS/ORGANIZER	1.16.	Students use computers and other kinds of technology to collect, organize, and communicate information and ideas. • Cellular World Unit 1 Lab 1 Activity 1 Learning About Cell Types • Cellular World Unit 2 Lab 2 Activity 1 Comparison of Plant and Animal Cell Organelles • Cellular World Unit 2 Lab 2 Activity 2 Identification of DNA and RNA in Plant Cells • Cellular World Unit 2 Lab 2 Activity 3 Identification of Mitochondria • Cellular World Unit 2 Lab 2 Activity 4 Plant Cell Structure and Function • Cellular World Unit 3 Lab 3 Activity 1 Osmoregulation in Cells • Cellular World Unit 3 Lab 3 Activity 2 Osmosis and Diffusion in Model Cells • Cellular World Unit 4 Lab 4 Activity 2 A Closer Look at Catalase • Cellular World Unit 4 Lab 4 Activity 3 Investigating Plant Pigments • Cellular World Unit 5 Lab 5 Activity 1 Growth and Preparation of Onion Roots • Cellular World Unit 5 Lab 5 Activity 2 Observing the Cell Cycle in Onion Roots • Cellular World Unit 5 Lab 5 Activity 4 Modeling Meiosis and Fertilization • Cellular World Unit 6 Lab 6 Activity 1 Understanding Why Cells Aren't Big • Cellular World Unit 6 Lab 6 Activity 2 Investigating Cell Growth Curves • Cellular World Unit 7 Lab 7 Activity 1 Developing a Biochemical Test for Catalase • Why Cells Aren't Big: Virtual Lab
CATEGORY	**KY.AE.**	**Academic Expectation**
GOAL/UNDERSTANDINGS/SUBDOMAIN	AE.2.	Students shall develop their abilities to apply core concepts and principles from mathematics, the sciences, the arts, the humanities, social studies, practical living studies, and vocational studies to what they will encounter throughout their lives.
AE/SKILLS & CONCEPTS/ORGANIZER	2.1.	Science: Students understand scientific ways of thinking and working and use those methods to solve real-life problems. • Cellular World Unit 5 Lab 5 Activity 2 Observing the Cell Cycle in Onion Roots • Cellular World Unit 7 Lab 7 Activity 1 Developing a Biochemical Test for Catalase
AE/SKILLS & CONCEPTS/ORGANIZER	2.2.	Science: Students identify, analyze, and use patterns such as cycles and trends to understand past and present events and predict possible future events. • Cell Reproduction and the Cell Cycle: Teacher Resource CD • Cellular World Unit 3 Lab 3 Activity 1 Osmoregulation in Cells

		• Cellular World Unit 7 Lab 7 Activity 1 Developing a Biochemical Test for Catalase
AE/SKILLS & CONCEPTS/ORGANIZER	2.4.	Science: Students use the concept of scale and scientific models to explain the organization and functioning of living and nonliving things and predict other characteristics that might be observed. • Cell Growth: Teacher Resoruce CD • Cell Types and Organization: Teacher Resource CD • Cellular World Unit 3 Lab 3 Activity 1 Osmoregulation in Cells • Cellular World Unit 3 Lab 3 Activity 2 Osmosis and Diffusion in Model Cells • Cellular World Unit 5 Lab 5 Activity 3 Modeling Mitosis • Cellular World Unit 5 Lab 5 Activity 4 Modeling Meiosis and Fertilization • Cellular World Unit 6 Lab 6 Activity 1 Understanding Why Cells Aren't Big • Cellular World Unit 6 Lab 6 Activity 2 Investigating Cell Growth Curves • Why Cells Aren't Big: Virtual Lab
AE/SKILLS & CONCEPTS/ORGANIZER	2.5.	Science: Students understand that under certain conditions nature tends to remain the same or move toward a balance. • Cell Process: Teacher Resource CD • Cell Structure and Function: Teacher Resource CD • Cellular World Unit 3 Lab 3 Activity 1 Osmoregulation in Cells • Cellular World Unit 3 Lab 3 Activity 2 Osmosis and Diffusion in Model Cells • Cellular World Unit 4 Lab 4 Activity 1 Investigating Carbon Cycling • Cellular World Unit 4 Lab 4 Activity 2 A Closer Look at Catalase • Cellular World Unit 4 Lab 4 Activity 3 Investigating Plant Pigments • Cellular World Unit 5 Lab 5 Activity 1 Growth and Preparation of Onion Roots • Cellular World Unit 5 Lab 5 Activity 2 Observing the Cell Cycle in Onion Roots • Cellular World Unit 5 Lab 5 Activity 3 Modeling Mitosis • Cellular World Unit 5 Lab 5 Activity 4 Modeling Meiosis and Fertilization • Cellular World Unit 6 Lab 6 Activity 1 Understanding Why Cells Aren't Big • Cellular World Unit 6 Lab 6 Activity 2 Investigating Cell Growth Curves • Cellular World Unit 7 Lab 7 Activity 1 Developing a Biochemical Test for Catalase
CATEGORY	**KY.CC.**	**Core Content for Assessment v.4.1**

GOAL/UNDERSTANDINGS/SUBDOMAIN	SC-HS-1.1.	Structure and Transformation of Matter: By high school, students will be dealing with evidence from both direct and indirect observations (microscopic level and smaller) to consider theories related to change and conservation of matter. The use of models (and an understanding of their scales and limitations) is an effective means of learning about the structure of matter. Looking for patterns in properties is also critical to comparing and explaining differences in matter.
AE/SKILLS & CONCEPTS/ORGANIZER	SC-HS-1.1.5.	Physical Science: Students will explain the role of intermolecular or intramolecular interactions on the physical properties (solubility, density, polarity, conductivity, boiling/melting points) of compounds. • Cellular World Unit 6 Lab 6 Activity 2 Investigating Cell Growth Curves
AE/SKILLS & CONCEPTS/ORGANIZER	SC-HS-1.1.6.	Physical Science: Students will identify variables that affect reaction rates; predict effects of changes in variables (concentration, temperature, properties of reactants, surface area, and catalysts) based on evidence/data from chemical reactions. • Cells and Energy: Teacher Resource CD • Cellular World Unit 4 Lab 4 Activity 2 A Closer Look at Catalase • Cellular World Unit 7 Lab 7 Activity 1 Developing a Biochemical Test for Catalase
AE/SKILLS & CONCEPTS/ORGANIZER	SC-HS-1.1.8.	Physical Science: Students will explain the importance of chemical reactions in a real-world context; justify conclusions using evidence/data from chemical reactions. • Cells and Energy: Teacher Resource CD • Cellular World Unit 4 Lab 4 Activity 1 Investigating Carbon Cycling • Cellular World Unit 4 Lab 4 Activity 2 A Closer Look at Catalase • Cellular World Unit 7 Lab 7 Activity 1 Developing a Biochemical Test for Catalase
CATEGORY	**KY.CC.**	**Core Content for Assessment v.4.1**
GOAL/UNDERSTANDINGS/SUBDOMAIN	SC-HS-2.3.	The Earth and the Universe: The Earth system is in a constant state of change. These changes affect life on earth in many ways. Finally, at the high school level, most of the emphasis is on why these changes occur. An understanding of systems and their interacting components will enable students to evaluate supporting theories of earth changes. High school is the time to bring all of the ideas together to look at the universe as a whole. Students will use evidence to evaluate and analyze theories related to the origin of the universe and all components of the universe.
AE/SKILLS & CONCEPTS/ORGANIZER	SC-HS-2.3.1.	Earth/Space Science: Students will explain phenomena (falling objects, planetary motion, satellite motion) related to gravity; describe the factors that affect gravitational force. • Cellular World Unit 6 Lab 6 Activity 2 Investigating Cell Growth Curves
CATEGORY	**KY.CC.**	**Core Content for Assessment v.4.1**

