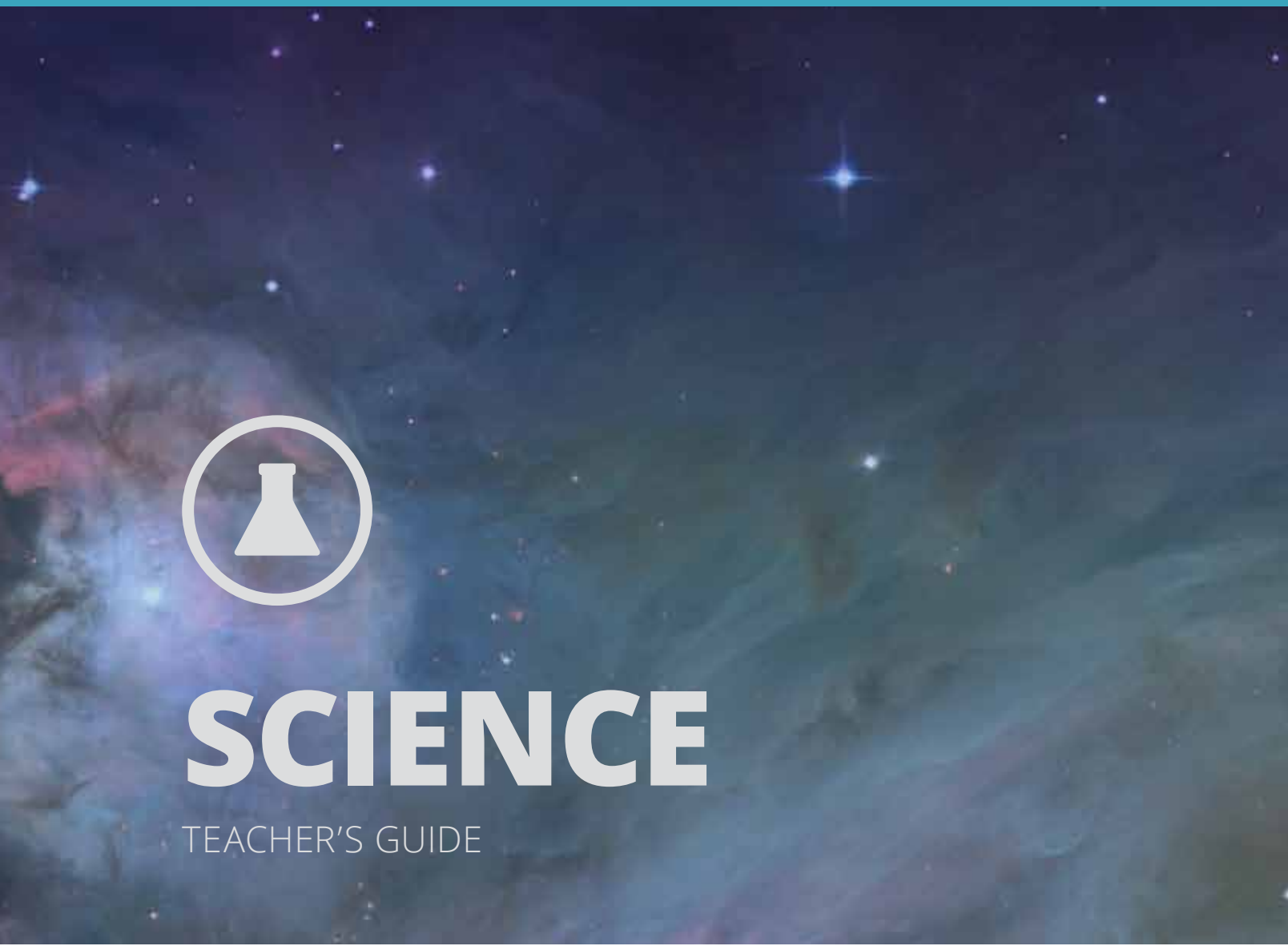
LIFEPAC®



SCIENCE

TEACHER'S GUIDE

7th Grade

Alpha Omega
PUBLICATIONS

SCIENCE 700
Teacher's Guide

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Alpha Omega
PUBLICATIONS

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Teacher Notes

INSTRUCTIONS FOR SCIENCE

The LIFEPAC curriculum from grades two through twelve is structured so that the daily instructional material is written directly into the LIFEPACs. The student is encouraged to read and follow this instructional material in order to develop independent study habits. The teacher should introduce the LIFEPAC to the student, set a required completion schedule, complete teacher checks, be available for questions regarding both content and procedures, administer and grade tests, and develop additional learning activities as desired. Teachers working with several students may schedule their time so that students are assigned to a quiet work activity when it is necessary to spend instructional time with one particular student.

