



AGsploration

The Science of Maryland Agriculture

UNIVERSITY OF
MARYLAND
EXTENSION



Lesson Alignment with Next Generation Science Standards



ANIMAL AGRICULTURE

1. Food, Fiber, and More from Animals

5-PS1-4 Matter and Its Interactions

Conduct an investigation to determine whether the mixing of two or more substances results in new substances.

MS-PS1-2 Matter and Its Interactions

Analyze and interpret data on the properties of substances before and after the substances interact to determine if a chemical reaction has occurred.

2. Wild and Woolly

MS-LS4-4 Biological Evolution: Unity and Diversity

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 Biological Evolution: Unity and Diversity

Gather and synthesize information about the technologies that have changed the way humans influence the inheritance of desired traits in organisms.

3. Moo Who?

MS-LS4-4 Biological Evolution: Unity and Diversity

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 Biological Evolution: Unity and Diversity

Gather and synthesize information about the technologies that have changed the way humans influence the inheritance of desired traits in organisms.

4. Animal Digestion

MS-LS1-3 From Molecules to Organisms: Structures and Processes

Use an argument supported by evidence for how the body is a system of interacting subsystems composed of groups of cells.

MS-LS1-7 From Molecules to Organisms: Structures and Processes

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.

5. Undressing the Mystery of Meats

MS-LS4-5 Biological Evolution: Unity and Diversity

Gather and synthesize information about the technologies that have changed the way humans influence the inheritance of desired traits in organisms.

6. Milk in Motion: A Dynamic Dairy Experiment

5-PS1-4 Matter and Its Interactions

Conduct an investigation to determine whether the mixing of two or more substances results in new substances.

MS-PS1-2 Matter and its Interactions

Analyze and interpret data on the properties of substances before and after the substances interact to determine if a chemical reaction has occurred.

MS-LS4-5 Biological Evolution: Unity and Diversity

Gather and synthesize information about the technologies that have changed the way humans influence the inheritance of desired traits in organisms.

7. Poultry: Feed Basics for a Growing Bird

MS-LS1-5 From Molecules to Organisms: Structures and Processes

Construct a scientific explanation based on evidence for how environmental and genetic factors influence the growth of organisms.

MS-LS4-5 Biological Evolution: Unity and Diversity

Gather and synthesize information about the technologies that have changed the way humans influence the inheritance of desired traits in organisms.

8. Horses and Evolution

MS-LS4-1 Biological Evolution: Unity and Diversity

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-LS4-5 Biological Evolution: Unity and Diversity

Gather and synthesize information about the technologies that have changed the way humans influence the inheritance of desired traits in organisms.

PLANT AGRICULTURE

9. It's Not Just Dirt

4-ESS2-1 Earth's Systems

Make observations and/or measurements to provide evidence of the effects of weathering or the rate of erosion by water, ice, wind, or vegetation.

MS-ESS2-1 Earth's Systems

Develop a model to describe the cycling of Earth's materials and the flow of energy that drives this process.

10. Send in the Sun: A Look at Photosynthesis

5-PS3-1 Energy

Use models to describe that energy in animals' food (used for body repair, growth, motion, and to maintain body warmth) was once energy from the sun.

5-LS1-1 From Molecules to Organisms: Structures and Processes

Support an argument that plants get the materials they need for growth chiefly from air and water.

MS-LS1-6 From Molecules to Organisms: Structures and Processes

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.

11. Grains: The Whole Story

MS-LS1-7 From Molecules to Organisms: Structures and Processes

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.

12. Soy: The Magic Bean

HS-LS2-3 Ecosystems: Interactions, Energy, and Dynamics

Construct and revise an explanation based on evidence for the cycling of matter and flow of energy in aerobic and anaerobic conditions.

13. Buy Close to Home, Purchase Locally Grown

5-ESS3-1 Earth and Human Activity

Obtain and combine information about ways individual communities use science ideas to protect the Earth's resources and environment.

MS-LS2-1 Ecosystems: Interactions, Energy, and Dynamics

Analyze and interpret data to provide evidence for the effects of resource availability on organisms and populations of organisms in an ecosystem.

