

**Belvidere Cluster Wide
Science Curriculum
7th grade
Updated Fall 2018**

All Belvidere Cluster curriculum and instruction areas are aligned to the New Jersey Student Learning Standards (NJSLS) in accordance with the NJ Department of Education's curriculum implementation requirements.

Interdisciplinary Connections

English Language Arts
Mathematics
Social Studies
Technology
Visual and Performing Arts

Technology Standards and Integration

iPads/Chromebooks

TCI Science

iXL

Scholastic Online

Interactive SmartBoard activities

NJSLA Technology

8.1.2.A.2

Create a document using a word processing application.

8.1.2.A.4

Demonstrate developmentally appropriate navigation skills in virtual environments (i.e. games, museums).

8.1.P.B.1

Create a story about a picture taken by the student on a digital camera or mobile device.

8.1.P.C.1

Collaborate with peers by participating in interactive digital games or activities.

8.1.2.E.1

Use digital tools and online resources to explore a problem or issue.

**CAREER EDUCATION
(NJDOE CTE Clusters)**

Education & Training

Finance

Information Technology

Science, Technology, Engineering & Mathematics (STEM)

21st Century Skills/ Themes

Global Awareness

Financial, Economic, Business and Entrepreneurial Literacy

Civic Literacy

Health Literacy

Environmental Literacy

Creativity and Innovation

Critical Thinking

Problem Solving

Communication

Collaboration

Information Literacy

Media Literacy

ICT (Information, Communication and Technology) Literacy

- CRP1. Act as a responsible and contributing citizen and employee.
- CRP2. Apply appropriate academic and technical skills.
- CRP3. Attend to personal health and financial well-being.
- CRP4. Communicate clearly and effectively and with reason.
- CRP5. Consider the environmental, social and economic impacts of decisions.
- CRP6. Demonstrate creativity and innovation.
- CRP7. Employ valid and reliable research strategies.
- CRP8. Utilize critical thinking to make sense of problems and persevere in solving them.
- CRP9. Model integrity, ethical leadership and effective management.
- CRP10. Plan education and career paths aligned to personal goals.
- CRP11. Use technology to enhance productivity.

Reading and Writing Companion Standards

RST.6-8.1

Cite specific textual evidence to support analysis of science and technical texts. (MS-LS1-3)

RST.6-8.2

Determine the central ideas or conclusions of a text; provide an accurate summary of the text distinct from prior knowledge or opinions. (MS-LS1-5),(MS-LS1-6)

RI.6.8

Trace and evaluate the argument and specific claims in a text, distinguishing claims that are supported by reasons and evidence from claims that are not. (MS-LS1-3)

WHST.6-8.1

Write arguments focused on discipline content. (MS-LS1-3)

WHST.6-8.7

Conduct short research projects to answer a question (including a self-generated question), drawing on several sources and generating additional related, focused questions that allow for multiple avenues of exploration. (MS-LS1-1)

WHST.6-8.8

Gather relevant information from multiple print and digital sources, using search terms effectively; assess the credibility and accuracy of each source; and quote or paraphrase the data and conclusions of others while avoiding plagiarism and following a standard format for citation. (MS-LS1-8)

Grade 7, Science, Unit 1, Structure, Function and Information Processing

Content Area: **Science**
Course(s): **Science**
Time Period: **September**
Length: **8 weeks**
Status: **Published**

Enduring Understanding

Living organisms are made of cells and have a specific relationship to the environment.

Essential Questions

How do the structures of organisms contribute to life's functions?

How do systems and subsystems interact with each other and what part do cells play in those interactions?

Next Generation Science Standards

Structure, Function and Information Processing

SCI.MS-LS1-1	Conduct an investigation to provide evidence that living things are made of cells, either one cell or many different numbers and types of cells.
SCI.MS SCI.MS-LS1-2	Structure, Function, and Information Processing Develop and use a model to describe the function of a cell as a whole and ways parts of cells contribute to the function.
SCI.MS-LS1-8	Gather and synthesize information that sensory receptors respond to stimuli by sending messages to the brain for immediate behavior or storage as memories.
SCI.MS-LS1-3	Use argument supported by evidence for how the body is a system of interacting subsystems composed of groups of cells.

Student Learning Objectives

1	Conduct an investigation to provide evidence that living things are made of cells; either one cell or numbers and types of cells.
2	Develop and use a model to describe the function of a cell as a whole and ways parts of cells contribute to the function.
3	Use argument supported by evidence for how the body is a system of interacting subsystems composed of cells.
4	Develop a model to explain how senses change energy coming from the environment (light, sound, gases or food, heat or touch/pressure) into electrical signals in the nerves that go into the brain and
5	Gather and synthesize information that sensory receptors respond to stimuli by sending messages for immediate behavior or storage as memories.

