

Science 8 Syllabus

Course Name: Science 8 – Physical Science

Course Instructor:

Room Number:
Phone: 891-5335 Ex.
Email:

Textbooks:

Science Explorer
Prentice Hall
Science Insights: Exploring Earth and Space (Class sets only)
Glencoe Science

Supplies: 1” 3-ring binder	Pens in blue or black ink
5 dividers for binder	No. 2 pencils
Loose-leaf paper	Graph paper
Spiral notebook for journal	Colored Pencils
Markers	

Course Description:

Science 8 is a yearlong course devoted to teaching Physical Science integrated with Earth, Space and Life Science. Skills of measuring and testing the world by working with the concepts of motion, force, and energy will be the under-lying theme. Emphasis is given to laboratory techniques, cooperative work, math analysis and interpretation of data for all students to grow as problem solvers.

Differentiated instruction methods will be used to address the needs of various student abilities. Critical thinking skills will be promoted in all classes by using a variety of hands on/student centered activities.

It is a Rio Rancho public schools requirement that Pre-A.P. science students develop their own research project. Although it is strongly recommended, it is optional for students in regular science. Pre-A.P. science students will also have additional class requirements.

Grading policy:

A+97-100, A 93-96, A- 90-92, B+87-89, B 83-86, B- 80-82, C+77-79, C 73-76, C- 70-72, D+ 67-69, D 63-66, D- 60-62, F <60%

Course Exit Standards

(These are the New Mexico state benchmarks for 8th grade science)

Upon completion of this course the students will:

1. Understand the processes of scientific investigations and use inquiry and scientific ways of observing, experimenting, predicting, and validating to think critically.
2. Understand the structure and properties of matter, the characteristics of energy, and the interactions between matter and energy.
3. Understand the properties, structures, and processes of living things and the interdependence of living things and their environments.

4. Understand the structure of Earth, the solar system, and the universe, the interconnections among them, and the processes and interactions of Earth's systems.
5. Understand how scientific discoveries, inventions, practices, and knowledge influence, and are influenced by, individuals and societies.

Course Outline: Scientific Scope (significant activities are listed, there will be others)

Semester One:

1st 4½ Weeks:

General Science

- Laboratory Safety..... Chapter 1, Science Explorer
- Scientific Method..... Chapter 1, Science Explorer
(Mystery Container Lab, Penny Test Lab)
- Measurement..... Teacher Resources
(Metric Measurement Lab, Pi Lab)

2nd 4½ Weeks:

Earth Science

- Rocks and the Rock Cycle.... Chapter 10, Science Insights
(Rock Cycle project, Rock Identification Lab)
- Fresh Water..... Chapter 14, Science Insights
(Water Density Lab)
- Ecosystems and Carbon Cycle..Teacher Resources
(Ecosystem and Carbon Cycle Diagrams)

Structure of Matter

- Atoms, ElementsChapter 2, Science Explorer
(Atom Mnemonic Project)

3rd 4½ Weeks:

Nature of Matter

- Compounds and Mixtures.....Chapter 2, Science Explorer
(Mystery Mixture Lab)
- Properties and Changes of Matter.....Chapter 2, Science Explorer
- States of Matter.....Chapter 3, Science Explorer
(Phase Change Lab)
- The Periodic Table..... Chapter 4, Science Explorer
(Periodic Scramble)

4th 4½ Weeks:

Chemistry

- Atomic Structure and Chemical Bonds.....Chapter 5, Science Explorer
(Marshmallow Compounds Lab)
- Chemical Reactions.....Chapter 6 & 7, Science Explorer
(How Can You Measure Energy Changes Lab, Titration Lab; Acids and Bases, Kool-Aid Chromatography)
- Substances, Mixtures, and Solubility..... Chapter 7, Science Explorer
(Concentrations of NaCl)
- Carbon Chemistry..... Chapter 8, Science Explorer
(Silly Polymers lab)

DNA/Heredit

- Structure of DNA and Cellular Respiration..... Teacher Resources
(Banana DNA, Paper Chromatography)

Semester Two:

1st 4½ Weeks:

Motion and Forces

- Motion and Momentum..... Chapter 9, Science Explorer
- Astronomy with relation to gravity- solar system
- Force and Newton's Laws..... Chapter 10, Science Explorer
(Newton's Forces and Motion Group project, Barbie Bungee Jumping, Roller Coaster Group project; potential and kinetic energy)
- Forces and Fluids..... Chapter 11, Science Explorer
(It's a Gas Lab)