GOAL/UNDERSTANDINGS/SUBDOMAIN	**SC-HS-3.4.**	Unity and Diversity: At the high school level, an in-depth study of the specialization and chemical changes occurring at the cellular level builds upon the foundational ideas developed earlier to investigate DNA and effects of alterations in DNA for an individual organism as well as for a species. Emphasis at every level should be placed upon the understanding that while every living thing is composed of similar small constituents that combine in predictable ways, it is the subtle variations within these small building blocks that account for both the likenesses and differences in form and function that create the diversity of life.
AE/SKILLS & CONCEPTS/ORGANIZER	**SC-HS-3.4.2.**	Biological Science: Students will understand that most cell functions involve chemical reactions. Food molecules taken into cells react to provide the chemical constituents needed to synthesize other molecules. Both breakdown and synthesis are made possible by a large set of protein catalysts, called enzymes. The breakdown of some of the food molecules enables the cell to store energy in specific chemicals that are used to carry out the many functions of the cell. • Cell Growth: Teacher Resoruce CD • Cell Process: Teacher Resource CD • Cell Reproduction and the Cell Cycle: Teacher Resource CD • Cell Structure and Function: Teacher Resource CD • Cells and Energy: Teacher Resource CD • Cellular World Unit 3 Lab 3 Activity 1 Osmoregulation in Cells • Cellular World Unit 3 Lab 3 Activity 2 Osmosis and Diffusion in Model Cells • Cellular World Unit 4 Lab 4 Activity 1 Investigating Carbon Cycling • Cellular World Unit 4 Lab 4 Activity 2 A Closer Look at Catalase • Cellular World Unit 4 Lab 4 Activity 3 Investigating Plant Pigments • Cellular World Unit 5 Lab 5 Activity 1 Growth and Preparation of Onion Roots • Cellular World Unit 5 Lab 5 Activity 2 Observing the Cell Cycle in Onion Roots • Cellular World Unit 5 Lab 5 Activity 3 Modeling Mitosis • Cellular World Unit 5 Lab 5 Activity 4 Modeling Meiosis and Fertilization • Cellular World Unit 6 Lab 6 Activity 1 Understanding Why Cells Aren't Big • Cellular World Unit 6 Lab 6 Activity 2 Investigating Cell Growth Curves • Cellular World Unit 7 Lab 7 Activity 1 Developing a Biochemical Test for Catalase • Why Cells Aren't Big: Virtual Lab
AE/SKILLS & CONCEPTS/ORGANIZER	**SC-HS-3.4.3.**	Biological Science: Students will describe cell regulation (enzyme function, diffusion, osmosis, homeostasis); predict consequences of internal/external environmental change on cell function/regulation. • Cell Growth: Teacher Resoruce CD • Cell Process: Teacher Resource CD • Cell Structure and Function: Teacher Resource CD • Cells and Energy: Teacher Resource CD

		• Cellular World Unit 1 Lab 1 Activity 2 Learning About Cell Organization • Cellular World Unit 3 Lab 3 Activity 1 Osmoregulation in Cells • Cellular World Unit 3 Lab 3 Activity 2 Osmosis and Diffusion in Model Cells • Cellular World Unit 4 Lab 4 Activity 2 A Closer Look at Catalase • Cellular World Unit 5 Lab 5 Activity 3 Modeling Mitosis • Cellular World Unit 5 Lab 5 Activity 4 Modeling Meiosis and Fertilization • Cellular World Unit 6 Lab 6 Activity 1 Understanding Why Cells Aren't Big • Cellular World Unit 6 Lab 6 Activity 2 Investigating Cell Growth Curves • Cellular World Unit 7 Lab 7 Activity 1 Developing a Biochemical Test for Catalase • Why Cells Aren't Big: Virtual Lab
AE/SKILLS & CONCEPTS/ORGANIZER	**SC-HS-3.4.4.**	Biological Science: Students will understand that plant cells contain chloroplasts, the site of photosynthesis. Plants and many microorganisms (e.g., Euglena) use solar energy to combine molecules of carbon dioxide and water into complex, energy-rich organic compounds and release oxygen to the environment. This process of photosynthesis provides a vital link between the Sun and energy needs of living systems. • Cell Process: Teacher Resource CD • Cell Structure and Function: Teacher Resource CD • Cell Types and Organization: Teacher Resource CD • Cells and Energy: Teacher Resource CD • Cellular World Unit 1 Lab 1 Activity 1 Learning About Cell Types • Cellular World Unit 1 Lab 1 Activity 2 Learning About Cell Organization • Cellular World Unit 2 Lab 2 Activity 1 Comparison of Plant and Animal Cell Organelles • Cellular World Unit 2 Lab 2 Activity 2 Identification of DNA and RNA in Plant Cells • Cellular World Unit 2 Lab 2 Activity 3 Identification of Mitochondria • Cellular World Unit 2 Lab 2 Activity 4 Plant Cell Structure and Function • Cellular World Unit 4 Lab 4 Activity 1 Investigating Carbon Cycling • Cellular World Unit 4 Lab 4 Activity 3 Investigating Plant Pigments • Cellular World Unit 5 Lab 5 Activity 1 Growth and Preparation of Onion Roots • Cellular World Unit 5 Lab 5 Activity 2 Observing the Cell Cycle in Onion Roots • Cellular World Unit 5 Lab 5 Activity 3 Modeling Mitosis • Cellular World Unit 5 Lab 5 Activity 4 Modeling

		Meiosis and Fertilization
AE/SKILLS & CONCEPTS/ORGANIZER	SC-HS-3.4.5.	Biological Science: Students will explain the relationship between sexual reproduction (meiosis) and the transmission of genetic information; draw conclusions/make predictions based on hereditary evidence/data (pedigrees, punnet squares). • Cell Reproduction and the Cell Cycle: Teacher Resource CD • Cellular World Unit 5 Lab 5 Activity 4 Modeling Meiosis and Fertilization
CATEGORY	**KY.CC.**	**Core Content for Assessment v.4.1**
GOAL/UNDERSTANDINGS/SUBDOMAIN	SC-HS-3.5.	Biological Change: The only thing certain is that everything changes. The stage is set for high school students to evaluate the role natural selection plays in the diversity of species. Modern ideas of evolution provide a scientific explanation for three main sets of observable facts about life on earth: the enormous number of different life forms we see about us, the systematic similarities in anatomy and molecular chemistry we see within that diversity and the sequence of changes in fossils found in successive layers of rock that have been formed over more than a billion years (Science for All Americans, p. 67).
AE/SKILLS & CONCEPTS/ORGANIZER	SC-HS-3.5.1.	Biological Science: Students will predict the impact on species of changes to 1) the potential for a species to increase its numbers, (2) the genetic variability of offspring due to mutation and recombination of genes, (3) a finite supply of the resources required for life, or (4) natural selection; propose solutions to real-world problems of endangered and extinct species. • Cellular World Unit 6 Lab 6 Activity 2 Investigating Cell Growth Curves
CATEGORY	**KY.CC.**	**Core Content for Assessment v.4.1**
GOAL/UNDERSTANDINGS/SUBDOMAIN	SC-HS-4.6.	Energy Transformations: The use of models to illustrate the often invisible and abstract notions of energy transfer will aid in conceptualization, especially as students move from the macroscopic level of observation and evidence (primarily elementary school) to the microscopic interactions at the atomic level (middle and high school levels). Students in high school expand their understanding of constancy through the study of a variety of phenomena. Conceptual understanding and application of the laws of thermodynamics connect ideas about matter with energy transformations within all living, physical and earth systems.
AE/SKILLS & CONCEPTS/ORGANIZER	SC-HS-4.6.10.	Unifying Concepts: Students will identify the components and mechanisms of energy stored and released from food molecules (photosynthesis and respiration); apply information to real-world situations. • Cells and Energy: Teacher Resource CD • Cellular World Unit 4 Lab 4 Activity 1 Investigating Carbon Cycling • Cellular World Unit 4 Lab 4 Activity 3 Investigating Plant Pigments
CATEGORY	**KY.CC.**	**Core Content for Assessment v.4.1**
GOAL/UNDERSTANDINGS/SUBDOMAIN	SC-HS-	Interdependence: At the high school level, the concept of an

