**NGSS GRADE 8 SCIENCE**
**COURSE OVERVIEW**

The NGSS Grade 8 Science course has been developed to support Maryland's adoption of the Next Generation Science Standards (NGSS) and to address the state's environmental literacy graduation requirement (COMAR 13A.04.17). The course was developed using a three dimensional approach as outlined in the NGSS. The units address Life Science and Physical Science (Disciplinary Core Ideas) with corresponding Science and Engineering Practices and Cross Cutting Concepts.

There are four units written with a problem-based approach. Essential questions of study for each unit are derived from the *A Framework for K-12 Science Education (2012).* The subsequent driving questions allow students to investigate the science concepts within real-world applications. All units contain culminating events or projects that compel students to construct explanations to scientific phenomenon or design solutions to engineering challenges related to the performance expectations. Learning cycles guide the teacher to the appropriate scope and pacing for student acquisition of the key topics within each unit as well as provide the resources to design daily lesson planning.

The following chart provides a description and tentative pacing guide (based upon a 50 -minute class period) for the units:

| Unit Title | Unit Summary |
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| **Climate Detectives** (eight weeks) | In this unit, students will create an argument to support or refute a scientific claim about the severity and incidence of extreme weather. The unit begins by examining research regarding the number and types of hazards and natural disasters that could occur in Maryland. Next, students will investigate the interactions between the atmosphere and hydrosphere involved in the development of weather events and ultimately lead to climate in a given location over time. The unit concludes by examining how human activities are impacting global temperatures over the last century and consider how human behaviors and choices may be the keys to mitigation of negative impacts to the environment. |
| **Mastodons and Megalodons** (six weeks) | Students will work to determine how fossil evidence supports the idea that ancient organisms are related to modern day organisms. They will learn about the formation of fossils, and how rock strata can be used to determine the relative age of fossils in order to reconstruct the Geologic Time Scale. Evidence from patterns found in the fossil record and rock strata will be used to determine how organisms have changed over time in the context of anatomical structure and embryological relationships. Students will compare anatomical structures in modern and ancient organisms as evidence for common ancestry and to infer evolutionary descent. Students will also compare embryo development to further investigate relationships among seemingly different species and will address how embryologic evidence can be used to show relatedness among organisms. The unit concludes with students creating an exhibit for the Maryland Science Center. The exhibit |

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| | should help the visitors understand how the life forms have changed in Maryland over time. |
| **Designer Dogs** (eight weeks) | This is an eight-week unit focusing on heredity, genetic science and technology, and natural selection. In learning cycle one students examine the inheritance of traits based on the structure of genes, models of inheritance (Punnett squares), and the effects of mutations. Students also determine differences in genetic variations between organisms that reproduce sexually and asexually. In learning cycle 2, students will apply what they have learned about heredity to investigate the processes of artificial selection and genetic modification in plants and animals, especially in an agricultural setting. In this learning cycle, students to evaluate the sources of information being used to assess credibility, accuracy, and possible bias. In the final learning cycle, students will engage in a variety of investigations related to natural selection. They explore how changing environmental conditions can influence the distribution of traits in a population over multiple generations. |
| **Overstepping Our Resources** (eight weeks) | This unit focuses on how humans depend on and use natural resources and how the use of resources impacts Earth systems. In addition, students will explore and evaluate various strategies used to mitigate the impact of human activities as they obtain and use resources. Earth's processes affect and are affected by human activities. Humans depend on all of the planet's systems (biosphere, hydrosphere, atmosphere, geosphere) for a variety of resources, some of which are renewable or replaceable and some of which are not. The formation of a resources will result in their uneven geographic distribution, which then impacts how humans acquire these resources. Students will focus on local natural resources and related issues with an emphasis on the Chesapeake Bay, its vast supply of living resources and the ecosystems that sustain them. Students will explain ways that as humans alter ecosystems and harvest resources, their activities affect long-term sustainability and biodiversity. In the culminating event, students will develop an action plan to mitigate human impact on a specific natural resource or ecosystem using evidence from the learning cycles. |