

	Science Benchmarks Compacted Science 8/9
	Standard 1: NATURE OF SCIENCE Understand that science is ongoing and inventive, and that scientific understandings have changed over time as new evidence is found.
8/9-1a.	Construct arguments that demonstrate how differing models and explanations of events can result from similar evidence. <ul style="list-style-type: none"> • How do scientific understandings change as a result of new discoveries?
8/9-1b.	Show how cultures and individuals have contributed to the development of major ideas in the earth, space, and physical sciences as well as identify the cultural conditions usually present during these great times of discovery.
8/9-1c.	Show how basic research and applied research can lead to new discoveries, inventions, and applications.
	Standard 2: SCIENCE INQUIRY Investigate questions using scientific methods and tools, revise their personal understanding to accommodate knowledge, and communicate these understandings to others.
8/9-2a.	Give examples and show how basic systems, models, and explanations can be used to give quick and reasonable solutions that are accurate enough for basic needs.
8/9-2b.	Use evidence gained to replace inaccurate personal models and explanations of science related themes.
8/9-2c.	Re-examine past evidence and reasoning that led to conclusions drawn from investigations.
8/9-2d.	Identify and analyze social issues, literature, and observations of phenomenon related to science as well as ask questions about, design investigations for, and predict outcomes that may result from such investigations of these issues.
8/9-2e.	Evaluate and critique data collective procedures and results during an investigation and then suggest ideas for improvement.
8/9-2f.	During an investigation, students will choose the best data collecting procedures and materials available, use them correctly, and calculate uncertainty of resulting data. <ul style="list-style-type: none"> • Use of metric system and basic lab tools for measuring length, mass, volume, and temperature. • List and explain reasons for important lab safety rules and describe how to respond to possible lab emergencies.
8/9-2g.	Based on existing explanations and models, develop logical explanations for the results of their own investigations.
8/9-2h.	Evaluate articles and reports in popular press, in scientific journals, on TV, and on the Internet for accuracy, validity, experimental design, sampling, and treatment of data.

	Science Benchmarks Compacted Science 8/9
	Standard 3: PHYSICAL SCIENCE Demonstrate an understanding of the physical and chemical properties of matter, the forms and properties of energy, and the ways in which matter and energy interact.
8/9-3a.	Describe the structure and properties of atoms, molecules, and matter during physical and chemical interactions.
8/9-3b.	Explain the forces that hold the atom together and illustrate how nuclear interactions change the atom.
8/9-3c.	Illustrate exchanges of energy, including the law of conservation of energy, during chemical and atomic/nuclear reactions.
8/9-3d.	Explain the exchange of mass in atomic/nuclear reactions.
8/9-3e.	Explain how simple and complex substances interact to produce new substances.
8/9-3f.	Identify patterns in chemical and physical properties and use them to predict likely chemical & physical changes and interactions.
8/9-3g.	Investigate and identify the types of <i>*chemical interactions</i> including endothermic, exothermic, oxidation, photosynthesis, and acid/base reactions. <i>*synthesis, decomposition, single-replacement, double-replacement reactions.</i>
8/9-3h.	Understand the forces of gravitation, electromagnetic force, intermolecular force, and explain their impact on the universal system, including strong and weak force.
8/9-3i.	Investigate and describe models of light, heat, and sound including similarities and differences in the way these energy forms behave.
8/9-3j.	Use the science themes and knowledge of chemical, physical, atomic, and nuclear interactions to explain common occurrences in the physical world including changes in materials, living things, earth's features, stars, and the law of conservation of energy and law of conservation of mass.
	Standard 4: EARTH & SPACE SCIENCE Demonstrate an understanding of the structure and systems of the Earth, other bodies in the universe, and their interactions.
8/9-4a.	Use the science themes; distinguish between the earth's internal and external energy systems and how these sources of energy affect the earth. <ul style="list-style-type: none"> • Radioactive decay of radioactive isotopes, plate tectonics, gravity, and the sun.
8/9-4b.	Analyze the benefits, costs, and limitations of past, present, and projected use of resources and technology and explain the consequences to the environment. <ul style="list-style-type: none"> • Mining ores such as iron, zinc, copper, coal, etc. Benefits of mining vs. cost to environment.

	Science Benchmarks Compacted Science 8/9
	Standard 5: LIFE & ENVIRONMENTAL SCIENCE Demonstrate an understanding of the characteristics and structures of living things, the processes of life, and how living things interact with one another and their environment.
8/9-5a.	Describe how the physical and earth sciences are intricately connected to the processes of living things. including the following: <ul style="list-style-type: none"> • Atoms/elements and molecules/compounds as building blocks of life. • Structure, function, and limitations of the ear and eye.
8/9-5b.	Investigate and compare the cells of animals for the purpose of classification.
8/9-5c.	Differentiate between single-celled and multiple-celled organisms (including humans) through investigation, comparing the cell functions of specialized cells for each type of organism.
8/9-5d.	Explain how an organism is regulated internally through a biological clock and externally through stimuli.
8/9-5e.	Understand that an organism's behavior evolves through adaptation to its environment.
8/9-5f.	Investigate and explain that heredity is comprised of the characteristics and traits found in genes.
8/9-5g.	Explain that animals have a variety of body parts and internal structures that contribute to their being able to make or find food, reproduce, and adapt to their environment.
8/9-5h.	Analyze how current trends in human resource use and population growth will influence the ecosystems, and show how current policies affect those trends.
8/9-5i.	Explain that although different species look very different, the unity among organisms becomes apparent from an analysis of internal structures and observation of similarity of their anatomy (for kingdoms of living things).
	Standard 6: SCIENCE APPLICATIONS Demonstrate an understanding of the relationship between science & technology & the ways in which that relationship influences human activities.
8/9-6a.	Designs, build, evaluate, and revise models and explanations related to the earth, space, and physical sciences.
8/9-6b.	Analyze the positive and negative impacts scientific or technological innovation has on individuals and society.
8/9-6c.	Choose a specific problem in our society, identify logical scientific or technological solutions to that problem, and argue its merits.

	Science Benchmarks Compacted Science 8/9
	Standard 7: SCIENCE IN SOCIAL & PERSONAL PERSPECTIVES Use scientific information and skills to make decisions about themselves, Wisconsin, and the world in which they live.
8/9-7a.	Demonstrate how the underlying themes of science and scientific methods can be used to make real-life decisions about the future; including decisions about careers, work places, life-style, use of resources, and the environment.
8/9-7b.	Use science themes and knowledge of the earth, space, and physical sciences to analyze the positive and negative consequences concerning resource management in the local and greater communities and its impact on life.
8/9-7c.	Evaluate proposed policy recommendations (local, state, and national) in science and technology for validity, evidence, reasoning, and long and short-term implications.
8/9-7d.	Show how policy decisions in science depend on many factors including social values, ethics, beliefs, time frames, and considerations of science and technology.
8/9-7e.	Advocate solutions to scientific or technological problems by constructing a plan based on current scientific knowledge and reasoning.
8/9-7f.	Evaluate data and sources of information when using scientific information to make decisions. <ul style="list-style-type: none"> • Use scientific tools of measurement (balances, graduated cylinders, etc.) properly to make accurate measurements.

Curriculum Map

Course Title: Compacted 8/9

<u>MONTH</u>	<u>UNITS/CONCEPTS</u>	<u>CORRESPONDING BENCHMARKS</u>
AUGUST Unit #1	<u>Introduction to Lab Science</u> <ul style="list-style-type: none"> Scientific Method/Measurement Lab Safety Properties of Matter 	1B, 1C 2A, 2D, 2E, 2F 3I 7A (video), 7F
SEPTEMBER Unit #2	<div style="text-align: center;">↓</div> <u>Atomic Structure and Theory</u> <ul style="list-style-type: none"> Atomic Models Subatomic Particles Forces 	1A, 1C 2A, 2B, 2C 3B, 3H 6A (Steve & Eliz project) 7F
OCTOBER Unit #3	<div style="text-align: center;">↓</div> <u>Periodic Table</u> <ul style="list-style-type: none"> Arrangement Properties 	1A 2B, 2C, 2G } Alkaline Earth Flame Test Halogen Lab
NOVEMBER Unit #4	<ul style="list-style-type: none"> Design Radioactivity <u>Bonding</u> <ul style="list-style-type: none"> Types of Bonds <ul style="list-style-type: none"> Ionic Covalent 	3A, 3C, 3D, 3F 4A, 4B 5A1 6A (Kelly's lab), 6B 7F 2E, 2F 3A, 3E, 3F 6A 7F
DECEMBER Unit #5	<ul style="list-style-type: none"> Oxidation Numbers Valence Numbers Chemical Formulas Chemical and Physical Properties <u>Chemical Reactions</u> <ul style="list-style-type: none"> Law of Conservation of Mass 	1C 3A, 3C, 3E, 3G, 3J

Curriculum Map

Course Title: Compacted 8/9

<u>MONTH</u>	<u>UNITS/CONCEPTS</u>	<u>CORRESPONDING BENCHMARKS</u>
JANUARY (8 weeks)	<u>Chemical Reactions (continued)</u> <ul style="list-style-type: none"> Acids and Bases <u>Classification System</u> <ul style="list-style-type: none"> Animal Kingdom 	6A, 6B, 6C 7B, 7E, 7F 5A, 5B, 5C, 5D, 5E, 5F, 5G, 5H
FEBRUARY		
MARCH		
APRIL	<u>Waves</u> <ul style="list-style-type: none"> Light, Heat, Energy Forms <u>Sound</u> <ul style="list-style-type: none"> Properties, Applications Anatomy/Structure of Ear Noise Pollution 	2E, 2F 3J 6A 7F 2C, 2E, 2F, 2H 3J 5A6 6C 7C, 7D
MAY	<u>Light</u> <ul style="list-style-type: none"> EM Spectrum Reflection and Refraction Color and Sight Optical Instruments Applications 	1A, 1C 2C, 2E, 2F, 2H 3C, 3E, 3I 5A 6B

Course #3040 Earth Science

Earth Science is a study of the planet Earth – its features, its forces, its place in the solar system, and its place in the universe. The study proceeds from an overview of the characteristics of the earth, through an in-depth study of its matter and processes, to a survey of matter processed in the universe. Earth Science is explained in concepts and a language suited for the student. The study of mountains, rocks, weather, oceans, planet, rivers, wind, earthquakes, fossils, glaciers, meteorites, stars, and maps are some examples of the areas studied. Field trips and laboratories are used to aid the student in the understanding of the processes of the earth.

	Science Benchmarks
	The student will:
	Standard 4: EARTH & SPACE SCIENCE Demonstrate an understanding of the structure and systems of the Earth, other bodies in the universe, and their interactions.
3040-4a.	Identify the major branches of the Earth Sciences.
3040-4b.	Name and describe the layers of the earth's interior.
3040-4c.	Describe what astronomers and meteorologists do and give examples of activities they would perform.
3040-4d.	Describe the origin of the solar system using the protoplanet hypothesis.
3040-4e.	Discuss the importance of volcanism in the origin of oceans.
3040-4f.	Discuss the possible origin of the continents.
3040-4g.	Describe both ancient and modern evidences that the earth is spherical.
3040-4h.	Explain how gravity shows that the earth is an oblate spheroid.
3040-4i.	Discuss Earth's polar and equatorial dimensions.
3040-4j.	Define specific gravity, explain how it is determined, and discuss the specific gravity of the earth's interior and exterior.
3040-4k.	Describe the temperatures of the earth's interior.
3040-4l.	Discuss the possible sources of heat within the earth.
3040-4m.	Discuss the relationship between rocks and minerals and give examples of each.
3040-4n.	List the most common minerals that occur in the crust and which ones that occur as elements.
3040-4o.	Define isotope and discuss the isotopes of hydrogen, carbon, and uranium. Discuss the importance of each in radioactive isotope dating of rocks.