HS-ETS1-1 Engineering Design

Analyze a major global challenge to specify qualitative and quantitative criteria and constraints for solutions that account for societal needs and wants.

14. Amazing Corn

5-PS1-4 Matter and Its Interactions

Conduct an investigation to determine whether the mixing of two or more substances results in new substances.

MS-PS1-2 Matter and its Interactions

Analyze and interpret data on the properties of substances before and after the substances interact to determine if a chemical reaction has occurred.

AGRICULTURE AND THE ENVIRONMENT

15. Food for Thought: Agriculture in the Chesapeake Bay Watershed

MS-LS2-2 Ecosystems: Interaction, Energy, and Dynamics

Construct an explanation that predicts patterns of interactions among organisms across multiple ecosystems.

MS-LS2-4 Ecosystems: Interactions, Energy, and Dynamics

Construct an argument supported by empirical evidence that changes to physical or biological components of an ecosystem affect populations.

16. Do You Get My (Non)Point? Modeling Pollution in a Watershed

MS-LS2-3 Ecosystems: Interactions, Energy, and Dynamics

Develop a model to describe the cycling of matter and flow of energy among living and nonliving parts of an ecosystem.

MS-ESS3-3 Earth and Human Activity

Apply scientific principles to design a method for monitoring and minimizing a human impact on the environment.

17. Conservation Choices: How Farmers and Developers Protect the Bay

5-ESS3-1 Earth and Human Activity

Obtain and combine information about ways individual communities use science ideas to protect the Earth's resources and environment.

MS-ESS3-3 Earth and Human Activity

Apply scientific principles to design a method for monitoring and minimizing a human impact on the environment.

MS-ETS1-2 Engineering Design

Evaluate competing design solutions using a systematic process to determine how well they meet the criteria and constraints of the problem.

18. Who Lives Here? Species of the Bay Region and Watershed

MS-LS2-2 Ecosystems: Interactions, Energy, and Dynamics

Construct an explanation that predicts patterns of interactions among organisms across multiple ecosystems.

MS-LS2-4 Ecosystems: Interactions, Energy, and Dynamics

Construct an argument supported by empirical evidence that changes to physical or biological components of an ecosystem affect populations.

AGRICULTURE TECHNOLOGY

19. Persistent Pests

MS-LS2-4 Ecosystems: Interactions, Energy, and Dynamics

Construct an argument supported by empirical evidence that changes to physical or biological components of an ecosystem affect populations.

MS-LS4-4 Biological Evolution: Unity and Diversity

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.

20. Something Fishy: Aquaculture in Maryland

MS-ESS3-4 Earth and Human Activity

Construct an argument supported by evidence for how increases in human population and per-capita consumption of natural resources impact Earth's systems.

21. What's in Your Genes?

MS-LS3-2 Heredity: Inheritance and Variation of Traits

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.

22. Food Safety is for Everyone

MS-ETS1-3 Engineering Design

Analyze data from tests to determine similarities and differences among several design solutions to identify the best characteristics of each that can be combined into a new solution to better meet the criteria for success.

HS-ETS1-3 Engineering Design

Evaluate a solution to a complex real-world problem based on prioritized criteria and trade-offs that account for a range of constraints, including cost, safety, reliability, and aesthetics as well as possible social, cultural, and environmental impacts.

23. Down and Dirty with Biosecurity

MS-ETS1-2 Engineering Design

Evaluate competing design solutions using a systematic process to determine how well they meet the criteria and constraints of the problem.

HS-ETS1-3 Engineering Design

Evaluate a solution to a complex real-world problem based on prioritized criteria and trade-offs that account for a range of constraints, including cost, safety, reliability, and aesthetics as well as possible social, cultural, and environmental impacts.

24. Feeding Our Future

MS-LS3-1 Heredity: Inheritance and Variation of Traits

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.

HS-ETS1-1 Engineering Design (Grade 9-12)

Analyze a major global challenge to specify qualitative and quantitative criteria and constraints for solutions that account for societal needs and wants.

HS-ETS1-3 Engineering Design

Evaluate a solution to a complex real-world problem based on prioritized criteria and trade-offs that account for a range of constraints, including cost, safety, reliability, and aesthetics as well as possible social, cultural, and environmental impacts.