Instructional Activities

Microscope introduction

Making and observing microscope slides

Cheek cell lab / elodea cell lab

Potato cell osmosis and diffusion

<http://concord.org/stem-resources/diffusion>

Osmosis and Diffusion Lab

 [Download Lesson](#)

[Evaluate](#)

Experiment

Students will observe diffusion and osmosis of cell membranes using three different labs. Topics include lipid bilayer, osmosis, diffusion, and ion concentration gradients.

NJSLS

ELA-Literacy.RST.11-12.1,
ELA-Literacy.RST.11-12.7,
ELA-Literacy.RST.11-12.8

NGSS

HS-LS1-2, HS-LS2-1

Published by Lesson Plans Inc.

High School



Movement Across the Membrane (Diffusion)

[Download Lesson Plan](#)

[Evaluate](#)

Experiment

The main objectives of this Mini-teach are to explain the concept of diffusion and to show the process how all materials enter and leave the cell. Includes 3 diffusion experiments and 3 osmosis experiments.

NJSLS

ELA-Literacy.RST.11-12.1,
ELA-Literacy.RST.11-12.7,
ELA-Literacy.RST.11-12.8

NGSS

HS-LS1-2, HS-LS2-1

Published by Kelly Ludwig

High School



Investigating Osmosis

[Download Student Handout](#)

[Download Teacher Notes](#)

[Evaluate](#)

Experiment

Students make predictions about the effects of osmosis and design an experiment to test these predictions. The experimental approach is similar to the diffusion activity, but focused specifically on osmosis.

NJSLS

ELA-Literacy.RST.11-12.1,
ELA-Literacy.RST.11-12.7,
ELA-Literacy.RST.11-12.8

NGSS

HS-LS1-2, HS-LS2-1

Published by Ingrid Waldron and Jennifer Doherty

High School



Dialysis Lab

 [Download Lesson](#)

[Evaluate](#)

Experiment

Students will learn about how the cell membrane can be semi-permeable. Topics include concentration gradients, osmosis, and diffusion.

NJSLS

ELA-Literacy.RST.11-12.1,

ELA-Literacy.RST.11-12.7,

ELA-Literacy.RST.11-12.8

NGSS

HS-LS1-2, HS-LS2-1

Published by Lesson Plans Inc.

High School



Cell Membrane Quiz

 [Download Lesson](#)

[Evaluate](#)

Tests

This quiz assesses students knowledge of the structure of the cell membrane, lipid bilayer, phospholipids, how cells interact with their environment, semi-permeability, passive transport, diffusion, osmosis, facilitated diffusion, active transport, pumps, endocytosis, and exocytosis.

NJSLS

ELA-Literacy.RST.11-12.1,

ELA-Literacy.RST.11-12.7,

ELA-Literacy.RST.11-12.8

NGSS

HS-LS1-2, HS-LS2-1

Interdisciplinary Connections

NJSLS Connections:

ELA/Literacy -

[RST.6-8.1](#)

[Cite specific textual evidence to support analysis of science and technical texts.](#) (MS-LS1-3)

[RST.6-8.2](#)

[Determine the central ideas or conclusions of a text; provide an accurate summary of the text distinct from prior knowle](#)
LS1-5),(MS-LS1-6)

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WHST.6-8.8

Gather relevant information from multiple print and digital sources, using search terms effectively; assess the credibility and accuracy of each source; and quote or paraphrase the data and conclusions of others while avoiding plagiarism and following a standard format for citation. (MS-LS1-8)

SL.8.5

Integrate multimedia and visual displays into presentations to clarify information, strengthen claims and evidence, and make connections to media, print, or digital text. (MS-LS1-2)

Mathematics -

6.EE.C.9

Use variables to represent two quantities in a real-world problem that change in relationship to one another; write an equation to express one quantity, thought of as the dependent variable, in terms of the other quantity, thought of as the independent variable. Analyze the relationship between the dependent and independent variables using graphs and tables, and translate between the two representations. (MS-LS1-1), (MS-LS1-2), (MS-LS1-3)

Assessment

Formative Assessments:

Exit tickets; teacher produced rubrics; student self checkoff rubric; three fact fold chart; conversations with students about their thinking

Index Card/Summaries/Questions: Periodically, distribute index cards and ask students to write on both sides, with these instructions: (Side 1) Based on our study of (unit topic), list a big idea that you understand and word it as a summary statement. (Side 2) Identify something about (unit topic) that you do not yet fully understand and word it as a statement or question.

Hand Signals: Ask students to display a designated hand signal to indicate their understanding of a specific concept, principal, or process: - I understand _____ and can explain it (e.g., thumbs up). - I do not yet understand _____ (e.g., thumbs down). - I'm not completely sure about _____ (e.g., wave hand).