The Teacher Notes section of the Teacher's Guide lists the required or suggested materials for the LIFEPACs and provides additional learning activities for the students. The materials section refers only to LIFEPAC materials and does not include materials which may be needed for the additional activities. Additional learning activities provide a change from the daily school routine, encourage the student's interest in learning and may be used as a reward for good study habits.

If you have limited facilities and are not able to perform all the experiments contained in the LIFEPAC curriculum, the Science Project List may be a useful tool for you. This list prioritizes experiments into three categories: those essential to perform, those which should be performed as time and facilities permit, and those not essential for mastery of LIFEPACs. Of course, for complete understanding of concepts and student participation in the curriculum, all experiments should be performed whenever practical. Materials for the experiments are shown in Teacher Notes – Materials Needed.

A suggested support item for this course is the 7th Grade Science Experiments video, SD0701. The video includes presentations of many of the experiments in this course. Several of the experiments that require special equipment or materials are demonstrated on these videos. They can either be used for answering the questions of the lab report or as a demonstration of the procedure prior to performing the experiment. A notice is included with each experiment in the LIFEPAC where the video is available.

Science Projects List

Key

(1) = Those essential to perform for basic understanding of scientific principles.

(2) = Those which should be performed as time permits.

(3) = Those not essential for mastery of LIFEPACs.

S = Equipment needed for home school or Christian school lab.

E = Explanation or demonstration by instructor may replace student or class lab work.

H = Suitable for homework or for home school students. (No lab equipment needed.)

V = This experiment is available on the Science Experiments video.

Science 701

pp	13	(1)	H
	27	(2)	S

Science 702

pp	20	(1)	S & V
	24	(1)	S & V

Science 703

pp	10	(1)	H & V
	18	(2)	S or H
	18	(1)	S
	24	(2)	E & V
	40	(1)	S & V
	41	(2)	S
	45	(2)	S & V
	52	(1)	S & V

Science 704

pp	31	(1)	S
	40	(2)	H
	42	(1)	S
	55	(1)	S

Science 705

pp	15	(1)	S & V
	27	(2)	H

Science 706

pp	9	(1)	H
	21	(1)	S & V

Science 707

None

Science 708

pp	7	(1)	S & V
	33	(1)	H
	37	(2)	H & V
	39	(1)	H & V

Science 709

pp	11	(1)	S & V
	18	(1)	H
	20	(1)	H
	33	(2)	H

Science 710

pp	8	(1)	H & V

Materials Need for LIFEPAC

Required:
None

Suggested:
box containing a variety of objects for students to classify--For example:
a nail, a piece of wood, a tin can, a seed,
a piece of cloth, a sponge,
a comb, a stone, a pencil, a plastic bag,
a book of matches, and so on
a book or other resource with information about George Washington Carver

Additional Learning Activities

Section I Tools of a Scientist

1. Arrange ten objects on a tray. Show the tray to a group of friends for fifteen seconds and cover the tray. Ask your friends to list as many of the objects as they can remember.
2. Gather leaves from ten different plants. List as many similarities and differences as possible. Name ways to classify your leaves.

Section II Methods of a Scientist

1. Show the student(s) a magazine picture and ask the students to write as many questions as they can about the picture.
2. With a friend use the scientific method to solve a problem.
3. Write a skit involving a problem. Solve the problem with the scientific method. Present the skit to the rest of the class.
4. Make a poster illustrating the scientific method.
5. Write a one-page report on the importance of curiosity to a scientist.

Section III Work of a Scientist

1. Discuss the ways scientists have improved the quality of life. Topics might include: curing disease, predicting earthquakes and volcanic eruptions, developing varieties of plants that produce higher yields, forecasting the weather, and so on.
2. Make a bulletin board of famous scientists and their contributions.
3. Select one famous Christian scientist and write a one-page report about him. You may use an encyclopedia or other library books for this assignment.

