Introduction

Curriculum Overview

Congratulations on choosing an outstanding fourth-grade curriculum! Using this curriculum, you and your student will be engaged in performing lab experiments, identifying ocean movements, explaining the water cycle, observing properties of matter, describing planets in the solar system, and a plethora of other activities. One of the true advantages in selecting Texas Tech University K-12 is that you will have an all-encompassing curriculum similar to what you would find in some of the most outstanding teachers' classrooms in our nation.

This course is completed online in Blackboard using the PDF **Unit Lessons** and **Worksheets** documents.

Unit assessments in this course consist of two parts, the **Unit Test** and the **Unit Project**. The Unit Test are online quizzes. For each Unit Project, scan or take digital photographs of the completed project showing the student's work. Combine the images for each assignment into a single PDF (see **Requirements for Creating PDFs** on the course home page) and upload the file for grading as instructed in the assignment.

4th Grade Science

Semester B of fourth-grade science will focus on Earth science (1 unit) and physical science (2 units). The student will be provided numerous opportunities to conduct scientific experiments and investigations. In order to gain the full experience of science, the student must be involved in and take ownership of each of the experiments. A master list of materials needed for the experiments is included in this introduction. A list of materials is also provided at the beginning of each unit and each day's lesson. The needed materials should be gathered and prepared ahead of time. A list of vocabulary cards for each unit is located in the **Worksheets** document in the **Resources** section of this course. The student should fill out and study these cards daily to become familiar with the terms and concepts introduced in the lessons.

At the end of each unit, the student is required to submit a completed unit test and project. The project lists are located in each unit folder. Before beginning the lessons for each unit, the student should look at and decide on a project to complete for grading. The student will need to find time to work on the selected project to ensure that it is finished on time.

In Unit 4 the student will learn how the weather on Earth is predicted by observing the patterns of changes in the atmosphere. The atmosphere and its four layers are defined and discussed. The student will learn what causes weather and how it is affected by the sun. The greenhouse effect, air masses, and fronts are explained. There is an in-depth discussion of the oceans and the role they play in the water cycle. An explanation of the causes of ocean currents and tides is included

along with definitions of waves, storm surges, and the different types of currents and tides. This unit also includes a discussion of the universe. The student will read about the nine planets and learn their names, descriptions, composition, and how they revolve around the sun. Other objects in our solar system are discussed such as stars, asteroids, and comets. There are explanations on how the solar system is studied using telescopes and space probes. Constellations and how they can be used as navigational tools and calendars is included.

Units 5 and 6 focus on physical science. In Unit 5 the student will learn about matter and energy. This includes the states of matter and their physical properties, how matter is measured and compared, and the useful properties of matter. The student will read about the forms of energy (thermal energy, sound, and electricity and magnetism) and learn how they interact with matter. There are discussions on thermal energy and how people use it each day, the definition of sound and explanations on how it interacts with matter, and the ways in which technology uses electricity and magnetism to make light, heat, sound, and motion. Unit 6 discusses forces and motion. The student will learn that forces are a part of everyday life, for all movement begins and ends when forces interact with objects. Forces in nature are also mentioned. This unit lists and explains the six simple machines and explains the use of these combined with the force exerted by a person to do work. Examples of these machines are included.

Course Objectives

This curriculum meets all the Texas Essential Knowledge and Skills (TEKS) objectives. At the end of the second semester, the student should be able to:

- **Scientific processes:**
  - ◊ demonstrate safe practices during field and laboratory investigations;
  - ◊ make wise choices in the use and conservation of resources and the disposal or recycling of materials;
  - ◊ plan and implement descriptive investigations including asking well-defined questions, formulating testable hypotheses, and selecting and using equipment and technology;
  - ◊ collect information by observing and measuring;
  - ◊ analyze and interpret information to construct reasonable explanations from direct and indirect evidence;
  - ◊ communicate valid conclusions;
  - ◊ construct simple graphs, tables, maps, and charts to organize, examine, and evaluate information;
  - ◊ analyze, review, and critique scientific explanations including hypotheses and theories, as to their strengths and weaknesses using scientific evidence and information;
  - ◊ draw inferences based on information related to promotional materials for products and services;

