

**Live from McDonald Observatory**  
Science TEKS Grades 9-12: IPC, Chemistry, Physics, Astronomy

**Integrated Physics and Chemistry**

Scientific Processes

(1) The student, for at least 40% of instructional time, conducts field and laboratory investigations using safe, environmentally appropriate, and ethical practices. The student is expected to:

- \*(A) demonstrate safe practices during field and laboratory investigations; and
- (B) make wise choices in the use and conservation of resources and the disposal or recycling of materials.

(2) The student uses scientific methods during field and laboratory investigations. The student is expected to:

- \*(A) plan and implement investigative procedures including asking questions, formulating testable hypotheses, and selecting equipment and technology;
- \*(B) collect data and make measurements with precision;
- \*(C) organize, analyze, evaluate, make inferences, and predict trends from data; and
- \*(D) communicate valid conclusions.

(3) The student uses critical thinking and scientific problem solving to make informed decisions. The student is expected to:

- \*(A) analyze, review, and critique scientific explanations, including hypotheses and theories, as to their strengths and weaknesses using scientific evidence and information;
- (C) evaluate the impact of research on scientific thought, society, and the environment;
- (D) describe connections between physics and chemistry, and future careers; and
- (E) research and describe the history of physics, chemistry, and contributions of scientists.

(4) The student knows concepts of force and motion evident in everyday life. The student is expected to:

- \*(A) calculate speed, momentum, acceleration, work, and power in systems such as in the human body, moving toys, and machines.

(5) The student knows the effects of waves on everyday life. The student is expected to:

- \*(B) demonstrate wave interactions including interference, polarization, reflection, refraction, and resonance within various materials;
- (C) identify uses of electromagnetic waves in various technological applications such as fiber optics, optical scanners, and microwaves.

(6) The student knows the impact of energy transformations in everyday life. The student is expected to:

- \*(B) investigate and demonstrate the movement of heat through solids, liquids, and gases by convection, conduction, and radiation.

(8) The student knows that changes in matter affect everyday life. The student is expected to:

\* indicates TEKS which satisfy TAKS test objectives

- \*(A) distinguish between physical and chemical changes in matter such as oxidation, digestion, changes in states, and stages in the rock cycle; and
- (D) describe types of nuclear reactions such as fission and fusion and their roles in applications such as medicine and energy production.

## **Chemistry**

### Scientific Processes

- (2) . The student uses scientific methods during field and laboratory investigations. The student is expected to:
  - (D) organize, analyze, evaluate, make inferences, and predict trends from data; and
  - (E) communicate valid conclusions.
- (4) The student knows the characteristics of matter. The student is expected to:
  - (A) differentiate between physical and chemical properties of matter.
- (5) The student knows that energy transformations occur during physical or chemical changes in matter. The student is expected to:
  - (A) identify changes in matter, determine the nature of the change, and examine the forms of energy involved.

## **Physics**

### Scientific Processes

- (1) The student, for at least 40% of instructional time, conducts field and laboratory investigations using safe, environmentally appropriate, and ethical practices. The student is expected to:
  - (A) demonstrate safe practices during field and laboratory investigations; and
  - (B) make wise choices in the use and conservation of resources and the disposal or recycling of materials.
- (2) The student uses scientific methods during field and laboratory investigations. The student is expected to:
  - (A) plan and implement experimental procedures including asking questions, formulating testable hypotheses, and selecting equipment and technology;
  - (B) make quantitative observations and measurements with precision;
  - (C) organize, analyze, evaluate, make inferences, and predict trends from data; and
  - (D) communicate valid conclusions;
- (6) The student knows forces in nature. The student is expected to:
  - (F) identify examples of electrical and magnetic forces in everyday life.
- (8) The student knows the characteristics and behavior of waves. The student is expected to:
  - (A) examine and describe a variety of waves propagated in various types of media and describe wave characteristics such as velocity, frequency, amplitude, and behaviors such as reflection, refraction, and interference.

\* indicates TEKS which satisfy TAKS test objectives

## Astronomy

### Scientific processes

(1) The student, for at least 40% of instructional time, conducts field and laboratory investigations using safe, environmentally appropriate, and ethical practices. The student is expected to:

- (A) demonstrate safe practices during field and laboratory investigations; and
- (B) make wise choices in the use and conservation of resources and the disposal or recycling of materials.

(2) The student uses scientific methods during field and laboratory investigations. The student is expected to:

- (C) organize, analyze, evaluate, make inferences, and predict trends from data; and
- (D) communicate valid conclusions.

(3) The student uses critical thinking and scientific problem solving skills to make informed decisions. The student is expected to:

- (C) evaluate the impact of research on scientific thought, society, and the environment; and
- (D) describe the connection between astronomy and future careers.

(6) The student knows the characteristics and the life cycle of stars. The student is expected to:

- (A) describe nuclear reactions in stars.

(8) The student knows the role of the Sun in our solar system. The student is expected to:

- (A) identify the approximate ~~mass~~<sup>\*\*</sup>, size, ~~motion~~, temperature, structure, ~~and composition~~ of the Sun;
- (B) identify the source of energy within the Sun and explain that the Sun is the major source of energy for the Earth; and
- (C) describe the Sun's effects on the Earth.

**\*\*Strikethrough indicates components which are not covered in videoconference.**

\* indicates TEKS which satisfy TAKS test objectives