	Science Benchmarks
3040-4p.	Define compound and list the common minerals that are compounds.
3040-4q.	Discuss the cause of crystalline structure in minerals.
3040-4r.	Describe why rock-forming minerals are important and explain how minerals are usually identified.
3040-4s.	Define luster and give examples of it.
3040-4t.	Discuss crystal shape and its importance to field identification of minerals.
3040-4u.	Define mineral streak and how it is used to identify minerals.
3040-4v.	Define mineral cleavage and give examples of it.
3040-4w.	Define mineral hardness and be able to measure it.
3040-4x.	Define specific gravity and give examples of various minerals and their relative specific gravities.
3040-4y.	Describe the acid test for calcite and its relationship to limestone.
3040-4z.	Identify several special properties of minerals.
3040-4aa.	Name the three families of rocks and describe how each form.
3040-4bb.	Identify two types of igneous rocks and explain how each form.
3040-4cc.	Differentiate between magma and lava and name the two different types of magma and discuss their composition.
3040-4dd.	Discuss the relationship between igneous rock texture and the rate of formation.
3040-4ee.	Define sedimentary rocks and name the three families of sedimentary rocks and how they form.
3040-4ff.	Discuss the most common occurring sedimentary rocks and their importance to our sources of water, oil, and crushed rock.
3040-4gg.	Define metamorphic rocks and identify three factors that promote their formation.
3040-4hh.	Explain the effect of metamorphism in the porosity of metamorphic rocks as compared to their parent rocks.
3040-4ii.	Describe the changes in rocks within the rock cycle.
3040-4jj.	Compare dynamic metamorphism to thermal metamorphism.

	Science Benchmarks
3040-4kk.	Define ore mineral and gangue. Differentiate between resources and reserves.
3040-4ll.	List some important metals and the ores from which they are derived.
3040-4mm.	List some important non-metals and the ores from which they are derived.
3040-4nn.	Compare energy sources of the past with those used today.
3040-4oo.	Describe how coal forms and compare the various kinds of coal.
3040-4pp.	Discuss the way in which oil and natural gas form.
3040-4qq.	Discuss methods of conserving non-renewable resources.
3040-4rr.	Discuss methods and uses of recycled resources.
3040-4ss.	Distinguish between weathering and erosion and name several agents of erosion.
3040-4tt.	Distinguish between mechanical and chemical weathering and give examples of each.
3040-4uu.	Discuss the effects of weathering on several common rocks, minerals, and structures made from them.
3040-4vv.	Discuss the relationship of time, temperature, and climate on the rate of weathering.
3040-4ww.	Define soil and discuss the relationship between residual and transported soils.
3040-4xx.	Name the two main soil types found in the USA and identify where they occur and why.
3040-4yy.	Compare the amounts of salt water and fresh water on earth and discuss the quantity and distribution of fresh water.
3040-4zz.	Describe the movement of water in the water cycle.
3040-4aaa.	Discuss what a water budget is and relate it to the local environment.
3040-4bbb.	Discuss the relationship of rock type and its suitability to being an aquifer.
3040-4ccc.	Discuss the water table and how it varies from one location to another.
3040-4ddd.	Distinguish between porosity and permeability.

	Science Benchmarks
3040-4eee.	Discuss ordinary water wells and artesian wells and diagram each.
3040-4fff.	Identify three factors that determine the kind and quantity of mineral matter dissolved in ground water. Name the most common mineral that makes our water hard.
3040-4ggg.	Discuss ways in which our ground water can be contaminated by human means.
3040-4hhh.	Describe the features that occur in areas of thermal ground water such as in Yellowstone National Park.
3040-4iii.	Discuss the effect of permafrost on ground water.
3040-4jjj.	Discuss Karst topography and the features that occur in such areas.
3040-4kkk.	Describe the formation of limestone caves and the features within them.
3040-4lll.	Describe the ways that running water attacks bedrock and its erosive capacity.
3040-4mmm.	Define stream discharge and discuss the factors that determine the carrying power of a stream.
3040-4nnn.	Explain how running water gets its energy from the sun.
3040-4ooo.	Describe the parameters of a river system including waterbed, base level, canyons, potholes, plunge pools, etc.
3040-4ppp.	Define base level and its relationship to stream velocity and pressure gradient.
3040-4qqq.	Explain how and why waterfalls form.
3040-4rrr.	Discuss stream deposition including terms such as levee, delta, alluvial fan, back swamp, oxbow lakes, and cut-offs.
3040-4sss.	Discuss flooding and flood prevention.
3040-4ttt.	Describe valley glaciers and ice sheets.
3040-4uuu.	Explain how scientists identified the ice ages and the lands involved.
3040-4vvv.	Locate the centers of accumulation during the ice ages and the extent of the ice sheets in North America.
3040-4www.	Discuss theories that explain how the ice ages occurred.
3040-4xxx.	Describe the movement of glacial ice and its erosive capacity.

	Science Benchmarks
3040-4yyy.	Describe the formation of glacial ice from snow and explain the factors that affect its movement.
3040-4zzz.	Describe how glaciers deposit material and be able to identify features such as terminal moraines, glacial till, eskers, Kames, kettles, drumlins, erratics, outwash plains, etc.
3040-4aaaa.	Describe the three types of lakes resulting from glaciation.
3040-4bbbb.	Discuss valley glacier features such as aretes, glacial Troughs, hanging valley, waterfalls, cirques, Tarns, horns, etc.
3040-4cccc.	Identify two kinds of areas where wind erosion is most effective and list the particle sizes usually carried by winds.
3040-4dddd.	Describe the formation of sand dunes, dune migration, and discern between the windward and leeward side.
3040-4eeee.	Discuss the formation of the desert paramount and deflation.
3040-4ffff.	Describe the characteristics of loess and identify where and why it deposited.
3040-4gggg.	Describe the parameters of waves on water.
3040-4hhhh.	Explain the three causes of waves on water movements in undertows, rip currents, and long shore currents.
3040-4iiii.	Name, discuss the origin, and give examples of three types of shorelines.
3040-4jjjj.	Describe corals and the formation of coral reefs, fringing reefs, barrier reefs, and atolls.
3040-4kkkk.	Identify coastline features such as spits, offshore bars, hooks, and bay mouth bars.
3040-4llll.	Define Tsunami and explain its relationship to earthquakes
3040-4mmmm.	Define plate Tectonics and list several main plates and their movements.
3040-4nnnn.	Identify Alfred Wegener and list several evidences he used to support the theory of continental drift.
3040-4oooo.	Explain why most of the earth's volcanoes and earthquakes occur at plate boundaries.
3040-4pppp.	Describe plate behavior at converging boundaries and list examples of present and past converging boundaries.

	Science Benchmarks
3040-4qqqq.	Define subduction and name the features that occur there.
3040-4rrrr.	Define and locate a sliding boundary.
3040-4ssss.	Define terrain and explain how to identify it.
3040-4tttt.	Explain what a craton is and how it is related to the shield of a continent.
3040-4uuuu.	Define earthquake and discuss the various causes of earthquakes.
3040-4vvvv.	Locate the epicenter of earthquakes using charts made from the arrival of P, S, and L waves on seismograph using the triangulation method.
3040-4wwww.	Explain how a seismograph works.
3040-4xxxx.	Explain the relationship of depth of focus of an earthquake and bedrock type to the damage done.
3040-4yyyy.	Explain the system of the Richter Scale in explaining earthquake Magnitude.
3040-4zzzz.	Discuss how earthquake waves are used to study the earth's interior.
3040-4aaaaa.	Discuss historical and modern earthquakes and their resulting damages including Tsunamis.
3040-4bbbbb.	Discuss the differences between active and passive continental boundaries and give examples of each.
3040-4ccccc.	Using plate tectonics, explain how various mountain ranges in the world formed.
3040-4ddddd.	Define anticline, syncline, limb, dip and strike.
3040-4eeee.	Discuss how using the geology of rock layers of the crust is used to locate oil and valuable minerals.
3040-4ffff.	Discuss how changes in elevation are measured.
3040-4ggggg.	Discuss the significance of the earth being called the water planet and locate the oceans of the earth.
3040-4hhhhh.	Discuss the historical development of oceanography.
3040-4iiii.	Define salinity and discuss the major ions found in ocean water.
3040-4jjjj.	Discuss the future uses of the oceans for food and mineral resources.

	Science Benchmarks
3040-4kkkkk.	Locate and define the submarine features of the ocean floor and continental margins.
3040-4lllll.	Discuss the sediments of the ocean floor formation both organic and non-organic methods.
3040-4mmmm m.	Define the various currents of the ocean and list the causes.
3040-4nnnnn.	Discuss the relationship of the wind and currents.
3040-4ooooo.	Explain how the rotation of the earth affects the currents of the oceans.
3040-4pppppp.	Define astronomy and cosmology.
3040-4qqqqq.	Recognize the various types of telescopes using diagrams.
3040-4rrrrr.	Discuss the advantages of each type of telescope in studying the universe.
3040-4sssss.	Explain how spectroscopes may be used to identify the composition of stars, planets, and their atmospheres.
3040-4ttttt.	Define light year and use the distances to understand the vastness of space
3040-4uuuuu.	Discuss the constellations.
3040-4vvvvv.	List the various star types and relate our sun to them.
3040-4wwww w.	Discuss the life history of stars.
3040-4xxxxx.	Discuss the hypothesis of the evolution of the universe including the big bang.
3040-4yyyyy.	Define galaxy and list three types of galaxies.
3040-4zzzzz.	Discuss black holes and their relationship to galaxies and the inter change of mass and energy that may occur there.
3040-4aaaaaa.	Discuss the source of energy in the sun.
3040-4bbbbbb.	Discuss the solar wind and its effect on earth.
3040-4cccccc.	Name the planets and explain their orbits using Kepler's laws of motion.
3040-4ddddd.	List major properties and the significance of each of the bodies in the solar system

	Science Benchmarks
3040-4eeeeee.	Discuss meteors and comets.
3040-4ffffff.	Discuss and locate various moons in the solar system.
3040-4gggggg.	Describe the various features of earth's moon.
3040-4hhhhhh.	Discuss the Apollo space program that took men to the moon.
3040-4iiiiii.	Discuss lunar and solar eclipses.
3040-4jjjjjj.	Discuss the phases of the moon and their relation to the tides of the ocean.
3040-4kkkkkk.	Explain earth's rotation and how it relates to time zones.
3040-4llllll.	Discuss the tilt of the axis of earth's orbit and how it causes the seasons.
3040-4mmmmmm.	Explain when the seasons start and end.
3040-4nnnnnn.	Define meteorology and list the layers of the atmosphere.
3040-4oooooo.	Identify factors that cause water vapor content in the air to vary and the relationship of dust particles in the air to condensation.
3040-4pppppp.	Discuss the relationship of the sun's energy to resulting weather.
3040-4qqqqqq.	Discuss how heat is transferred in the atmosphere.
3040-4rrrrrr.	Identify the warmest and coldest hours of the day and explain why they occur when they do.
3040-4sssss.	Identify the warmest and coldest month and explain it occurs when it does.
3040-4ttttt.	Define temperature inversion and explain the effects of inversions on located weather.
3040-4uuuuuu.	Discuss the relative heating and cooling of land and water and the resulting effects.
3040-4vvvvvv.	List methods used to measure temperatures.
3040-4wwwwww.	Identify the cause of air pressure and the rate at which it drops with altitude.

	Science Benchmarks
3040-4xxxxxx.	Describe the instruments used to monitor air pressure.
3040-4yyyyyy.	Define isobar and how they are used on weather maps to locate high and low pressure systems.
3040-4zzzzzz.	Explain the relationship between the winds and pressure systems.
3040-4aaaaaaa.	Locate the earth's wind belts and explain their shifting during the year.
3040-4bbbbbbb.	Explain monsoons and sea breezes.
3040-4ccccccc.	Explain the relationship between the three states of matter as it pertains to water in the atmosphere.
3040-4ddddddd.	Describe the relationship of temperature to evaporation and condensation.
3040-4eeeeeee.	Explain how to measure relative humidity and its impact on the weather.
3040-4ffffff.	Discuss dew point, condensation nuclei, fog, and frost.
3040-4ggggggg.	Explain how clouds form and list the various types of clouds.
3040-4hhhhhhh.	Discuss the types of weather associated with various cloud types.
3040-4iiiiiii.	Discuss adiabatic temperature changes.
3040-4jjjjjjj.	Explain the lifting condensation level.
	Standard 4: EARTH & SPACE SCIENCE Demonstrate an understanding of the structure and systems of the Earth, other bodies in the universe, and their interactions.
3040-4a.	Describe the various types of precipitation.
3040-4b.	Discuss the different types of air masses and their moisture content and temperature.
3040-4c.	Define warm front, cold front, and occluded front and diagram the associated weather.