One Minute Essay: A one-minute essay question (or one-minute question) is a focused question with a specific goal that can, in fact, be answered within a minute or two.

Analogy Prompt: (A designated concept, principle, or process) is like _____ because _____.

Web or Concept Map: Any of several forms of graphical organizers which allow learners to perceive relationships between concepts through diagramming key words representing those concepts.

<http://www.graphic.org/concept.html>

Summative Assessments:

Selected response items: Multiple choice, True/false, Matching, Short answer, Fill in the blank, One or two sentence response, Extended written response

Performance assessment: Laboratory activities, models, various projects

End-of-unit or -chapter tests

End-of-term or -semester exams

Benchmark:

ELA Research Based Benchmark

Interim Assessments

Alternative

:

Self Selected Science Projects

Group Collaboration Projects

Concept Map

Demonstration Stations

Powerpoints

Texts and Resources

microscopes, stereomicroscope, hand lens, slide, various objects, specimens, test tube rack, test tube, scoop, fine sand, dried yeast, sugar, warm water, eyedropper, compound microscope, prepared plant cell slide, prepared animal cell slide, slide, cell model, cell poster, 250 mL beaker, cheesecloth, rubber bands, ammonia, gelatin mix, ice- cube tray, phenolphthalein, scoop, prepared mitosis slide, onion, DNA model kit, DNA model

Grade 7, Science, Unit 2, Growth, Development, and Reproduction of Organisms

Content Area: **Science**
Course(s): **Science**
Time Period: **November**
Length: **8 weeks**
Status: **Published**

Enduring Understanding

The environment and genetic factors determine the growth of an individual organism.

Essential Questions

How do organisms grow, develop, and reproduce?

How has technology influenced the inheritance of desired traits?

Next Generation Science Standards

Growth, Development, and Reproduction of Organisms

SCI.MS-LS3-1	Develop and use a model to describe why structural changes to genes (mutations) located on chromosomes may affect proteins and may result in harmful, beneficial, or neutral effects to the structure and function of the organism.
SCI.MS-LS3-2	Develop and use a model to describe why asexual reproduction results in offspring with identical genetic information and sexual reproduction results in offspring with genetic variation.
SCI.MS-LS4-5	Gather and synthesize information about the technologies that have changed the way humans influence the inheritance of desired traits in organisms.
SCI.MS-LS1-5	Construct a scientific explanation based on evidence for how environmental and genetic factors influence the growth of organisms.
SCI.MS-LS1-4	Use argument based on empirical evidence and scientific reasoning to support an explanation for how characteristic animal behaviors and specialized plant structures affect the probability of successful reproduction of animals and plants respectively.
SCI.MS	Growth, Development, and Reproduction of Organisms

Student Learning Objectives

1	Use argument based on empirical evidence and scientific reasoning to support an explanation for how characteristic animal behaviors and specialized plant structures affect the probability of successful reproduction of animals and plants respectively.
2	Construct a scientific explanation based on evidence for how environmental and genetic factors influence the growth of organisms.
3	Develop and use a model to describe why structural changes to genes (mutations) located on chromosomes may affect proteins and may result in harmful, beneficial, or neutral effects to the structure and function of the organism.
4	Develop and use a model to describe why asexual reproduction results in offspring with identical genetic information and sexual reproduction results in offspring with genetic variation.
5	Gather and synthesize information about the technologies that have changed the way humans influence the inheritance of desired traits in organisms.

Instructional Activities

Reproduction:

http://www.pbslearningmedia.org/resource/tdc02.sci.life.repro.lp_reproduce/reproduction/

Animal Reproduction, Growth and Development:

<http://study.com/academy/topic/animal-reproduction-growth-and-development.html>

From Molecules to Organisms: Structures and Processes:

<http://www.ck12.org/ngss/middle-school-life-sciences/from-molecules-to-organisms:-structures-and-processes>

Comparing Fish Life Cycles:

http://intotheoutdoors.org/wp-content/uploads/2013/06/CompareLifecycles.Lesson.final_.pdf

Genetics:

<http://www.cal.org/create/pdfs/genetics-lesson-set.pdf>

Interdisciplinary Connections

NJSLS Connections:

ELA/Literacy -

RST.6-8.1

Cite specific textual evidence to support analysis of science and technical texts. (MS-LS1-4),(MS-LS1-5),((MS-LS3-1),(MS-LS3-2),(MS-LS4-5)

RST.6-8.2

Determine the central ideas or conclusions of a text; provide an accurate summary of the text distinct from prior knowledge or opinions. (MS-LS1-5)

RST.6-8.4

Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 6-8 texts and topics. (MS-LS3-1),(MS-LS3-2)