2nd 4½ Weeks:

Energy

- Energy and Energy Resources.....Chapter 13 & 14, Science Explorer
(Energy and the Environment Project)
- Thermal Energy..... Chapter 14, Science Explorer

3rd 4½ Weeks:

Electricity and Magnetism

- Electricity.....Chapter 20 & 21, Science Explorer
(Building a Parallel Circuit)
- Magnetism.....Chapter 19 & 21, Science Explorer
- ElectronicsChapter 22, Science Explorer

4th 4½ Weeks:

Waves, Sound, and Light

- Waves..... Chapter 15, Science Explorer
(Investigating Air Currents Activity)
- Sound..... Chapter 16, Science Explorer
(Pipe Sounds Lab)
- Electromagnetic Waves..... Chapter 17, Science Explorer
- Light, Mirrors, and Lenses..... Chapter 18, Science Explorer
(Light Stations)
- Astronomy with relation to star and galaxy information and distance through the use of light.

*** Science and Technology will be integrated throughout the course.**

Sequence:

The scientific subjects listed in the scientific scope for each semester will be presented to students in an order that is compatible with teacher preference, school calendar, and availability of equipment and resources.

Science 8 - Short Cycle Assessment- First 4 1/2 Weeks

Strand 1 – Power Standard #1

Measurement and the Scientific Process:

- The scientific process generally begins with a:
 - graph
 - testable question
 - lab report
 - experiment
- In the scientific process, an experiment is considered to be a test of the:
 - theory
 - hypothesis
 - fact
 - model
- In which section of the scientific process would a scientist look for and display trends or patterns in the data?
 - observations
 - conclusion
 - analysis
 - procedure
- What kind of a graph would be best for a scientist to use to show changes in plant growth over a 7 day period?
 - line graph
 - bar graph
 - histogram
 - circle graph (pie chart)
- If you observe the symbol of an eye in a science laboratory, it means you will
 - work with fire
 - mix chemicals
 - look at data
 - wear safety goggles
- In a science experiment the variable that responds to a change is called the
 - independent variable
 - factor
 - control variable
 - dependent variable
- The measure of how much space an object takes up is called its:
 - mass
 - volume
 - density
 - length
- Ten (10) centimeters (cm) is the same as 0.10
 - millimeters
 - kilometers
 - meters
 - grams
- The unit used to measure liquid volume in the S.I. (metric) system is the:
 - gallon
 - Celsius degree
 - liter
 - milligram
- An object's density is defined as its:
 - length times width
 - atomic weight
 - mass divided by volume
 - length times width times height

8th Grade Science
Short-Cycle Assessment 1st Semester, 2nd 4.5 Week Period

1. A scientist who studies the size, shape, and features of the earth is a.
 - a. chemist
 - b. biologist
 - c. physicist
 - d. geologist

2. What forces cause sedimentary rocks to form?
 - a. erosion and compacting pressure
 - b. heat and pressure
 - c. wind, rain and ice
 - d. molten rock

3. Which rock type is formed by heat and pressure?
 - a. igneous
 - b. metamorphic
 - c. sedimentary
 - d. mineral

4. If any of the rock types are melted they turn into _____ rock again.
 - a. igneous
 - b. metamorphic
 - c. sedimentary
 - d. chemical

5. Water is found naturally in all 3 phases; which phase is the most common on Earth?
 - a. solid
 - b. liquid
 - c. vapor
 - d. gas

6. Water is one of the reactants in _____, producing oxygen for all animal life on Earth.
 - a. oxidation
 - b. photosynthesis
 - c. acid-base
 - d. reduction

7. Evaporation, condensation, precipitation and percolation are all phases of the _____ cycle.
 - a. carbon
 - b. water
 - c. nitrogen
 - d. life

8. An important part of the _____ cycle is the absorption of CO₂ by plants.
 - a. carbon
 - b. water
 - c. nitrogen
 - d. life

9. Energy in ecosystems flows in this order:
 - a. sunlight, animals, plants
 - b. plants, animals, sunlight
 - c. animals, sunlight, plants
 - d. sunlight, plants, animals

