

Wilson Area School District Planned Course Guide

Title of Planned Course: Grade 5 Science

Subject Area: Science

Grade Level: 5th

Course Description: Students will explore scientific concepts in grade 5 that encourage critical and creative thinking in the Physical, Earth, and Life Sciences. Students will learn to develop testable questions and plan their own investigations.

Time/Credit for this Course: 18 Weeks

Curriculum Writing Committee: Rosemarie Reider and Joseph Wolfe

Course Materials

Textbook:

Science Fusion
Houghton Mifflin Harcourt
2012
<http://www.sciencefusion.com>

Supplemental Resources:

Science Fusion
Cd-Rom –Teaching Resources
<http://www.ThinkCentral.com>

Science Fusion
Houghton Mifflin Harcourt – Online – Student Version
2012
<http://www.sciencefusion.com>

Scott Foresman Science
Pearson Education
2003

Teacher Resources:

Discovery Education
United Streaming
<http://www.discoveryeducation.com>

Super Teacher
<http://www.superteacher.com>

Brain Pop
<http://www.brainpop.com>

Earth Science Resources ck-12
<http://www.ck12.org/earth-science>

NASA Earth Science Resources for Educators
<http://sciencenasa.gov/educators>

Investigating Kinetic and Potential Energy
<http://www.pbslearningmedia.com>

Matter
<http://www.teachervision.com>

Life Science Activities
<http://www.proteacher.co>,

Science activities, games, and quizzes for kids
<http://www.sheppardsoftware.com>

Foss Models and Designs
<http://www.fossweb.com>

Non-Fiction Science articles
<http://www.scholasticnews.com>

Curriculum Map

August: Process Skills (Models & Designs)

September: Process Skills (Models & Designs)

October: Social Studies Curriculum

November: Physical Science

December: Social Studies Curriculum

January: Social Studies Curriculum

February: Earth Science

March: Social Studies Curriculum

April: Life Science

May: Life Science

June: Social Studies Curriculum

Curriculum Scope & Sequence

Planned Course: Science Grade 5

Unit: Process Skills/Models and Designs

Time frame: 5 Weeks

State Standards 3.1.5.A9, 3.1.5.B6, 3.4.5.E3, 3.4.5.E4

Anchor(s) or adopted anchor: S4.A.2.1, S4.A.2.2, S4.A.3.1, S4.A.3.2, S4.C.1.1, S4.C.2.1, S4.A.1.1, S4.C.3.1

Essential content/objectives: At end of the unit, students will be able to:

- Explore the basic concepts of scientific reasoning and design by proposing solutions to various problems, and investigating products
- Develop models to help better understand the relationships of parts of systems that are not accessible to them as well as to overcome engineering challenges
- Understand a model is a representation or explanation of a system that cannot be observed directly
- Understand that scientists develop models to explain how a system works
- Recognize that conceptual models can be communicated through words and drawings
- Understand that scientists collaborate to find solutions to solve problems
- Recognize that electric devices need complete circuits to work
- Understand levers are used to move objects
- Understand the way something is put together is its design
- Recognize that engineers use scientific principles and knowledge to design useful products
- Recognize land vehicles have wheels fixed to axles which require power
- Understand systems can be designed to perform specific functions
- Understand that the application of science for the benefit of people is technology
- Understand that a variable is anything you can change in a design that might affect the performance of a product
- Create multi sensory observations
- Construct physical models to complete conceptual models
- Construct rolling carts
- Utilize a design and test approach to solve problems
- Use hand-eye coordination and spatial relationships to design carts
- Relate structures to their functions
- Modify self-propelled carts

Core Activities: Students will complete/participate in the following:

- Black Boxes: Black Box Investigations, Building Black Boxes, The Drought Stopper
- Hum Dingers: Exploring Hum Dingers, Model Hum Dingers, Reveal and Replicate
- Go Carts: Free-Rolling Go-Carts, Self-Propelled Go-Carts, The Two Meter Run

Extensions:

- **Black Boxes**
 - Language Extensions
 1. Research and Report on the solar system
 2. Brainstorm other concepts scientists might build models of because they cannot be physically observed.
 - Math Extensions
 1. Problems of the week
 2. Draw blueprints
 3. Play model-building games
 - Science and Social Studies Extensions
 1. Gather information about black boxes
 2. Introduce more boxes
- **Hum Dingers**
 - Language Extensions
 1. Write directions for conclusion
 2. Define switch
 3. Use the word humdinger as an idiom
 4. Brainstorm other words for humdinger
 - Math Extensions
 1. Problem of the week
 - Art Extensions
 1. Create humdinger advertisements
 - Science Extensions
 1. Replicate simple devices
 2. Make a doorbell
- **Go Carts**
 - Language Extensions
 1. Write a letter to a manufacturer
 2. Research and report on engineers
 - Math Extensions
 1. Problem of the week
 - Science Extensions
 1. Improve a household device
 2. Design a self-propelled, rubber-band boat.
 3. Use air and spring power for a model design.
 4. Propel a wagon

Remediation:

- **Black Boxes**
 - Conduct a class discussion if students are not making a clear distinction between conceptual and physical models
 - Brainstorm various items such as the solar system or atoms that scientists cannot directly observe

- **Hum Dingers**
 - Provide students with extra time in order to investigate their hum dinger
 - Create a word web to help students further understand the concept of collaboration
 - Work with students in small groups to further evaluate circuits and how they operate
- **Go Carts**
 - Create guiding questions to the investigation
 - Work with small groups to brainstorm the design of familiar objects
 - Create visual representations of wheels and axles in small groups by creating posters

Instructional Methods:

- Motivation
- Hands on learning
- Discussion through questioning
- Reinforcing concepts through scientific process skills
- Whole group discussions
- Read aloud (guided/whole group)

Materials & Resources:

- Foss Models and Designs Kit
- Foss Models and Designs Teacher Binder
- Foss Science Stories booklets
- Multimedia United Streaming/Discovery Education
- Student Portfolios
- fossweb.com

Assessments:

- Recording sheets
- Student portfolios
- Investigation Response sheets
- Investigation creations
- Teacher observation and observation checklists
- Teacher made formative and summative assessments
- Teacher made vocabulary assessments
- End of unit assessment

Curriculum Scope & Sequence

Planned Course: 5th Grade Physical Science

Unit: Matter

Time Frame: 3 Weeks

State Standards and Related Anchors: 3.3.5A6, S5.C.1, S5.C.1.1, S5.C.1.2.2, S5.C.1.2.2

Essential content/objectives: At the end of the unit, students will be able to:

- Describe various physical properties of matter
- Relate the states of matter to temperature and the arrangement of movement of particles
- Compare solids, liquids, gasses based on their physical properties
- Explain that matter is made of atoms and describe the structure of an atom
- Identify some elements and describe how elements differ from one another
- Compare an element to a compound

Core Activities: Students will complete/participate in the following:

- Investigate to determine the freezing point of a liquid
- Use the five steps of the design process to build a solar still
- Explore the process of distillation
- Recognize that some properties of water such as shape and appearance, may change during a state
- Recognize the mass of water remains unchanged as it undergoes a change of state
- Follow directions for an investigation to make models of atoms
- Plan and conduct online research about an element, and use the research to prepare a presentation
- Complete vocabulary builder activities

Extensions:

- Students will complete virtual labs and use online concepts provided by Houghton Mifflin Harcourt's : thinkcentral.com
- Social Studies Connection: After doing an experiment watching the water level rise in a container, discuss how global warming might affect glaciers and shore lines
- Journal writing: Each partner or group is assigned a compound. They must find out what elements are in the compounds and what uses the compounds have in the human body. Write and present a news report for their compound
- Students will research an assigned scientist and find out how the scientist's work is related to atoms. Students will sketch a picture and write a quote balloon similar to those in the lesson

Remediation:

- Re-read selection in small groups
- Modify tests and quizzes
- Differentiated student projects
- Inquiry flipcharts
- Interactive digital lessons and virtual labs
- Online support for vocabulary and concepts

Instructional Methods:

- Hands on exploration within cooperative learning groups
- Small and whole group instruction
- Direct instruction
- Modeling
- Project based learning and student research
- Research and note taking strategies using non-fiction articles and the internet

Materials & Resources:

- Fusion Science; Houghton Mifflin Harcourt,2012
- Teacher made materials
- Fusion Science CD –Rom
- Fusion Science: Flip Charts, Virtual Labs, and online Vocabulary Cards
- Fusion Science website: thinkcentral.com
- Discovery Education-United Streaming
<http://www.discoveryeducation.com>
- Atoms
- <http://www.neok12.com>
- Matter, Elements, and the Atom
- <http://www.chem4kids.com>