RST.6-8.7

Integrate quantitative or technical information expressed in words in a text with a version of that information expressed visually (e.g., in a flowchart, diagram, model, graph, or table). (MS-LS3-1),(MS-LS3-2)

RI.6.8

Trace and evaluate the argument and specific claims in a text, distinguishing claims that are supported by reasons and evidence from claims that are not. (MS-LS1-4)

WHST.6-8.1

Write arguments focused on discipline content. (MS-LS1-4)

WHST.6-8.2

Write informative/explanatory texts to examine a topic and convey ideas, concepts, and information through the selection, organization, and analysis of relevant content. (MS-LS1-5)

WHST.6-8.8

Gather relevant information from multiple print and digital sources, using search terms effectively; assess the credibility and accuracy of each source; and quote or paraphrase the data and conclusions of others while avoiding plagiarism and following a standard format for citation.(MS-LS4-5)

WHST.6-8.9

Draw evidence from informational texts to support analysis, reflection, and research. (MS-LS1-5)

SL.8.5

Integrate multimedia and visual displays into presentations to clarify information, strengthen claims and evidence, and add interest. (MS-LS3-1),(MS-LS3-2)

Mathematics -

MP.4

Model with mathematics. (MS-LS3-2)

6.SP.A.2

Understand that a set of data collected to answer a statistical question has a distribution which can be described by its center, spread, and overall shape. (MS-LS1-4),(MS-LS1-5)

6.SP.B.4

Summarize numerical data sets in relation to their context. (MS-LS1-4),(MS-LS1-5)

6.SP.B.5

Summarize numerical data sets in relation to their context. (MS-LS3-2)

5

Assessment

Formative Assessments:

Misconception Check: Present students with common or predictable misconceptions about a designated concept, principle, or process. Ask them whether they agree or disagree and explain why. The misconception check can also be presented in the form of a multiple-choice or true-false quiz.

Student Conference: One on one conversation with students to check their level of understanding.

3-Minute Pause: The Three-Minute Pause provides a chance for students to stop, reflect on the concepts and ideas that have just been introduced, make connections to prior knowledge or experience, and seek clarification.

Observation: Walk around the classroom and observe students as they work to check for learning and take anecdotal notes.

Self-Assessment: A process in which students collect information about their own learning, analyze what it reveals

about their progress toward the intended learning goals and plan the next steps in their learning.

Index Card/Summaries/Questions: Periodically, distribute index cards and ask students to write on both sides, with these instructions: (Side 1) Based on our study of (unit topic), list a big idea that you understand and word it as a summary statement. (Side 2) Identify something about (unit topic) that you do not yet fully understand and word it as a statement or question.

Hand Signals: Ask students to display a designated hand signal to indicate their understanding of a specific concept, principal, or process: - I understand _____ and can explain it (e.g., thumbs up). - I do not yet understand _____ (e.g., thumbs down). - I'm not completely sure about _____ (e.g., wave hand).

One Minute Essay: A one-minute essay question (or one-minute question) is a focused question with a specific goal that can, in fact, be answered within a minute or two.

Analogy Prompt: Present students with an analogy prompt: (A designated concept, principle, or process) is like _____ because _____.

Web or Concept Map: Any of several forms of graphical organizers which allow learners to perceive relationships between concepts through diagramming key words representing those concepts.
<http://www.graphic.org/concept.html>

Summative Assessments:

Selected response items: Multiple choice, True/false, Matching, Short answer, Fill in the blank, One or two sentence response, Extended written response

Performance assessment: Laboratory activities, models, various projects

End-of-unit or -chapter tests

End-of-term or -semester exams

Benchmark:

ELA Research Based Benchmark

Interim Assessments

Alternative

:

Self Selected Science Projects

Group Collaboration Projects

Concept Map

Demonstration Stations

Powerpoints

Texts and Resources

coins, dice, cotton balls, pipe cleaners, shoes, various objects, guess who games (scientists), sterile petri dishes, sterile cotton swabs, nutrient agar, incubator, hand lens, compound microscope, amoeba slide, euglena slide, paramecium slide, diatom slide, colored pencils, slide, cover slip, eyedropper, red stain, warm water, sugar, dried yeast, 100 mL flask, tray, ulothrix slide, oedogonium slide, spirogyra slide, mixed algae slide, plastic sheets, rigid rods (wood, metal, plastic), sunny window access, tape and scissors, paper for designs, protractor, stereomicroscope, celery stalk, red dye, 250 mL beaker, water, dissecting pan, dissecting kit, bean seeds, flowers (assorted), fruit (assorted), insect collection, benthic macroinvertebrates, ID chart, sorting pans, 2 liter bottle with cap, eyedropper, water, contour feathers, down feathers, owl pellets, hair samples, fur samples, funnels, tubing, construction paper, glue, straw (clean), large flask, large graduate, stopper (2 hole), glass tubing, blindfold, popsicle sticks, tape, cake frosting (or lard)

Grade 7, Science, Unit 3, Natural Selection and Adaptations

Content Area: **Science**
 Course(s): **Science**
 Time Period: **January**
 Length: **8 weeks**
 Status: **Published**

Enduring Understanding

Fossils are evidence of the history of life on Earth and can assist in constructing explanations for similarities in organisms.

