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PUBLICATIONS

4th Grade



SCIENCE

SCIENCE 400

Teacher's Guide

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SCIENCE SCOPE & SEQUENCE

Our Earth and Solar System (Grade 4)

Unit 1	<p>PLANTS</p> <ul style="list-style-type: none"> • Plants and living things • Using plants • Parts of plants • Function of plants
Unit 2	<p>ANIMALS</p> <ul style="list-style-type: none"> • Animal structures • Animal behavior • Animal instincts • Humans protect animals
Unit 3	<p>HUMANKIND'S ENVIRONMENT</p> <ul style="list-style-type: none"> • Resources • Balance in nature • Communities • Conservation and preservation
Unit 4	<p>MACHINES</p> <ul style="list-style-type: none"> • Work and energy • Simple machines • Simple machines together • Complex machines
Unit 5	<p>ELECTRICITY AND MAGNETISM</p> <ul style="list-style-type: none"> • Electric current • Electric circuits • Magnetic materials • Electricity and magnets
Unit 6	<p>PROPERTIES OF MATTER</p> <ul style="list-style-type: none"> • Properties of water • Properties of matter • Molecules and atoms • Elements
Unit 7	<p>WEATHER</p> <ul style="list-style-type: none"> • Causes of weather • Forces of weather • Observing weather • Weather instruments
Unit 8	<p>THE SOLAR SYSTEM</p> <ul style="list-style-type: none"> • Our solar system • The universe • Sun and planets • Stars and space
Unit 9	<p>THE PLANET EARTH</p> <ul style="list-style-type: none"> • The atmosphere • The hydrosphere • The lithosphere • Rotation and revolution
Unit 10	<p>OUR EARTH & SOLAR SYSTEM</p> <ul style="list-style-type: none"> • Earth and solar system • Matter and weather • Using nature • Conservation

TEACHER NOTES

MATERIALS NEEDED FOR UNIT

Required

- fresh celery stalk (stem) with leaves on top
- glass of water
- red ink or red food coloring
- knife

Suggested

ADDITIONAL LEARNING ACTIVITIES

Section 1: Plant Life

1. Take a planned field trip to a supermarket. Divide into two groups. One group makes list of all vegetables; other group makes list of all fruits. Groups compare lists at school and discuss.
2. Have small groups work together to make a list of all state flowers. Share list with class.
3. Have the students draw a flower arrangement.
4. Using real or artificial flowers, have the students make a floral arrangement and bring it to class.

Section 2: Plant Parts

1. For a classroom bulletin board, have students cut colored pictures of flowers and flower arrangements from magazines. Arrange bulletin board display.
2. Let each student make a leaf collection. Identify from reference books and share with class.
3. Have the students bring seeds to class and classify them.
4. Instruct the students to plant some plants at home. Keep a diary of progress of the plants. Have one of their parents sign the report when they bring it to class.
5. Assign the students to make a picture using various seeds.

Administer the Test.

The test is to be administered in one session. Give no help except with directions. Evaluate the tests and review areas where the students have done poorly. Review the pages and activities that stress the concepts tested. If necessary, administer the Alternate Test.

ANSWER KEYS

SECTION 1

- 1.1 strong
 1.2 largest
 1.3 mammal
 1.4 two
 1.5 tooth
 1.6 ivory
 1.7 false
 1.8 true
 1.9 true
 1.10 false
 1.11 true
 1.12 true
 1.13 false
 1.14 true
 1.15 b. warm-blooded
 1.16 b. lungs and mouth or nose
 1.17 a. blowhole
 1.18 b. oil
 1.19 false
 1.20 true
 1.21 false
 1.22 false
 1.23 false
 1.24 true
 1.25 true
 1.26 false
 1.27 false
 1.28 true
 1.29 Answers will vary.
 The shape of the whale's spout or blow identifies the whale.
 The blow of a blue whale is tall, slender and vertical, upwards of 9 meters in height. They are blue-gray with a blotchy appearance. The tail fluke is very broad with a straight or slightly concave bottom edge with a slight notch in the middle.
 The blow of a right whale is a distinct V-shaped blow, upwards of 5 meters in height. They are mostly black with irregular white patches on the belly. The tail fluke is broad and symmetrical with a distinct notch.
 The blow of a sperm whale is a low bushy blow, projected forward and to the left, usually less than 2 meters in height, very distinct. They are dark brownish gray with wrinkled skin. Each half of the tail fluke is the shape of a right triangle with a distinctive V notch in the middle. Sperm whales are easily identified by the large head.
- 1.30 c. follow a planned course
 1.31 a. timetable of coming and going
 1.32 d. bird
 1.33 b. Arctic tern
 1.34 nests
 1.35 flocks
 1.36 seeds
 1.37 breeding
 1.38 three thousand (or 3,000)
 1.39 short
 1.40 runway
 1.41 South (or Carolinas)
 1.42 nests
 1.43 V
 1.44 c
 1.45 a
 1.46 e
 1.47 f
 1.48 b
 1.49 d
 1.50 reptile
 1.51 snake
 1.52 armor
 1.53 crawl
 1.54 legs
 1.55 water
 1.56 cold
 1.57 snake (or reptile)
 1.58 legs
 1.59 Cold
 1.60 Examples; any order:
 a. lizards
 b. snakes
 c. turtles and tortoises
 d. crocodiles
 1.61 Example:
 Fish have fins, a body that moves, and gills with which to breathe.
 1.62 Example:
 The fish swims by wiggling its body and using its tail fins.
 1.63 Example:
 The fish has two pairs of fins in place of legs and arms. The fins act as limbs in helping the fish travel. The fins are like broad paddles which drive the fish through the water.
 1.64 Example:
 The fish turns by using its tail and body.
 1.65 A fish's scales overlap, one on top of another.