	Science Benchmarks
3040-4d.	Describe the wind patterns in a low- pressure system and the types of weather associated around a low.
3040-4e	Describe the wind patterns in a high- pressure system and the types of weather associated around a high.
3040-4f.	Explain how tornadoes and hurricanes form and the dangers associated with them.
3040-4g.	Explain lightning and discuss the danger associated with it.
3040-4h.	Describe how radar and satellites are used to track weather systems.
3040-4i.	Explain climate and the causes of the variety of climates throughout the world.
3040-4j.	Discuss the effect of topography on climate.
3040-4k.	Discuss how fossils are used to study past occurrences on the earth.
3040-4l.	Discuss radioactive dating.
3040-4m.	Discuss the changes in the earth over geologic time.
3040-4n.	Discuss the changes in life on the earth over geologic time.
	Standard 5: LIFE & ENVIRONMENTAL SCIENCE Demonstrate an understanding of the characteristics and structures of living things, the processes of life, and how living things interact with one another and their environment.
3040-5a.	Discuss the four parts of the environment that are essential to life on earth (or any other planet.)
3040-5b.	Differentiate between a renewable resource and nonrenewable resource and give several examples of each.
3040-5c.	Identify several problems connected with the use of water as a resource and explain why it is a renewable resource.
3040-5d.	Define ore mineral and gangue and the difference between resources and reserves.
3040-5e.	Discuss how ores are mined and discuss the impact of the process on the environment.
	Standard 7: SCIENCE IN SOCIAL & PERSONAL PERSPECTIVES Use scientific information and skills to make decisions about themselves, Wisconsin, and the world in which that relationship influences human activities.
3040-7a.	Discuss the laws in Wisconsin as they pertain to water rights as per use both privately and industrially.

	Science Benchmarks
3040-7b.	Discuss the laws in Wisconsin as they relate to contamination and the clean up of water.
3040-7c.	Discuss the impact of mining ores and their impact both economically and environmentally.
3040-7d.	Discuss the energy sources and how they have changed throughout history and discuss how they are likely to change in the future.
3040-7e.	View and ride in an electric car and discuss the likelihood of use of such a vehicle in the future.
3040-7f.	Discuss the use of coal as an energy source compared to alternate forms of energy.
3040-7g.	Discuss the impact that understanding plate tectonics has had on mineral discoveries and ultimately on modern day economies.
3040-7h.	Discuss the effects of long-range weather forecasts on the economy of our country.
3040-7i.	Discuss how the oceans will likely become an important food source for future generations via growth of aquaculture.

Curriculum Map

Course Title: Earth Science

<u>MONTH</u>	<u>UNITS/CONCEPTS</u>	<u>CORRESPONDING BENCHMARKS</u>
SEPTEMBER 1 Week 1 Week 2 Weeks 2 Weeks	<u>Introduction to Earth Science and Laboratory Safety Instruction</u> <u>Earth Shape, Dimensions, structure and Internal Heat</u> <u>Mineralogy</u> <u>Rocks and Ores</u>	4A-4F, 5A, 4G-4L, 4M-4Z, 2B-2G, 4AA-4MM, 7C, 6O, 5D, 5E, 2H-2K
OCTOBER 2 Weeks 1 Week	<u>Energy and Natural Resources</u> <u>Weathering and Mass Movement</u>	4NN-4RR, 5B, 5C, 5D, 5E, 7D, 7E, 7F, 6S, 6R, 6Q, 4SS-4XX
NOVEMBER 2 Weeks 11/2 Weeks	<u>Hydrogeology, Water Supply, and Water Quality</u> <u>Rivers</u>	4YY-4KKK, 7A, 7B, 6P, 6N, 2L-2M, 4LLL-4RRR

Curriculum Map

Course Title Earth Science

<u>MONTH</u>	<u>UNITS/CONCEPTS</u>	<u>CORRESPONDING BENCHMARKS</u>
DECEMBER 2 Weeks 1 Week	<u>Glaciers and Pleistocene Geology</u> <u>Erosion and Weathering</u>	4SSS-4BBBB, 2N-2O, 4CCCC-4LLLL
JANUARY 1 Week 2 Weeks 2 Weeks	<u>Plate Tectonics</u> <u>Volcanology</u> <u>Seismology</u>	4MMMM, -4TTTT, 7G, 6T, 4UUUU-4AAAAA, 2P, 6A
FEBRUARY 1 Week 2 Weeks	<u>Landform Geology</u> <u>Oceanography</u>	4BBBBB-4FFFFF, 4GGGGG-4OOOOO, 7I, 6B-6D
MARCH 2 Weeks 2 Weeks	<u>Astronomy</u> <ul style="list-style-type: none"> Stars and Galaxies <u>Solar System</u>	4PPPPP- 4ZZZZZ, 2Q, 4AAAAAA- 4FFFFFFF, 6D-6F

Curriculum Map

Course Title: Earth Science

<u>MONTH</u>	<u>UNITS/CONCEPTS</u>	<u>CORRESPONDING BENCHMARKS</u>
APRIL 1 Week 1 1/2 Weeks 1 Week 1 Week	<u>The Moon</u> <u>Earth Motion and Time</u> <u>Meteorology</u> <u>Atmosphere and Heating</u> <u>Atmospheric Pressure and Winds</u>	4GGGGGG-4JJJJJ, 6G-6H, 2R, 4KKKKKK-4MMMMMM, 4NNNNNN-4UUUUUU, 4WWWWW-4BBBBBB
MAY 1 Week 1 Week 1 Week 1 Week	<u>Evaporation, Condensation, and Precipitation</u> <u>Air Masses and Fronts</u> <u>Storms and Forecasts</u> Earth History	4CCCCCCC-4FFFFFFF, 2S, 6I-6J, 4HHHHHH-4JJJJJ, 2T-2T, 6K-6L, 4A-4J, 7H, 6M, 4K-4N

Course #3000 Fundamentals of Laboratory Science / #3003 Applications in Physical Science

Fundamentals of Lab. Science – This introductory course which is lab oriented prepares students for advanced Science courses. It encompasses the topics of measurement, periodicity, chemical bonding and reactions, electricity, magnetism, sound and light. Students are strongly encouraged to take this course prior to enrollment in other science offerings.

Applications in Physical Science – Applications in Physical Science is taught with hands on activities encompassing the topics of measurement, periodicity, chemical bonding and reactions, electricity, magnetism, sound, and light. This course will not meet 4-year university/college entrance requirements.

	Science Benchmarks
	The student will:
	Standard 1: NATURE OF SCIENCE Understand that science is ongoing and inventive, and that scientific understandings have changed over time as new evidence is found.
3000/03-1a.	Construct arguments that demonstrate how differing models and explanations of events can result from similar evidence. <ul style="list-style-type: none">• How do scientific understandings change as a result of new discoveries?
3000/03-1b.	Show how cultures and individuals have contributed to the development of major ideas in the earth, space, and physical sciences as well as identify the cultural conditions usually present during these great times of discovery.
3000/03-1c.	Show how basic research and applied research can lead to new discoveries, inventions, and applications.
3000/03-1d.	Explain how science uses assumptions about the natural world and themes that describe the natural world to teach the goal of understanding the universe.
	Standard 2: SCIENCE INQUIRY Investigate questions using scientific methods & tools, revise their personal understanding to accommodate knowledge, & communicate these understandings to others.
3000/03-2a.	Give examples and show how basic systems, models, and explanations can be used to give quick and reasonable solutions that are accurate enough for basic needs.
3000/03-2b.	Use evidence gained to replace inaccurate personal models and explanations of science related themes.
3000/03-2c.	Re-examine past evidence and reasoning that led to conclusions drawn from investigations.
3000/03-2d.	Identify and analyze social issues, literature, and observations of phenomenon related to science as well as ask questions about, design investigations for, and predict outcomes that may result from such investigations of these issues.
3000/03-2e.	Evaluate and critique data collective procedures and results during an investigation and then suggest ideas for improvement.

	Science Benchmarks
3000/03 -2f.	During an investigation, students will choose the best data collecting procedures and materials available, use them correctly, and calculate uncertainty of resulting data. <ul style="list-style-type: none"> • Use of metric system and basic lab tools for measuring length, mass, volume, and temperature. • List and explain reasons for important lab safety rules and describe how to respond to possible lab emergencies.
3000/03 -2g.	Based on existing explanations and models, develop logical explanations for the results of their own investigations.
3000/03 -2h.	Evaluate articles and reports in popular press, in scientific journals, on TV, and on the Internet for accuracy, validity, experimental design, sampling, and treatment of data.
	Standard 3: PHYSICAL SCIENCE Demonstrate an understanding of the physical and chemical properties of matter, the form and properties of energy, and the way in which matter and energy interact.
3000/03 -3a.	Describe the structure and properties of atoms, molecules, and matter during physical and chemical interactions.
3000/03 -3b.	Explain the forces that hold the atom together and illustrate how nuclear interactions change the atom.
3000/03 -3c.	Illustrate exchanges of energy, including the law of conservation of energy, during chemical and atomic/nuclear reactions.
3000/03 -3d.	Explain the exchange of mass in atomic/nuclear reactions.
3000/03 -3e.	Explain how simple and complex substances interact to produce new substances.
3000/03 -3f.	Identify patterns in chemical and physical properties and use them to predict likely chemical & physical changes and interactions.
3000/03 -3g.	Investigate and identify the types of <i>*chemical interactions</i> including endothermic, exothermic, oxidation, photosynthesis, and acid/base reactions. <i>*synthesis, decomposition, single-replacement, double-replacement reactions.</i>
3000/03 -3h.	Qualitatively and quantitatively analyze changes in the motion of objects and the forces that act on them and present data both algebraically and graphically.
3000/03 -3i.	Understand the forces of gravitation, electromagnetic force, intermolecular force, and explain their impact on the universal system, including strong and weak force.
3000/03 -3j.	Investigate and describe models of light, heat, and sound including similarities and differences in the way these energy forms behave.

	Science Benchmarks
3000/03-3k.	Use the science themes and knowledge of chemical, physical, atomic, and nuclear interactions to explain common occurrences in the physical world including changes in materials, living things, earth's features, stars, and the law of conservation of energy and law of conservation of mass.
	Standard 4: EARTH & SPACE SCIENCE Demonstrate an understanding of the structure and systems of the Earth, other bodies in the universe, and their interactions.
3000/03-4a.	Use the science themes to distinguish between the earth's internal and external energy systems and how these sources of energy affect the earth. <ul style="list-style-type: none"> • Radioactive decay of radioactive isotopes, plate tectonics, gravity, and the sun.
3000/03-4b.	Analyze the benefits, costs, and limitations of past, present, and projected use of resources and technology and explain the consequences to the environment. <ul style="list-style-type: none"> • Mining ores such as iron, zinc, copper, coal, etc. Benefits of mining vs. cost to environment.
3000/03-4c.	Describe the theories of the origins and evolution of the universe and solar system, including the earth system as part of the solar system, and relate these theories and their implications to geologic time on the earth using the study of cosmology.
3000/03-4d.	Describe how the origin of the universe is not completely understood but that there are current ideas in the study of cosmology that attempt to explain its origin. <ul style="list-style-type: none"> • Big bang theory.
3000/03-4e.	Analyze the geochemical and physical cycles of the earth and use them to describe movements of matter. <ul style="list-style-type: none"> • Glaciers and rivers.
	Standard 5: LIFE & ENVIRONMENTAL Demonstrate an understanding of the characteristics and structures of living things, the processes of life, and how living things interact with one another and their environment.
3000/03-5a.	Describe how the physical and earth sciences are intricately connected to the processes of living things, including the following: 1 • Atoms/elements and molecules/compounds as building blocks of life. 2 • Acid/base reactions in the body. 3 • Chemical and physical changes due to bodily processes. 4 • Photosynthesis. 5 • Geochemical cycles. 6 • Structure, function, and limitations of the ear and eye. 7 • Electrical impulses in the body. 8 • Motion of the body. 9 • Forces exerted on the body.

