



1. STUDENT INFORMATION

Name:

DOB:

Current Grade:

2. MMC CREDIT AUDIT- (Check which credits have already been earned & enter date of completion, \_\_\_ credits are required.)

Biology

Chemistry

Physics

\_\_\_ Additional Science Credit

Completed:

Completed:

Completed:

Completed:

3. MMC SCIENCE CONTENT MODIFICATION OPTION

- Modify content expectations in Science--only available to students eligible for special education with an IEP

4. CONTENT MODIFICATION REQUESTED- (Check & date when modification was completed.)

Additional Science Credit

Completed:

5. RATIONALE FOR MODIFICATION: \_\_\_\_\_

6. PERSONAL CURRICULUM – Complete only for students with an IEP who require modified content expectations. Below are suggested essential learning targets in this content area for students. They are considered appropriate for most students. The Personal Curriculum allows for the use of these for students with an IEP.

#	Essential Learning Targets – Earth Science
	Inquiry, reflection, and social implications – Students will understand the nature of science and demonstrate an ability to practice scientific reasoning by applying it to the design, execution, and evaluation of scientific investigations. Students will demonstrate their understanding that scientific knowledge is gathered through various forms of direct and indirect observations and the testing of this information by methods including, but not limited to, experimentation. They will use their scientific knowledge to assess the costs, risks, and benefits of technological systems as they make personal choices and participate in public policy decisions. These insights will help them analyze the role science plays in society, technology, and potential career opportunities.
1.	Generate new questions that can be investigated in the laboratory or field.
2.	Evaluate the uncertainties or validity of scientific conclusions using an understanding of sources of measurement error, the challenges of controlling variables, accuracy of data analysis, logic of argument, logic of experimental design, and/or the dependence on underlying assumptions.
3.	Conduct scientific investigations using appropriate tools and techniques (e.g. selecting an instrument that measures the desired quantity – length, volume, weight, time interval, temperature – with the appropriate level of precision).
4.	Identify patterns in data and relate them to theoretical models.
5.	Describe a reason for a given conclusion using evidence from an investigation.
6.	Critique whether or not specific questions can be answered through scientific investigations.
7.	Identify and critique arguments about personal or societal issues based on scientific evidence.
8.	Develop an understanding of a scientific concept by accessing information from multiple sources. Evaluate the scientific accuracy and significance of the information.

Instructional methods and assessments should be matched to learner needs. These essential learning targets will be assessed using multiple methods with an aggregate proficiency level of 60% or higher.

Student: \_\_\_\_\_

Content Area: Earth Science (Cont.)

6. PERSONAL CURRICULUM – Complete only for students with an IEP who require modified content expectations. List or review the essential learning targets for the student in the specified content area above.	
#	Essential Learning Targets
9.	Evaluate scientific explanations in a peer review process or discussion format.
10.	Evaluate the future career and occupational prospects of science fields.
	<b>Earth systems – Students describe the interactions within and between Earth systems, focusing on the cycling of water and carbon between ground, water and air. Students describe the relationship between physical process and human activities and demonstrate an ability to make wise decisions about land use.</b>
11.	Explain why the Earth is essentially a closed system in terms of matter.
12.	Analyze the interactions between the major systems (geosphere, atmosphere, hydrosphere, biosphere) that make up Earth – the flow of water between the ground, the surface and the atmosphere and the exchange of carbon, nitrogen and oxygen between rocks, water, living things and the atmosphere.
13.	Explain, using specific examples, how a change in one system affects other Earth systems; specifically, how the impact of human activities on the environment (e.g., deforestation, air pollution, coral reef destruction) can be understood through the analysis of interactions between the four Earth systems. For example, an increase in atmospheric carbon dioxide from human sources is causing the oceans to become more acidic, which will eventually put stress on coral reefs.
14.	Describe the Earth's principal sources of internal and external energy (internal: radioactive decay under the surface, internal pressure from gravity; external: solar energy heating the land and water).
15.	Identify differences in the origin and use of renewable (e.g., solar, wind, water, biomass) and nonrenewable (e.g., fossil fuels, nuclear ([U-235]) sources of energy. Compare their effects on the environment, and their overall costs and benefits.
16.	Describe natural processes in which heat transfer in the Earth occurs by conduction, convection, and radiation. (Radiation from the sun, heating the land and water; convection in the oceans and atmosphere, causing currents and storms; convection in the mantle, driving plate tectonics.)
17.	Identify the main sources of energy to the climate system. (Heat from the sun drives our climate systems.)
	<b>The Solid Earth – Students explain how scientists study and model the interior of the Earth and its dynamic nature. They use the theory of plate tectonics, the unifying theory of geology, to explain a wide variety of Earth features and processes and how hazards resulting from these processes impact society.</b>
18.	Explain how plate tectonics accounts for the features and processes (sea floor spreading, mid-ocean ridges, earthquakes and volcanoes, mountain ranges) that occur on or near the Earth's surface.
19.	Use the distribution of earthquakes and volcanoes to locate plate boundaries.
20.	Describe how the sizes of earthquakes and volcanoes are measured or characterized.
21.	Describe the effects of earthquakes and volcanic eruptions on humans.
22.	Discriminate between (Compare and contrast) igneous, sedimentary, and metamorphic rocks and describe the processes that change one kind of rock into another.

