



**CORRELATIONS FOR THE**  
Missouri Forestkeepers Network &  
The Missouri Show-Me Standards  
& Science Grade Level Expectations

D.L.



## THE MISSION OF THE MISSOURI FORESTKEEPERS

Network (FKN) is “to develop a network of informed citizens working to conserve, sustain and enhance Missouri’s urban and rural forest resources through volunteerism, advocacy, and management.” The free program provides opportunities for teachers and students to become involved in data collection, identifying Missouri trees, data analysis, and report writing. Participation in the FKN can help teachers meet several of the Missouri Show-Me Standards and the Missouri Science Grade Level Expectations.

This document outlines the standards and GLE’s which can be addressed by student participation in this program. (\*\*indicates some extension to the standard program may be required.)

Missouri Department of Conservation education consultants are available to assist teachers with correlating Forestkeepers activities into your school’s curriculum. For assistance locating your local education consultant, visit: [www.mdc.mo.gov/teacher/myeducator-search.html](http://www.mdc.mo.gov/teacher/myeducator-search.html) or call 1-888-9-FOREST (1-888-936-7378).

# Missouri Show-Me Standards

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## SCIENCE

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3. characteristics and interactions of living organisms
4. changes in ecosystems and interactions of organisms with their environments
7. processes of scientific inquiry (such as formulating and testing hypotheses)
8. impact of science, technology and human activity on resources and the environment

## COMMUNICATION ARTS

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- 1.\*\* speaking and writing standard English (including grammar, usage, punctuation, spelling, capitalization)
- 4.\*\* writing formally (such as reports, narratives, essays) and informally (such as outline, notes)

## MATHEMATICS

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3. data analysis, probability and statistics

## GOAL 1

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Students in Missouri public schools will acquire the knowledge and skills to gather, analyze and apply information and ideas.

- 1.\*\* develop questions and ideas to initiate and refine research
2. conduct research to answer questions and evaluate information and ideas
- 3.\*\* design and conduct field and laboratory investigations to study nature and society
6. discover and evaluate patterns and relationships in information, ideas and structures
8. organize data, information, and ideas into useful forms (including charts, graphs, outlines) for analysis or presentation
- 10.\*\* apply acquired information, ideas and skills to different contexts as students, workers, citizens and consumers

## GOAL 2

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Students in Missouri public schools will acquire the knowledge and skills to communicate effectively within and beyond the classroom.

- 1.\*\* plan and make written, oral and visual presentations for a variety of purposes and audiences
- 2.\*\* review and revise communications to improve accuracy and clarity
3. exchange information, questions and ideas while recognizing the perspectives of others

## GOAL 3

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Students in Missouri public schools will acquire the knowledge and skills to recognize and solve problems.

1. identify problems and define their scope and elements
- 2.\*\* develop and apply strategies based on ways others have prevented or solved problems
5. reason inductively from a set of specific facts and deductively from general premises
- 6.\*\* examine problems and proposed solutions from multiple perspectives

## GOAL 4

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Students in Missouri public schools will acquire the knowledge and skills to make decisions and act as responsible members of society.

1. explain reasoning and identify information used to support decisions

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# Missouri Science Grade Level Expectations

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## KINDERGARTEN

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### STRAND 3

1.D.a.\*\* Observe and compare the structures and behaviors of different kinds of plants and animals.

### STRAND 4

1.A.a.\*\* Describe how the seasons affect the behavior of plants and animals.

### STRAND 7

1.A.a Pose questions about objects, materials, organisms and events in the environment.

1.B.a Make qualitative observations using the five senses.

1.B.c\*\* Measure length and mass using non-standard units.

1.B.d\*\* Compare amounts/measurements.

1.C.a Use observations to construct reasonable explanations.

1.C.b Use observations to describe relationships and make predictions to be tested.

1.D.a Compare explanations with prior knowledge.

1.E.a Communicate observations using words, pictures, and numbers.

### STRAND 8

1.B.a Describe how tools have helped scientists make better observations (i.e., magnifiers).

## FIRST GRADE

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### STRAND 3

1.A.b\*\* Identify the basic needs of most plants (i.e., air, water, light).