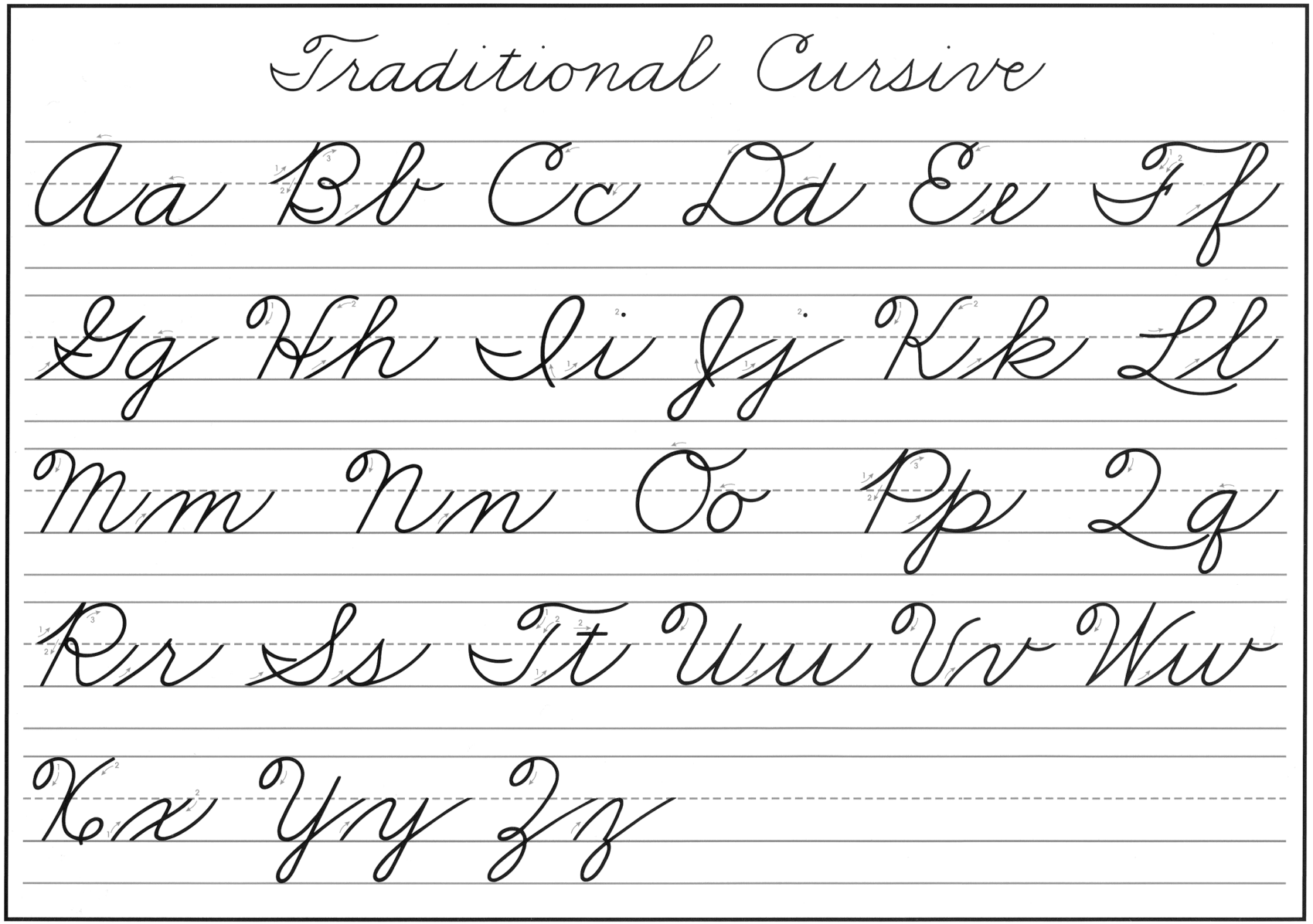
- ◊ represent the natural world using models and identify their limitations;
- ◊ evaluate the impact of research on scientific thought, society, and the environment;
- ◊ connect Grade 4 science concepts with the history of science and contributions of scientists;
- ◊ collect and analyze information using tools including calculators, safety goggles, microscopes, cameras, sound recorders, computers, hand lenses, rulers, thermometers, meter sticks, timing devices, balances, and compasses;
- ◊ demonstrate that repeated investigations may increase the reliability of results;