	4.7.	ecosystem should bring coherence to the complex array of relationships among organisms and environments that students have encountered. Students growing understanding of systems in general will reinforce the concept of ecosystems. Stability and change in ecosystems can be considered in terms of variables such as population size, number and kinds of species, productivity and the effect of human intervention (adapted from Benchmarks for Science Literacy, 1993).
AE/SKILLS & CONCEPTS/ORGANIZER	SC-HS-4.7.1.	Unifying Concepts: Students will analyze relationships and interactions among organisms in ecosystems; predict the effects on other organisms of changes to one or more components of the ecosystem. • Cell Structure and Function: Teacher Resource CD
AE/SKILLS & CONCEPTS/ORGANIZER	SC-HS-4.7.5.	Unifying Concepts: Students will predict the consequences of changes in resources to a population; select or defend solutions to real-world problems of population control. • Cellular World Unit 6 Lab 6 Activity 2 Investigating Cell Growth Curves

Grade 10

CATEGORY	KY.PS.	Program of Studies 2006
GOAL/UNDERSTANDINGS/SUBDOMAIN	H-STM.	Big Idea: Structure and Transformation of Matter (Physical Science) - A basic understanding of matter is essential to the conceptual development of other big ideas in science. By high school, students will be dealing with evidence from both direct and indirect observations (microscopic level and smaller) to consider theories related to change and conservation of matter. The use of models (and an understanding of their scales and limitations) is an effective means of learning about the structure of matter. Looking for patterns in properties is also critical to comparing and explaining differences in matter. (Academic Expectations 2.1, 2.2, 2.4, 2.5)
AE/SKILLS & CONCEPTS/ORGANIZER	SC-H-STM-U-7.	Program of Studies: Understandings - Students will understand that chemical reactions have a variety of essential real-world applications, such as oxidation and various metabolic processes. • Cells and Energy: Teacher Resource CD • Cellular World Unit 4 Lab 4 Activity 1 Investigating Carbon Cycling • Cellular World Unit 4 Lab 4 Activity 2 A Closer Look at Catalase • Cellular World Unit 7 Lab 7 Activity 1 Developing a Biochemical Test for Catalase
AE/SKILLS & CONCEPTS/ORGANIZER	SC-H-STM-S-1.	Program of Studies: Skills and Concepts - Students will classify samples of matter from everyday life as being elements, compounds, or mixtures • Cells and Energy: Teacher Resource CD • Cellular World Unit 4 Lab 4 Activity 3 Investigating Plant Pigments
AE/SKILLS & CONCEPTS/ORGANIZER	SC-H-STM-S-5.	Program of Studies: Skills and Concepts - Students will identify and test variables that affect reaction rates

		• Cells and Energy: Teacher Resource CD • Cellular World Unit 4 Lab 4 Activity 2 A Closer Look at Catalase • Cellular World Unit 7 Lab 7 Activity 1 Developing a Biochemical Test for Catalase
AE/SKILLS & CONCEPTS/ORGANIZER	SC-H-STM-S-6.	Program of Studies: Skills and Concepts - Students will use evidence/data from chemical reactions to predict the effects of changes in variables (concentration, temperature, properties of reactants, surface area and catalysts) • Cells and Energy: Teacher Resource CD • Cellular World Unit 4 Lab 4 Activity 2 A Closer Look at Catalase • Cellular World Unit 7 Lab 7 Activity 1 Developing a Biochemical Test for Catalase
AE/SKILLS & CONCEPTS/ORGANIZER	SC-H-STM-S-9.	Program of Studies: Skills and Concepts - Students will investigate the role of intermolecular or intramolecular interactions on the physical properties (solubility, density, polarity, boiling/melting points) of compounds • Cellular World Unit 6 Lab 6 Activity 2 Investigating Cell Growth Curves
AE/SKILLS & CONCEPTS/ORGANIZER	SC-H-STM-S-14.	Program of Studies: Skills and Concepts - Students will explore real-life applications of a variety of chemical reactions (e.g., acids and bases, oxidation, rusting, tarnishing) and communicate findings/present evidence in an authentic form (transactive writing, public speaking, multimedia presentations) • Cells and Energy: Teacher Resource CD • Cellular World Unit 4 Lab 4 Activity 1 Investigating Carbon Cycling • Cellular World Unit 4 Lab 4 Activity 2 A Closer Look at Catalase • Cellular World Unit 7 Lab 7 Activity 1 Developing a Biochemical Test for Catalase
CATEGORY	**KY.PS.**	**Program of Studies 2006**
GOAL/UNDERSTANDINGS/SUBDOMAIN	SC-H-UD.	Big Idea: Unity and Diversity (Biological Science) - All matter is comprised of the same basic elements, goes through the same kinds of energy transformations, and uses the same kinds of forces to move. Living organisms are no exception. At the high school level, an in-depth study of the specialization and chemical changes occurring at the cellular level builds upon the foundational ideas developed earlier to investigate deoxyribonucleic acid (DNA) and effects of alterations in DNA for an individual organism as well as for a species. Emphasis at every level should be placed upon the understanding that while every living thing is composed of similar small constituents that combine in predictable ways, it is the subtle variations within these small building blocks that account for both the likenesses and differences in form and function that create the diversity of life. (Academic Expectations 2.1, 2.3, 2.4, 2.5)
AE/SKILLS & CONCEPTS/ORGANIZER	SC-H-UD-U-1.	Program of Studies: Understandings - Students will understand that the many body cells in an individual can be very different from one another even though they are all descended from a single cell and

		thus have essentially identical genetic instructions. Different parts of the instructions are used in different types of cells. • Cell Types and Organization: Teacher Resource CD • Cellular World Unit 1 Lab 1 Activity 2 Learning About Cell Organization • Cellular World Unit 2 Lab 2 Activity 2 Identification of DNA and RNA in Plant Cells
AE/SKILLS & CONCEPTS/ORGANIZER	**SC-H-UD-U-2.**	Program of Studies: Understandings - Students will understand that within every cell are specialized parts for the transport of materials, energy transfer, protein building, waste disposal, information feedback and even movement. In addition, most cells in multi-cellular organisms perform specialized functions that others do not. • Cell Process: Teacher Resource CD • Cell Reproduction and the Cell Cycle: Teacher Resource CD • Cell Structure and Function: Teacher Resource CD • Cell Types and Organization: Teacher Resource CD • Cells and Energy: Teacher Resource CD • Cellular World Unit 1 Lab 1 Activity 1 Learning About Cell Types • Cellular World Unit 1 Lab 1 Activity 2 Learning About Cell Organization • Cellular World Unit 2 Lab 2 Activity 1 Comparison of Plant and Animal Cell Organelles • Cellular World Unit 2 Lab 2 Activity 2 Identification of DNA and RNA in Plant Cells • Cellular World Unit 2 Lab 2 Activity 3 Identification of Mitochondria • Cellular World Unit 2 Lab 2 Activity 4 Plant Cell Structure and Function
AE/SKILLS & CONCEPTS/ORGANIZER	**SC-H-UD-U-3.**	Program of Studies: Understandings - Students will understand that DNA, composed of 4 nucleic acids, serves as the blueprint for the production of a variety of proteins. These dynamic and complicated proteins facilitate practically every function/process that occurs within the cell. • Cell Structure and Function: Teacher Resource CD • Cell Types and Organization: Teacher Resource CD • Cellular World Unit 1 Lab 1 Activity 2 Learning About Cell Organization • Cellular World Unit 2 Lab 2 Activity 2 Identification of DNA and RNA in Plant Cells
AE/SKILLS & CONCEPTS/ORGANIZER	**SC-H-UD-U-4.**	Program of Studies: Understandings - Students will understand that the information passed from parents to offspring is coded in DNA molecules. The sorting and recombination of genes through sexual reproduction results in a great variety of gene combinations that can be used to make predictions about the potential traits of offspring. • Cell Growth: Teacher Resoruce CD • Cell Reproduction and the Cell Cycle: Teacher