1.D.a Identify and compare the physical structures of a variety of plants (e.g., stem, leaves, flowers, seeds, and roots).

1.D.c Identify the relationships between the physical structures of plants and the function of those structures (e.g., absorption of water, support, absorbing light energy, reproduction).

### STRAND 7

1.A.a Pose questions about objects, materials, organisms, and events in the environment.

1.B.a Make qualitative observations using the five senses.

1.B.c\*\* Measure length, mass, and temperature using standard and non-standard units.

1.B.d\*\* Compare amounts/measurements.

1.C.a Use observations to construct reasonable explanations.

1.C.b Use observations to describe relationships and make predictions to be tested.

1.D.a Compare explanations with prior knowledge.

1.E.a Communicate simple procedures and results of investigations and explanations through: oral presentations, drawings and maps, data tables, graphs (bar, pictographs), writings.

### STRAND 8

1.B.a Describe how tools have helped scientists make better observations (e.g., magnifiers, balances, thermometers).

## SECOND GRADE

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### STRAND 7

1.B.a Make qualitative observations using the five senses.

1.B.c\*\* Measure length, mass, and temperature using standard and non-standard units.

1.B.d\*\* Compare amounts/measurements.

1.C.a Use observations to construct reasonable explanations.

1.C.b Use observations to describe relationships and make predictions to be tested.

1.E.a Communicate simple procedures and results of investigations and explanations through: oral presentations, drawings and maps, data tables, graphs (bar, pictographs), writings.

## THIRD GRADE

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### STRAND 3

1.A.a\*\* Describe the basic needs of most plants (i.e., air, water, light, nutrients and temperature).

1.B.a Recognize that plants progress through life cycles of seed germination, growth and development, reproduction, and death.

1.B.b Observe and describe the life cycle of a flowering plant.

1.B.c Sequence and describe the stages in the life cycle of a flowering plant.

1.D.a Identify the major organs (roots, stems, flowers and leaves) and their functions in vascular plants (e.g., absorption, transport, reproduction).

### STRAND 4

2.A.a Identify sunlight as the primary source of energy plants use to produce their own food.

### STRAND 7

1.A.a Pose questions about objects, materials, organisms, and events in the environment.

1.B.a Make qualitative observations using the five senses.

1.B.b Observe using simple tools and equipment (e.g., hand lenses, magnets, thermometers, metric rulers, balances, graduated cylinders).

# Missouri Science Grade Level Expectations; *continued*

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1.B.c\*\* Measure length to the nearest centimeter, mass using grams, temperature using degrees Celsius, volume using liters.

1.B.d\*\* Compare amounts/measurements.

1.B.e\*\* Judge whether measurements and computation of quantities are reasonable.

1.C.a Use quantitative and qualitative data to construct reasonable explanations.

1.C.b Use data to describe relationships and make predictions to be tested.

1.D.a Make predictions supported by scientific knowledge/explanations.

1.D.b Evaluate the reasonableness of an explanation.

1.D.c Analyze whether evidence supports proposed explanations.

1.E.a Communicate simple procedures and results of investigations and explanations through: oral presentations, drawings and maps, data tables, graphs (bar, single line, pictographs), writings.

1.E.b Interpret data presented in writings, tables, graphs (bar, single line, pictographs), and drawings.

## STRAND 8

3.A.b Work with a group to solve a problem, giving due credit to the ideas and contributions of each group member.

## FOURTH GRADE

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### STRAND 4

1.A.a Identify the ways a specific organism may interact with other organisms or with the environments (e.g., pollination, shelter, seed dispersal, camouflage, migration, hibernation, defensive mechanism).

1.D.a Identify examples in Missouri where human activity has had a beneficial or harmful effect on other organisms (e.g., feeding birds, littering vs. pick-up trash, hunting/conservation of species, paving/restoring greenspace).

3.C.a Identify specialized structures and describe how they help plants survive in their environment (e.g., root, cactus needles, thorns, winged seed, waxy leaves).

### STRAND 7

1.A.a\*\* Formulate testable questions and explanations (hypotheses).

1.B.a Make qualitative observations using the five senses.

1.B.b Observe using simple tools and equipment (e.g., hand lenses, magnets, thermometers, metric rulers, balances, graduated cylinders, spring scales).

