Science - 4

Course #: E3402, E3409

Course Description:

The performance expectations in fourth grade help students formulate answers to questions such as: "What are waves and what are some things they can do? How can water, ice, wind and vegetation change the land? What patterns of Earth's features can be determined with the use of maps? How do internal and external structures support the survival, growth, behavior, and reproduction of plants and animals? What is energy and how is it related to motion? How is energy transferred? Students are able to use a model of waves to describe patterns of waves in terms of amplitude and wavelength, and that waves can cause objects to move. Students are expected to develop understanding of the effects of weathering or the rate of erosion by water, ice, wind, or vegetation. They apply their knowledge of natural Earth processes to generate and compare multiple solutions to reduce the impacts of such processes on humans. In order to describe patterns of Earth's features, students analyze and interpret data from maps. Students are expected to develop an understanding that plants and animals have internal and external structures that function to support survival, growth, behavior, and reproduction. By developing a model, they describe that an object can be seen when light reflected from its surface enters the eye. Students are able to use evidence to construct an explanation of the relationship between the speed of an object and the energy of that object. Students are expected to develop an understanding that energy can be transferred from place to place by sound, light, heat, and electric currents or from object to object through collisions. They apply their understanding of energy to design, test, and refine a device that converts energy from one form to another. Students are expected to demonstrate grade-appropriate proficiency in asking questions, developing and using models, planning and carrying out investigations, analyzing and interpreting data, constructing explanations and designing solutions, engaging in argument from evidence, and obtaining, evaluating, and communicating information to demonstrate understanding of the core ideas.

Course Proficiencies:

The following is a list of skills and concepts students will be proficient in upon successful completion of this course. These proficiencies form the basis of assessment of each student's achievement. Students who demonstrate understanding can:

1. Identify evidence from patterns in rock formations and fossils in rock layers to support an explanation for changes in a landscape over time. ***(4-ESS1-1)***
2. Make observations and/or measurements to provide evidence of the effects of weathering or the rate of erosion by water, ice, wind, or vegetation. ***(4-ESS2-1)***
3. Analyze and interpret data from maps to describe patterns of Earth's features. ***(4-ESS2-2)***
4. Obtain and combine information to describe that energy and fuels are derived from natural resources and their uses affect the environment. ***(4-ESS3-1)***

5. Generate and compare multiple solutions to reduce the impacts of natural Earth processes on humans. ***(4-ESS3-2)***
6. Ask questions to determine cause-and-effect relationships of electric or magnetic interactions between two objects not in contact with each other. ***(3-PS2-3)***
7. Use evidence to construct an explanation relating the speed of an object to the energy of that object. ***(4-PS3-1)***
8. Make observations to provide evidence that energy can be transferred from place to place by sound, light, heat, and electric currents. ***(4-PS3-2)***
9. Ask questions and predict outcomes about the changes in energy that occur when objects collide. ***(4-PS3-3)***
10. Apply scientific ideas to design, test, and refine a device that converts energy from one form to another. ***(4-PS3-4)***
11. Develop a model of waves to describe patterns in terms of amplitude and wavelength and that waves can cause objects to move. ***(4-PS4-1)***
12. Develop a model to describe that light reflecting from objects and entering the eye allows objects to be seen. ***(4-PS4-2)***
13. Generate and compare multiple solutions that use patterns to transfer information. ***(4-PS4-3)***
14. Obtain and combine information to describe that energy and fuels are derived from natural resources and that their uses affect the environment. ***(4-ESS3-1)***
15. Construct an argument that plants and animals have internal and external structures that function to support survival, growth, behavior, and reproduction. ***(4-LS1-1)***
16. Use a model to describe that animals receive different types of information through their senses, process the information in their brain, and respond to the information in different ways. **(*4-LS1-2)***
17. Use evidence to construct an explanation for how the variations in characteristics among individuals of the same species may provide advantages in surviving, finding mates, and reproducing. ***(3-LS4-2)***
18. Make a claim about the merit of a solution to a problem caused when the environment changes and the types of plants and animals that live there may change. ***(3-LS4-4)***
19. Obtain and combine information about ways individual communities use science ideas to protect the Earth's resources and environment. ***(5-ESS3-1)***
20. Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost. ***(3-5-ETS1-1)***
21. Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem. ***(3-5-ETS1-2)***
22. Plan and carry out fair tests in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved. ***(3-5-ETS1-3)***

23. Select and use technology applications effectively and productively to gather, evaluate and use the information to explore a problem, develop a solution, and communicate ideas. ***(8.1.5.A.1, 8.1.5.A.2, 8.1.5.A.3, 8.1.5.A.4, 8.1.5.E.1, 8.1.5.F.1)***
24. Develop an understanding of the nature and impact of technology, engineering, design, and computational thinking on the individual, global society, and the environment. ***(8.2.5.A.4, 8.2.5.A.5, 8.2.5.B.4, 8.2.5.C.4, 8.2.5.D.1, 8.2.5.D.7)***
25. Relate how the skills and knowledge acquired lay the foundation for future academic and career success. ***(9.2.4.A.2, 9.2.4.A.3, 9.2.4.A.4)***

Assessment:

In grade 4, student progress in science is measured through teacher observation of students as they work with science materials, work with their peers and independently, and by the questions they ask and answer. Students will also maintain a science journal to record their observations, analyze data and draw conclusions. Students' progress will also be assessed through benchmarks and/or a summative assessment at the end of each investigation.

Board Adopted Materials:

Teaching Resources and Related Student Materials:
Title: FOSS (Full Options Science System) Next Generation
Modules:

1. Soils, Rocks, and Landforms
2. Energy
3. Environments

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