- **Science concepts:**
  - ◊ identify and describe the roles of some organisms in living systems such as plants in a schoolyard, and parts in nonliving systems such as a light bulb in a circuit;
  - ◊ predict and draw conclusions about what happens when part of a system is removed;
  - ◊ identify patterns of change such as in weather, metamorphosis, and objects in the sky;
  - ◊ illustrate that certain characteristics of an object can remain constant even when the object is rotated like a spinning top, translated like a skater moving in a straight line, or reflected on a smooth surface;
  - ◊ use reflections to verify that a natural object has symmetry;
  - ◊ observe and record changes in the states of matter caused by the addition or reduction of heat;
  - ◊ conduct tests, compare data, and draw conclusions about physical properties of matter including states of matter, conduction, density, and buoyancy;
  - ◊ identify characteristics that allow members within a species to survive and reproduce;
  - ◊ compare adaptive characteristics of various species;
  - ◊ identify the kinds of species that lived in the past and compare them to existing species;
  - ◊ distinguish between inherited traits and learned characteristics;
  - ◊ identify and provide examples of inherited traits and learned characteristics;
  - ◊ identify and observe effects of events that require time for changes to be noticeable including growth, erosion, dissolving, weathering, and flow;
  - ◊ draw conclusions about “what happened before” using fossils or charts and tables;
  - ◊ test properties of soils including texture, capacity to retain water, and ability to support life;
  - ◊ summarize the effects of the oceans on land;
  - ◊ identify the Sun as the major source of energy for the Earth and understand its role in the growth of plants, in the creation of winds, and in the water cycle.

Handwriting

Handwriting is taught in the Language Arts course; however, good handwriting skills are necessary in all subjects including science. In Kindergarten, Grade 1, and Grade 2, manuscript is the preferred technique; in Grades 3, 4, and 5, cursive is preferred. When teaching your child handwriting, please consider the appropriate letter and number formation and spacing. Please refer to the cursive chart included on the next page to assist you in appropriately teaching your child handwriting. Please reinforce the importance of good handwriting in all subject areas.

Traditional Cursive



Books and Materials for SCI 4 This Semester

Textbook

- Frank, Marjorie, *Harcourt Science* (Harcourt Schools Publisher, 2000), ISBN 0153112077

Materials

Required

- aluminum foil
- balloon clamps
- balloons
- books, several
- bowls, clear: 1 large, 1 medium-sized
- bulbs (must be 60-W or greater incandescent bulb)
- clay, modeling
- clock
- container
- cork, small piece
- cotton swabs
- cup
- desk lamp
- doorstop, wooden
- drinking glasses, identical, 4-5 (glass only—NO PLASTIC)
- foam cup (can substitute a paper cup)
- food coloring
- glue
- gummed reinforcements, 4
- hole punch
- hose, rubber or plastic, about 40-50 cm long
- jars, clear glass: 1 tall, 1 small
- large pan or sink
- magnet, bar, small
- markers
- masking tape
- meter stick
- metric ruler
- objects made of iron or steel, small (e.g., paper clips)
- pad of small self-stick notes
- paper clip
- paper: construction, graph, tissue, writing
- pencils (1 unsharpened)
- penlight
- pitcher
- plastic bag, small
- plastic box about the size of a shoe box
- plastic wrap
- poster board
- rubber bands
- rulers: 2 wooden, 1 plastic, 1 metric
- safety goggles
- salt

- scissors
- sewing needle or straight pin, 4-5 cm long
- shoe box with lid
- skewer, wooden, thin
- spoon, metal
- spring scales, 3
- straight pins
- string
- tape
- thermometer
- thread
- toy car
- water
- wooden pole, round (such as a piece of broom handle), 20 cm long
- yarn

