

SWALLOW SCHOOL DISTRICT CURRICULUM GUIDE

Curriculum Area: Science

Course Length: Full Year

Grade: 5th Grade

Date Last Approved:

Reviewed:

Stage 1: Desired Results

Course Description and Purpose: In fifth grade, there are four units of study, three Full Option Science System (FOSS) units, and one Project Lead the Way (PLTW) unit. The *Mixtures and Solutions* unit has five investigations that engage students with the phenomena of matter and its interactions in our everyday life—mixtures, solutions, solubility, concentration, and chemical reactions. In the *Energy and Electromagnetism* unit, students have hands-on experiments with magnets, wires, batteries, and other materials to observe and test concepts related to electricity and magnetism. The *Earth and Sun* unit provides students with experiences to explore the properties of the atmosphere, the energy transfer from the Sun to Earth, and the dynamics of weather and water cycling in Earth’s atmosphere. In the PLTW unit *Infection Detection*, students explore transmission of infection, agents of disease, and mechanisms the body uses to stay healthy.

Enduring Understanding(s):

1. Electricity (electric current) transfers energy that can produce heat, light, sound, and motion. Electricity can be produced from a variety of sources.
2. Matter has physical properties that can be observed and quantified (e.g., density, solubility, conductivity).
3. Mass of material is conserved.
4. During physical interactions, substances form mixtures in which the interacting substances retain their original properties
5. During chemical interactions, starting substances (reactants) change into new substances (products).
6. Infectious agents, such as bacteria and viruses, can cause illness and can spread from person to person.
7. The body protects and defends itself from infection.
8. Computer modeling can help us predict outcomes in order to prepare for events.

Essential Question(s):

1. What forms does energy take?
2. What do we observe that tells us energy is present and has been transferred?
3. What are the properties of mixtures?
4. How can solutions made with the same substances be distinguished one from another?
5. Mass is conserved even when a solute dissolves into a solvent.
6. What observations serve as evidence that a chemical reaction has occurred?
7. How can germs be spread from person to person?
8. How does the body defend itself from infectious disease?
9. How can medical professionals use patient symptoms to diagnose illness?
10. How can scientists determine how a germ might spread through a group of people?

Learning Targets:

1. Students can apply the scientific process to evaluate investigations or the design process to create design solutions to solve a problem.
2. Students can evaluate and communicate information.
3. Students can develop and interpret models.
4. Students can analyze scientific issues and support their claims with evidence.

Stage 2: Learning Plan

I Foss: Electromagnetism and Energy

- A. What do we observe that energy is present and has been transferred?
- B. What forms does energy take?
- C. How is usable energy converted from resources in your area?

Standards Referenced:

Standard SCI.PS1
Standard SCI.PS3
Standard SCI.ETS1.C.3-5
Standard SCI.SEP3
4-PS3-4
3-5-ETS1-2

Learning Targets Addressed:

Target 1

Target 2

Target 3

Target 5

Target 4

Key Resources Used:

- FOSS
- Launch

Assessment Map:

Type	Level	Assessment Detail
Practice	Knowledge	<ul style="list-style-type: none">• Students will participate in a series of labs, read texts, and watch videos that demonstrate that electricity is present and that it can be transferred into different forms.
Formative	Skills/ Reasoning	<ul style="list-style-type: none">• Through a lab, students will create two pieces of evidence that electrical energy was transferred into another type of energy.• Students will work with batteries and transfer of energy.
Summative	Product	<ul style="list-style-type: none">• Written responses to Focus Questions per investigation/Part Performance Assessments

II. Mixtures and Solutions

- A. What are the properties of mixtures?
- B. How can solutions made with the same substances be distinguished one from another?
- C. Mass is conserved even when a solute dissolves into a solvent.
- D. What observations serve as evidence that a chemical reaction has occurred?

Standards:

Standard: SCI.CC5.3-5

Standard SCI.SEP3

Standard SCI.SEP7

Learning Targets Addressed:

Target 1

Target 2

Target 3

Target 4

Key Resources Used:

- Launch

Assessment Map:

Type	Level	Assessment Detail
Practice	Knowledge	<ul style="list-style-type: none">• Students will participate in a series of labs designed to teach them what mixtures are based on their properties. They will learn techniques for comparing like solutions and their concentrations. They will witness chemical reactions and their properties.
Formative	Skills/ Reasoning	<ul style="list-style-type: none">• Students will create examples of mixtures and solutions given their choice of materials. They will write claim/evidence statements to support their creations.• Students will be given two like solutions and they will design and implement labs to gather data that compares their concentrations in multiple ways.• Students will mix various substances together, write observations and use those observations to determine what two mystery substances are based on evidence collected when mixing them together.• Students will take various paper and pencil check assessments after each new concept is taught and experienced through labs.