Section IV Careers in Science

1. Discuss with the students the difference between a technician and an engineer (Training differences can be seen in a university catalog or a junior college catalog.)
2. Read a brief biography of a scientist in an encyclopedia. With friends act out an important event in the life of that scientist.
3. Look in pamphlets like those from the federal or state governments, colleges, or Metropolitan Life Insurance Co. Select one field of science and read about different occupations within that field.
4. Make a poster using the information given in Section IV to illustrate the need for scientists.

Alternate Tests

Reproducible Tests
for use with the Science 700
Teacher's Guide

Name _____

Answer *true* or *false* (each answer, 1 point).

1. _____ Observation involves a careful examination of things around us.
2. _____ The inductive method is a process of beginning with many particulars and proceeding to a generalization.
3. _____ Living things depend on other living things.
4. _____ Chemists tell us how things work, e.g. how a camera works.
5. _____ Philosophers are concerned about how man's mind works.
6. _____ Classification tells us the length and weight of something.
7. _____ Psychologists study human and animal behavior.
8. _____ Anthropologists study man's culture.
9. _____ Geology is a biological science.
10. _____ An experiment is a trial or test to discover something unknown.

Complete these statements (each answer, 3 points).

11. When making observations, man has _____ that he uses.
12. An inference is a _____ .
13. When a scientist makes a reasonable guess about the answer to a problem, he makes a _____ .
14. The sciences that are concerned with the nature of the universe are called _____ .
15. The biological sciences are concerned with the study of_____ _____ .
16. The process of orderly observation and thinking is _____ .
17. The study of the relationships of living things to each other and their environment is called _____ .
18. The branch of biology concerned with plant life is _____ .
19. The work of _____ was to change agriculture in the south.

Match these items (each answer, 2 points).

20._____ classification
21._____ data
22._____ measurement
23._____ questions
24._____ Antoine Lavoisier
25._____ Isaac Newton
26._____ Albert Einstein
27._____ Anton van Leeuwenhoek
28._____ Galileo
29._____ Carolus Linnaeus

a. found no gain or loss in chemical reactions
b. information
c. studied water with microscope
d. Law of Gravitation
e. determining length, weight, and volume
f. system of classification
g. systematic arrangement
h. wondering about phenomena
i. solar system and telescope
j. Law of Relativity

Write *1* before each physical science, write *2* before each biological science, and write *3* before each social science (each answer, 2 points).

30.

a. _____	anthropology	g. _____	geology
b. _____	astronomy	h. _____	meteorology
c. _____	botany	i. _____	paleontology
d. _____	chemistry	j. _____	physics
e. _____	ecology	k. _____	sociology
f. _____	geography	l. _____	zoology

Circle the correct answer (each answer, 2 points).

31. All human hands have a thumb. Bill is a human child. Therefore, Bill has a thumb. This example illustrates (inductive, deductive) reasoning.

32. Ann lives in Greenville. Everyone who lives in Greenville has a garden. Therefore, Ann has a garden. This example illustrates (inductive, deductive) reasoning.

Write the definitions (each answer, 5 points).

33. a. Classification_____
_____
_____

b. Theory_____
_____
_____
_____

Complete these activities (each answer, 2 points).

34. List three ways in which a horse and a dog are alike.
a. _____
b. _____
c. _____

35. List three ways in which a horse and a dog are different.
a. _____
b. _____
c. _____

86/107

Date _____
Score _____

Answer Keys

SECTION ONE

Answers may vary slightly depending on the resources that are used.

1.1 Fahrenheit was a German physicist who developed the Fahrenheit temperature scale. He made the measurement of temperature more accurate by developing a mercury thermometer.

1.2 Galileo is called the Father of Experimental Science. He discovered the law of the pendulum. He made the first practical use of the telescope in astronomy. He built larger and better telescopes.

1.3 Otto von Guericke proved that a vacuum could exist. Creating a vacuum was foundational for research into electronics and other related new scientific fields.

1.4 Robert Hooke constructed the first reflecting telescope.

1.5 Johannes Kepler was a German astronomer who discovered the three laws of planetary motion. He discovered a better combination of lenses for a telescope.

1.6 Anton van Leeuwenhoek was a Dutch scientist who revealed the world of microscopic life through his observations and drawings. He developed a precise grinding process to make high quality lenses.

1.7 Torricelli was an Italian physicist who discovered the principle of the barometer. He invented the mercurial barometer. A barometer is used to measure air pressure.