		Resource CD • Cell Types and Organization: Teacher Resource CD • Cellular World Unit 5 Lab 5 Activity 4 Modeling Meiosis and Fertilization • Cellular World Unit 6 Lab 6 Activity 2 Investigating Cell Growth Curves
AE/SKILLS & CONCEPTS/ORGANIZER	**SC-H-UD-S-1.**	Program of Studies: Skills and Concepts - Students will analyze the parts within a cell responsible for particular processes and create analogous models for those processes • Cell Process: Teacher Resource CD • Cell Reproduction and the Cell Cycle: Teacher Resource CD • Cell Structure and Function: Teacher Resource CD • Cell Types and Organization: Teacher Resource CD • Cells and Energy: Teacher Resource CD • Cellular World Unit 1 Lab 1 Activity 1 Learning About Cell Types • Cellular World Unit 1 Lab 1 Activity 2 Learning About Cell Organization • Cellular World Unit 2 Lab 2 Activity 1 Comparison of Plant and Animal Cell Organelles • Cellular World Unit 2 Lab 2 Activity 2 Identification of DNA and RNA in Plant Cells • Cellular World Unit 2 Lab 2 Activity 3 Identification of Mitochondria • Cellular World Unit 2 Lab 2 Activity 4 Plant Cell Structure and Function
AE/SKILLS & CONCEPTS/ORGANIZER	**SC-H-UD-S-2.**	Program of Studies: Skills and Concepts - Students will identify a variety of specialized cell types and describe how these differentiated cells contribute to the function of an individual organism as a whole • Cell Types and Organization: Teacher Resource CD • Cellular World Unit 1 Lab 1 Activity 2 Learning About Cell Organization • Cellular World Unit 2 Lab 2 Activity 2 Identification of DNA and RNA in Plant Cells
AE/SKILLS & CONCEPTS/ORGANIZER	**SC-H-UD-S-3.**	Program of Studies: Skills and Concepts - Students will investigate the role of genes/chromosomes in the passing of information from one generation to another (heredity) • Cell Reproduction and the Cell Cycle: Teacher Resource CD • Cell Structure and Function: Teacher Resource CD • Cellular World Unit 1 Lab 1 Activity 2 Learning About Cell Organization • Cellular World Unit 2 Lab 2 Activity 2 Identification of DNA and RNA in Plant Cells • Cellular World Unit 5 Lab 5 Activity 2 Observing the Cell Cycle in Onion Roots

		• Cellular World Unit 5 Lab 5 Activity 3 Modeling Mitosis • Cellular World Unit 5 Lab 5 Activity 4 Modeling Meiosis and Fertilization
AE/SKILLS & CONCEPTS/ORGANIZER	**SC-H-UD-S-6.**	Program of Studies: Skills and Concepts - Students will describe the structure of DNA and explain its role in protein synthesis, cell replication and reproduction • Cell Growth: Teacher Resoruce CD • Cell Reproduction and the Cell Cycle: Teacher Resource CD • Cell Structure and Function: Teacher Resource CD • Cell Types and Organization: Teacher Resource CD • Cellular World Unit 1 Lab 1 Activity 2 Learning About Cell Organization • Cellular World Unit 2 Lab 2 Activity 2 Identification of DNA and RNA in Plant Cells • Cellular World Unit 5 Lab 5 Activity 2 Observing the Cell Cycle in Onion Roots • Cellular World Unit 5 Lab 5 Activity 3 Modeling Mitosis • Cellular World Unit 5 Lab 5 Activity 4 Modeling Meiosis and Fertilization • Cellular World Unit 6 Lab 6 Activity 2 Investigating Cell Growth Curves
AE/SKILLS & CONCEPTS/ORGANIZER	**SC-H-UD-S-7.**	Program of Studies: Skills and Concepts - Students will describe and classify a variety of chemical reactions required for cell functions • Cell Growth: Teacher Resoruce CD • Cell Process: Teacher Resource CD • Cell Reproduction and the Cell Cycle: Teacher Resource CD • Cell Structure and Function: Teacher Resource CD • Cells and Energy: Teacher Resource CD • Cellular World Unit 3 Lab 3 Activity 1 Osmoregulation in Cells • Cellular World Unit 3 Lab 3 Activity 2 Osmosis and Diffusion in Model Cells • Cellular World Unit 4 Lab 4 Activity 1 Investigating Carbon Cycling • Cellular World Unit 4 Lab 4 Activity 2 A Closer Look at Catalase • Cellular World Unit 4 Lab 4 Activity 3 Investigating Plant Pigments • Cellular World Unit 5 Lab 5 Activity 1 Growth and Preparation of Onion Roots • Cellular World Unit 5 Lab 5 Activity 2 Observing the Cell Cycle in Onion Roots • Cellular World Unit 5 Lab 5 Activity 3 Modeling Mitosis • Cellular World Unit 5 Lab 5 Activity 4 Modeling Meiosis and Fertilization • Cellular World Unit 6 Lab 6 Activity 1

		Understanding Why Cells Aren't Big • Cellular World Unit 6 Lab 6 Activity 2 Investigating Cell Growth Curves • Cellular World Unit 7 Lab 7 Activity 1 Developing a Biochemical Test for Catalase • Why Cells Aren't Big: Virtual Lab
AE/SKILLS & CONCEPTS/ORGANIZER	SC-H-UD-S-8.	Program of Studies: Skills and Concepts - Students will describe the processes by which cells maintain their internal environments within acceptable limits • Cell Growth: Teacher Resoruce CD • Cell Process: Teacher Resource CD • Cell Structure and Function: Teacher Resource CD • Cellular World Unit 1 Lab 1 Activity 2 Learning About Cell Organization • Cellular World Unit 3 Lab 3 Activity 1 Osmoregulation in Cells • Cellular World Unit 3 Lab 3 Activity 2 Osmosis and Diffusion in Model Cells • Cellular World Unit 5 Lab 5 Activity 3 Modeling Mitosis • Cellular World Unit 5 Lab 5 Activity 4 Modeling Meiosis and Fertilization • Cellular World Unit 6 Lab 6 Activity 1 Understanding Why Cells Aren't Big • Cellular World Unit 6 Lab 6 Activity 2 Investigating Cell Growth Curves • Cellular World Unit 7 Lab 7 Activity 1 Developing a Biochemical Test for Catalase • Why Cells Aren't Big: Virtual Lab
CATEGORY	**KY.PS.**	**Program of Studies 2006**
GOAL/UNDERSTANDINGS/SUBDOMAIN	SC-H-BC.	Big Idea: Biological Change (Biological Science) - The only thing certain is that everything changes. At the high school level, students evaluate the role natural selection plays in the diversity of species. Modern ideas of evolution provide a scientific explanation for three main sets of observable facts about life on Earth: the enormous number of different life forms we see about us, the systematic similarities in anatomy and molecular chemistry we see within that diversity, and the sequence of changes in fossils found in successive layers of rock that have been formed over more than a billion years. (Academic Expectations 2.1, 2.2, 2.5, 2.6)
AE/SKILLS & CONCEPTS/ORGANIZER	SC-H-BC-U-3.	Program of Studies: Understandings - Students will understand that some organisms have greater adaptive capabilities than others, giving them a greater chance of survival under changing environmental conditions. These adaptations may be patterns of behavior as well as physical characteristics. • Cells and Energy: Teacher Resource CD
CATEGORY	**KY.PS.**	**Program of Studies 2006**
GOAL/UNDERSTANDINGS/SUBDOMAIN	SC-H-ET.	Big Idea: Energy Transformations (Unifying Concepts) - Energy transformations are inherent in almost every system in the universe - from tangible examples at the elementary level, such as heat production in simple Earth and physical systems to more abstract ideas beginning at middle school, such as