10. Which particles of an atom are found in the nucleus?
 - a. electrons
 - b. neutrons
 - c. protons
 - d. b and c

SHORT CYCLE II STRAND II: 3RD 4½ WEEKS

- Evaporation is to condensation as _____ is to freezing.
 - Sublimation
 - Melting
 - Plasma
 - Vaporization
- Oil and vinegar is a good example of a(n) _____ because it is heterogeneous.
 - element
 - solution
 - compound
 - mixture
- Compounds and elements are classified as _____.
 - mixtures
 - solutions
 - substances
 - atoms
- Sometimes two elements combine to make a new substance with its own special properties. This new substance is an example of:
 - a homogenous mixture
 - a heterogeneous mixture
 - an atom
 - a compound
- An important way to tell a metal from a nonmetal would be
 - density
 - conductivity
 - temperature
 - boiling point
- The _____ is the particle in an atom that carries a negative charge.
 - proton
 - electron
 - neutron
 - nucleus
- When Mendeleev made his arrangement of the elements in a table, he found that elements with _____ fell into groups on the table.
 - the same mass
 - similar size
 - similar properties
 - same color
- In a mixture of iced-tea, how can you separate the water?
 - evaporation
 - freezing
 - magnetism
 - filtration
- Water is considered a _____ molecule because its atoms have a slight electric charge.
 - compound
 - magnetic
 - weak
 - polar
- In an atom, where is an electron located?
 - on the periodic table
 - in the nucleus
 - in a cloudlike formation around the nucleus.
 - with the neutron

Chemistry: 4th 41/2 Short Cycle Assessment

1. What is the ratio of iron to oxygen atoms in the Fe_2O_3 ?
 - a. 3:3
 - b. 1:2
 - c. 1:1:5
 - d. 2:3
2. What does the letter "S" stand for in the formula SO_2 ?
 - a. selenium
 - b. silicon
 - c. sulfur
 - d. scandium

Power Standard II, i.

3. Which of these is an example of a chemical change?
 - a. paper pieces
 - b. melting
 - c. freezing
 - d. burning
4. Which of these is an example of a physical change?
 - a. photosynthesis
 - b. respiration
 - c. rusting
 - d. condensation

Power Standard II, j.

5. Melting is to freezing as _____ is to condensation.
 - a. sublimation
 - b. freezing
 - c. plasma
 - d. vaporization

Power Standard II, k.

6. What is the effect of higher temperature on chemical reaction rate?
 - a. it speeds it up
 - b. it does not change
 - c. it slows it down
 - d. it varies

Power Standard II, l.

7. In an endothermic reaction energy is _____.
 - a. released
 - b. not needed
 - c. absorbed
 - d. fused

Power Standard III, d

8. Living organisms are made up primarily of CHON; what elements do these letters stand for?
 - a. carbon, helium, nitrogen, oxygen
 - b. carbon, hydrogen, oxygen, nitrogen
 - c. calcium, hydrogen, nitrogen, oxygen
 - d. carbon, helium, neon, oxygen

Power Standard III, e.

9. Carbon is the basis for life on Earth; what is so special about this element?
 - a. it makes up 80% of the Earth's crust
 - b. it easily turns into other elements
 - c. it has 4 available bonding sites
 - d. it is formed during solar fusion

Power Standard III, f.

10. Which of the following will not affect the activity of an enzyme?
 - a. temperature
 - b. concentration of substance
 - c. pH
 - d. altitude

Spring Semester

Short Cycle Assessment #1

Motion

1. Speed is the rate of change in _____.
 - a. velocity
 - b. time
 - c. distance
 - d. direction
2. To describe velocity you need to know _____.
 - a. speed and direction
 - b. speed and time
 - c. direction and acceleration
 - d. speed and acceleration
3. When you graph the motion of an object, you put _____ on the horizontal axis and _____ on the vertical axis.
 - a. speed, time
 - b. distance, time
 - c. time, speed
 - d. time, distance
4. Acceleration involves a change in _____.
 - a. time
 - b. direction
 - c. speed
 - d. both b and c
5. If you exert a force on an object in motion you will change its _____.
 - a. mass
 - b. weight
 - c. inertia
 - d. momentum
6. The distance traveled divided by the time taken to travel the distance is _____.
 - a. weight
 - b. mass
 - c. momentum
 - d. speed
7. Momentum is the measure of _____.
 - a. how hard it is to stop an object
 - b. the amount of matter in an object
 - c. the tendency of an object to change its motion
 - d. the amount of force acting on an object

