

Grade 8 Science Performance Level Descriptors

Limited

A student performing at the **Limited Level** demonstrates a minimal command of Ohio's Learning Standards for Grade 8 Science. A student at this level has an emerging ability to explain how geologic processes formed the Earth's surface and interior and explain how the geologic record contains evidence of these changes, communicate that the characteristics of organisms are a result of inherited traits passed on by reproduction, describe how fossils provide evidence of the changes and diversity of life over geologic time, predict how forces with magnitude and direction affect the movements of objects, and explain the differences in types of potential energy.

A student at the **Limited Level** can:

- Recognize that seismic data can be used to determine the composition of Earth's interior;
- Recall that geologic and fossil records serve as evidence for past environmental conditions;
- Recall that tectonic plates move;
- Identify tectonic plate boundaries;
- Define tectonic activity, erosion, and deposition;
- Define relative and absolute age of geologic features;
- Describe sexual and asexual reproduction;
- Recall that mitosis and meiosis are processes by which genetic material is copied and divided;
- Complete a monohybrid cross Punnett square;
- Identify gravitational, electric, and magnetic fields;
- Identify that motion is relative and dependent on the position of the observer;
- Define potential energy (e.g., gravitational, elastic, chemical, electric).

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Basic

A student performing at the **Basic Level** demonstrates a partial command of Ohio's Learning Standards for Grade 8 Science. A student at this level has a general ability to explain how geologic processes formed the Earth's surface and interior and explain how the geologic record contains evidence of these changes, communicate that the characteristics of organisms are a result of inherited traits passed on by reproduction, describe how fossils provide evidence of the changes and diversity of life over geologic time, predict how forces with magnitude and direction affect the movements of objects, and explain the differences in types of potential energy.

A student at the **Basic Level** can:

- Recall that movement of tectonic plates is caused by convection currents;
- Identify types and characteristics of tectonic plate boundaries and the resulting features or events;
- Describe major geologic processes that form specific features on the surface of Earth (e.g., tectonic activity, erosion, deposition);
- Identify the processes that cause the formation of various types of surface features (e.g., rivers, streams, deserts, coastlines);
- Identify and recall factors (e.g., topography, climate, soil, rock characteristics) that affect the surface patterns associated with streams, floodplains, glaciers, coastlines, flooding, and deserts;
- Describe how to determine relative age of geologic features;
- Analyze the inheritance patterns shown in pedigrees based on relationships between phenotypes and genotypes;
- Use diagrams to show the genetic differences between the daughter cells produced by mitosis and meiosis;
- Explain the advantages and disadvantages of sexual and asexual reproduction;
- Identify behavior of objects with mass, charge and/or magnetic properties in gravitational, electric or magnetic fields;
- Interpret the magnetic field from drawings/pictures of a magnet and iron filings;
- Interpret force/free-body diagrams;
- Describe different types of potential energy (e.g., gravitational, elastic, chemical, electric).

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Proficient

A student performing at the **Proficient Level** demonstrates an appropriate command of Ohio's Learning Standards for Grade 8 Science. A student at this level has a consistent ability to explain how geologic processes formed the Earth's surface and interior and explain how the geologic record contains evidence of these changes, communicate that the characteristics of organisms are a result of inherited traits passed on by reproduction, describe how fossils provide evidence of the changes and diversity of life over geologic time, predict how forces with magnitude and direction affect the movements of objects, and explain the differences in types of potential energy.