		those transformations involved in the growth, dying and decay of living systems. The use of models to illustrate the often invisible and abstract notions of energy transfer will aid in conceptualization, especially as students move from the macroscopic level of observation and evidence (primarily elementary school) to the microscopic interactions at the atomic level (middle and high school levels). Students in high school expand their understanding of constancy through the study of a variety of phenomena. Conceptual understanding and application of the laws of thermodynamics connect ideas about matter with energy transformations within all living, physical and Earth systems. (Academic Expectations 2.1, 2.2, 2.3, 2.4, 2.5)
AE/SKILLS & CONCEPTS/ORGANIZER	**SC-H-ET-U-5.**	Program of Studies: Understandings - Students will understand that radiant energy from the sun is stored in a chemical form in plants as a result of photosynthesis. This energy transformation allows plants to use simple molecules, such as carbon dioxide and water, to assemble the complex molecules needed to increase their mass. • Cells and Energy: Teacher Resource CD • Cellular World Unit 4 Lab 4 Activity 1 Investigating Carbon Cycling • Cellular World Unit 4 Lab 4 Activity 3 Investigating Plant Pigments • Cellular World Unit 5 Lab 5 Activity 1 Growth and Preparation of Onion Roots • Cellular World Unit 5 Lab 5 Activity 2 Observing the Cell Cycle in Onion Roots
AE/SKILLS & CONCEPTS/ORGANIZER	**SC-H-ET-U-6.**	Program of Studies: Understandings - Students will understand that energy stored in food is released by a series of internal chemical reactions that reorganize the molecules into a form useable by the organism. • Cell Structure and Function: Teacher Resource CD • Cells and Energy: Teacher Resource CD • Cellular World Unit 4 Lab 4 Activity 1 Investigating Carbon Cycling • Cellular World Unit 4 Lab 4 Activity 2 A Closer Look at Catalase
AE/SKILLS & CONCEPTS/ORGANIZER	**SC-H-ET-S-6.**	Program of Studies: Skills and Concepts - Students will explain the metabolic process of photosynthesis and describe the molecules it assembles to store solar energy • Cells and Energy: Teacher Resource CD • Cellular World Unit 4 Lab 4 Activity 1 Investigating Carbon Cycling • Cellular World Unit 4 Lab 4 Activity 3 Investigating Plant Pigments
AE/SKILLS & CONCEPTS/ORGANIZER	**SC-H-ET-S-7.**	Program of Studies: Skills and Concepts - Students will describe the metabolic processes that allow energy stored in food to be made available to the organism • Cell Structure and Function: Teacher Resource CD • Cellular World Unit 4 Lab 4 Activity 1 Investigating Carbon Cycling • Cellular World Unit 4 Lab 4 Activity 2 A Closer

		Look at Catalase
AE/SKILLS & CONCEPTS/ORGANIZER	SC-H-ET-S-8.	Program of Studies: Skills and Concepts - Students will explore the composition and function of the carbon compounds involved in metabolism • Cell Structure and Function: Teacher Resource CD • Cellular World Unit 4 Lab 4 Activity 1 Investigating Carbon Cycling • Cellular World Unit 4 Lab 4 Activity 2 A Closer Look at Catalase
CATEGORY	**KY.PS.**	**Program of Studies 2006**
GOAL/UNDERSTANDINGS/SUBDOMAIN	SC-H-I.	Big Idea: Interdependence (Unifying Concepts) - It is not difficult for students to grasp the general notion that species depend on one another and on the environment for survival. But their awareness must be supported by knowledge of the kinds of relationships that exist among organisms, the kinds of physical conditions that organisms must cope with, the kinds of environments created by the interaction of organisms with one another and their physical surroundings, and the complexity of such systems At the high school level, the concept of an ecosystem should bring coherence to the complex array of relationships among organisms and environments that students have encountered. Students growing understanding of systems in general will reinforce the concept of ecosystems. Stability and change in ecosystems can be considered in terms of variables such as population size, number and kinds of species, productivity and the effect of human intervention. (Academic Expectations 2.1, 2.2, 2.3, 2.4)
AE/SKILLS & CONCEPTS/ORGANIZER	SC-H-I-U-4.	Program of Studies: Understandings - Students will understand that every ecosystem contains natural checks and balances, both biotic and abiotic, that serve to limit the size and range of the populations contained within it. • Cellular World Unit 6 Lab 6 Activity 2 Investigating Cell Growth Curves
AE/SKILLS & CONCEPTS/ORGANIZER	SC-H-I-S-4.	Program of Studies: Skills and Concepts - Students will examine existing models of global population growth and the factors affecting population change (e.g., geography, diseases, natural events, birth/death rates). Propose and defend solutions to identified problems of population change • Cellular World Unit 6 Lab 6 Activity 2 Investigating Cell Growth Curves
CATEGORY	**KY.AE.**	**Academic Expectation**
GOAL/UNDERSTANDINGS/SUBDOMAIN	AE.1.	Students are able to use basic communication and mathematics skills for purposes and situations they will encounter throughout their lives.
AE/SKILLS & CONCEPTS/ORGANIZER	1.2.	Students make sense of the variety of materials they read. • Cellular World Unit 2 Lab 2 Activity 1 Comparison of Plant and Animal Cell Organelles • Cellular World Unit 2 Lab 2 Activity 2 Identification of DNA and RNA in Plant Cells

		• Cellular World Unit 2 Lab 2 Activity 3 Identification of Mitochondria • Cellular World Unit 2 Lab 2 Activity 4 Plant Cell Structure and Function
AE/SKILLS & CONCEPTS/ORGANIZER	**1.3.**	Students make sense of the various things they observe. • Cellular World Unit 1 Lab 1 Activity 1 Learning About Cell Types • Cellular World Unit 1 Lab 1 Activity 2 Learning About Cell Organization • Cellular World Unit 2 Lab 2 Activity 1 Comparison of Plant and Animal Cell Organelles • Cellular World Unit 2 Lab 2 Activity 2 Identification of DNA and RNA in Plant Cells • Cellular World Unit 2 Lab 2 Activity 3 Identification of Mitochondria • Cellular World Unit 2 Lab 2 Activity 4 Plant Cell Structure and Function • Cellular World Unit 3 Lab 3 Activity 1 Osmoregulation in Cells • Cellular World Unit 3 Lab 3 Activity 2 Osmosis and Diffusion in Model Cells • Cellular World Unit 4 Lab 4 Activity 1 Investigating Carbon Cycling • Cellular World Unit 4 Lab 4 Activity 2 A Closer Look at Catalase • Cellular World Unit 4 Lab 4 Activity 3 Investigating Plant Pigments • Cellular World Unit 5 Lab 5 Activity 1 Growth and Preparation of Onion Roots • Cellular World Unit 5 Lab 5 Activity 2 Observing the Cell Cycle in Onion Roots • Cellular World Unit 5 Lab 5 Activity 3 Modeling Mitosis • Cellular World Unit 5 Lab 5 Activity 4 Modeling Meiosis and Fertilization • Cellular World Unit 6 Lab 6 Activity 1 Understanding Why Cells Aren't Big • Cellular World Unit 6 Lab 6 Activity 2 Investigating Cell Growth Curves • Cellular World Unit 7 Lab 7 Activity 1 Developing a Biochemical Test for Catalase • Why Cells Aren't Big: Virtual Lab
AE/SKILLS & CONCEPTS/ORGANIZER	**1.4.**	Students make sense of the various messages to which they listen. • Cellular World Unit 2 Lab 2 Activity 1 Comparison of Plant and Animal Cell Organelles • Cellular World Unit 2 Lab 2 Activity 2 Identification of DNA and RNA in Plant Cells • Cellular World Unit 2 Lab 2 Activity 3 Identification of Mitochondria • Cellular World Unit 2 Lab 2 Activity 4 Plant Cell

