

PROFICIENT STUDENTS

Performance Level Descriptors

PHYSICAL SCIENCE



A student who is **PROFICIENT** *consistently* exhibits competency in the scientific method, the scientific process, quantitative analysis, and science content. Proficient students are able to demonstrate their knowledge and skills in the following eight areas of physical science as indicated below.

SCIENTIFIC THINKING AND PRACTICE

Proficient students are able to accomplish the following:

1. Identify and apply steps of the scientific method
2. Describe the essential components of scientific lab investigation
3. Use scientific reasoning and valid logic to recognize cause and effect
4. Apply the appropriate International System of Units (SI) base unit to measure an object
5. Convert from one SI unit to another

SCIENCE AND SOCIETY

Proficient students are able to accomplish the following:

1. Describe New Mexico's role in nuclear science
2. Describe causes of global warming

PROPERTIES OF MATTER

Proficient students are able to accomplish the following:

1. Classify, model, and describe types of matter
2. Calculate density
3. Interpret pH scale

STRUCTURE OF MATTER

Proficient students are able to accomplish the following:

1. Understand and identify atomic structure including subatomic particles, their charges, relative masses, and locations in the atom
2. Make predictions about elements using the periodic table
3. Distinguish between the states of matter, based on the arrangement and movement of atoms
4. Use context clues to calculate the half-life of the radio activity of isotopes
5. Predict chemical reactivity based on the periodic table
6. Make predictions about the polarity of the bonds between two atoms

ENERGY TRANSFORMATION AND TRANSFER

Proficient students are able to accomplish the following:

1. Differentiate between the various types of thermal energy transfer by conduction, convection, and radiation.
2. Predict what happens to an object's energy when it is converted from one form to another
3. Explain how thermal energy consists of vibrations of atoms and how the energy is transferred from one form to another

INTERACTION OF ENERGY AND MATTER

Proficient students are able to accomplish the following:

1. Recall the order of waves on the electromagnetic spectrum
2. Distinguish between gamma, X-ray, ultraviolet, visible, infrared, radio, and other waves
3. Describe the characteristics of waves

FORCE

Proficient students are able to accomplish the following:

1. Recognize that every object exerts gravitational force on every other object
2. Understand that the gravitational force depends on the masses of the objects and the distance between them
3. Interpret the magnitude and direction of forces using vector diagrams
4. Interpret and apply Newton's Third Law of Motion
5. Explain Newton's Universal Law of Gravitation in terms of the relationship between the distance and mass of two objects
6. Make observations about how the different types of friction affect motion
7. Illustrate the concept of displacement using vector diagrams

MOTION

Proficient students are able to accomplish the following:

1. Describe how a change in one wave characteristic affects the other characteristics
2. Explain interactions between waves and a medium, including when a wave moves from one medium to another
3. Investigate how the interactions of two waves affect the characteristic of those waves
4. Apply Newton's Laws to describe and analyze the behavior of moving objects

BOREDERLINE PROFICIENT STUDENTS

Performance Level Descriptors

PHYSICAL SCIENCE



A student who is **BORDERLINE PROFICIENT** *sporadically* exhibits competency in the scientific method, the scientific process, quantitative analysis, and science content. Borderline proficient students are able to demonstrate their knowledge and skills in the following eight areas of physical science as indicated below.

SCIENTIFIC THINKING AND PRACTICE

Borderline proficient students are able to accomplish the following:

1. Identify steps of the scientific method
2. Describe the essential components of scientific lab investigation
3. Recognize cause and effect
4. Identify correct SI base units
5. Convert from one SI unit to another

SCIENCE AND SOCIETY

Borderline proficient students are able to accomplish the following:

6.

1. Describe New Mexico's role in nuclear science
2. List causes of global warming

PROPERTIES OF MATTER

Borderline proficient students are able to accomplish the following:

3.

1. Classify and describe types of matter
2. Calculate density
3. Interpret the pH scale

STRUCTURE OF MATTER

Borderline proficient students are able to accomplish the following:

1. Identify subatomic particles within an atom
2. Identify the characteristics of elements using the periodic table
3. Identify the states of matter based on the movement of atoms
4. State the different types of bonds between atoms

ENERGY TRANSFORMATION AND TRANSFER

Borderline proficient students are able to accomplish the following:

1. Differentiate between conduction, convection, and radiation
2. State what happens to an object's energy when it is converted from one form to another

INTERACTION OF ENERGY AND MATTER

Borderline proficient students are able to accomplish the following:

3.

1. Recall the order of waves on the electromagnetic spectrum
2. Distinguish between gamma, X-ray, ultraviolet, visible, infrared, radio, and other waves
3. Describe the characteristics of waves

FORCE

Borderline proficient students are able to accomplish the following:

1. Recognize that every object exerts gravitational force on every other object
2. Understand that the force of gravitation depends on the masses of the objects and the distance between them
3. Interpret the magnitude and direction of forces using vector diagrams
4. Recite Newton's Third Law of Motion
5. Define the different types of friction that affect motion

MOTION

Borderline proficient students are able to accomplish the following:

1. Draw and label wave characteristics
2. Define reflection, refraction, and dispersion
3. Recognize how interference affects waves
4. Use Newton's Laws to describe the behavior of moving objects