1.B.c\*\* Measure length to the nearest centimeter, mass using grams, temperature using degrees Celsius, volume to the nearest milliliter, weight to the nearest Newton).

1.B.d\*\* Compare amounts/measurements.

1.B.e\*\* Judge whether measurements and computation of quantities are reasonable.

1.C.a Use quantitative and qualitative data to construct reasonable explanations.

1.C.b Use data to describe relationships and make predictions to be tested.

1.D.a Make predictions supported by scientific knowledge/explanations.

1.D.b Evaluate the reasonableness of an explanation.

1.D.c Analyze whether evidence supports proposed explanations.

1.E.a Communicate simple procedures and results of investigations and explanations through: oral presentations, drawings and maps, data tables, graphs (bar, single line, pictographs), writings.

1.E.b Interpret data in order to make and support conclusions.

## STRAND 8

3.A.b Work with a group to solve a problem, giving due credit to the ideas and contributions of each group member.

## FIFTH GRADE

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### STRAND 3

1.E.a Explain how similarities are the basis for classification.

1.E.e\*\* Identify plants or animals using simple dichotomous keys.

2.C.a Recognize the major life processes carried out by the major systems of plants and animals (e.g., support, reproductive, digestive, transport/circulatory, excretory, response).

### STRAND 7

1.B.a Make qualitative observations using the five senses.

1.B.b Determine the appropriate tools and techniques to collect data.

1.B.c Use a variety of tools and equipment to gather data (e.g., hand lenses, magnets, thermometers, metric rulers, balances, graduated cylinders, spring scales).

1.B.f Judge whether measurements and computation of quantities are reasonable.

1.C.a Use quantitative and qualitative data to construct reasonable explanations.

1.C.b Use data to describe relationships and make predictions to be tested.

1.D.a Make predictions supported by scientific knowledge/explanations.

1.D.b Evaluate the reasonableness of an explanation.

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- 1.D.c Analyze whether evidence supports proposed explanations.
- 1.E.a Communicate the procedures and results of investigations and explanations through: oral presentations, drawings and maps, data tables, graphs (bar, single line, pictographs), writings.
- 1.E.b Interpret data in order to make and support conclusions.

#### STRAND 8

- 3.A.b Work with a group to solve a problem, giving due credit to the ideas and the contributions of each group member.

### SIXTH GRADE

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#### STRAND 3

- 1.A.a\*\* Describe the common life processes necessary to the survival of organisms (i.e., growth, reproduction, life span, response to stimuli, energy use, exchange of gases, use of water, and elimination of waste).

#### STRAND 4

- 1.A.a Identify the biotic factors (populations of organisms) and abiotic factors (e.g., quantity of light and water, range of temperatures, soil composition) that make up an ecosystem.
- 1.B.a Identify populations within a community that are in competition with one another for resources.
- 1.B.b Recognize the factors that affect the number and types of organisms an ecosystem can support (e.g. food availability, abiotic factors such as quantity of light and water, temperature and temperature range, soil composition, disease, competitions from other organisms, predation).
- 1.B.c Predict the effects of changes in the number and types of organisms in an ecosystem on the populations of other organisms within that ecosystem.
- 1.D.a Describe beneficial and harmful activities of organisms, including humans, that affect the environment (e.g., deforestation, fishing/hunting, overpopulation, water and air pollution, global warming, restoration of natural environments, river bank/coastal stabilization, recycling, channelization, reintroduction of species, depletion of resources) and explain how these activities affect organisms within an ecosystem.
- 1.D.b Predict the impact (beneficial or harmful) of a natural environmental change (e.g., forest fire, flood, volcanic eruption, avalanche) on the organisms in an ecosystem.
- 1.D.c Describe possible solutions to potentially harmful environmental changes within an ecosystem.
- 3.C.a Relate examples of adaptations (specialized structures or behaviors) within a species to its ability to survive in a specific environment (e.g., hollow bones/flight, hollow hair/insulation, dense root structure/compact soil, seeds/food and protection for plant embryo vs. spores, fins/movement in water).