	Science Benchmarks
	Standard 6: SCIENCE APPLICATIONS Demonstrate an understanding of the relationship between science and technology and the ways in which that relationship influences human activities.
3000/03-6a.	Design, build, evaluate, and revise models and explanations related to the earth, space, and physical sciences.
3000/03-6b.	Analyze the positive and negative impacts scientific or technological innovation has on individuals and society.
3000/03-6c.	Choose a specific problem in our society, identify logical scientific or technological solutions to that problem, and argue its merits.
	Standard 7: SCIENCE IN SOCIAL & PERSONAL PERSPECTIVES Use scientific information and skills to make decisions about themselves, Wisconsin, and the world in which they live.
3000/03-7a.	Demonstrate how the underlying themes of science and scientific methods can be used to make real-life decisions about the future, including decisions about careers, work places, life-style, use of resources, and the environment.
3000/03-7b.	Use science themes and knowledge of the earth, space, and physical sciences to analyze the positive and negative consequences concerning resource management in the local and greater communities and its impact on life.
3000/03-7c.	Evaluate proposed policy recommendations (local, state, and national) in science and technology for validity, evidence, reasoning, and long and short-term implications.
3000/03-7d.	Show how policy decisions in science depend on many factors including social values, ethics, beliefs, time frames, and considerations of science and technology.
3000/03-7e.	Advocate solutions to scientific or technological problems by constructing a plan based on current scientific knowledge and reasoning.
3000/03-7f.	Evaluate data and sources of information when using scientific information to make decisions. <ul style="list-style-type: none"> • Use scientific tools of measurement (balances, graduated cylinders, etc.) properly to make accurate measurements.

Curriculum Map

Course Title: Fundamentals of Lab Science/Applications in Lab Science

<u>MONTH</u>	<u>UNITS/CONCEPTS</u>	<u>CORRESPONDING BENCHMARKS</u>
AUGUST Unit #1 (4 weeks)	<u>Introduction to Lab Science</u> <ul style="list-style-type: none"> Scientific Method/Measurement Lab Safety Properties of Matter 	1B, 1C 2A, 2D, 2E, 2F 3I 7A (video), 7F
SEPTEMBER Unit #2 (3 weeks)	<div style="text-align: center;">↓</div> <u>Atomic Structure and Theory</u> <ul style="list-style-type: none"> Atomic Models Subatomic Particles Forces 	1A, 1C 2A, 2B, 2C 3B, 3I 6A (Steve & Eliz project) 7F
OCTOBER Unit #3 (3 weeks)	<div style="text-align: center;">↓</div> <u>Periodic Table</u> <ul style="list-style-type: none"> Arrangement Properties 	1A 2B, 2C, 2G <div style="display: inline-block; vertical-align: middle; font-size: 3em; margin: 0 10px;">}</div> Alkaline Earth Flame Test Halogen Lab
NOVEMBER Unit #4 (3-4 weeks)	<ul style="list-style-type: none"> Design SPDF Radioactivity <u>Bonding</u> <ul style="list-style-type: none"> Types of Bonds <ul style="list-style-type: none"> Ionic Covalent 	3A, 3C, 3D, 3F 4A, 4B 5A1 6A (Kelly's lab), 6B 7F 2E, 2F 3A, 3E, 3F 6A 7F

Curriculum Map

Course Title: Fundamentals of Lab Science / Applications in Lab Science

<u>MONTH</u>	<u>UNITS/CONCEPTS</u>	<u>CORRESPONDING BENCHMARKS</u>
DECEMBER	<u>Bonding (continued)</u> <ul style="list-style-type: none"> • Oxidation Numbers • Chemical Formulas • Chemical and Physical Properties 	
Unit #5 (3 weeks)	<u>Chemical Reactions</u> <ul style="list-style-type: none"> • Law of Conservation of Mass 	1C 3A, 3C, 3E, 3G, 3K
JANUARY	<u>Chemical Reactions (continued)</u> <ul style="list-style-type: none"> • Acids and Bases 	6A, 6B, 6C 7B, 7E, 7F
Unit #6 (2 weeks)	<u>Waves</u> <ul style="list-style-type: none"> • Light • Heat • Energy Forms 	2E, 2F 3J 6A 7F
FEBRUARY	<u>Sound</u> <ul style="list-style-type: none"> • Properties • Applications • Anatomy/Structure of Ear • Noise Population 	2C, 2E, 2F, 2H 3J 5A6 6C (Noise Population) 7C, 7D (Noise Population)
Unit #7 (3 weeks)		
Unit #8 (5 weeks)	<u>Light</u> <ul style="list-style-type: none"> • EM Spectrum 	1A (wave vs. particle), 1C
MARCH	<u>Light (continued)</u> <ul style="list-style-type: none"> • Reflection and Refraction • Color and Sight • Optical Instruments • Applications 	2C, 2E, 2F, 2H 3C, 3E (radioactivity), 3J 5A (photosynthesis, eye) 6B

Curriculum Map

Course Title: Fundamentals of Lab Science/Applications in Lab Science

<u>MONTH</u>	<u>UNITS/CONCEPTS</u>	<u>CORRESPONDING BENCHMARKS</u>
APRIL Unit #9 (3 weeks)	<u>Electricity</u> <ul style="list-style-type: none"> • Static Electricity • Electric and Magnetic Fields • Circuits • Power and Energy • Applications <ul style="list-style-type: none"> - Calc. cost. 	2D (Kelly's meter reading project), 2E, 2F 5A 7B 9A (circuits)
MAY Unit #10 (1 week)	<u>Magnetism</u> <ul style="list-style-type: none"> • How Magnets Work • Earth as a Magnet 	2B, 2E, 2F 3I

Course #3020 Modern Chemistry

Modern Chemistry is a study of matter and the reasons for its physical and chemical properties. Early course work develops the model for an atom. Numerous experiments and demonstrations are used to relate the topics to the real world. Periodicity, chemical bonds, and rates of reactions are examples of topics included in the course. This course is intended for students who do plan to attend college and pursue a science-oriented career.

	Science Benchmarks
	The student will:
	Standard 1: NATURE OF SCIENCE Understand that science is ongoing and inventive and that scientific understandings have changed over time as new evidence is found.
3020-1a.	Identify how science is based on assumptions about the natural world; learn to use laboratory systems, models, and explanations to make quick and reasonable suggestions to resolve questions and problems dealing with the natural world.
3020-1b.	Construct arguments that show how healthy conflict about basic research and applied research can contribute to different models and perceptions that lead to varied inventions and applications.
3020-1c.	Connect the major themes of science to human progress and explain how this will direct the students' decisions about careers, work places, life styles, and resources available.
3020-1d.	Having had experience identifying cultural conditions that were present in periods of past significant scientific discovery, construct defensible visions of the future.
3020-1e.	Re-examine the evidence and reasoning used in classic investigations and see how the culture and the individuals involved were major contributors to ideas of life, space, and physical science we enjoy today.
3020-1f.	Read biographical material about a select list of famous scientists and include a review of that reading in written reports and classroom presentations.
	Standard 2: SCIENCE INQUIRY Investigate questions using scientific methods and tools, revise their personal understanding to accommodate knowledge, and communicate these understandings to others.
3020-2a.	Using current social issues and incorporating the scientific method, develop hypothetical issues to research and propose ways to manage the question.
3020-2b.	Select and evaluate an issue in the area of scientific study to conduct an actual investigation in a safe and responsible fashion. This work should require the creative use of the scientific method.
3020-2c.	In doing the research noted in standard 2b above, subject the work they have done to evaluate its procedural value, completeness, and degree of precision.
3020-2d.	Use explanations and models available in the physical sciences to substantiate research results.
3020-2e.	Evaluate articles and governmental policy issues from various sources and comment on their accuracy, experimental design, and implications.

	Science Benchmarks
	Standard 3: PHYSICAL SCIENCE Demonstrate an understanding of the physical and chemical properties of matter, the form and properties of energy, and the ways in which matter and energy interact.
3020-3a.	Describe atomic structure and properties of atoms, molecules and matter during physical and chemical interactions and use this knowledge to explain how atoms are held together in the molecule.
3020-3b.	Construct mental and physical models of atomic and molecular bonding to understand the properties of materials.
3020-3c.	Explain the source of and calculate the values of energy changes that take place in chemical interactions and physical changes.
3020-3d.	Explain how substances, both simple and complex, interact with one another to produce new substances.
3020-3e.	Apply knowledge of balancing equations to the solving of stoichiometric calculations.
3020-3f.	Identify patterns in chemical and physical properties and use them to predict likely reactions and products.
3020-3g.	Through investigation, identify the types of chemical interactions such as endothermic, exothermic, oxidation, and reduction.
3020-3h.	Describe models of light and heat and through investigations, describe similarities and differences in the way these forms of energy behave.
3020-3i.	Using scientific themes, illustrate the law of conservation of energy during chemical change.
3020-3j.	Use science themes to explain common chemical and physical changes noted in the world around our classroom.
	Standard 4: EARTH & SPACE SCIENCE Demonstrate an understanding of the structure and systems of the Earth, other bodies in the universe, and their interactions.
3020-4a.	Analyze the benefits, costs, and limitations of past, present, and projected use of resources and technology. Explain the consequences to the environment. This work is to be done in the context of a student project or a research paper.
	Standard 6: SCIENCE APPLICATIONS Demonstrate an understanding of the relationship between science and technology and the ways in which that relationship influences human activities.
3020-6a.	Design or build and evaluate, models and explanations related to the environment and physical sciences.
3020-6b.	Analyze the costs, benefits, or problems resulting from a scientific or technological innovation, including implications for the individual and the community.
3020-6c.	Show how a major scientific or technological change has had an impact on work, leisure, and home.
3020-6d.	Choose a specific problem in society, identify alternative scientific or technological solutions to the problem and argue its merits.

	Science Benchmarks
	Standard 7: SCIENCE IN SOCIAL & PERSONAL PERSPECTIVES Use scientific information and skills to make decisions about themselves, Wisconsin, and the world in which they live.
3020-7a.	Using the science themes and knowledge of the environment and physical science, analyze the costs, risks, benefits and consequences of a proposal concerning resources management in the community and determine the potential impact of the proposal on life in the community and the region.
3020-7b.	Evaluate proposed policy recommendations in science and technology for validity, evidence, reasoning, and implications (both long and short-term).
3020-7c.	Show how policy decisions in science depend on many factors, including social values, ethics, beliefs, time frames, and considerations of science and technology.
3020-7d.	Investigate how current plans or proposals concerning resource management, scientific knowledge, or technology development will have an impact on the environment, ecology, and quality of life in a community or region.
3020-7e.	Evaluate data and sources of information when using scientific information to make decisions.