		Structure and Function
AE/SKILLS & CONCEPTS/ORGANIZER	**1.5-1.9.**	Students use mathematical ideas and procedures to communicate, reason, and solve problems. • Cellular World Unit 2 Lab 2 Activity 1 Comparison of Plant and Animal Cell Organelles • Cellular World Unit 2 Lab 2 Activity 2 Identification of DNA and RNA in Plant Cells • Cellular World Unit 2 Lab 2 Activity 3 Identification of Mitochondria • Cellular World Unit 2 Lab 2 Activity 4 Plant Cell Structure and Function • Cellular World Unit 3 Lab 3 Activity 1 Osmoregulation in Cells • Cellular World Unit 3 Lab 3 Activity 2 Osmosis and Diffusion in Model Cells • Cellular World Unit 4 Lab 4 Activity 1 Investigating Carbon Cycling • Cellular World Unit 4 Lab 4 Activity 2 A Closer Look at Catalase • Cellular World Unit 4 Lab 4 Activity 3 Investigating Plant Pigments • Cellular World Unit 5 Lab 5 Activity 1 Growth and Preparation of Onion Roots • Cellular World Unit 5 Lab 5 Activity 2 Observing the Cell Cycle in Onion Roots • Cellular World Unit 5 Lab 5 Activity 3 Modeling Mitosis • Cellular World Unit 5 Lab 5 Activity 4 Modeling Meiosis and Fertilization • Cellular World Unit 6 Lab 6 Activity 1 Understanding Why Cells Aren't Big • Cellular World Unit 6 Lab 6 Activity 2 Investigating Cell Growth Curves • Cellular World Unit 7 Lab 7 Activity 1 Developing a Biochemical Test for Catalase • Why Cells Aren't Big: Virtual Lab
AE/SKILLS & CONCEPTS/ORGANIZER	**1.11.**	Students write using appropriate forms, conventions, and styles to communicate ideas and information to different audiences for different purposes. • Cellular World Unit 2 Lab 2 Activity 1 Comparison of Plant and Animal Cell Organelles • Cellular World Unit 2 Lab 2 Activity 2 Identification of DNA and RNA in Plant Cells • Cellular World Unit 2 Lab 2 Activity 3 Identification of Mitochondria • Cellular World Unit 2 Lab 2 Activity 4 Plant Cell Structure and Function • Cellular World Unit 3 Lab 3 Activity 1 Osmoregulation in Cells • Cellular World Unit 3 Lab 3 Activity 2 Osmosis and Diffusion in Model Cells • Cellular World Unit 4 Lab 4 Activity 1

		Investigating Carbon Cycling • Cellular World Unit 4 Lab 4 Activity 2 A Closer Look at Catalase • Cellular World Unit 4 Lab 4 Activity 3 Investigating Plant Pigments • Cellular World Unit 5 Lab 5 Activity 1 Growth and Preparation of Onion Roots • Cellular World Unit 5 Lab 5 Activity 2 Observing the Cell Cycle in Onion Roots • Cellular World Unit 5 Lab 5 Activity 3 Modeling Mitosis • Cellular World Unit 5 Lab 5 Activity 4 Modeling Meiosis and Fertilization • Cellular World Unit 6 Lab 6 Activity 1 Understanding Why Cells Aren't Big • Cellular World Unit 6 Lab 6 Activity 2 Investigating Cell Growth Curves • Cellular World Unit 7 Lab 7 Activity 1 Developing a Biochemical Test for Catalase
AE/SKILLS & CONCEPTS/ORGANIZER	**1.12.**	Students speak using appropriate forms, conventions, and styles to communicate ideas and information to different audiences for different purposes. • Cellular World Unit 2 Lab 2 Activity 1 Comparison of Plant and Animal Cell Organelles • Cellular World Unit 2 Lab 2 Activity 2 Identification of DNA and RNA in Plant Cells • Cellular World Unit 2 Lab 2 Activity 3 Identification of Mitochondria • Cellular World Unit 2 Lab 2 Activity 4 Plant Cell Structure and Function • Cellular World Unit 3 Lab 3 Activity 1 Osmoregulation in Cells • Cellular World Unit 3 Lab 3 Activity 2 Osmosis and Diffusion in Model Cells • Cellular World Unit 4 Lab 4 Activity 1 Investigating Carbon Cycling • Cellular World Unit 4 Lab 4 Activity 2 A Closer Look at Catalase • Cellular World Unit 4 Lab 4 Activity 3 Investigating Plant Pigments • Cellular World Unit 5 Lab 5 Activity 1 Growth and Preparation of Onion Roots • Cellular World Unit 5 Lab 5 Activity 2 Observing the Cell Cycle in Onion Roots • Cellular World Unit 5 Lab 5 Activity 3 Modeling Mitosis • Cellular World Unit 5 Lab 5 Activity 4 Modeling Meiosis and Fertilization • Cellular World Unit 6 Lab 6 Activity 1 Understanding Why Cells Aren't Big • Cellular World Unit 6 Lab 6 Activity 2 Investigating Cell Growth Curves • Cellular World Unit 7 Lab 7 Activity 1 Developing a Biochemical Test for Catalase

AE/SKILLS & CONCEPTS/ORGANIZER	1.16.	Students use computers and other kinds of technology to collect, organize, and communicate information and ideas. • Cellular World Unit 1 Lab 1 Activity 1 Learning About Cell Types • Cellular World Unit 2 Lab 2 Activity 1 Comparison of Plant and Animal Cell Organelles • Cellular World Unit 2 Lab 2 Activity 2 Identification of DNA and RNA in Plant Cells • Cellular World Unit 2 Lab 2 Activity 3 Identification of Mitochondria • Cellular World Unit 2 Lab 2 Activity 4 Plant Cell Structure and Function • Cellular World Unit 3 Lab 3 Activity 1 Osmoregulation in Cells • Cellular World Unit 3 Lab 3 Activity 2 Osmosis and Diffusion in Model Cells • Cellular World Unit 4 Lab 4 Activity 2 A Closer Look at Catalase • Cellular World Unit 4 Lab 4 Activity 3 Investigating Plant Pigments • Cellular World Unit 5 Lab 5 Activity 1 Growth and Preparation of Onion Roots • Cellular World Unit 5 Lab 5 Activity 2 Observing the Cell Cycle in Onion Roots • Cellular World Unit 5 Lab 5 Activity 4 Modeling Meiosis and Fertilization • Cellular World Unit 6 Lab 6 Activity 1 Understanding Why Cells Aren't Big • Cellular World Unit 6 Lab 6 Activity 2 Investigating Cell Growth Curves • Cellular World Unit 7 Lab 7 Activity 1 Developing a Biochemical Test for Catalase • Why Cells Aren't Big: Virtual Lab
CATEGORY	**KY.AE.**	**Academic Expectation**
GOAL/UNDERSTANDINGS/SUBDOMAIN	AE.2.	Students shall develop their abilities to apply core concepts and principles from mathematics, the sciences, the arts, the humanities, social studies, practical living studies, and vocational studies to what they will encounter throughout their lives.
AE/SKILLS & CONCEPTS/ORGANIZER	2.1.	Science: Students understand scientific ways of thinking and working and use those methods to solve real-life problems. • Cellular World Unit 5 Lab 5 Activity 2 Observing the Cell Cycle in Onion Roots • Cellular World Unit 7 Lab 7 Activity 1 Developing a Biochemical Test for Catalase
AE/SKILLS & CONCEPTS/ORGANIZER	2.2.	Science: Students identify, analyze, and use patterns such as cycles and trends to understand past and present events and predict possible future events. • Cell Reproduction and the Cell Cycle: Teacher Resource CD • Cellular World Unit 3 Lab 3 Activity 1 Osmoregulation in Cells