- 3.C.b Predict how certain adaptations, such as behavior, body structure, or coloration, may offer a survival advantage to an organism in a particular environment.

#### STRAND 7

- 1.B.a Make qualitative observations using the five senses.
- 1.B.b Determine the appropriate tools and techniques to collect data.
- 1.B.c Use a variety of tools and equipment to gather data (e.g., microscopes, thermometers, computers, spring scales, balances, magnets, metric rulers, graduated cylinders, stopwatches).
- 1.B.f Judge whether measurements and computation of quantities are reasonable.
- 1.C.a Use quantitative and qualitative data to construct reasonable explanations (conclusions).
- 1.C.b Use data to describe relationships and make predictions to be tested.
- 1.C.c Recognize the possible effects of errors in observations, measurements, and calculations on the formulation of explanations (conclusions).
- 1.D.a Make predictions supported by scientific knowledge/explanations.
- 1.D.b Analyze whether evidence (data) supports proposed explanations (hypotheses, laws, theories).
- 1.D.c Evaluate the reasonableness of an explanation (conclusion).
- 1.E.a Communicate the procedures and results of investigations and explanations through: oral presentations, drawings and maps, data tables, graphs (bar, single line, pictographs), writings.
- 1.E.b Interpret data in order to make and support conclusions.

### SEVENTH GRADE

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#### STRAND 7

- 1.B.a Use quantitative and qualitative data to construct reasonable explanations (conclusions).
- 1.B.b Determine the appropriate tools and techniques to collect data.
- 1.B.c Use a variety of tools and equipment to gather data (e.g., microscopes, thermometers, analog and digital meters, computers, spring scales, balances, metric rulers, graduated cylinders, stopwatches).
- 1.B.f Judge whether measurements and computation of quantities are reasonable.
- 1.B.g Calculate the range and average/mean of a set of data.
- 1.C.a Use quantitative and qualitative data to construct reasonable explanations (conclusions).
- 1.C.b Use data to describe relationships and make predictions to be tested.
- 1.C.c Recognize the possible effects of errors in observations, measurements, and calculations on the formulation of explanations (conclusions).

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# Missouri Science Grade Level Expectations; *continued*

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- 1.D.a Make predictions supported by scientific knowledge/explanations.
- 1.D.b Analyze whether evidence (data) supports proposed explanations (hypotheses, laws, theories).
- 1.D.c Evaluate the reasonableness of an explanation (conclusion).
- 1.E.a. Communicate the procedures and results of investigations and explanations through: oral presentations, drawings and maps, data tables, graphs (bar, single line, pictographs), writings.
- 1.E.b Interpret data in order to make and support conclusions.

## EIGHTH GRADE

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### STRAND 3

- 1.A.a\*\* Recognize that most plants and animals require food and oxygen (needed to release the energy from that food).
- 1.D.a Compare and contrast the structures of plants and animals that serve similar functions (e.g., taking in water and oxygen, support, response to stimuli, obtaining energy, circulation, digestion, excretion, reproduction).

### STRAND 4

- 1.D.a Explain the beneficial or detrimental impact that some organisms (i.e., viruses, bacteria, protists, fungi) may have on other organisms (e.g., diseases, antibiotics, breakdown of waste, fermentation).
- 2.B.a\*\* Illustrate the oxygen/carbon dioxide cycles.
- 2.B.b\*\* Describe the processes involved in the recycling of matter in the oxygen/carbon dioxide cycles.

### STRAND 7

- 1.B.a Make qualitative observations using the five senses.
- 1.B.b Determine the appropriate tools and techniques to collect data.
- 1.B.c Use a variety of tools and equipment to gather data (e.g., microscopes, thermometers, analog and digital meters, computers, spring scales, balances, metric rulers, graduated cylinders, stopwatches).
- 1.B.f Judge whether measurements and computation of quantities are reasonable.
- 1.B.g Calculate the range and average/mean of a set of data.
- 1.C.a Use quantitative and qualitative data to construct reasonable explanations (conclusions).
- 1.C.b Use data to describe relationships and make predictions to be tested.
- 1.C.c Recognize the possible effects of errors in observations, measurements, and calculations on the formulation of explanations (conclusions).