Essential Questions

How does genetic variation among organisms in a species affect survival and reproduction?

How does the environment influence genetic traits in populations over multiple generations?

Next Generation Science Standards

Natural Selection and Adaptations

SCI.MS-LS4-1	Analyze and interpret data for patterns in the fossil record that document the existence, diversity, extinction, and change of life forms throughout the history of life on Earth under the assumption that natural laws operate today as in the past.
SCI.MS-LS4-6	Use mathematical representations to support explanations of how natural selection may lead to increases and decreases of specific traits in populations over time.
SCI.MS-LS4-3	Analyze displays of pictorial data to compare patterns of similarities in the embryological development across multiple species to identify relationships not evident in the fully formed anatomy.
SCI.MS SCI.MS-LS4-2	Natural Selection and Adaptations Apply scientific ideas to construct an explanation for the anatomical similarities and differences among modern organisms and between modern and fossil organisms to infer evolutionary relationships.
SCI.MS-LS4-4	Construct an explanation based on evidence that describes how genetic variations of traits in a population increase some individuals' probability of surviving and reproducing in a specific environment.

Student Learning Objectives

1	Analyze and interpret data for patterns in the fossil record that document the existence, diversity, extinction, and change of life forms throughout the history of life on Earth under the assumption that natural laws operate today as in the past.	MS-LS4-:
2	Apply scientific ideas to construct an explanation for the anatomical similarities and differences among modern organisms and between modern and fossil organisms to infer evolutionary relationships.	MS-LS4-:
3	Analyze displays of pictorial data to compare patterns of similarities in the embryological development across multiple species to identify relationships not evident in the fully formed anatomy.	MS-LS4-:
4	Construct an explanation based on evidence that describes how genetic variations of traits in a population increase some individuals' probability of surviving and reproducing in a specific environment.	MS-LS4-:
5	Use mathematical representations to support explanations of how natural selection may lead to increases and decreases of specific traits in populations over time.	MS-LS4-t

Instructional Activities

Natural selection simulation <http://phet.colorado.edu/en/simulation/natural-selection>

Peppered moth simulation <http://biologycorner.com/worksheets/pepperedmoth.html>

Natural selection cartoon <https://www.teacherspayteachers.com/Product/Natural-Selection-Cartoon-1109024>

<http://www.sciencechannel.com/games-and-interactives/charles-darwin-game/>

<http://teacher.scholastic.com/activities/explorations/adaptation/index.htm>

Interdisciplinary Connections

NJSLS Connections:

ELA/Literacy – RST.6-8.1 Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions (MS-LS4- 1),(MS-LS4-2),(MS-LS4-3),(MS-LS4-4)

RST.6-8.7 Integrate quantitative or technical information expressed in words in a text with a version of that information expressed visually (e.g., in a flowchart, diagram, model, graph, or table). (MS-LS4-1),(MS-LS4-3)

RST.6-8.9 Compare and contrast the information gained from experiments, simulations, video, or multimedia sources with that gained from reading a text on the same topic. (MS-LS4-3),(MS-LS4-4)

WHST.6-8.2 Write informative/explanatory texts to examine a topic and convey ideas, concepts, and information through the selection, organization, and analysis of relevant content. (MS-LS4-2),(MS-LS4-4)

WHST.6-8.9 Draw evidence from informational texts to support analysis, reflection, and research. (MS-LS4-2),(MS-LS4-4)

SL.8.1 Engage effectively in a range of collaborative discussions (one-on-one, in groups, teacher-led) with diverse partners on grade 6 topics, texts, and issues, building on others' ideas and expressing their own clearly. (MS-LS4-2),(MS-LS4-4)

SL.8.4 Present claims and findings, emphasizing salient points in a focused, coherent manner with relevant evidence, sound valid reasoning, and well-chosen details; use appropriate eye contact, adequate volume, and clear pronunciation. (MS-LS4-2),(MS-LS4-4)

Mathematics –

MP.4 Model with mathematics. (MS-LS4-6) 6.RP.A.1 Understand the concept of a ratio and use ratio language to describe a ratio relationship between two quantities. (MS-LS4-4),(MS-LS4-6)

6.SP.B.5 Summarize numerical data sets in relation to their context. (MS-LS4-4),(MS-LS4-6)

6.EE.B.6 Use variables to represent numbers and write expressions when solving a real-world or mathematical problem; understand that a variable can represent an unknown number, or, depending on the purpose at hand, any number in a specified set. (MS-LS4-1),(MS-LS4-2) 7.RP.A.2 Recognize and represent proportional relationships between quantities. (MS-LS4-4),(MS-LS4-6)

Assessment

Formative Assessments:

Exit Card: Exit cards are written student responses to questions posed at the end of a class or learning activity or at the end of a day.