Curriculum Map

Course Title: Modern Chemistry

<u>MONTH</u>	<u>UNITS/CONCEPTS</u>	<u>CORRESPONDING BENCHMARKS</u>
SEPTEMBER Unit #1 (4-5 weeks)	<u>Atomic Structure</u> <ul style="list-style-type: none">• Nuclear Composition• Isotopes• Mass No./Atom No.	1B, 1D 3A 6A
OCTOBER Unit #2 (4-5 weeks)	<u>Chemical Names and Formulas</u> <ul style="list-style-type: none">• Ions<ul style="list-style-type: none">- Mono- Polyatomic• Formulas of Compounds• Naming of Compounds	3D, 3H 6A
NOVEMBER Unit #3 (4-5 weeks)	<u>Chemical Quantities</u> <ul style="list-style-type: none">• Gram Formula Masses• Gases and the Mole• Empirical Formulas	6A
DECEMBER Unit #4 (3-4 weeks)	<u>Chemical Reactions</u> <ul style="list-style-type: none">• Identification of Reaction Types• Predicting Products of Reactions• Net. Ionic Equations	1A, 1D 3C, 3D, 3E, 3G, 3H 6A

Curriculum Map

Course Title: Modern Chemistry

<u>MONTH</u>	<u>UNITS/CONCEPTS</u>	<u>CORRESPONDING BENCHMARKS</u>
JANUARY Unit #5 (5-6 weeks)	<u>Stoichiometry</u> <ul style="list-style-type: none"> Equations & the Amounts Involved in the Reactions Limiting Reagents Percent Yield 	1C 3C, 3E 4A 6A
FEBRUARY Unit #6 (4-5 weeks)	<div style="text-align: center;">↓</div> <u>States of Matter</u> <ul style="list-style-type: none"> Characteristics of Phases of Matter Energy Associated with Phase Changes 	4A
MARCH Unit #7 (4-5 weeks)	<u>States of Matter</u> (continued) <ul style="list-style-type: none"> Phase Diagrams <u>Thermochemistry</u> <ul style="list-style-type: none"> Specific Heat Ectothermic & Endothermic Reactions Thermochemical Equations Hess's Law 	1A, 1B 3B, 3C, 3E, 3F, 3G
APRIL Unit #8 (4-5 weeks)	<u>Gas Laws</u> <ul style="list-style-type: none"> Model of Gases Gas Laws Real Gases vs. Ideal Gases 	1A 3H 6A

Curriculum Map

Course Title: Modern Chemistry

<u>MONTH</u>	<u>UNITS/CONCEPTS</u>	<u>CORRESPONDING BENCHMARKS</u>
MAY Unit #9 (4-5 weeks)	<u>Electronic Structures</u> <ul style="list-style-type: none"> • Atomic Orbitals • Light and Spectra • Wave Nature of Matter 	1B, 1D 3A, 3F 6A
JUNE Unit #10 (1 ½ weeks) Unit #11 (1 ½ weeks)	<u>Ionic</u> <ul style="list-style-type: none"> • Electrons, Cations, & Anions • Properties of Ionic Compounds • Metallic Bonds <u>Project Work</u> <ul style="list-style-type: none"> • Chemistry of Social Issues • Biographical Review of Famous Scientists 	3A 1E 2A 6B

Course #3005 Physics	
Physics teaches units in mechanics, properties of matter, waves, sound, light, electricity, and magnetism. Lab experiments are done with toys, ball games, musical instruments, and electrical generators to study the principles of physics.	
	Science Benchmarks
	The student will:
	Standard 1: NATURE OF SCIENCE Understand that science is ongoing and inventive, and that scientific understandings have changed over time as new evidence is found.
3005-1a.	Discuss and explain how different cultures and cultural conditions have contributed to or hindered scientific development (e.g. examples such as Aristotle, Galileo, Newton, and Einstein).
3005-1b.	Describe the importance of models and diagrams in physics and relate them to basic and applied research.
3005-1c.	List the fundamental SI units and the quantities they describe.
3005-1d.	Demonstrate the ability to dimensionally analyze a quantity to verify the validity of the expression.
	Standard 2: SCIENCE INQUIRY Investigate questions using scientific methods and tools, revise their personal understanding to accommodate knowledge, and communicate these understandings to others.
3005-2a.	Describe and apply the processes of the scientific method.
3005-2b.	Evaluate data collection procedures, discern between valid and invalid data, and identify sources of error in a typical laboratory setting.
3005-2c.	Demonstrate the ability to differentiate between accuracy and precision in laboratory investigations.
	Standard 3: PHYSICAL SCIENCE Demonstrate an understanding of the physical and chemical properties of matter, the form and properties of energy, and the ways in which matter and energy interact.
3005-3a.	Describe motion in terms of position, displacement, velocity, acceleration, and time.
3005-3b.	Construct and interpret graphs of position, velocity, and acceleration vs. time.
3005-3c.	Define and provide examples of a reference frame.
3005-3d.	Apply kinematic equations to calculate distance, time, or velocity under conditions of constant acceleration.
3005-3e.	Compare the motions of different objects in free fall and relate the motion to that of objects with uniform acceleration.
3005-3f.	Distinguish between vector and scalar quantities.
3005-3g.	Demonstrate the ability to add/subtract vectors both graphically and analytically, as well as multiplying/dividing a vector by a scalar.

	Science Benchmarks
3005-3h.	Resolve a given vector quantity into its perpendicular components using right angle trigonometry relationships.
3005-3i.	Recognize examples of projectile motion and apply vector resolution and kinematic equations to solve problems involving projectile motion.
3005-3j.	Define the term “force” and list and provide examples of each of the four fundamental forces and their relative strengths.
3005-3k.	Explain the relationship between force, mass, and acceleration. Be able to calculate each from given data, and apply the result to calculate changes in position, velocity, or elapsed time for an object in motion.
3005-3l.	State and apply Newton’s three laws of motion.
3005-3m.	State the conditions necessary for conservation of momentum, define momentum and impulse, and calculate each from given data.
3005-3n.	Describe the transfer of momentum during elastic, inelastic, and explosion type collisions.
3005-3o.	Define and distinguish between work, kinetic, potential, and thermal energies and power, and describe their relationship and calculate each from given data.
3005-3p.	State the necessary conditions for conservation of energy.
3005-3q.	State and apply Coulomb’s Laws of Electrostatics and Magnetism.
3005-3r.	Define static electricity and describe how it is produced.
3005-3s.	Distinguish between the processes of induction and conduction.
3005-3t.	Explain magnetism in terms of the domain theory.
3005-3u.	Explain the concept of a magnetic or electric field and the relationship between electricity and magnetism.
3005-3v.	Describe the ray model of light and apply it to the reflection and refraction of light.
3005-3w.	Identify and describe the basic properties of all waves and contrast between transverse and longitudinal waves, light and sound waves, and pulse waves and periodic waves.
3005-3x.	Apply the relationship between wave speed, frequency, and wavelength to solve problems.
3005-3y.	Describe and provide examples of the various types of wave interactions: reflection, refraction, diffraction, constructive, and destructive interference.
3005-3z.	Describe the following wave phenomena: resonance, polarization, and the Doppler effect.
3005-3aa.	Distinguish between convergence and divergence, concave and convex, real and virtual images, specular and diffuse reflection, and luminous and illuminated objects.

	Science Benchmarks
3005-3bb.	State the additive and subtractive colors of light, show the ability to add and subtract colors, and relate this process to color perception.
	Standard 4: EARTH & SPACE SCIENCE Demonstrate an understanding of the structure and systems of the Earth, other bodies in the universe, and their interactions.
3005-4a.	Relate the motion of a freely falling body in a uniform gravitational field to motion with constant acceleration.
3005-4b.	Recognize gravitational potential as an energy form.
3005-4c.	Apply Newton's universal law of gravitation to find the gravitational force between two masses.
3005-4d.	State Kepler's Laws of Planetary Motion and describe the conditions necessary for placing a satellite in orbit.
3005-4e.	Demonstrate the ability to calculate centripetal acceleration and force and relate those quantities to the Earth, the moon, and the Solar System.
	Standard 5: LIFE & ENVIRONMENTAL Demonstrate an understanding of the characteristics and structures of living things, the processes of life, and how living things interact with one another in their environment.
3005-5a.	Discuss the association(s) between size and scale of living things as well as man made structures and relate those associations to the physical characteristics, needs, and limitations of the animal or structure.
	Standard 6: SCIENCE APPLICATIONS Demonstrate an understanding of the relationship between science and technology and the ways in which that relationship influences human activities.
3005-6a.	Identify examples of scientific/technological advances in the past 50 years, 20 years, 5 years, and/or year and describe how these advances have affected your life. Cite examples such as engines, energy sources, audio-video, computers, space travel and calculators.
3005-6b.	Design and construct a structure that will maximize the time interval over which an object's gravitational potential energy is converted to kinetic energy.
3005-6c.	Design and construct an apparatus that will decrease the force exerted on a falling object by increasing the time interval over which the impulse is delivered.
	Standard 7: SCIENCE IN SOCIAL & PERSONAL PERSPECTIVES Use scientific information and skill to make decisions about themselves, Wisconsin, and the world in which they live.
3005-7a.	Identify the primary areas of physics and identify activities and fields that involve each.

Curriculum Map

Course Title: Physics

<u>MONTH</u>	<u>UNITS/CONCEPTS</u>	<u>CORRESPONDING BENCHMARKS</u>
SEPTEMBER Unit #1 (2 weeks) Unit #2 (3 weeks)	<u>Basic Science</u> <ul style="list-style-type: none"> • Units • Methods • Measurement (Chapter 1) <u>Linear Motion</u> <ul style="list-style-type: none"> • Velocity • Displacement • Position • Acceleration • Graphs (Chapter 2)	1A, 1B, 1C, 1D 2A, 2B, 2C 5A 1A, 1D 2A, 2C 3A, 3B, 3C, 3D
OCTOBER Unit #3	<u>Two Dimension/Vectors</u> <ul style="list-style-type: none"> • Scalars • Components • Projectiles • Satellites • Law of Gravitation • Circular Motion • Torque (Chapter 3)	1A, 1B, 1D 2A, 2B, 2C 3A, 3E, 3F, 3G, 3H, 3I 4A 6A 7A
NOVEMBER Unit #4	<div style="text-align: center;">↓</div> <u>Force</u> <ul style="list-style-type: none"> • Fundamental Forces • Newton's Laws of Mass, Weight, Friction, and Pressure (Chapters 4 and 7)	1A, 1D 2B 3A, 3J, 3K, 3L 4C, 4D, 4E
DECEMBER	<div style="text-align: center;">↓</div>	

Curriculum Map

Course Title: _____ Physics _____

<u>MONTH</u>	<u>UNITS/CONCEPTS</u>	<u>CORRESPONDING BENCHMARKS</u>
JANUARY Unit #5	<u>Momentum</u> <ul style="list-style-type: none"> • IM Theorem • Conservation of Momentum • Center of Mass • Newton's Laws • Collisions (Chapter 6)	2A, 2B, 2C 3C, 3F, 3M, 3N 6C
FEBRUARY Unit #6 Unit #7	<u>Energy and Work</u> <ul style="list-style-type: none"> • Work • Power • KE • PE • Conservation of Energy • Efficiency (Chapter 5) <u>Electrostatics and Magnetism</u> <ul style="list-style-type: none"> • Coulomb's Law • Conservation of Charge 	1D 2A, 2B, 2C 3O, 3P 4B 6A, 6B 7A 1A, 1B, 1D 2B 3F, 3G, 3H, 3Q, 3R, 3S, 3T, 3U 7A
MARCH Unit #8 (1-2 weeks)	<ul style="list-style-type: none"> • Conductors/Insulation, • Lightning (Chapters 17 and 21) <u>Vibrations/Waves</u> <ul style="list-style-type: none"> • Wave types • Wave interactions (Chapter 12)	1A, 1B 2A, 2B, 2C 3W, 3X, 3Y, 3Z

Curriculum Map

Course Title: Physics

<u>MONTH</u>	<u>UNITS/CONCEPTS</u>	<u>CORRESPONDING BENCHMARKS</u>
APRIL Unit #9	<u>Light and Reflection</u> <ul style="list-style-type: none"> • Parallax • Luminous Intensity • Reflection • Scattering • Image Formation • Convergence and Divergence • Color (Chapter 12)	1A, 1B, 1D 2A, 2B, 2C 3V, 3Y, 3AA, 3BB 6A 7A
MAY Unit #10	<u>Refraction</u> <ul style="list-style-type: none"> • Refraction • Snell's Law • T.I.R. Dispersions • Mixing of Lenses • Image Formation (Chapter 15)	1A, 1B 2A, 2B, 2C 3W, 3X, 3Y, 3Z

Course #3033 Advanced/AP Biology

Advanced/AP Biology is a lab science course designed to give students an opportunity to do an in-depth study of life science using college level resources, and AP materials and tests. Some of the topics to be studied include molecular biology, genetics and plant/animal function and development. The course is intended for students with a high interest in biology and who plan post-high school training in a life science related field. Students who take this class will be encouraged to take the Advanced Placement Biology exam.