	Summative	Product	<ul style="list-style-type: none">● Given a substance, students will write a claim and evidence statement which supports whether the substance is a mixture or not based on its properties.● Students will create two like solutions with different concentrations, provide evidence that their solutions are different and then write a claim/evidence piece to support their work.● When witnessing a demonstration of two reactants being mixed identify the signs that a chemical reaction has occurred.● Students will use mass to determine the weight change of a solvent after a solute has been added.● Students will gather observational data on how substances react when mixed with various solvents. They will then use that information to determine the ingredients of a mystery powder that evokes a chemical reaction and write a claim/evidence piece to share their findings.● Students will take a pencil and paper test where they will choose the best answer for each scenario given related to mixtures and solutions.
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III. Launch Module: Infection Detection

- A. How can germs be spread from person to person?
- B. How does the body defend itself from infectious disease?
- C. How can medical professionals use patient symptoms to diagnose illness?
- D. How can scientists determine how a germ spreads through a group of people?
- E. In what ways can computer models and simulations be used to predict outcomes?

Standards:
LS2.A
ETS1.B

Learning Targets Addressed:
Target 1
Target 3
Target 5

Key Resources Used:

- Launch

Assessment Map:

Type	Level	Assessment Detail
Practice	Knowledge	<ul style="list-style-type: none"> • Participate in a simulation where a patient zero passes a germ on to others through touch. Use the data to determine where the spread originated and by what mode of transmission. • Read about the various ways transmission of germs can occur. • Watch videos on the various structures in the body that help defend against infectious diseases. • Sort diseases based on their descriptions into communicable and noncommunicable diseases. • Students will use a computer modeling program to witness how a disease spreads through a population when various variables are put in place.
Formative	Skills/ Reasoning	<ul style="list-style-type: none"> • On a diagram label the various structures of the body that defend against infectious diseases and explain how they do their job.

		<ul style="list-style-type: none"> • Read about the symptoms a person is experiencing and determine what communicable disease it may be. • Students will follow a list of instructions to build a computer model that simulates how a population can change based on the number of prey or predators that are in a particular population.
	Summative	Product <ul style="list-style-type: none"> • In this design challenge, students will determine the patient zero in a school outbreak of strep throat. Students will deduce a path of transmission among the students in the class who are sick. Students will work through the design process to solve the problem

V. Earth and Sun

Describe how day and night cycles are caused by Earth's rotation. What Seasonal changes are due to Earth's tilt and revolution around the Sun? How do Shadows and their changing patterns based on the Sun's position? What is the concept of the Earth's orbit Energy transfer from the Sun to Earth?

Standards:

- 5-ESS1-1: Use evidence to construct an explanation relating the speed of an object to the energy of that object
- 5-ESS1-2: Represent data in graphical displays to reveal patterns of daily changes in length and direction of shadows, day and night, and the seasonal appearance of some stars in the night sky
- 5-ESS1-3: Make observations to provide evidence that energy can be transferred from place to place by sound, light, heat, and electric currents

Learning Targets Addressed:
 Target 1
 Target 3
 Target 5

Key Resources Used:

<ul style="list-style-type: none"> • Launch • FOSS
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Assessment Map:

Type	Level	Assessment Detail
Practice	Knowledge	<ul style="list-style-type: none"> • Earth is the third planet from the Sun. It travels around the Sun in a nearly circular orbit at a distance of about 150 million

			<p>kilometers. Earth is water-rich, with 71% of the planet's surface covered with water. It is surrounded by a shallow atmosphere of nitrogen (78%) and oxygen (21%), and small amounts of a lot of other gases. Students investigate the patterns observed in the sky over a day, a month, a year, and more, and their effects on Earth</p>
	Formative	Skills/ Reasoning	<ul style="list-style-type: none"> Experiences help students to develop and use models to understand Earth's place in the solar system, and the interactions of Earth, the Sun, and the Moon to reveal predictable patterns—daily length and direction of shadows, day and night, and the seasonal appearance of stars in the night sky. Students gain experiences that will contribute to their understanding
	Summative	Product	<ul style="list-style-type: none"> Written responses to Focus Questions per investigation/Part Performance Assessments