		• Cellular World Unit 7 Lab 7 Activity 1 Developing a Biochemical Test for Catalase
AE/SKILLS & CONCEPTS/ORGANIZER	2.4.	Science: Students use the concept of scale and scientific models to explain the organization and functioning of living and nonliving things and predict other characteristics that might be observed. • Cell Growth: Teacher Resoruce CD • Cell Types and Organization: Teacher Resource CD • Cellular World Unit 3 Lab 3 Activity 1 Osmoregulation in Cells • Cellular World Unit 3 Lab 3 Activity 2 Osmosis and Diffusion in Model Cells • Cellular World Unit 5 Lab 5 Activity 3 Modeling Mitosis • Cellular World Unit 5 Lab 5 Activity 4 Modeling Meiosis and Fertilization • Cellular World Unit 6 Lab 6 Activity 1 Understanding Why Cells Aren't Big • Cellular World Unit 6 Lab 6 Activity 2 Investigating Cell Growth Curves • Why Cells Aren't Big: Virtual Lab
AE/SKILLS & CONCEPTS/ORGANIZER	2.5.	Science: Students understand that under certain conditions nature tends to remain the same or move toward a balance. • Cell Process: Teacher Resource CD • Cell Structure and Function: Teacher Resource CD • Cellular World Unit 3 Lab 3 Activity 1 Osmoregulation in Cells • Cellular World Unit 3 Lab 3 Activity 2 Osmosis and Diffusion in Model Cells • Cellular World Unit 4 Lab 4 Activity 1 Investigating Carbon Cycling • Cellular World Unit 4 Lab 4 Activity 2 A Closer Look at Catalase • Cellular World Unit 4 Lab 4 Activity 3 Investigating Plant Pigments • Cellular World Unit 5 Lab 5 Activity 1 Growth and Preparation of Onion Roots • Cellular World Unit 5 Lab 5 Activity 2 Observing the Cell Cycle in Onion Roots • Cellular World Unit 5 Lab 5 Activity 3 Modeling Mitosis • Cellular World Unit 5 Lab 5 Activity 4 Modeling Meiosis and Fertilization • Cellular World Unit 6 Lab 6 Activity 1 Understanding Why Cells Aren't Big • Cellular World Unit 6 Lab 6 Activity 2 Investigating Cell Growth Curves • Cellular World Unit 7 Lab 7 Activity 1 Developing a Biochemical Test for Catalase
CATEGORY	**KY.CC.**	**Core Content for Assessment v.4.1**

GOAL/UNDERSTANDINGS/SUBDOMAIN	SC-HS-1.1.	Structure and Transformation of Matter: By high school, students will be dealing with evidence from both direct and indirect observations (microscopic level and smaller) to consider theories related to change and conservation of matter. The use of models (and an understanding of their scales and limitations) is an effective means of learning about the structure of matter. Looking for patterns in properties is also critical to comparing and explaining differences in matter.
AE/SKILLS & CONCEPTS/ORGANIZER	SC-HS-1.1.5.	Physical Science: Students will explain the role of intermolecular or intramolecular interactions on the physical properties (solubility, density, polarity, conductivity, boiling/melting points) of compounds. • Cellular World Unit 6 Lab 6 Activity 2 Investigating Cell Growth Curves
AE/SKILLS & CONCEPTS/ORGANIZER	SC-HS-1.1.6.	Physical Science: Students will identify variables that affect reaction rates; predict effects of changes in variables (concentration, temperature, properties of reactants, surface area, and catalysts) based on evidence/data from chemical reactions. • Cells and Energy: Teacher Resource CD • Cellular World Unit 4 Lab 4 Activity 2 A Closer Look at Catalase • Cellular World Unit 7 Lab 7 Activity 1 Developing a Biochemical Test for Catalase
AE/SKILLS & CONCEPTS/ORGANIZER	SC-HS-1.1.8.	Physical Science: Students will explain the importance of chemical reactions in a real-world context; justify conclusions using evidence/data from chemical reactions. • Cells and Energy: Teacher Resource CD • Cellular World Unit 4 Lab 4 Activity 1 Investigating Carbon Cycling • Cellular World Unit 4 Lab 4 Activity 2 A Closer Look at Catalase • Cellular World Unit 7 Lab 7 Activity 1 Developing a Biochemical Test for Catalase
CATEGORY	**KY.CC.**	**Core Content for Assessment v.4.1**
GOAL/UNDERSTANDINGS/SUBDOMAIN	SC-HS-2.3.	The Earth and the Universe: The Earth system is in a constant state of change. These changes affect life on earth in many ways. Finally, at the high school level, most of the emphasis is on why these changes occur. An understanding of systems and their interacting components will enable students to evaluate supporting theories of earth changes. High school is the time to bring all of the ideas together to look at the universe as a whole. Students will use evidence to evaluate and analyze theories related to the origin of the universe and all components of the universe.
AE/SKILLS & CONCEPTS/ORGANIZER	SC-HS-2.3.1.	Earth/Space Science: Students will explain phenomena (falling objects, planetary motion, satellite motion) related to gravity; describe the factors that affect gravitational force. • Cellular World Unit 6 Lab 6 Activity 2 Investigating Cell Growth Curves
CATEGORY	**KY.CC.**	**Core Content for Assessment v.4.1**

GOAL/UNDERSTANDINGS/SUBDOMAIN	**SC-HS-3.4.**	Unity and Diversity: At the high school level, an in-depth study of the specialization and chemical changes occurring at the cellular level builds upon the foundational ideas developed earlier to investigate DNA and effects of alterations in DNA for an individual organism as well as for a species. Emphasis at every level should be placed upon the understanding that while every living thing is composed of similar small constituents that combine in predictable ways, it is the subtle variations within these small building blocks that account for both the likenesses and differences in form and function that create the diversity of life.
AE/SKILLS & CONCEPTS/ORGANIZER	**SC-HS-3.4.2.**	Biological Science: Students will understand that most cell functions involve chemical reactions. Food molecules taken into cells react to provide the chemical constituents needed to synthesize other molecules. Both breakdown and synthesis are made possible by a large set of protein catalysts, called enzymes. The breakdown of some of the food molecules enables the cell to store energy in specific chemicals that are used to carry out the many functions of the cell. • Cell Growth: Teacher Resoruce CD • Cell Process: Teacher Resource CD • Cell Reproduction and the Cell Cycle: Teacher Resource CD • Cell Structure and Function: Teacher Resource CD • Cells and Energy: Teacher Resource CD • Cellular World Unit 3 Lab 3 Activity 1 Osmoregulation in Cells • Cellular World Unit 3 Lab 3 Activity 2 Osmosis and Diffusion in Model Cells • Cellular World Unit 4 Lab 4 Activity 1 Investigating Carbon Cycling • Cellular World Unit 4 Lab 4 Activity 2 A Closer Look at Catalase • Cellular World Unit 4 Lab 4 Activity 3 Investigating Plant Pigments • Cellular World Unit 5 Lab 5 Activity 1 Growth and Preparation of Onion Roots • Cellular World Unit 5 Lab 5 Activity 2 Observing the Cell Cycle in Onion Roots • Cellular World Unit 5 Lab 5 Activity 3 Modeling Mitosis • Cellular World Unit 5 Lab 5 Activity 4 Modeling Meiosis and Fertilization • Cellular World Unit 6 Lab 6 Activity 1 Understanding Why Cells Aren't Big • Cellular World Unit 6 Lab 6 Activity 2 Investigating Cell Growth Curves • Cellular World Unit 7 Lab 7 Activity 1 Developing a Biochemical Test for Catalase • Why Cells Aren't Big: Virtual Lab
AE/SKILLS & CONCEPTS/ORGANIZER	**SC-HS-3.4.3.**	Biological Science: Students will describe cell regulation (enzyme function, diffusion, osmosis, homeostasis); predict consequences of internal/external environmental change on cell function/regulation. • Cell Growth: Teacher Resoruce CD • Cell Process: Teacher Resource CD • Cell Structure and Function: Teacher Resource CD • Cells and Energy: Teacher Resource CD