SELF TEST 1

- 1.01 d
 1.02 f
 1.03 a
 1.04 i
 1.05 h
 1.06 g
 1.07 c
 1.08 j
 1.09 e
 1.010 b
 1.011 ecologist
 1.012 population
 1.013 mold (or bacteria)
 1.014 sun
 1.015 communities
 1.016 food chain
 1.017 Any order:
 a. air
 b. water
 c. light
 d. soil
 1.018 bacteria
 1.019 water
 1.020 disrupt
 1.021 grasshopper
 1.022 birds
 1.023 bears
 1.024 ~~fungi~~
 1.025 clover
 1.026 water lily
 1.027 rabbit
 1.028 frog
 1.029 cow
 1.030 ~~mold~~
 1.031 cat
 1.032 spider
 1.033 snake
 1.034 ~~termite~~
 1.035 orange tree
 1.036 heat
 1.037 sun
 1.038 energy
 1.039 The right number of plants and animals are in a community.
 1.040 All life is connected.
 1.041 Consumers eat many times their weights in food during their lifetimes.

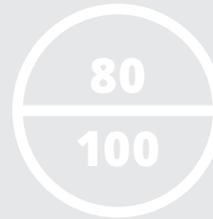
SCIENCE 404

ALTERNATE TEST

NAME _____

DATE _____

SCORE _____



Match these items (each answer, 2 points).

- | | |
|-------------------------------|--|
| 1. _____ friction | a. to interlock |
| 2. _____ energy in action | b. tool to make work easier |
| 3. _____ machine | c. moving an object |
| 4. _____ mechanical advantage | d. stops moving things |
| 5. _____ mesh | e. thing to be moved |
| 6. _____ pitch | f. energy not being used |
| 7. _____ slope | g. energy in motion |
| 8. _____ load | h. force gained by using a machine |
| 9. _____ work | i. slant |
| 10. _____ stored energy | j. distance between threads of a screw |

Answer true or false (each answer, 2 points).

11. _____ By using a lever, a heavy load can be raised with less force.
12. _____ A child swimming is energy in action.
13. _____ A wheel is a simple machine.
14. _____ The use of gears increases speed.
15. _____ A doorknob is an inclined plane.
16. _____ A spiral stairway is an inclined plane.
17. _____ All lifting work is done against the force called gravity.
18. _____ The simple machine called a wedge is used only by woodcutters.