	Science Benchmarks
	The student will:
	Standard 1: NATURE OF SCIENCE Understand that science is ongoing and inventive, and that scientific understandings have changed over time as new evidence is found.
3033-1a.	Identify how individuals have contributed to the development of major ideas in life and environmental sciences.
3033-1b.	Relate the major themes of science to human progress in understanding science and the world.
3033-1c.	Show how basic and applied research contribute to new discoveries and applications.
	Standard 2: SCIENCE INQUIRY Investigate questions using scientific methods and tools, revise their personal understanding to accommodate knowledge, and communicate these understandings to others.
3033-2a.	Evaluate the data collected during an investigation, critique the data-collection procedures and results, and suggest ways to make any improvements.
3033-2b.	During investigations, choose the best data-collection procedures and materials available, use them competently, and calculate the degree of precision of the resulting data.
3033-2c.	Use the explanations and models found in life and environmental sciences to develop likely explanations for the results of their investigations.
3033-2d.	When studying science content, ask questions suggested by current social issues, scientific literature, and observations of phenomena, and build hypotheses that might answer some of these questions.
	Standard 3: PHYSICAL SCIENCE Demonstrate an understanding of the physical and chemical properties of matter, the forms and properties of energy, and the ways in which matter and energy interact.
3033-3a.	Explain how substances, both simple and complex, interact with one another to produce new substances.
3033-3b.	Using the science themes, explain common occurrences in the physical world.
3033-3c.	Explain exchanges of energy in chemical interactions.
3033-3d.	Using the science themes, illustrate the law of conservation of energy during chemical reactions.
3033-3e.	Using the science themes and knowledge of chemical interactions, explain changes in living things.

	Science Benchmarks
	Standard 4: EARTH & SPACE SCIENCE Demonstrate an understanding of the structure and systems of the Earth, other bodies in the universe, and their interactions.
3033-4a.	Using the science themes, describe theories of the origins and evolution of life.
3033-4b.	Analyze the ethics of past, present, and projected use of DNA technology.
	Standard 5: LIFE & ENVIRONMENTAL SCIENCE Demonstrate an understanding of the characteristics and structures of living things, the processes of life, and how living things interact with one another and their environment.
3033-5a.	Evaluate the normal structures and the general and special functions of cells in single-celled and multiple-celled organisms.
3033-5b.	Understand that cells differentiate and that cells are regulated.
3033-5c.	Explain current scientific ideas and information about the genetic basis of heredity.
3033-5d.	State the relationships between functions of the cell and functions of the organism as related to genetics and heredity.
3033-5f.	Using concepts of evolution and heredity, account for changes in species and the diversity of species, including the influence of these changes on science (e.g., breeding of plants or animals).
3033-5g.	Show how energy is stored in food (plants and animals) and how energy is released by digestion and metabolism.
3033-5h.	Understand the impact of energy on organisms in living systems.
3033-5i.	Investigate how the complexity and organization of organisms accommodate the need for obtaining, transforming, transporting, releasing, and eliminating the matter and energy used to sustain an organism.
3033-5j.	Trace how the sensory and nervous systems of various organisms react to the internal environment and transmit survival or learning stimuli to cause change in behavior or resources.
	Standard 6: SCIENCE APPLICATIONS Demonstrate an understanding of the relationship between science and technology and the ways in which that relationship influences human activities.
3033-6a.	Identify personal interests in science and technology; account for implications that this interest might have for future education, and decisions to be considered.
3033-6b.	Design, build, or use models, diagrams, photos, and explanations related to life sciences.
3033-6c.	Show how a major scientific or technological change has had an impact on health or life styles.

	Science Benchmarks
	Standard 7: SCIENCE IN SOCIAL & PERSONAL PERSPECTIVES. Use scientific information and skills to make decisions about themselves, Wisconsin, and the world in which they live.
3033-7a.	Show how policy decisions in science depend on many factors, including social values, ethics, beliefs, time frames, and considerations of science and technology.
3033-7b.	Discuss how current plans or proposals concerning scientific knowledge or technological development will have an impact on the environment and quality of life.
3033-7c.	Evaluate data and sources of information when using scientific information to make decisions.
3033-7d.	When doing projects, construct a plan that includes the use of current knowledge scientific reasoning.

Curriculum Map

Course Title: Advanced/AP Biology

<u>MONTH</u>	<u>UNITS/CONCEPTS</u>	<u>CORRESPONDING BENCHMARKS</u>
SEPTEMBER Unit #1 Unit #2	<u>Introduction to Science</u> <ul style="list-style-type: none"> Experimentation Skills Semester Projects <u>Review Simple Chemistry</u> <ul style="list-style-type: none"> pH Reactions Organic Molecules <ul style="list-style-type: none"> Carbohydrates Proteins Fats DNA 	1A, 1C 2A, 2B 3A, 3B, 3D, 3E 5I 6A 7C, 7D
OCTOBER Unit #3 Unit #4	<u>Enzymes and Catalysts</u> <ul style="list-style-type: none"> Energy ATP Coupler Reactions <u>Prokaryotic/Eukaryotic Cells</u> <ul style="list-style-type: none"> Cell Organelles/Chemical Functions Cell Membranes 	2C 3B, 3C, 3E 1A 2C 5A, 5G, 5H, 5I 6B
NOVEMBER Unit #5	<ul style="list-style-type: none"> Mitosis Meiosis Cell Cycles Life Cycles <u>Genetics</u> <ul style="list-style-type: none"> Growth DNA RNA Transcription Translation Replication Codes Codons Mutation 	1A, 1B 2D 4B 5B, 5D, 5I 6B

Curriculum Map

Course Title: Advanced/AP Biology

<u>MONTH</u>	<u>UNITS/CONCEPTS</u>	<u>CORRESPONDING BENCHMARKS</u>
DECEMBER Unit #6	<u>Genetics (continued)</u> <ul style="list-style-type: none"> Genetic Diseases <u>Natural Selection</u> <ul style="list-style-type: none"> Gene Pools Evolution Genetic Engineering 	4A, 4B 5C, 5D, 5E 6C 7A, 7B
JANUARY Unit #7	Semester Exams/Review <u>Plant Structure and Physiology</u> <ul style="list-style-type: none"> Plant Function Plant Reproduction Alternation of Generations Plant Growth 	4A 5G, 5H, 5I 6A, 6B
FEBRUARY Unit #8 Unit #9	<u>Animal Anatomy</u> <ul style="list-style-type: none"> Animal Patterns Animal Development Animal Tissues <u>Human Anatomy</u> <ul style="list-style-type: none"> Muscles and Bones Circulation 	3E 5A, 5H 6C 1B 3E 5B, 5I, 5J 6A, 6B, 6C
MARCH	<u>Human Anatomy (continued)</u> <ul style="list-style-type: none"> Immunity Excretory System Respiratory System Digestive System 	7B

Curriculum Map

Course Title: Advanced/AP Biology

<u>MONTH</u>	<u>UNITS/CONCEPTS</u>	<u>CORRESPONDING BENCHMARKS</u>
APRIL	<u>Human Anatomy</u> (continued) <ul style="list-style-type: none">• Nervous System• Brain• Behavior	
MAY	<u>Human Anatomy</u> (continued) <ul style="list-style-type: none">• Review• AP Exam• Fetal Pig Dissection	

Course #3037 Advanced/AP Chemistry

This course is designed to be the equivalent of the general chemistry course usually taken during the first year of college. Fundamental topics are covered in greater depth with more emphasis on chemical calculations and the mathematical formation principles. Organic laboratory techniques are introduced. The course is intended for students who plan post high school training in a physical science related field. Students who take this class will be encouraged to take the Advanced Placement Chemistry exam.

	Science Benchmarks
	The student will:
	Standard 1: NATURE OF SCIENCE Understand that science is ongoing and inventive, and that scientific understandings have changed over time as new evidence is found.
3037-1a.	Identify how science is based on assumptions about the natural world and use partial systems, models, and explanations to make quick and reasonable suggestions to resolve questions and problems dealing with that natural world. <ul style="list-style-type: none">• The student will work problems and investigate laboratory examples of the mathematical models used to describe chemical reactions, energy production, and rates of change.
	Standard 3: PHYSICAL SCIENCE Demonstrate an understanding of the physical and chemical properties of matter, the form and properties of energy, and the ways in which matter and energy interact.
3037-3a.	Understand the nature of matter and the way changes in this form will result in energy changes. Using atomic and molecular models.
3037-3b.	Develop an understanding of how properties can be studied and measured for matter and energy.

Curriculum Map

Course Title: Advanced/AP Chemistry

<u>MONTH</u>	<u>UNITS/CONCEPTS</u>	<u>CORRESPONDING BENCHMARKS</u>
SEPTEMBER Unit #1 (2-3 weeks)	<u>Advanced Atomic Structure</u> -Quantum Model -Periodic Table	1A, 2B, 3A, 3B, 6A
Unit #2 (3 weeks)	<u>Covalent Bonding</u> -Lewis Structure -Hybridization -Molecular Orbitals -VSERT -Resonance	1A 3A 3C 3D
OCTOBER Unit #2 (continued) Unit #3 (2 weeks)	↓ <u>Liquids and Solids</u> -Metallic Bonding -Molecular Solids -Ionic Solids	1A, 2D, 3B, 3D, 3F, 6A
NOVEMBER Unit #4 (2-3 weeks)	<u>Properties of Solutions</u> -Energy of Solution -Vapor Pressure -Osmotic Pressure -Colloids	
Unit #5 (4 weeks)	<u>Chemical Kinetics</u> -Rate -Forms of the Rate Law	1A, 3B, 3F, 3G, 3I

Curriculum Map

Course Title: Advanced/AP Chemistry

<u>MONTH</u>	<u>UNITS/CONCEPTS</u>	<u>CORRESPONDING BENCHMARKS</u>
DECEMBER Unit #5 (Continued)	<u>Reaction Mechanisms</u>	
Unit #6 (4 weeks)	<u>Chemical Equilibrium</u> -Equilibrium Constants -Heterogeneous Equilibrium -Le Chatelier's Principle	1A, 3A, 3D, 3F, 3J, 6A
JANUARY Unit #7 (5 weeks)	<u>Acid and Bases</u> -Acid Strength -pH -Polyprotic Acids -Oxides and Acids	1A 2D 3C 3D 3F 1A
FEBRUARY Unit #8 (3 weeks)	<u>Equilibrium and Acids and Bases</u> -Buffers -Titration -Solubility Products	1A 3A 3E, 3G 3F, 3J, 6A, 6C
MARCH Unit #9 (3-4 weeks)	<u>Spontaneity-Entropy</u> -Entropy -Free Energy -Free Energy and Equilibrium	2D, 3C, 3G, 3I, 3J, 6C

Curriculum Map

Course Title: Advanced/AP Chemistry

<u>MONTH</u>	<u>UNITS/CONCEPTS</u>	<u>CORRESPONDING BENCHMARKS</u>
APRIL Unit #10 (3-4 weeks)	<u>Electrochemistry</u> -Galvanic Cells -Cell Potentials -Corrosion	3B 3D 3E 3F 3G 6A 6C
MAY Prep for A.P. Exam		

Course #3025 Biology / #3027 Applications in Biology

Biology is a two-semester course featuring the study of ecology, animals, plants, microbes, cells, the human body, genetics and reproduction. The course includes class work, discussions, labs, and some topic videos. This course is required for graduation.