		• Cellular World Unit 1 Lab 1 Activity 2 Learning About Cell Organization • Cellular World Unit 3 Lab 3 Activity 1 Osmoregulation in Cells • Cellular World Unit 3 Lab 3 Activity 2 Osmosis and Diffusion in Model Cells • Cellular World Unit 4 Lab 4 Activity 2 A Closer Look at Catalase • Cellular World Unit 5 Lab 5 Activity 3 Modeling Mitosis • Cellular World Unit 5 Lab 5 Activity 4 Modeling Meiosis and Fertilization • Cellular World Unit 6 Lab 6 Activity 1 Understanding Why Cells Aren't Big • Cellular World Unit 6 Lab 6 Activity 2 Investigating Cell Growth Curves • Cellular World Unit 7 Lab 7 Activity 1 Developing a Biochemical Test for Catalase • Why Cells Aren't Big: Virtual Lab
AE/SKILLS & CONCEPTS/ORGANIZER	**SC-HS-3.4.4.**	Biological Science: Students will understand that plant cells contain chloroplasts, the site of photosynthesis. Plants and many microorganisms (e.g., Euglena) use solar energy to combine molecules of carbon dioxide and water into complex, energy-rich organic compounds and release oxygen to the environment. This process of photosynthesis provides a vital link between the Sun and energy needs of living systems. • Cell Process: Teacher Resource CD • Cell Structure and Function: Teacher Resource CD • Cell Types and Organization: Teacher Resource CD • Cells and Energy: Teacher Resource CD • Cellular World Unit 1 Lab 1 Activity 1 Learning About Cell Types • Cellular World Unit 1 Lab 1 Activity 2 Learning About Cell Organization • Cellular World Unit 2 Lab 2 Activity 1 Comparison of Plant and Animal Cell Organelles • Cellular World Unit 2 Lab 2 Activity 2 Identification of DNA and RNA in Plant Cells • Cellular World Unit 2 Lab 2 Activity 3 Identification of Mitochondria • Cellular World Unit 2 Lab 2 Activity 4 Plant Cell Structure and Function • Cellular World Unit 4 Lab 4 Activity 1 Investigating Carbon Cycling • Cellular World Unit 4 Lab 4 Activity 3 Investigating Plant Pigments • Cellular World Unit 5 Lab 5 Activity 1 Growth and Preparation of Onion Roots • Cellular World Unit 5 Lab 5 Activity 2 Observing the Cell Cycle in Onion Roots • Cellular World Unit 5 Lab 5 Activity 3 Modeling Mitosis • Cellular World Unit 5 Lab 5 Activity 4 Modeling

		Meiosis and Fertilization
AE/SKILLS & CONCEPTS/ORGANIZER	SC-HS-3.4.5.	Biological Science: Students will explain the relationship between sexual reproduction (meiosis) and the transmission of genetic information; draw conclusions/make predictions based on hereditary evidence/data (pedigrees, punnet squares). • Cell Reproduction and the Cell Cycle: Teacher Resource CD • Cellular World Unit 5 Lab 5 Activity 4 Modeling Meiosis and Fertilization
CATEGORY	**KY.CC.**	**Core Content for Assessment v.4.1**
GOAL/UNDERSTANDINGS/SUBDOMAIN	SC-HS-3.5.	Biological Change: The only thing certain is that everything changes. The stage is set for high school students to evaluate the role natural selection plays in the diversity of species. Modern ideas of evolution provide a scientific explanation for three main sets of observable facts about life on earth: the enormous number of different life forms we see about us, the systematic similarities in anatomy and molecular chemistry we see within that diversity and the sequence of changes in fossils found in successive layers of rock that have been formed over more than a billion years (Science for All Americans, p. 67).
AE/SKILLS & CONCEPTS/ORGANIZER	SC-HS-3.5.1.	Biological Science: Students will predict the impact on species of changes to 1) the potential for a species to increase its numbers, (2) the genetic variability of offspring due to mutation and recombination of genes, (3) a finite supply of the resources required for life, or (4) natural selection; propose solutions to real-world problems of endangered and extinct species. • Cellular World Unit 6 Lab 6 Activity 2 Investigating Cell Growth Curves
CATEGORY	**KY.CC.**	**Core Content for Assessment v.4.1**
GOAL/UNDERSTANDINGS/SUBDOMAIN	SC-HS-4.6.	Energy Transformations: The use of models to illustrate the often invisible and abstract notions of energy transfer will aid in conceptualization, especially as students move from the macroscopic level of observation and evidence (primarily elementary school) to the microscopic interactions at the atomic level (middle and high school levels). Students in high school expand their understanding of constancy through the study of a variety of phenomena. Conceptual understanding and application of the laws of thermodynamics connect ideas about matter with energy transformations within all living, physical and earth systems.
AE/SKILLS & CONCEPTS/ORGANIZER	SC-HS-4.6.10.	Unifying Concepts: Students will identify the components and mechanisms of energy stored and released from food molecules (photosynthesis and respiration); apply information to real-world situations. • Cells and Energy: Teacher Resource CD • Cellular World Unit 4 Lab 4 Activity 1 Investigating Carbon Cycling • Cellular World Unit 4 Lab 4 Activity 3 Investigating Plant Pigments
CATEGORY	**KY.CC.**	**Core Content for Assessment v.4.1**
GOAL/UNDERSTANDINGS/SUBDOMAIN	SC-HS-	Interdependence: At the high school level, the concept of an

	4.7.	ecosystem should bring coherence to the complex array of relationships among organisms and environments that students have encountered. Students growing understanding of systems in general will reinforce the concept of ecosystems. Stability and change in ecosystems can be considered in terms of variables such as population size, number and kinds of species, productivity and the effect of human intervention (adapted from Benchmarks for Science Literacy, 1993).
AE/SKILLS & CONCEPTS/ORGANIZER	SC-HS-4.7.1.	Unifying Concepts: Students will analyze relationships and interactions among organisms in ecosystems; predict the effects on other organisms of changes to one or more components of the ecosystem. • Cell Structure and Function: Teacher Resource CD
AE/SKILLS & CONCEPTS/ORGANIZER	SC-HS-4.7.5.	Unifying Concepts: Students will predict the consequences of changes in resources to a population; select or defend solutions to real-world problems of population control. • Cellular World Unit 6 Lab 6 Activity 2 Investigating Cell Growth Curves