Assessments:

- Unit tests and quizzes
- Diagnostic pretests and open –ended responses
- Performance assessment
- Teacher observation
- Projects and reports
- Class discussion
- Daily Bell Ringers
- Self assessment-My Science Notebook

Curriculum Scope & Sequence

Planned Course: 5th Grade Physical Science

Unit: Motion and Forces

Time Frame: 3 Weeks

State Standards and Related Anchors: 3.2.5.B1, S5.C.2, S5.C.2.1, S5.C.2.1, S5.C.2.1.3, S5.C.3, S5.C.3.1

Essential content/objectives: At the end of the unit, students will be able to:

- Identify common forces
- Describe how varying the strength of a force affects the motion of an object
- Describe how objects of varying mass are each affected by a similar force
- Compare and contrast balanced and unbalanced forces
- Identify the forces that act on an object and explain how to measure the force needed to overcome each force in order for the object to move

Core Activities: Students will complete/participate in the following:

- Follow directions for an investigation to observe the effect of forces on the motion of a ball
- Plan and conduct an experiment to determine how to change the force required to do work
- Experiment to determine how the size of a force affects the motion of an object
- Experiment to determine how the mass of an object affects the objects motion when force is applied

Extensions:

- Journal writing: Students will write short stories with multiple examples of cause/effect. Examples should all concern forces and motion
- Students will formulate a question related to forces and motion. They will plan, gather, record, and display their information
- Math Connection: We measure in pounds but scientist measure weight in Newtons. Students will make a table that shows the weights of several objects in pounds and Newtons
- Students will complete virtual labs and use online concepts provided by Houghton Mifflin Harcourt's thinkcentral.com

Remediation:

- Re-read selection in small groups
- Modify tests and quizzes
- Differentiated student projects
- Inquiry flipcharts
- Interactive digital lessons and virtual labs
- Online support for vocabulary and concepts

Instructional Methods:

- Hands on exploration within cooperative learning groups
- Small and whole group instruction
- Direct instruction
- Modeling
- Project based learning and student research
- Research and note taking strategies using non-fiction articles.

Materials & Resources:

- Fusion Science; Houghton Mifflin Harcourt,2012
- Teacher made materials
- Fusion Science CD –Rom
- Fusion Science: Flip Charts, Virtual Labs, and online Vocabulary Cards
- Fusion Science website: thinkcentral.com
- Discovery Education-United Streaming
<http://www.discoveryeducation.com>

Assessments:

- Unit tests and quizzes
- Diagnostic pretests and open –ended responses
- Performance assessment
- Teacher observation
- Projects and reports
- Class discussion
- Daily Bell Ringers
- Self assessment-My Science Notebook

Curriculum Scope & Sequence

Planned Course: Science Grade 5

Unit: 12 Solar System and the Universe

Time frame: 2 Weeks

State Standards: 3.35B3

Anchor(s) or adopted anchor: S5.D.3, S5.D3.1, S5.D.1.1, S5.D.3.1.2

Essential content/objectives: At end of the unit, students will be able to:

- Explain what stars are and how they are classified
- Describe the solar systems place in the Milky Way
- Determine the role of technology in the work of scientists in space
- Identify major components of the solar system
- Compare the general characteristics of the planets within our solar system
- Describe asteroids, meteorites, comets, and dwarf planets

Core Activities: Students will complete/participate in the following:

- Follow directions for an investigation to create a model of the solar system
- Plan and conduct research to determine when solar system objects were discovered and create a Discovery Timeline
- Follow directions for an investigation to assemble a galaxy collage
- Complete vocabulary builder activities
- Organize content using charts/graphic organizers to compare the inner and outer planets
- Plan and conduct research to complete a power point on stars

Extensions:

- Journal writing (inquiry skills): Hypothesize how Saturn's rings may have formed
- Plan and conduct research to determine the Greek or Roman name for planets in the solar system
- Compare Ptolemy and Copernicus's model of the solar system and what factors may have influenced their ideas
- Students will complete virtual labs and use online concepts provided by Houghton Mifflin Harcourt's thinkcentral.com

Remediation:

- Re-read selection in small groups
- Modified tests and quizzes
- Inquiry flipcharts
- Online student edition with audio
- Interactive digital lessons and virtual labs
- Extra support for vocabulary and concepts (online worksheets)

Instructional Methods:

- Small and whole group instruction
- Direct instruction.
- Guided and independent practice
- Project based learning and student research
- Research and note-taking strategies using non-fiction articles
- Mimios and power points

Materials & Resources:

- Fusion Science; Houghton Mifflin Harcourt, 2012
- Scott Foresman Science, 2003
- Teacher made materials
- Fusion Science CD-Rom
- Internet based educational resources
- Fusion Science: Flipcharts, Virtual Labs, and online Vocabulary Cards
- Fusion Science website think central.com

Assessments:

- Unit tests and quizzes
- Diagnostic pretests and open-ended responses
- Performance assessment
- Portfolio assessment
- Teacher observation
- Projects and reports
- Class discussions
- Peer review in small groups
- Daily Bell Ringers
- Self assessment- My Science Notebook

Curriculum Scope & Sequence

Planned Course: Science Grade 5

Unit: Life Science (Unit 3, 4, and, 5)

Time Frame: 5 Weeks

State Standards and Related Anchors: S5.B.1, S5.B.2, S5.B.3
S5.B.1.1, S5.B.1.1.1, S5.B.1.1.2, S5.B.1.1.3; S5.B.2.1.1, S5.B.2.1.2, S5.B.2.1.3,
S5.B.2.1.4; S5.B.3.1.1, S5.B.3.1.2, S5.B.3.2

Essential content/objectives: At the end of the unit, students will be able to:

- Explain the six life processes and the relationship to organisms
- Explore and describe the concept that cells are the most basic component of life
- Identify the basic components of cells and how plant and animal cells differ
- Explain how cells grow by dividing and multiplying
- Investigate how cells can be observed and described
- Identify bean types using a Dichotomous Key
- Describe how plants grow and reproduce
- Identify factors that affect germination
- Describe an ecosystem and its components
- Explore and explain how an environment can affect organisms and ecosystems
- Explore and describe a plant's adaptations in an ecosystem
- Identify the process of succession in an ecosystem
- Identify a plant's role in an ecosystem; its role as a producer, and its role in food chains and webs.
- Describe how energy moves through an ecosystem

Core Activities:

- Investigate characteristics of life during a dry yeast experiment
- Identify living and nonliving things through life processes
- Investigate examples of plant cells under a microscope
- Identify major cell parts utilizing an interactive, online resource
- Follow the directions and perform an investigation that describes cell growth
- Plan and conduct online research examples of adaptations that have helped plants survive
- Create and complete a Dichotomous Key for bean plants
- Explore seed germination through an interactive, online resource
- Compare & contrast two different ecosystems
- Complete skill builder vocabulary activities
- Investigate the growth and life cycle of a bean plant, including the introduction of a sunlight variable

Extensions:

- Students will complete virtual labs provided Houghton Mifflin Harcourt's thinkcentral.com
- Math Connection: students can calculate cell division using an equation
- Write an instruction manual for an observation tool like a microscope
- Explore onion and elodea leaves under a microscope
- Investigate how a volcanic eruption can drastically alter an ecosystem, and how it slowly recovers with succession.
- Create food chain links and energy pyramids to demonstrate the continuous flow of food energy

Remediation:

- Modify tests and quizzes
- Differentiated student projects and assignments
- Houghton Mifflin Harcourt Unit Flipcharts
- Interactive digital lessons and virtual labs
- Online support for vocabulary and concept topics.
- Re-read selections in small groups

Instructional Methods:

- Hands on exploration within cooperative learning groups
- Project based learning and student research
- Direct instruction
- Modeling
- Research and organize strategies using non-fiction articles
- Small and whole group instruction

Materials & Resources:

- Fusion Science; Houghton Mifflin Harcourt, 2012
- Scott Foresman Science, 2003
- Teacher made materials
- Fusion Science: Flipcharts, Virtual Labs, and online Vocabulary Cards
- Fusion Science website: thinkcentral.com
- Discovery Ed/United Streaming

Assessments:

- Unit tests and quizzes
- Diagnostic pretests and open-ended responses
- Performance assessment
- Teacher observation
- Projects and reports
- Class discussion
- Daily Bell-Ringers