	Science Benchmarks
	The student will:
	Standard 1: NATURE OF SCIENCE Understand that science is ongoing and inventive, and that scientific understandings have changed over time as new evidence is found.
3025-1a.	Identify how individuals have contributed to the development of major ideas in the life and environmental sciences.
3025-1b.	Identify the time lines or era during great periods of discovery and scientific development.
3025-1c.	Show how basic research and applied research contribute to new discoveries, inventions, and applications.
3025-1d.	Explain how science is based on assumptions about the natural world and themes that describe the natural world.
	Standard 2: SCIENCE INQUIRY Investigate questions using scientific methods and tools, revise their personal understanding to accommodate knowledge, and communicate these understandings to others.
3025-2a.	Evaluate the data collected during an investigation, criticize the data-collection procedures and results, and suggest ways to make any needed improvements.
3025-2b.	During investigations, choose the best data-collection procedures and materials available, use them competently, and calculate the degree of precision of the resulting data.
3025-2c.	Use the explanations and models found in the life and environmental sciences to develop likely explanations for the results of their investigations.
3025-2d.	When studying science content, ask questions suggested by current social issues, scientific literature, and observations of phenomena, and build hypotheses that might answer some of these questions.
3025-2e.	Identify issues from an area of science study and current issues, write questions that could be investigated, review previous research on these questions, and design and evaluate investigations to help answer the questions.
	Standard 3: PHYSICAL SCIENCE Demonstrate an understanding of the physical and chemical properties of matter, the form and properties of energy, and the ways in which matter and energy interact.
3025-3a.	Explain how substances both simple and complex interact with one another to produce new substances (i.e., mineral cycles).
3025-3b.	Using the science themes, explain the common occurrences in the physical world.

	Science Benchmarks
	Standard 4: EARTH & SPACE SCIENCE Demonstrate an understanding of the structure and systems of the Earth, other bodies in the universe, and their interactions.
3025-4a.	Analyze the benefits, costs, and limitations of past, present, and projected use of resources and technology and explain the consequences to the environment.
3025-4b.	Using the science themes, understand that the origin of life is not completely understood, but that there are current ideas in science that attempt to explain its origin.
	Standard 5: LIFE & ENVIRONMENTAL SCIENCE Demonstrate an understanding of the characteristics and structures of living things, the processes of life, and how living things interact with one another and their environment.
3025-5a.	Evaluate the normal structures and the general and special functions of cells in single-celled and multiple-celled organisms.
3025-5b.	Understand that cells differentiate and that cells are regulated.
3025-5c.	Explain current scientific ideas and information about the genetic basis of heredity.
3025-5d.	State the relationship between functions of the cell and functions of the organism as related to genetics and heredity.
3025-5e.	Understand the theory of evolution, natural selection, and biological classification.
3025-5f.	Using concepts of evolution and heredity, account for changes in species and the diversity of species.
3025-5g.	Investigate how organisms both cooperate and compete in ecosystems.
3025-5h.	Using the science themes, investigate energy systems (related to food chains) to show how energy is released by digestion and metabolism.
3025-5i.	Understand the impact of energy on organisms in living systems.
3025-5j.	Investigate how the organization of animals accommodates the need for obtaining, transforming, transporting and eliminating the matter and energy used to sustain an organism.
3025-5k.	Using the science themes, infer changes in ecosystems prompted by the introduction of new species, environmental conditions, chemicals, and air, water, or earth pollution.
3025-5l.	Investigate the nature of factors that affect the growth of bacteria colonies.
3025-5m.	Explain how prokaryote cell structure differs from that of eukaryotes.
3025-5n.	Discuss the role of genetically engineered bacteria as a solution for health and agriculture problems.
3025-5o.	Explain how evolution has changed the physical characteristics of aquatic plants to adapt to land.
3025-5p.	Analyze the anatomy of the highest levels of land plants and the advantages created by these adaptations.

	Science Benchmarks
	Standard 6: SCIENCE APPLICATIONS Demonstrate an understanding of the relationship between science and technology and the ways in which that relationship influences human activities.
3025-6a.	Design, build, or use models, diagrams, photos, and explanations related to life sciences.
3025-6b.	Show how a major scientific or technological change has had an impact on health or life styles.
3025-6c.	Choose a specific problem in our society, identify alternative scientific or technological solutions to that problem, and argue its merits.
	Standard 7: SCIENCE IN SOCIAL & PERSONAL PERSPECTIVES Use scientific information and skills to make decisions about themselves, Wisconsin, and the world in which they live.
3025-7a.	Advocate a solution or combination of solutions to a problem in science or technology.
3025-7b.	Investigate how current plans or proposals concerning resource management, scientific knowledge, or technological development will have an impact on the environment, ecology, and quality of life in a community or region.
3025-7c.	Evaluate data and sources of information when using scientific information to make decisions.
3025-7d.	Construct a plan that includes the use of current scientific knowledge and scientific reasoning.

Curriculum Map

Course Title: Biology / Applications in Biology

<u>MONTH</u>	<u>UNITS/CONCEPTS</u>	<u>CORRESPONDING BENCHMARKS</u>
SEPTEMBER Unit # 1 Unit #2	<u>Introduction to Biology</u> <ul style="list-style-type: none"> • Scientific Method • Spontaneous Generation • Experimentation • Microscopes and Scientific Tools 	1A, 1B, 1C, 1D 2A, 2B, 2C 3B 6A
	<u>Ecology</u> <ul style="list-style-type: none"> • Biotic/Physical Cycles • Ecosystems 	1A 3A, 3B 4A, 4B
OCTOBER Unit #3	<u>Ecology (continued)</u> <ul style="list-style-type: none"> • Food Chain/Web/Pyramids • Population Patterns • Growth • Stabilization • Extinction 	5A, 5B, 5G, 5H, 5I 6A, 6B 7B, 7C
	<u>Cells</u> <ul style="list-style-type: none"> • Prokaryotic • Eukaryotic • Organelles • Cell Membrane • Diffusion/Membrane Transport 	1A 2D 5C, 5D, 5M
NOVEMBER Unit #4	<u>Cells (continued)</u> <ul style="list-style-type: none"> • Mitosis/Meiosis 	
	<u>Plant Diversity</u> <ul style="list-style-type: none"> • Principles of Classification • Dichotomous Keys • Alternation of Generations • Algae • Bryophytes 	5E, 5F, 5K, 5O, 5P 6A

Curriculum Map

Course Title: Biology / Applications in Biology

<u>MONTH</u>	<u>UNITS/CONCEPTS</u>	<u>CORRESPONDING BENCHMARKS</u>
DECEMBER	<u>Plant Diversity</u> (continued) <ul style="list-style-type: none"> Tracheophytes <ul style="list-style-type: none"> Seedless Cone-bearing Flowering 	
Unit #5	<u>Monera</u> <ul style="list-style-type: none"> Bacteria 	2A 5J, 5L, 5M, 5N
JANUARY	<ul style="list-style-type: none"> Bacteria (continued) 	
	Review/Semester Exams	6A
Unit #6	<u>Animal Diversity</u> <ul style="list-style-type: none"> Porifera Coelenterate 	5I, 5J 6A
FEBRUARY	<u>Animal Diversity</u> (continued) <ul style="list-style-type: none"> Worms Mollusks Echinoderms Arthropods <ul style="list-style-type: none"> Arachnids Crustaceans Myriapods 	
MARCH	<ul style="list-style-type: none"> Arthropods (continued) <ul style="list-style-type: none"> Insects 	
Unit #7	<u>Introduction to Chordates</u> <ul style="list-style-type: none"> Mammals Introduction to Humans 	6A
Unit #8	<u>Human Physiology</u> <ul style="list-style-type: none"> Nutrition/Digestion 	1A, 1B, 1D 4B
APRIL	<u>Human Physiology</u> (continued) <ul style="list-style-type: none"> Endocrine Reproduction Embryology STD 	6A, 6B
Unit #9	<u>Mendelian Genetics</u>	2A, 2B, 2D 4A

Curriculum Map

Course Title: Biology/ Applications in Biology

MONTH	<u>UNITS/CONCEPTS</u>	<u>CORRESPONDING BENCHMARKS</u>
MAY	<u>Genetics</u> (continued)	5C, 5D
Unit #10	<u>Water Ecology</u> <ul style="list-style-type: none"> • Pollution • Watersheds • Water Ecosystems • Water/Fish Species 	5G, 5H, 5I, 5J, 5K 6A, 6C 7A, 7B, 7C, 7D

Course #3050 Biotechnology: Connection of Humans, Animals, and Plants Explore genetic engineering, DNA Fingerprinting, microbiology, immunology, animal/plant tissue culturing, transgenic animals/plants, and cloning. This class will integrate science and agriculture concepts by allowing students to “learn by doing.”	
	Science Benchmarks
	The student will:
	Standard 1: NATURE OF SCIENCE Understand that science is ongoing and inventive, and that scientific understandings have changed over time as new evidence is found.
3050-1a.	Relate biotechnology to human progress in understanding science and the world.
3050-1b.	Identify and show how basic research and applied research in biotechnology contribute to new discoveries, inventions, and applications.
3050-1c.	Show how individuals have contributed to the development of the science biotechnology.
	Standard 2: SCIENCE INQUIRY Investigate questions using scientific methods and tools, revise their personal understanding to accommodate knowledge, and communicate these understandings to others.
3050-2a.	Evaluate the data collected during an investigation. Critique the data and results and suggest ways to make improvements.
3050-2b.	Evaluate problems and/or issues of biotechnology applications to consumer product and processes with the aid of articles and reports in the popular press, scientific journals, and TV and the internet.
	Standard 3: PHYSICAL SCIENCE Demonstrate an understanding of the physical and chemical properties of matter, the form and properties of energy, and the ways in which matter and energy interact.
3050-3a.	Monitor, use, store, and dispose of hazardous materials properly.
3050-3b.	Identify physical and chemical properties of a solution.
3050-3c.	Explain how substances react with one another to produce new substances and what changes may occur.
3050-3d.	Quantitatively analyze the size of microorganisms and cells.
	Standard 4: EARTH & SPACE SCIENCE Demonstrate an understanding of the structure and systems of the Earth, other bodies in the universe, and their interactions.
3050-4a.	Analyze the benefits, costs, and limitations of past, present, and projected use in biotechnology of resources and technology and the consequences to the environment.

	Science Benchmarks
	Standard 5: LIFE & ENVIRONMENTAL Demonstrate an understanding of the characteristics & structures of living things, the processes of life, & how living things interact with one another and their environment.
3050-5a.	Through investigation and discovery: <ul style="list-style-type: none"> • Understand how cells differentiate and how cells are regulated. • Show how cell structures are isolated and characterized. • Isolate, maintain, and store pure cultures. • Maintain and analyze fermentation materials. • Detect and isolate specific nucleic acid sequences. • Detect, isolate, and characterize specific proteins. • Perform bioassays (restriction digests, plant propagation, cytological tests, etc.).
	Standard 6: SCIENCE APPLICATIONS Demonstrate an understanding of the relationship between science and technology and the ways in which that relationship influences human activities.
3050-6a.	Recognize the impact of biotechnology on society and one's own life and how it can change human activity.
3050-6b.	Understand the applications of genetic engineering used in society and how it influences change in human activities.
	Standard 7: SCIENCE IN SOCIAL & PERSONAL PERSPECTIVES Use scientific information and skills to make decisions about themselves, Wisconsin, and the world in which they live.
3050-7a.	Using the biotechnology theme, analyze the cost, risks, benefits, and consequences of a proposal concerning change in the community and determine the potential impact of the proposal on life in the community and the region.

Curriculum Map

Course Title Biotechnology

<u>MONTH</u>	<u>UNITS/CONCEPTS</u>	<u>CORRESPONDING BENCHMARKS</u>
DECEMBER Unit #7 (2 weeks) Unit #8 (1 week)	<u>Nucleic Acid Techniques</u> -Genetic Code -DNA -DNA Fingerprinting -Gel Electrophoresis -Human Genome Project -Cloning <u>Protein Techniques</u> -Genes/Proteins -Enzymes -PCR -Promega Fieldtrip	2A, 5A 2A, 5A
JANUARY Unit #9 (2 weeks) Unit #10 (1 week)	<u>Bioethics</u> -How far -Ethical/Legal/Environmental -Debate biotechnology issues <u>Careers in Biotechnology</u> -Career Opportunities -Preparation for biotechnology career	2A, 2B, 6A, 6B, 7A
FEBRUARY	Repeat previous sequence second semester. <div style="text-align: center;">↓</div>	
MARCH	<div style="text-align: center;">↓</div>	

Course #3015 Chemistry: A Study of Science, Technology, and Society

The ACS (American Chemical Society) developed this course to help students realize the important role that chemistry plays in their personal lives. Students who take this course will use chemical knowledge to make thoughtful and informed decisions about issues involving science and technology. This course is centered on several units like water quality, food chemistry, and nuclear energy. This course is intended for students who do plan to attend college and pursue a non-science career.