8. When a toy truck collides into a toy car, the momentum of _____ is the same before and after the collision.
- the toy truck
 - the toy car
 - the toy truck plus the toy car
 - the toy truck times the toy car
9. An object changes its position if it moves relative to _____.
- its speed
 - its weight
 - its mass
 - a frame of reference or some other object or point
10. Which of the following does **NOT** involve direction?
- force
 - acceleration
 - weight
 - mass

Forces and Newton's Laws

11. A _____ is any push or pull.
- Newton
 - acceleration
 - force
 - momentum
12. In order to know how a force will affect an object, you must first know the mass and:
- normalcy.
 - weight.
 - direction.
 - gravity.
13. Newton's First Law of Motion states that an object at rest or moving at a constant speed is in a(n) _____ and will continue to do so until a net force acts on it.
- elliptical orbit
 - straight line
 - state of acceleration
 - curved path
14. The force of _____ exists between any two objects that have mass.
- gravity
 - acceleration
 - weight
 - free fall
15. In order to be _____ forces, their effects must cancel each other out and not cause a change in an object's motion.
- balanced
 - strong
 - weak
 - normal

16. Newton's Second Law of Motion states that an object acted upon by a net force will accelerate in the direction of the force according to the equation:

- a. $Ft=mv=mv$
- b. $a = \frac{F_{net}}{M}$
- c. $m \times v = mv$
- d. $v = at$

17. The time for an action-reaction situation is _____.

- a. at least 5 seconds
- b. instantaneous
- c. no more than 1 second
- d. no more than 5 seconds

18. A _____ force is the total force felt by an object.

- a. sum
- b. net
- c. strong
- d. balanced

19. _____ allows you to ride a bike without skidding and falling.

- a. static friction
- b. sliding friction
- c. rolling friction
- d. gravity

20. Which of the following statements about satellite motion is (are) **true**?

- a. Satellites go around the Earth in nearly circular orbits, with the centripetal force being gravity.
- b. The satellite does not keep horizontal because gravity pulls it downward so that it travels in a curved path.
- c. If a satellite is traveling at the same speed as the speed of the Earth's surface it will go into orbit around the Earth.
- d. All the above.

Spring Semester
Short Cycle Assessment #2

Energy

1. Which of the following is the **best** definition of kinetic energy? (Std II, BkII-B, PS-2)
 - a. Kinetic energy is stored energy.
 - b. Kinetic energy is the energy of motion.
 - c. All forms of energy are kinetic energy.
 - d. Only living things can have kinetic energy.

2. Which of the following is **NOT** a renewable resource? (Std II, BkII-B, PS-3)
 - a. solar energy
 - b. wind energy
 - c. geothermal energy
 - d. fossil fuels

3. The energy stored in an object because of its position is called: (Std II, BkII-B, PS-2)
 - a. nuclear energy
 - b. kinetic energy
 - c. potential energy
 - d. hydroelectric energy

4. Which of the following is the **best** definition of energy? (Std II, BkII-B, PS-1)
 - a. Energy is the same as speed.
 - b. Energy is the ability to cause change.
 - c. Energy equals mass time velocity.
 - d. Energy equal force times acceleration.

5. Which of the following **best** describes the energy transformations that take place at a coal-burning power plant? (Std II, BkII-B, PS-3)
 - a. Potential energy of water; nuclear energy of atoms; thermal energy of turbine; kinetic energy of generator.
 - b. Solar energy; kinetic energy of water; nuclear energy of atoms; thermal energy of generator.
 - c. Chemical energy of coal; thermal energy of water; kinetic energy of steam; kinetic energy of turbine; electrical energy of generator.
 - d. Kinetic energy of coal; kinetic energy of water; potential energy of steam; nuclear energy of turbine; radiant energy of generator.

6. Which of the following is a **renewable** energy resource? (Std II, BkII-B, PS-3)
 - a. coal
 - b. oil
 - c. natural gas
 - d. wind

7. When chemical energy is converted into thermal energy, which of the following must be **true**? (Std II, BkIII-A, PS-2)
 - a. The total amount of thermal energy plus chemical energy changes.
 - b. Only the amount of chemical energy changes.
 - c. Only the amount of thermal energy changes.
 - d. The total amount of thermal energy plus chemical energy does not change.

