## Science – 7

## Course #: M3702, M3707, M3708, M3709

## Course Description:

Seventh grade science provides students with a coordinated science course that integrates concepts in Life, Earth, and Physical Science through the use of a storyline approach - a logical sequence of lessons that are motivated by students' questions that arise from students' interactions with phenomena. Students examine phenomena dealing with Chemical Reactions & Matter, Chemical Reactions & Energy, Metabolic Reactions, Matter Cycling & Photosynthesis, Ecosystem Dynamics, and Natural Resources & Human Impact. Students will actively engage in scientific and engineering practices and apply crosscutting concepts to deepen their understanding of the core ideas. The learning experiences provided for students will engage them with fundamental questions about the world and in the role of scientists to investigate and find answers to those questions. Students will have ongoing opportunities to can-y out scientific investigations and engineering design projects related to the disciplinary core ideas throughout the course.

## Course Proficiencies:

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

1. Develop models to describe the atomic composition of simple molecules and extended structures. ***(MS-PS1-1)***
2. Analyze and interpret data on the properties of substances before and after the substances interact to determine if a chemical reaction has occurred. ***(MS-PS1-2)***
3. Develop and use a model to describe how the total number of atoms does not change in a chemical reaction and thus mass is conserved. ***(MS-PS1-5)***
4. Gather and synthesize information that sensory receptors respond to stimuli by sending messages to the brain for immediate behavior or storage as memories. ***(MS-LS1-8)***
5. Undertake a design project to construct, test, and modify a device that either releases or absorbs thermal energy by chemical processes. ***(MS-PS1-6)***
6. Evaluate competing design solutions using a systematic process to determine how well they meet the criteria and constraints of the problem. ***(MS-ETS1-2)***
7. 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. ***(MS-ETS1-3)***
8. Develop a model to generate data for iterative testing and modification of a proposed object, tool, or process so that an optimal design can be achieved. ***(MS-ETS1-4)***
9. Use argument supported by evidence for how the body is a system of interacting subsystems composed of groups of cells. ***(MS-LS1-3)***
10. Construct a scientific explanation based on evidence for how environmental and genetic factors influence the growth of organisms. ***(MS-LS1-5)***

11. 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. ***(MS-LS1-7)***
12. 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. ***(MS-LS1-6)***
13. Develop a model to describe the cycling of matter and flow of energy among living and nonliving parts of an ecosystem. ***(MS-LS2-3)***
14. Gather and make sense of information to describe that synthetic materials come from natural resources and impact society. ***(MS-PS1-3)***
15. Develop and use a model to describe the function of a cell as a whole and ways the parts of cells contribute to the function, specifically, chloroplasts and mitochondria. ***(MS-LS1-2)***
16. Analyze and interpret data to provide evidence for the effects of resource availability on organisms and populations of organisms in an ecosystem. ***(MS-LS2-1)***
17. Construct an argument supported by empirical evidence that changes to physical or biological components of an ecosystem affect populations. ***(MS-LS2-4)***
18. Construct an explanation that predicts patterns of interactions among organisms across multiple ecosystems. ***(MS-LS2-2)***
19. Evaluate competing design solutions for maintaining biodiversity and ecosystem services. ***(MS-LS2-5)***
20. Apply scientific principles to design a method for monitoring and minimizing a human impact on the environment. ***(MS-ESS3-3)***
21. Define the criteria and constraints of a design problem with sufficient precision to ensure a successful solution, taking into account relevant scientific principles and potential impacts on people and the natural environment that may limit possible solutions. ***(MS-ETS1-1)***
22. Construct a scientific explanation based on evidence for how the uneven distributions of Earth's mineral, energy, and groundwater resources are the result of past and current geoscience processes. (***MS-ESS3-1)***
23. Ask questions to clarify evidence of the factors that have caused the rise in global temperatures over the past century. ***(MS-ESS3-5)***
24. Construct an argument supported by evidence for how increases in human population and per-capita consumption of natural resources impact Earth's systems. ***(MS-ESS3-4)***
25. Identify questions and make predictions that can be addressed by conducting investigations. ***(Science and Engineering Practices – 1, 2)***
26. Collect and analyze data in order to evaluate the strength and weakness claims and arguments throughout the course. ***(Science and Engineering Practices – 3, 4, 6, 7)***
27. Engage in multiple forms of discussion in order to process, make sense of, and learn from others' ideas, observations, and experiences. **(*Science and Engineering Practices – 7, 8)***
28. Identify laboratory equipment and demonstrate its appropriate safe use. ***(Science and Engineering Practice – 3)***
29. Use appropriate technology in construction of a simple spreadsheet, the design and production of basic multimedia projects, and in the creation of documents in word processing with advanced text formatting and graphics. ***(NJSLS – 8.1.8.A.2, 8.1.8.A.4)***
30. 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. ***(8.1.8.A.1, 8.1.8.A.2, 8.1.8.A.3, 8.1.8.A.4, 8.1.8.C.1, 8.1.8.E.1, 8.1.8.F.1)***

31. Develop an understanding of the nature and impact of technology, engineering, design, and computational thinking on the individual, global society, and the environment. ***(8.2.8.A.4, 8.2.8.A.5, 8.2.8.B.2, 8.2.8.C.8, 8.2.8.D.2, 8.2.8.D.3)***
32. Develop important attributes for career success including communication, collaboration, critical thinking, creativity, and leadership skills. ***(9.2.8.CAP.2)***

## Assessment:

Evaluation of student achievement in this course will be based on the following assessment tools:

a. Tests and quizzes.
b. Laboratory performance, reports, and journals.
c. Class participation.
d. Well-developed homework.
e. Maintaining a folder/notebook.
f. Projects, including oral presentations.
g. Teacher observation.

## Board Adopted Textbook:

None