Portfolio Check: Check the progress of a student's portfolio. A portfolio is a purposeful collection of significant work, carefully selected, dated and presented to tell the story of a student's achievement or growth in well-defined areas of performance, such as reading, writing, math, etc. A portfolio usually includes personal reflections where the student explains why each piece was chosen and what it shows about his/her growing skills and abilities.

Quiz: Quizzes assess students for factual information, concepts and discrete skill. There is usually a single best answer.

Journal Entry: Students record in a journal their understanding of the topic, concept or lesson taught. The teacher reviews the entry to see if the student has gained an understanding of the topic, lesson or concept that was taught.

Choral Response: In response to a cue, all students respond verbally at the same time. The response can be either to answer a question or to repeat something the teacher has said.

Misconception Check: Present students with common or predictable misconceptions about a designated concept, principle, or process. Ask them whether they agree or disagree and explain why. The misconception check can also be presented in the form of a multiple-choice or true-false quiz.

Student Conference: One on one conversation with students to check their level of understanding.

3-Minute Pause: The Three-Minute Pause provides a chance for students to stop, reflect on the concepts and ideas that have just been introduced, make connections to prior knowledge or experience, and seek clarification.

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End-of-unit or -chapter tests

End-of-term or -semester exams

Benchmark:

ELA Research Based Benchmark
Interim Assessments

Alternative

Self Selected Science Projects
Group Collaboration Projects
Concept Map
Demonstration Stations
Powerpoints

Texts and Resources

peppered moths (dark and light), bean (various color and size), bark (light and dark), construction paper, dissection pan, stopwatch, poster of homologous structures, poster of superposition, dog breed charts, seed variety chart, spider plant, potting soil, pots, water, food labels, GMO posters, kerplunk game, meter sticks, beach ball, flowers, gardening tools, area to plant, paper for designing

Grade 7, Science, Unit 4, Interdependent Relationship in Ecosystems

Content Area: **Science**
Course(s): **Science**
Time Period: **March**

Length: **8 weeks**
Status: **Published**

Enduring Understanding

There are scientific, economic, political, and social justifications used in making decisions about maintaining biodiversity in ecosystems.

Essential Questions

How do organisms interact with other organisms in the physical environment to obtain matter and energy

Next Generation Science Standards

Interdependent Relationship in Ecosystems

SCI.MS-LS2-2
SCI.MS-LS2-5

Construct an explanation that predicts patterns of interactions among organisms across multiple ecosystems.
Evaluate competing design solutions for maintaining biodiversity and ecosystem services.

Student Learning Objectives

- 1 Describe how one population of organisms may affect other plants and/or animals in an ecosystem.
- 2 Predict the impact of humans altering biotic and abiotic factors has on an ecosystem.
- 3 Model the effect of positive and negative changes in population size on a symbiotic pairing.
- 4 Construct an explanation that predicts patterns of interactions among organisms across multiple ecosystems.
- 5 Evaluate competing design solutions for maintaining biodiversity and ecosystem services.*

Instructional Activities

<http://fishwildlife.org/files/ConEd-Schoolyard-Biodiversity-Guide.pdf>

<http://concord.org/stem-resources/can-we-feed-growing-population>

<http://concord.org/stem-resources/competition>

Interdisciplinary Connections

ELA/Literacy -

[RST.6-8.1](#) [Cite specific textual evidence to support analysis of science and technical texts.](#) (MS-LS2-2)

[RST.6-8.8](#) [Distinguish among facts, reasoned judgment based on research findings, and speculation in a text.](#) (MS-LS2-5)

[RI.8.8](#) [Trace and evaluate the argument and specific claims in a text, assessing whether the reasoning is sound and the evidence is relevant and sufficient to support the claims.](#) (MS-LS2-5)

[WHST.6-8.2](#) [Write informative/explanatory texts to examine a topic and convey ideas, concepts, and information through the selection, organization, and analysis of relevant content.](#) (MS-LS2-2)

[WHST.6-8.9](#) [Draw evidence from literary or informational texts to support analysis, reflection, and research.](#) (MS-LS2-2)