Optional

- alum, 40 g
- aluminum foil
- balance
- balloons
- basin or sink
- batteries, 3 (1 D-cell)
- beaker, 200-mL
- board eraser
- books, 5
- bowl, clear glass, large
- breakfast cereal
- broom handles, 2
- calculator
- cardboard
- cardboard tubes: 1 with a large diameter, 1 with a small diameter
- clay, modeling
- clock or watch
- cloth: 1 scrap of silk, 1 scrap of wool
- color pencils
- compass, magnetic
- containers, 2
- corn oil
- craft knife
- crayon, red
- cups, clear plastic, 4 identical
- drawing materials
- drinking straws, plastic
- electrical switch
- food coloring
- glass or jar, tall, narrow
- glasses, 3
- gloves, rubber
- glue
- hanger, wire
- ice cubes, 4 the same size
- index cards
- jars: 1 large, 1 small, 1 plastic
- lenses: 1 thick (objective), 1 thin (eyepiece)
- light bulbs: 1 miniature, 3 regular size
- maple syrup
- markers
- masking tape
- newspaper weather maps from 3 consecutive days
- pan balance
- paper towel

- paper: scrap, writing
- pencils (1 unsharpened with eraser)
- pennies
- plastic bag
- plastic wrap
- poster board
- pot, metal
- raisins
- ramp
- rock
- rope: 1 2-m piece, 1 strong piece 6 m or longer
- rubber bands
- ruler, metric
- safety goggles
- salt
- scissors
- spoon, metal, large
- spoons: plastic, wood, and metal, all about the same size
- spring scale
- stirring stick
- string
- tape
- thermometers, 3
- thumbtack
- tuning fork
- washer, heavy
- watch
- water
- wedges: 1 narrower than doorstop, 1 wider
- wires, at least 1 insulated electric
- wooden craft stick

Grading Procedures and Unit Assignment Checklists

Grades are calculated for Unit 4, Unit 5, and Unit 6. The semester grade is an average of the three unit grades. The unit grades will include a test and a project for each unit. The Units 4 and Unit 5 Tests and Projects are located in their respective Unit folders in this online course; the Unit 6 Test and Project are the Final Exam folder.

The Unit Tests and Projects will be submitted **separately** to Texas Tech University K-12 to be graded. The Unit Test is an online quiz and the Unit Project is an upload assignment.

Scan or photograph each Unit Project. (For audio or video projects, see "Audio Help" and "Video Help" on the course home page for information about saving these formats for upload.) Combine multiple images into a ***single*** **PDF** (see "Requirements for Creating PDFs" on the course home page). When you save the document, use the naming convention given for each Unit Project as the name of your file. Upload the file according to the instructions given in the assignment.

Schedule for tests and projects

Unit 4

- Days 97-98: Work on the Unit 4 Project
- Day 99: Review for the Unit 4 Test
- Day 100: Administer the Unit 4 Test
  Finish and submit the Unit 4 project

Unit 5

- Days 122-123: Work on the Unit 5 Project
- Day 124: Review for the Unit 5 Test
- Day 125: Administer the Unit 5 Test
  Finish and submit the Unit 5 project

Unit 6

- Days 146-147: Work on the Unit 6 Project
- Day 148: Review for the Unit 6 Test
- Day 149: Administer the Unit 6 Practice Test

- Day 150: Administer the Unit 6 Test
  Finish and submit the Unit 6 project

Unit Projects

Your student must complete a project for each unit. The student has the option of creating his or her own project or choosing one of those listed in **Suggested Projects** in this course. If the student chooses a topic, he or she must choose a topic based on the information presented in the unit, and it must be approved by Texas Tech University K-12. The student must also complete a **Unit Topic Planner**. Please submit these to Texas Tech University K-12 no later than one week after your student begins the unit.

The student's teacher will send feedback regarding whether or not your project has been approved. You will find it in the **My Grades** area of this course.