8. In most energy transformations, some of the energy is converted to:
(Std II, BkII-B, PS-1)
- heat.
 - ice.
 - wind.
 - water.
9. The two forms of energy that occur when a ball is thrown up and goes down are:
(Std II, BkII-B, PS-2)
- thermal and radiant
 - kinetic and potential
 - upward and downward
 - chemical and kinetic
10. Which of the following statements is (are) **true**? (Std II, BkIV-A, PS-3)
- The geologic conditions that have resulted in the formation of energy resources (coal, oil, and natural gas) are available in New Mexico.
 - The only nonrenewable energy resource formed in New Mexico is coal.
 - There are not the right geologic conditions in New Mexico to form any fossil fuels.
 - The only energy resource formed naturally in New Mexico is Wind.

**Spring Semester
Short Cycle Assessment #3**

Electricity and Magnetism

1. What flows in an electric current?
 - a. ions
 - b. electrons
 - c. protons
 - d. neutrons

2. How much energy is needed to run a 50 watt light bulb for 5 hours?
 - a. 10kWh
 - b. .01kWh
 - c. 250 kWh
 - d. .25kWh

3. How do insulators and conductors differ?
 - a. Insulators allow protons to pass through them.
 - b. conductors do not allow and electric current through them.
 - c. Insulators do not allow electrons to pass through them easily.
 - d. Conductors allow protons to pass through them.

4. Electrons have what charge?
 - a. neutral
 - b. negative
 - c. positive and negative
 - d. positive

5. Voltage means _____.
 - a. the current
 - b. the power in a current
 - c. the resistance
 - d. the energy electrons have

6. As resistance **increases**, what happens to current?
 - a. It stays the same.
 - b. It fluctuates randomly.
 - c. It increases.
 - d. It decreases.

7. Electric current passing through a wire produces _____.
 - a. a magnetic field around the wire.
 - b. a compass
 - c. geographic poles
 - d. a permanent magnet

8. How is an electromagnet **different** from a permanent magnet?
 - a. It has north and south poles.
 - b. It attracts magnetic substances.
 - c. Its magnetic field can be turned off.
 - d. Its poles cannot be reversed.

9. Which statement about the domains in a magnetized substance is **true**?
- a. Their poles are in random directions
 - b. Their poles cancel each other out.
 - c. Their poles point in one direction.
 - d. Their orientation cannot be changed.
10. In which of Earth's layers is Earth's magnetic field generated?
- a. crust
 - b. mantle
 - c. outer core
 - d. inner core

**Spring Semester
Short Cycle Assessment #4**

Sound, Waves, and Light

1. Which of the following is **NOT** an example of an electromagnetic wave? (*Strand II, Standard I, Benchmark III, 1*)
 - a. sound
 - b. x-rays
 - c. red light
 - d. gamma rays

2. Which one of the following determines the color of a light wave? (*Strand II, Standard I, Benchmark II, 5*)
 - a. amplitude only
 - b. wavelength and amplitude
 - c. wavelength and frequency
 - d. diffraction

3. In which of the following will refraction occur? (*Strand II, Standard I, Benchmark II, 5*)
 - a. light traveling from air to glass
 - b. light reflecting off of a mirror
 - c. light bending around the corner of a door
 - d. green light interfering with blue light

4. To produce sound, an object must be: (*Strand II, Standard I, Benchmark II, 6*)
 - a. moving toward the listener.
 - b. heated.
 - c. in a gas.
 - d. vibrating.

5. _____ is the human perception of the energy a wave carries. (*Strand II, Standard I, Benchmark II, 6*)
 - a. Loudness
 - b. Pitch
 - c. Wavelength
 - d. Amplitude

6. You can hear sound around an open door because sound waves _____. (*Strand II, Standard I, Benchmark II, 6*)
 - a. refract
 - b. reflect
 - c. diffract
 - d. diffuse

7. Electromagnetic waves are produced by _____. (*Strand II, Standard I, Benchmark II, 5*)
 - a. positive and negative charges
 - b. magnetic fields
 - c. charged particles of motion
 - d. electromagnetic energy

8. What is the name of the line drawn perpendicular to the surface where a light ray strikes? (*Strand II, Standard I, Benchmark II, 5*)
 - a. incoming ray
 - b. reflected ray
 - c. normal
 - d. vertical

9. If light waves change speed when they pass from one medium to another, the light will be _____ . (*Strand II, Standard I, Benchmark II, 5*)

- a. diffracted
- b. reflected
- c. separated
- d. refracted

10. Which of the following uses a lens and two mirrors? (*Strand II, Standard III, Benchmark I, 2*)

- a. binoculars
- b. microscope
- c. reflecting telescope
- d. refracting telescope