[SL.8.1](#) [Engage effectively in a range of collaborative discussions \(one-on-one, in groups, and teacher-led\) with diverse partners on grade 8 topics, texts, and issues, building on others' ideas and expressing their own clearly.](#) (MS-LS2-2)

[SL.8.4](#) [Present claims and findings, emphasizing salient points in a focused, coherent manner with relevant evidence, sound valid reasoning, and well-chosen details; use appropriate eye contact, adequate volume,](#)

[and clear pronunciation.](#) (MS-LS2-2)

Mathematics -

[MP.4 Model with mathematics.](#) (MS-LS2-5)

[6.RP.A.3 Use ratio and rate reasoning to solve real-world and mathematical problems.](#) (MS-LS2-5)

[6.SP.B.5 Summarize numerical data sets in relation to their context.](#) (MS-LS2-2)

Assessment

Formative Assessments:

A-B-C Summaries: Each student in the class is assigned a different letter of the alphabet and they must select a word starting with that letter that is related to the topic being studied.

Debriefing: A form of reflection immediately following an activity.

Idea Spinner: The teacher creates a spinner marked into 4 quadrants and labeled “Predict, Explain, Summarize, Evaluate.” After new material is presented, the teacher spins the spinner and if it lands in the “Summarize” quadrant, the teacher might say, “List the key concepts just presented.”

Inside-Outside Circle: Inside and outside circles of students face each other. Within each pair of facing students, students quiz each other with questions they have written. Outside circle moves to create new pairs.

Reader’s Theater:Exit Card: Exit cards are written student responses to questions posed at the end of a class or learning activity or at the end of a day.

Portfolio Check: Check the progress of a student’s portfolio. A portfolio is a purposeful collection of significant work, carefully selected, dated and presented to tell the story of a student’s achievement or growth in well-defined areas of performance, such as reading, writing, math, etc. A portfolio usually includes personal reflections where the student explains why each piece was chosen and what it shows about his/her growing skills and abilities.

Quiz: Quizzes assess students for factual information, concepts and discrete skill. There is usually a single best answer.

Journal Entry: Students record in a journal their understanding of the topic, concept or lesson taught. The teacher reviews the entry to see if the student has gained an understanding of the topic, lesson or concept that was taught.

Choral Response: In response to a cue, all students respond verbally at the same time. The response can be either to answer a question or to repeat something the teacher has said.

Misconception Check: Present students with common or predictable misconceptions about a designated concept, principle, or process. Ask them whether they agree or disagree and explain why. The misconception check can also be presented in the form of a multiple-choice or true-false quiz.

Student Conference: One on one conversation with students to check their level of understanding.

3-Minute Pause: The Three-Minute Pause provides a chance for students to stop, reflect on the concepts and ideas that have just been introduced, make connections to prior knowledge or experience, and seek clarification.

Observation: Walk around the classroom and observe students as they work to check for learning.

Self-Assessment: A process in which students collect information about their own learning, analyze what it reveals about their progress toward the intended learning goals and plan the next steps in their learning.

Index Card/Summaries/Questions: Periodically, distribute index cards and ask students to write on both sides, with these instructions: (Side 1) Based on our study of (unit topic), list a big idea that you understand and word it as a

summary statement. (Side 2) Identify something about (unit topic) that you do not yet fully understand and word it as a statement or question.

Hand Signals: Ask students to display a designated hand signal to indicate their understanding of a specific concept, principal, or process: - I understand _____ and can explain it (e.g., thumbs up). - I do not yet understand _____ (e.g., thumbs down). - I'm not completely sure about _____ (e.g., wave hand).

One Minute Essay: A one-minute essay question (or one-minute question) is a focused question with a specific goal that can, in fact, be answered within a minute or two.

Analogy Prompt: Present students with an analogy prompt: (A designated concept, principle, or process) is like _____ because _____.

Web or Concept Map: Any of several forms of graphical organizers which allow learners to perceive relationships between concepts through diagramming key words representing those concepts.
<http://www.graphic.org/concept.html>

Summative Assessments:

Selected response items: Multiple choice, True/false, Matching, Short answer, Fill in the blank, One or two sentence response, Extended written response

Performance assessment: Laboratory activities, models, various projects

End-of-unit or -chapter tests

End-of-term or -semester exams

Benchmark:

ELA Research Based Benchmark
Interim Assessments

Alternative

Self Selected Science Projects
Group Collaboration Projects
Concept Map
Demonstration Stations
Powerpoints

Texts and Resources

graph paper, pencil, test tube, candle, match, small pan (tuna fish), clay, water, metric ruler, beaker (250 mL), funnel, filter paper, gravel, sand, clay, world map, biome map, climate data, colored pencils. 2 liter bottle, scissors, various plants, various soils

Grade 7, Science, Unit 5, Matter & Energy in Organisms & Ecosystems

Content Area: **Science**
Course(s): **Science**
Time Period: **May**

Length: **8 weeks**
Status: **Published**

Enduring Understanding

The transfer of energy and cycling of matter has a role in the photosynthesis in cycling matter in ecosystems.