- 1.D.a Make predictions supported by scientific knowledge/explanations.
- 1.D.b Analyze whether evidence (data) supports proposed explanations (hypotheses, laws, theories).
- 1.D.c Evaluate the reasonableness of an explanation (conclusion).
- 1.E.a. Communicate the procedures and results of investigations and explanations through: oral presentations, drawings and maps, data tables, graphs (bar, single line, pictographs), writings.
- 1.E.b Interpret data in order to make and support conclusions.

## NINTH, TENTH & ELEVENTH GRADE

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### STRAND 4

- 1.A.a\*\* Explain the nature of interactions between organisms in different symbiotic relationships (i.e., mutualism, commensalism, parasitism).
- 1.B.a Identify and explain the limiting factors that may affect the carrying capacity of a population within an ecosystem.
- 1.B.b Predict how populations within an ecosystem change in number and/or structure in response to hypothesized changes in biotic and/or abiotic factors.
- 1.C.a\*\* Devise a multi-step plan to restore the stability and/or biodiversity of an ecosystem when given a scenario describing the possible adverse effects of human interactions with that ecosystem (e.g., destruction caused by direct harvesting, pollution, atmospheric changes).
- 1.C.b Predict and explain how natural or human-caused changes (biological, chemical and/or physical) in one ecosystem may affect another ecosystem.
- 1.D.a Predict the impact (beneficial or harmful) of a natural environmental event (e.g., forest fire, flood, volcanic eruption, avalanche) may have on the diversity of different species in an ecosystem.
- 1.D.b\*\* Describe possible causes of extinction of a population.

### STRAND 7

- 1.B.a Make qualitative and quantitative observations using the appropriate senses, tools and equipment to gather data (e.g., microscopes, thermometers, analog and digital meters, computers, spring scales, balances, metric rulers, graduated cylinders).
- 1.B.b\*\* Measure length to the nearest millimeter, mass to the nearest gram, volume to the nearest milliliter, force (weight) to the nearest Newton, temperature to the nearest degree Celsius, time to the nearest second.
- 1.B.c Determine the appropriate tools and techniques to collect, analyze, and interpret data.

(\*\*indicates some extension to the standard program may be required.)

- 1.B.d Judge whether measurements and computation of quantities are reasonable.
- 1.B.e Calculate the range, average/mean, percent and ratios for sets of data.
- 1.B.f Recognize that observation is biased by the experiences and knowledge of the observer (e.g., strong beliefs about what should happen in particular circumstances can prevent the detection of other results).
- 1.C.a Use quantitative and qualitative data to construct reasonable explanations (conclusions).
- 1.C.b Analyze experimental data to determine patterns, relationship, perspectives and credibility (e.g., predict/extrapolate data, explain the relationship between the independent and dependent variable).
- 1.C.c Identify the possible effects of measurement and calculation errors on the validity and reliability of data.
- 1.D.a Make predictions supported by scientific knowledge and explanations.
- 1.D.b Evaluate the reasonableness of an explanation (conclusion).
- 1.E.a Communicate the procedures and results of investigations and explanations through: oral presentations, drawings and maps, data tables, graphs (bar, single and multiple line), equations, and writings.
- 1.E.b Communicate and defend a scientific argument.
- 1.E.c\*\* Explain the importance of a public presentation of scientific work and supporting evidence to the scientific community (e.g., work and evidence must be critiqued, reviewed, and validated by peers; needed for subsequent investigations by peers; results can influence the decisions regarding future scientific work).

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These correlations were determined by Dr. Janice Schnake Greene, Biology professor at Missouri State University.

The Missouri Forestkeepers Network is coordinated by Forest ReLeaf of Missouri and the Missouri Department of Conservation. It is open to any interested individual, family or group. Once enrolled, members determine their level of involvement and the time they invest in the program.

Membership benefits include: a kit with introductory information, suggested activities, a field guide, membership certificate, Forestkeepers pin, sticker and more; a quarterly newsletter; invitations to workshops and events across the state; access to

the network website; a great array of incentives for reporting on activities; and the satisfaction of knowing that you are a part of a statewide effort helping to preserve and enhance Missouri's forest resources!

**FOR MORE INFORMATION, PLEASE CONTACT:**

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