A student at the **Proficient Level** can:

- Use seismic data, graphs, and charts to interpret the structure of Earth's interior;
- Explain and justify conclusions based on data, maps, and diagrams about the formation and boundaries of geologic features due to tectonic plate movement;
- Explain the characteristics of rocks and soil, climate, location, and topography as they relate to constructive and destructive processes occurring between the hydrosphere and lithosphere;
- Explain the connection between the presence of specific rock types, rock features, or fossils and environmental conditions at the time of formation (e.g., rocks with ripple marks and moving water, basalt and volcanic activity);
- Apply the concept of uniformitarianism to determine the relative age of geologic features using the law of superposition, index fossils or crosscutting relationships);
- Use diagrams or data from geologic columns and glacial cores to interpret and compare relative and absolute age and environmental conditions;
- Predict how genetic variation (e.g., beak structure, coloration) affects the survival or extinction of a species when environmental conditions change gradually or suddenly;
- Compare end products of sexual and asexual reproduction with an emphasis on their advantages and disadvantages in relation to the continuation of the species;
- Use pedigrees to explain the principles of Mendelian genetics, law of segregation, and law of independent assortment;
- Explain the relationship between electric currents and magnetic fields;
- Explain that generators and motors transform electrical and mechanical energy using electric currents and magnetic fields;
- Compare the properties of gravitational, electric, and magnetic fields;
- Complete and analyze simple force/free-body diagrams;
- Explain the changes in motion in a scenario involving balanced or unbalanced forces;
- Compare the different types of potential energy and their attributes.

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Accelerated

A student performing at the **Accelerated Level** demonstrates a strong command of Ohio's Learning Standards for Grade 8 Science. A student at this level has a superior ability to explain how geologic processes formed the Earth's surface and interior and explain how the geologic record contains evidence of these changes, communicate that the characteristics of organisms are a result of inherited traits passed on by reproduction, describe how fossils provide evidence of the changes and diversity of life over geologic time, predict how forces with magnitude and direction affect the movements of objects, and explain the differences in types of potential energy.

A student at the **Accelerated Level** can:

- Analyze or complete a diagram that shows how constructive or destructive processes affect the lithosphere;
- Use evidence from a geologic column to make conclusions about Earth's geologic history and make comparisons between the past and present;
- Analyze data to justify conclusions that the fossil record serves as evidence for biodiversity and/or diversity within a species and the fact that most species that have lived on Earth are now extinct;
- Interpret data from real-world scenarios or experiments showing outcomes (e.g., survival and reproduction rates) of sexual and asexual reproduction under varying environmental conditions;
- Design an experiment to determine possible genotypes and their probabilities of occurring in offspring from a cross;
- Use diagrams of motors, generators, or electromagnets to demonstrate the relationships between current and magnetic field;
- Predict changes in motion given a scenario involving balanced or unbalanced forces;
- Describe various forms of potential energy within a system in terms of the positions of the objects involved (e.g., elastic potential energy in a spring, electric potential energy associated with charges).

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Advanced

A student performing at the **Advanced Level** demonstrates a distinguished command of Ohio's Learning Standards for Grade 8 Science. A student at this level has a sophisticated ability to explain how geologic processes formed the Earth's surface and interior and explain how the geologic record contains evidence of these changes, communicate that the characteristics of organisms are a result of inherited traits passed on by reproduction, describe how fossils provide evidence of the changes and diversity of life over geologic time, predict how forces with magnitude and direction affect the movements of objects, and explain the differences in types of potential energy.

A student at the **Advanced Level** can:

- Use evidence from aerial photographs and/or topographical maps to generate and justify a conclusion about how specific land features were formed;
- Evaluate rock and fossil data to generate and justify conclusions about past environmental conditions;
- Trace climate change as documented by the geologic record and ice cores;
- Evaluate graphs showing population data related to environmental changes;
- Interpret and explain data from real-world scenarios or experiments showing outcomes (e.g., survival and reproduction rates) of sexual and asexual reproduction under varying environmental conditions;
- Interpret a pedigree to determine the genotype of an individual within that pedigree;
- Design an experiment to assess how objects would behave in electric, magnetic, or gravitational fields;
- Design an experiment to test the effect of multiple forces on the motion of an object;
- Make and justify conclusions using data collected from an experiment that studies the relationship between position and potential energy in a system.