Essential Questions

How do organisms obtain and use matter and energy?

How do matter and energy move through an ecosystem?

Next Generation Science Standards

Matter & Energy In Organisms & Ecosystems

SCI.MS-LS2-4	Construct an argument supported by empirical evidence that changes to physical or biological components of an ecosystem affect populations.
SCI.MS-LS1-6	Construct a scientific explanation based on evidence for the role of photosynthesis in the cycling of matter and flow of energy into and out of organisms.
SCI.MS-LS1-7	Develop a model to describe how food is rearranged through chemical reactions forming new molecules that support growth and/or release energy as this matter moves through an organism.
SCI.MS-LS2-1	Analyze and interpret data to provide evidence for the effects of resource availability on organisms and populations of organisms in an ecosystem.
SCI.MS-LS2-3	Develop a model to describe the cycling of matter and flow of energy among living and nonliving parts of an ecosystem.

Student Learning Objectives

- 1 Create a representation the process by which plants, algae and many microorganisms use the energy light to make sugars (food) from carbon dioxide from the atmosphere and water.
- 2 Construct a scientific explanation based on evidence for the role of photosynthesis in the cycling of matter and flow of energy into and out of organisms.
- 3 Develop a model to describe how food is rearranged through chemical reactions forming new molecules that support growth and/or release energy as this matter moves through an organism.
- 4 Analyze and interpret data to provide evidence for the effects of resource availability on organisms and populations of organisms in an ecosystem.
- 5 Develop a model to describe the cycling of matter and flow of energy among living and nonliving parts of an ecosystem.

Instructional Activities

Owl pellet activities

photosynthesis simulation:

<http://concord.org/stem-resources/leaf-photosynthesis->

Photosynthesis song:

<http://www.bing.com/videos/search?q=photosynthesis+song&FORM=VIRE2#view=detail&mid=E3D96D9A9E325D1667EFE3D96D9A9E325D1667EF>

Interdisciplinary Connections

NJSLS Connections:

ELA/Literacy -

RST.6-8.1 [Cite specific textual evidence to support analysis of science and technical texts.](#) (MS-LS1-6),(MS-LS2-1),(MS-LS2-3)

RST.6-8.2 [Determine the central ideas or conclusions of a text; provide an accurate summary of the text distinct from prior knowledge or opinions.](#) (MS-LS1-6)

[RST.6-8.7](#) Integrate quantitative or technical information expressed in words in a text with a version of that information expressed visually (e.g., in a flowchart, diagram, model, graph, or table). (MS-LS2-1)

[RI.8.8](#)

[WHST.6-8.1](#) Write arguments focused on discipline content. (MS-LS2-4)

[WHST.6-8.2](#) Write informative/explanatory texts to examine a topic and convey ideas, concepts, and information through the selection, organization, and analysis of relevant content. (MS-LS1-6)

[WHST.6-8.9](#) Draw evidence from informational texts to support analysis, reflection, and research. (MS-LS1-6)

[SL.8.5](#) Integrate multimedia and visual displays into presentations to clarify information, strengthen claims and evidence, and add interest. (MS-LS1-7),(MS-LS2-3)

Mathematics -

[6.EE.C.9](#) Use variables to represent two quantities in a real-world problem that change in relationship to one another; write an equation to express one quantity, thought of as the dependent variable, in terms of the other quantity, thought of as the independent variable. Analyze the relationship between the dependent and independent variables using graphs and tables, and relate these to the equation. (MS-LS1-6),(MS-LS2-3)

Assessment

Formative Assessments:

One Sentence Summary: Students are asked to write a summary sentence that answers the “who, what where, when, why, how” questions about the topic.

Summary Frames: Description: A _____ is a kind of _____ that
... Compare/Contrast: Problem/Solution/Cause/Effect

One Word Summary: Select (or invent) one word which best summarizes a topic.

Think-Pair- Share/Turn to Your Partner: Teacher gives direction to students. Students formulate individual response, and then turn to a partner to share their answers. Teacher calls on several random pairs to share their answers with the class.

Think-Write-Pair-Share: Students think individually, write their thinking, pair and discuss with partner, then share with the class.

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graph paper, pencil, test tube, candle, match, small pan (tuna fish), clay, water, metric ruler, beaker (250 mL), funnel, filter paper, gravel, sand, clay, world map, biome map, climate data, colored pencils. 2 liter bottle, scissors, various plants, various