TEACHER NOTES

MATERIALS NEEDED FOR UNIT

Required

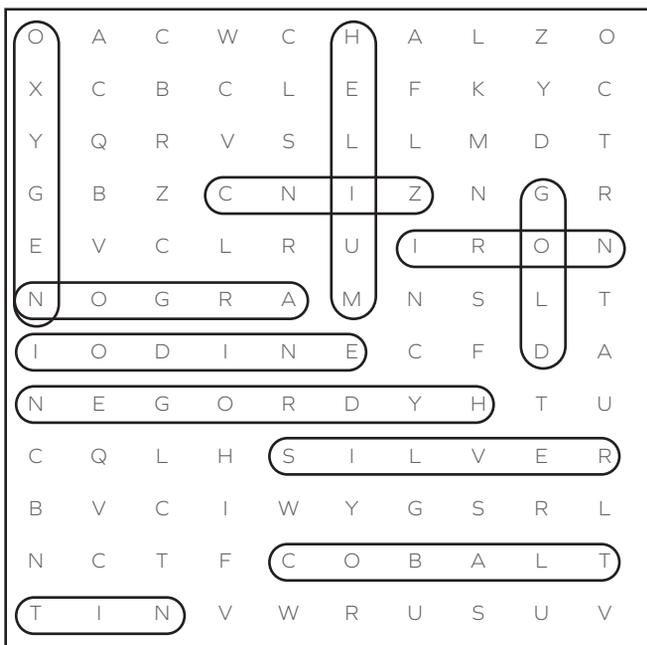
- some iron fillings
- a bar magnet
- a large iron nail
- a piece of steel (a knife blade or scissors)
- three strips of copper or heavy copper wire (or 3 copper metal electrodes)
- three strips of zinc metal or galvanized tin (or 3 zinc metal electrodes)
- one lemon
- vinegar
- some bell wire (light gauge solid copper wire)
- a dry cell (6 volt)
- a knife switch
- small metal objects
- string (for balloons)
- two balloons
- a woolen sweater or a piece of woolen cloth (wool friction pad)
- a rubber comb or hard rubber rod (rubber friction rod)
- one magnet
- two paper clips
- two rubber bands
- five pins, two sewing needles
- one piece of chalk
- two bits of wood
- one small piece of paper
- one penny
- one nickel
- one tin can
- one small plastic cup
- a magnetic compass
- meter stick, yardstick, or ruler
- about 40 centimeters of heavy string
- a stack of books
- a galvanometer (Or, make a galvanometer by wrapping wire around a compass.)
- a mailing tube or the cardboard from a roll of paper towels

Suggested

SECTION 2

- 2.1 b
- 2.2 c
- 2.3 b
- 2.4 c
- 2.5 a
- 2.6 Friend check
- 2.7 round
- 2.8 square
- 2.9 It is the shape of the bag.
- 2.10 Any order: solid, liquid, gas
- 2.11 container
- 2.12 gas
- 2.13 round
- 2.14 square
- 2.15 b. Matter takes up space.
e. All matter has mass or weight.
- 2.16 Is it a Solid, Liquid, or Gas?
liquid
solid
gas
Shape It Takes
container
definite
container
- 2.17 true
- 2.18 true
- 2.19 false
- 2.20 true
- 2.21 false
- 2.22 true
- 2.23 Teacher check
- 2.24

- 2.25 elements
- 2.26 100
- 2.27 silver
- 2.28 penny
- 2.29 atom
- 2.30 H
- 2.31 O
- 2.32 compound
- 2.33 Teacher check
- 2.34 a. guitar g. third
b. scarlet h. skirt
c. star i. girl
d. large j. circle
e. farm k. stir
f. hard l. shirt
- 2.35 er
- 2.36 ur
- 2.37 or
- 2.38 ar
- 2.39 eer
- 2.40 er
- 2.41 eer
- 2.42 or
- 2.43 ur
- 2.44 ar
- 2.45 no or not
- 2.46 bad or wrong
- 2.47 backward or again
- 2.48 before
- 2.49 mismatch
- 2.50 relearn
- 2.51 preview
- 2.52 unwrap
- 2.53 unhappy
- 2.54 repack



TEST

1. g
2. d
3. i
4. h
5. c
6. j
7. e
8. a
9. f
10. b
11. direction
12. Weather
13. predict
14. eye
15. any woman's or man's name
16. transparent
17. b. centigrade
18. a. troposphere
19. c. air pressure
20. a. zero
21. b. slower than
22. c. wind force and speed
23. c. soil
24. a. Heat rays from the sun pass through our atmosphere.
b. Heat rays strike the ground and warm it.
c. The ground absorbs heat from the sun.
d. The ground heats the air above it.
25. Examples:
Changes in the atmosphere, temperature, air pressure, air movements, and moisture cause weather to change.
26. Rainstorms happen when a large amount of water gathers in a cloud and falls to earth. Rainstorms supply water but sometimes cause bad floods. Blizzards are heavy, wind-blown snowstorms that block roads. The helpful part is the supply of water from the melting snow and cover for plants.
27. false
28. true
29. true
30. false
31. true

ALTERNATE TEST

1. e
2. d
3. j
4. i
5. h
6. a
7. f
8. g
9. b
10. c
11. vane
12. weather
13. satellite
14. sun
15. fog
16. snow
17. thermometer
18. water
19. electricity
20. 32
21. true
22. false
23. true
24. false
25. true
26. true
27. false
28. false
29. true
30. true
31. true
32. a. air
33. c. barometer
34. b. centigrade
35. b. sound
36. c. center
37. c. soil
38. a. erosion
39. c. warm
40. a. heat
41. c. space
42. b. rainfall
43. c. air
44. Either order:
a. air pressure changes
b. temperature changes or wind currents, wind, or moisture
45. Example:
A hurricane blows down buildings, trees, and telephone poles. It sometimes brings floods and kills people and animals.