	Science Benchmarks
	The student will:
	Standard 1: NATURE OF SCIENCE Understand that science is ongoing and inventive, and that scientific understandings have changed over time as new evidence is found.
3015-1a.	Show how cultures and individuals have contributed to the development of major ideas in the earth, space, life, environmental, and physical sciences.
3015-1b.	Identify the cultural conditions that are usually present during great periods of discovery, scientific development, and invention.
3015-1c.	Relate the major themes of science to human progress in understanding science and the world.
3015-1d.	Describe how basic and applied research has contributed to new discoveries, inventions, and applications.
3015-1e.	Show how science is based on assumptions about the natural world and themes that describe the natural world.
	Standard 2: SCIENCE INQUIRY Investigate questions using scientific methods and tools, revise their personal understanding to accommodate knowledge, and communicate these understandings to others.
3015-2a.	When studying science content, ask questions suggested by current social issues, scientific literature and observations of phenomena; build hypotheses that might answer some of these questions, design possible investigations, and describe results that might emerge from such investigations.
3015-2b.	Identify issues from an area of scientific study, write questions that could be investigated, review previous research on these questions, and design and conduct responsible and safe investigations to help answer the questions.
3015-2c.	Evaluate the data collected during an investigation, critique the data collection procedures and results, and suggest ways to make needed improvements.
3015-2d.	During investigations, choose the best data-collection procedures and materials available, use them competently, and calculate the degree of precision of the resulting data.



	Science Benchmarks
3015-2e.	Use the explanations and models found in the earth, space, life, environmental, and physical sciences to develop likely explanations for the results of their investigations.
3015-2f.	Evaluate articles and reports in the popular press, in scientific journals, on television, and on the Internet, using criteria related to accuracy, degree of error, sampling, treatment of data, and other standards of experimental design.
3015-2g.	Identify laboratory equipment, and use a variety of instruments to measure length, volume, mass, temperature, pH, and density as part of the data collection process.
	Standard 3: PHYSICAL SCIENCE Demonstrate an understanding of the physical and chemical properties of matter, the forms and properties of energy, and the ways in which matter and energy interact.
3015-3a.	Describe atomic structure and the properties of atoms, molecules, and matter during physical and chemical interactions.
3015-3b.	Explain the forces that hold the atom together and illustrate how molecular interactions change the atom.
3015-3c.	Explain exchanges of energy in chemical interactions and exchange of mass and energy in atomic/nuclear reactions.
3015-3d.	Explain how substances, both simple and complex, interact with one another to produce new substances.
3015-3e.	Identify patterns in chemical and physical properties and use them to predict likely chemical and physical changes and interactions.
3015-3f.	Through investigations, identify the types of chemical interactions, including endothermic, exothermic, oxidation, photosynthesis, and acid/base reactions.
3015-3g.	Using the science themes, illustrate the law of conservation of energy during chemical and nuclear reactions.
3015-3h.	Using the science themes, explain common occurrences in the physical world.
3015-3i.	Using the science themes and knowledge of chemical, physical, atomic, and nuclear interactions, explain changes in materials, living things, earth's features, and stars.
	Standard 4: EARTH & SPACE SCIENCE Demonstrate an understanding of the structure and systems of the earth, other bodies in the universe, and their interactions.
3015-4a.	Using the science themes, distinguish between internal energies (decay of radioactive isotopes, gravity) and external energies (sun) in the earth's systems and show how these sources of energy have an impact on those systems.
3015-4b.	Analyze the geochemical and physical cycles of the earth and use them to describe movements of matter.

	Science Benchmarks
3015-4c.	Analyze the benefits, costs, and limitations of past, present, and projected use of resources and technology and explain the consequences to the environment.
3015-4d.	Using science themes, understand that the origin of the universe is not completely understood, but that there are current ideas in science that attempt to explain the origin.
	Standard 5: LIFE & ENVIRONMENTAL Demonstrate an understanding of the characteristics and structures of living things, the processes of life, and how living things interact with one another and their environment.
3015-5a.	Evaluate the normal structures and the general and special functions of cells in single-celled and multiple-celled organisms.
3015-5b.	Understand how cells differentiate and how cells are regulated.
3015-5c.	Using the science themes, infer changes in ecosystems prompted by the introduction of new species, environmental conditions, chemicals, and air, water, or earth pollution.
3015-5d.	Using the science themes, investigate energy systems (related to food chains) to show how energy is stored in food (plants and animals) and how energy is released by digestion and metabolism.
	Standard 6: SCIENCE APPLICATIONS Demonstrate an understanding of the relationship between science and technology and the ways in which that relationship influences human activities.
3015-6a.	Design, build, evaluate, and revise models and explanations related to the earth, space, life, environmental, and physical sciences.
3015-6b.	Analyze the costs, benefits, or problems resulting from a scientific or technological innovation, including implications for the individual and the community.
3015-6c.	Show how a major scientific or technological change has had an impact on work, leisure, or the home.
3015-6d.	Choose a specific problem in our society, identify alternative scientific or technological solutions to that problem and argue its merits.
	Standard 7: SCIENCE IN SOCIAL & PERSONAL PERSPECTIVES Use scientific information and skills to make decisions about themselves, Wisconsin, and the world in which they live.
3015-7a.	Using the science themes and knowledge of the earth, space, life, environmental, and physical sciences, analyze the costs, risks, benefits, and consequences of a proposal concerning resource management in the community and determine the potential impact of the proposal on life in the community and the region.
3015-7b.	Evaluate proposed policy recommendations (local, state, and/or national) in science and technology for validity, evidence, reasoning, and implications, both short and long-term.
3015-7c.	Show how policy decisions in science depend on many factors, including social values, ethics, beliefs, time frames, and considerations of science and technology.

	Science Benchmarks
3015-7d.	Advocate a solution or combination of solutions to a problem in science or technology.
3015-7e.	Investigate how current plans or proposals concerning resource management, scientific knowledge, or technological development will have an impact on the environment, ecology, and quality of life in a community or region.
3015-7f.	Evaluate data and sources of information when using scientific information to make decisions.
3015-7g.	When making decisions, construct a plan that includes the use of current scientific knowledge and scientific reasoning.


Curriculum Map

Course Title: Chemistry – A Study of Science, Technology, and Society

<u>MONTH</u>	<u>UNITS/CONCEPTS</u>	<u>CORRESPONDING BENCHMARKS</u>
SEPTEMBER Unit #1 (2 weeks)	<u>Lab Safety and Measurement</u> <ul style="list-style-type: none"> • The Metric System <ul style="list-style-type: none"> - Origin - Units - Symbols - Making Measurements • Laboratory Safety <ul style="list-style-type: none"> - Rules - Proper Procedures and Use of Equipment 	1A, 1B, 1C, 1D 2C, 2D, 2G 
Unit #2 (7 weeks)	<u>Supplying our Water Needs</u> <ul style="list-style-type: none"> • The Quality of Our Water <ul style="list-style-type: none"> - Water Use - Water and Health - Hydrologic Cycle 	1A, 1B, 1C, 1D, 1E 2A, 2B, 2C, 2D, 2E, 2G 3A, 3B, 3E, 3H, 3I 4B, 4C 6A, 6C
OCTOBER	<u>Supplying (continued)</u> <ul style="list-style-type: none"> • Water and its Contaminants <ul style="list-style-type: none"> - Physical Properties - Mixtures - Chemical Properties - Solutions - Molecular View - Symbols - Formulas - Equations - Water Testing - Solubility - Temperature - Oxygen Supply and Demand - Acid Contamination - Ions - Solvents • Water Purification and Treatment <ul style="list-style-type: none"> - Water Softening - Chlorination 	



Curriculum Map

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<u>MONTH</u>	<u>UNITS/CONCEPTS</u>	<u>CORRESPONDING BENCHMARKS</u>
NOVEMBER Unit #3 (7 weeks)	<u>Chemistry, Air, and Climate</u> <ul style="list-style-type: none"> • Living in a Sea of Air <ul style="list-style-type: none"> - Physical and Chemical Properties - Behavior of Gases - Altitude - Air Pressure - Boyle's Law - Charles's Law - Kelvin Temperature Scale - Kinetic Molecular Theory 	1A, 1B, 1C, 1D, 1E 2A, 2E 3A, 3D, 3E, 3F, 3G, 3H, 3I 4A, 4B 5A, 5C 6B, 6D 7A, 7C, 7E, 7F 
DECEMBER	<u>Chemistry, Air (continued)</u> <ul style="list-style-type: none"> • Atmosphere and Climate <ul style="list-style-type: none"> - Properties of Electromagnetic Radiation - Reflectivity - Heat Capacity - Greenhouse Effect - Global Warming - Ozone Layer • Human Impact on Air <ul style="list-style-type: none"> - Human Sources of Air Pollution - Smog - Pollution Control - Controlling Auto Emissions - Acid Rain - pH 	

Curriculum Map

Course Title: Chemistry – A Study of Science, Technology, and Society

<u>MONTH</u>	<u>UNITS/CONCEPTS</u>	<u>CORRESPONDING BENCHMARKS</u>
JANUARY Unit #4 (7 weeks)	<u>Understanding Food</u> <ul style="list-style-type: none"> • Foods: To Build or To Burn <ul style="list-style-type: none"> - Nutritional Imbalances - Supply, Demand, and Distribution • Food as Energy <ul style="list-style-type: none"> - Calories - Conversions Between Dietary Units - Carbohydrates - Fats - Foods as Chemical Reactants - Limiting Reactants - Proteins 	1A, 1C, 1D, 1E 2A, 2C, 2G 3A, 3C, 3D, 3F 5A, 5B, 5C, 5D 6D 7B, 7D, 7G 
FEBRUARY	<u>Understanding Food (continued)</u> <ul style="list-style-type: none"> • Other Substances in Food <ul style="list-style-type: none"> - Vitamins - Minerals - Food Additives - Diets of Other Countries 	
Unit #5 (7 weeks)	<u>Health: Your Risks and Choices</u> <ul style="list-style-type: none"> • Risk and Personal Decisions <ul style="list-style-type: none"> - Cigarettes and Warnings 	1A, 1C, 1D, 1E 2B, 2F 3C, 3D, 3I 5A 6C 7F, 7G 
MARCH	<u>Health: Your Risks (continued)</u> <ul style="list-style-type: none"> • Your Body's Internal Chemistry <ul style="list-style-type: none"> - Homeostasis - Elements in the Human Body - Enzymes - Acids, Bases, and Buffers in the Body • Chemistry at the Body's Surface <ul style="list-style-type: none"> - Skin and Skin Protection - Sunscreens - Vitamin D - Hair Chemistry 	

Curriculum Map

Course Title: Chemistry – A Study of Science, Technology, and Society

<u>MONTH</u>	<u>UNITS/CONCEPTS</u>	<u>CORRESPONDING BENCHMARKS</u>
APRIL	<u>Health: Your Risks</u> (continued) <ul style="list-style-type: none"> • Chemical Control: Drugs and Toxins in the Body <ul style="list-style-type: none"> - Aspirin - Alcohol - Cigarettes - Assessing Risks 	
Unit #6 (6 weeks)	<u>Nuclear Chemistry in our World</u> <ul style="list-style-type: none"> • Energy and Atoms <ul style="list-style-type: none"> - Kinds of Radiation - Isotopes 	3B, 3C, 3G 4A, 4C, 4D 6A, 6B, 6C 7B, 7D
MAY	<u>Nuclear Chemistry in...</u> (continued) <ul style="list-style-type: none"> • Radioactive Decay <ul style="list-style-type: none"> - Natural Radioactive Decay - Alpha, Beta, and Gamma Rays - Half-Life - Radiation Detectors - Artificial Radioactivity • Nuclear Energy <ul style="list-style-type: none"> - Fission - Fusion - Chain Reactions - Nuclear Power Plants - Radioisotopes - Radiation Exposure 	