Instructional methods and assessments should be matched to learner needs. These essential learning targets will be assessed using multiple methods with an aggregate proficiency level of 60% or higher.



**Science**  
**Personal Curriculum Plan**  
Earth Science

Date:

Student: \_\_\_\_\_

Content Area: Earth Science (Cont.)

6. PERSONAL CURRICULUM - <i>Complete only for students with an IEP who require modified content expectations.</i>	
List or review the essential learning targets for the student in the specified content area above.	
#	Essential Learning Targets
	<b>The Fluid Earth – Students explain how the ocean and atmosphere move and transfer energy around the planet. They also explain how these movements affect climate and weather and how severe weather impacts society. Students explain how long term climate changes (glaciers) have shaped the Michigan landscape. They also explain features and processes related to surface and groundwater and describe the sustainability of systems in terms of water quality and quantity.</b>
23.	Compare and contrast surface water systems (lakes, rivers, streams, wetlands) and groundwater in regard to their relative sizes as Earth's fresh water reservoirs and the dynamics of water movement (inputs and outputs, residence times, sustainability).
24.	Explain the features and processes of groundwater systems and how sustainability of North American aquifers has changed in recent history (e.g., the past 100 years) qualitatively using the concepts of recharge, residence time, inputs, and outputs.
25.	Explain how water quality in both groundwater and surface systems is impacted by land use decisions.
26.	Describe the damage resulting from, and the social impact of thunderstorms, tornadoes, hurricanes, and floods.
27.	Describe severe weather and flood safety and mitigation.
28.	Describe seasonal variations in severe weather in Michigan.
29.	Describe conditions associated with frontal boundaries that result in severe weather (thunderstorms, tornadoes, and hurricanes).
	<b>The Earth in Space and Time – Students explain theories about how the Earth and universe formed and evolved over a long period of time. Students predict how human activities may influence the climate of the future.</b>
30.	Describe the position and motion of our solar system in our galaxy and the overall scale, structure, and age of the universe.
31.	Explain how the solar system formed from a nebula of dust and gas in a spiral arm of the Milky Way Galaxy about 4.6 Ga (billion years ago).
32.	Describe the process of radioactive decay and explain how radioactive elements are used to date the rocks that contain them.
33.	Relate major events in the history of the Earth to the geologic time scale, including formation of the Earth, formation of an oxygen atmosphere, rise of life, Cretaceous- Tertiary (K-T) and Permian extinctions, and Pleistocene ice age.
34.	Describe how index fossils can be used to determine time sequence.
35.	Describe natural mechanisms that could result in significant changes in climate (e.g., major volcanic eruptions, changes in sunlight received by earth, and meteorite impacts).
36.	Explain the rate and consequences of global warming and list sources of carbon dioxide emissions that contribute to it.

Instructional methods and assessments should be matched to learner needs. These essential learning targets will be assessed using multiple methods with an aggregate proficiency level of 60% or higher.