12. The natural force that causes objects to move toward each other is called _____.
 a. astronomy b. gravity c. astrology
13. Astronomers are able to map the paths of the _____ because the universe is one of order.
 a. planets b. sea c. winds
14. The sun is the center of the _____.
 a. galaxy b. Milky Way c. solar system
15. Galaxies are moving _____ each other.
 a. toward b. around c. away from

Complete these statements (each answer, 3 points).

16. In ancient times, people thought the world rested on the back of a(n) _____.
17. They also thought the sun, moon, and stars revolved around the _____.
18. The constellations were called _____ pictures and were imagined by the ancients.
19. The largest planet is _____.
20. The planet that was reclassified to a dwarf planet is _____.
21. Eight _____ are revolving around the sun.
22. A heavenly body with a star-like center and a tail is called a(n) _____.
23. The earth revolves around the _____.

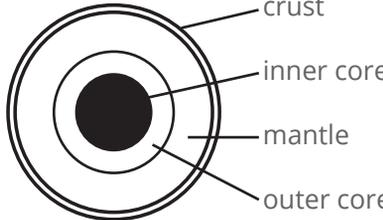
Match each item (each answer, 2 points).

- | | |
|---------------------------|---------------------------|
| 24. _____ Lippershey | a. at least six rings |
| 25. _____ universe | b. pole star |
| 26. _____ North Star | c. belief |
| 27. _____ Saturn | d. Ra |
| 28. _____ sun | e. telescope |
| 29. _____ gravity | f. asteroids |
| 30. _____ radio-telescope | g. expanding |
| 31. _____ minor planets | h. oval |
| 32. _____ elliptical | i. astrologers |
| 33. _____ opinion | j. center of the universe |
| 34. _____ zodiac | k. radio waves |
| 35. _____ Egyptian god | l. Newton |
| | m. 93,000,000 |

SECTION 3

- 3.1 4
 3.2 2
 3.3 3
 3.4 1
 3.5 a. core
 3.6 b. mantle
 3.7 a. granite and basalt
 3.8 c. 4
 3.9 Example:
 Crust, mantle, outer core, inner core
 3.10 round
 3.11 no
 3.12 Teacher check
 3.13 a. sphere
 b. ground or land
 c. feet
 d. earth
 e. water
 f. clouds
 3.14 Teacher check
 3.15 mountains — flat area less than 2,000 feet above sea level
 3.16 volcano — opening in the earth's crust where hot rock comes out
 3.17 plain — flat area above 2,000 feet
 3.18 plateau — a landform that reaches very high into the air
 3.19 glacier — a great body of packed ice
 3.20 Examples:
 a. rain
 b. wind
 c. earthquakes
 d. volcanoes
 3.21 magnetism
 3.22 gravity
 3.23 air (atmosphere)
 3.24 storms
 3.25 poles
 3.26 Sun
 3.27 colder
 3.28 axis
 3.29 earthquake
 3.30 moving

SELF TEST 3

- 3.01 h
 3.02 e
 3.03 i
 3.04 b
 3.05 c
 3.06 f
 3.07 j
 3.08 g
 3.09 d
 3.010 a
 3.011 true
 3.012 true
 3.013 false
 3.014 false
 3.015 true
 3.016 two
 3.017 mantle
 3.018 Either order:
 a. granite
 b. basalt
 3.019 four
 3.020
- 
- 3.021 the water portion of the earth
 3.022 Without oxygen a fire will not burn. Pure oxygen would cause an instant, disastrous fire.
 3.023 because of the water cycle
 3.024 crust, mantle, and inner and outer cores
 3.025 granite and basalt
 3.026 Example:
 The earth moves, slips, or slides along the fault in the crust.
 3.027 Example:
 Magellan sailed all the way around the world, discovering it was round.

TEACHER NOTES

MATERIALS NEEDED FOR UNIT

Required	Suggested
None	

ADDITIONAL LEARNING ACTIVITIES

Section 1: Our Earth and Solar System

1. Have a group prepare and present a short dramatic skit based on Matthew Maury's discovery of the ocean currents.
2. Have a group prepare and present a similar skit about Benjamin Franklin and his discovery of electricity.
3. Interested students may wish to make drawings of the teeth and jaws of different animals, and show adaptations.
4. Assign the students the task of writing a short biography of one of the astronauts.
5. Have the students write a short fiction story about a trip to one of the planets.
6. Instruct the students to make a picture showing the "balance of nature." People and animals need oxygen; plants need carbon dioxide. Label the two gases and show how plants help us.

Section 2: Our Changing World

1. Have students investigate the change in the form of a drop of perfume. Place a drop of perfume in a clean bottle and watch it change from a liquid to a gas. Discuss evaporation.
2. Have each member of a group select a different scientist who has been mentioned in the previous unit and make up a list of questions about him. Have a quiz based on the questions.
3. Instruct the students to read about Matthew Maury from several sources. Have them write a short review of his life and share it with the class.
4. Have students research the subject of oceanography and tell about it in class. Maury was one of the first oceanographers.
5. Since dust affects rainfall and cloud formation, weathermen measure the dust in the air. Students, too, can measure dust. Have them cover each of two cardboard squares with a six-inch strip of fly paper, sticky side out. One square goes in a box where air currents cannot reach it. The other square should be placed outdoors. After three days, students observe and compare the two squares using a microscope.

ANSWER KEYS

SECTION 1

- 1.1 false
 1.2 true
 1.3 false
 1.4 true
 1.5 true
 1.6 false
 1.7 true
 1.8 false
 1.9 true
 1.10 false
 1.11 a. 1969
 1.12 a. Mercury
 1.13 c. astronomy
 1.14 b. 3,000 to 5,000
 1.15 a. telescope
 1.16 b. Earth
 1.17 b. science
 1.18 Any order:
 a. sun
 b. moon
 c. Earth
 d. planets
 1.19 Any order:
 a. meteoroids
 b. comets
 c. asteroids
 1.20 10 pounds
 1.21 false
 1.22 true
 1.23 false
 1.24 true
 1.25 true
 1.26 Any order:
 a. root(s)
 b. stem(s)
 c. leaf (leaves)
 d. flower(s)
 e. fruit(s)
 1.27 Either order:
 a. to make food
 b. to give off oxygen or to provide shelter; enjoyment
- 1.28 a. carbon dioxide
 b. food
 c. leaves
 d. sun
- 1.29 earth — make food
 1.30 decay — has everything plants need
 1.31 leaves — take minerals from the soil
 1.32 stems — moves up the stem
 1.33 roots — carry water to leaves
 1.34 water — means to become rotten
- 1.35 a. a stem, carries food and water to the plant, holds flowers (blossoms) up
 b. receptacle, attaches flower to stem
 c. petal, attracts insects and birds
 d. pistil, lets flower reproduce
- 1.36 Teacher check
 1.37 h
 1.38 f
 1.39 i
 1.40 j
 1.41 b
 1.42 e
 1.43 d
 1.44 g
 1.45 a
 1.46 c
 1.47 false
 1.48 false
 1.49 true
 1.50 true
 1.51 false
 1.52 true
 1.53 true
 1.54 true
 1.55 true
 1.56 false
 1.57 true
 1.58 false
 1.59 true
 1.60 true

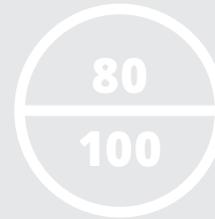
SCIENCE 410

ALTERNATE TEST

NAME _____

DATE _____

SCORE _____



Match each item (each answer, 2 points).

1. _____ temperature change
 2. _____ conductor
 3. _____ circuit breaker
 4. _____ community
 5. _____ mosquito
 6. _____ wedge
 7. _____ Volta
 8. _____ chemistry
 9. _____ gears
 10. _____ erosion
 11. _____ Edison
 12. _____ ferns
 13. _____ gravity
 14. _____ thermometer
 15. _____ barometer
- a. insect
 - b. study of matter
 - c. inclined plane
 - d. wearing away by wind and rain
 - e. wheels with teeth that turn
 - f. switch
 - g. electric light
 - h. forest community
 - i. holds things on Earth
 - j. battery
 - k. one cause of weather
 - l. measures air pressure
 - m. habitat for living things
 - n. copper wire
 - o. measures air temperature



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