1.8 Hint:
Discuss the tree's color, height, location, leaf shape and color and taste, bark texture, condition of crumbliness (friability). Discuss the form, color, taste of seeds; attributes of fruits (if present); animal population; parasites (dead or alive). Tell whether the tree is denuded.

1.9 Observations will vary.

1.10 Observations will vary.

1.11 Hint:
Write about the taste and smell of pine needles. Write about the taste and texture of the tree's fruit. Write about the sound and feel of a breaking twig.

1.12 Examples:
How old is the tree?
How many rings does the tree have?
Are there any birds' nests in the tree?
Is the tree climbable?

1.13 Questions will vary.

1.14 observation

1.15 Any order:
a. seeing
b. hearing
c. smelling
d. tasting
e. feeling

1.16 instruments

1.17 Any order:
a. collect accurate data
b. recognize evidence or to think
c. make comparisons

1.18 Either order:
a. observation
b. thinking

1.19 meter

1.20 gram

1.21 liter

1.22 one-millionth

1.23 one-thousandth

1.24 one-hundredth
1.25 one thousand
1.26 An angstrom is one hundred millionth of a centimeter.
1.27 A light year is the distance light travels in a year: almost 6,000,000,000,000 miles or 9,654,000,000,000 meters.
1.28 A micron is one-millionth of a meter.
1.29 Classifications of objects can be made according to color, shape, size, or use of material. Objects belong to the mineral kingdom, the vegetable kingdom, or the animal kingdom.
1.30 Any order:
a. mineral
b. plant or vegetable
c. animal
1.31 a. grow
b. grow and live
c. grow, live, and have feeling
1.32

	Similarities	Differences
	Examples:	Examples:
a.	animal	coloring
b.	lives in Africa	sound each makes
c.	warm-blooded	food each eats

1.33 Classifications will vary.
1.34 Observation will vary: however, observations will describe the differences between a paper clip and a ruler.
1.35 Answers will vary.
1.36 Answers will vary.
1.37 Answers will vary.
1.38 a. observation or question or data or experiments
b. generalization or conclusion
1.39 conservation of matter
1.40 The deductive method of reasoning starts with a general principle that is accepted as true, applies it to a particular case, and arrives at a conclusion. This means the reasoning proceeds from the general to the specific.
1.41 The inductive method of reasoning is one in which one collects many particular cases, finds out what is common, and forms a general rule that is taken to be true. This has the reasoning proceeding from the specific to the general.
1.42 deductive
1.43 deductive
1.44 inductive
1.45 deductive
1.46 inductive
1.47 balance
1.48 Either order:
a. gains
b. loses
1.49 conservation of matter
1.50 inductive
1.51 inductive
1.52 deductive
1.53 Example:
All Christians love God.
Mary is a Christian.
Therefore, Mary loves God.
1.54 Example:
Mary, Joe, Bill, Jan, and Jim are Christians.
Mary, Joe, Bill, Jan, and Jim love God.
Therefore, all Christians love God.

SECTION TWO

2.1 25 years old at least

2.2 The tree rings vary in width due to climate, availability of rainfall, and average temperature.

2.3 The tree rings grew unevenly because of the orientation of the tree and distribution of light in the forest.

2.4 The burn occurred years ago and bark grew over the burn

2.5 Questions will vary.

2.6 Questions will vary.

2.7 Hypotheses will vary, but they must be relevant and reasonable.

2.8 Hypotheses will vary, but they must be relevant and reasonable.

2.9 Hypotheses will vary, but they must be relevant and reasonable.

2.10 Hypotheses will vary, but they must be relevant and reasonable.

2.11 Hypotheses will vary, but they must be relevant and reasonable.

2.12 Hypotheses will vary, but they must be relevant and reasonable

2.13 a. conclusion
b. information

2.14 Answers will vary.

2.15 Solutions will vary.

2.16 __✔__ Drop a ten-pound piece of rubber and a five-pound piece of rubber from 100 feet.
Time the fall of each object.

2.17 candle or some other simple flame. something to smother it, matches, flame (candle) holder

2.18 Plans will vary, but you will need a plan which will cut off the oxygen supply.

2.19 This is the step-by-step procedure.
Example:
1. Place pad on table
2. Put candle (in holder) on pad
3. Light candle
4. Place jar over candle
5. Record observations

2.20 true

2.21 true

2.22 false

2.23 false

2.24 increases

2.25 The clam died.

2.26 January

2.27 fall

2.28 b. 8 in.

2.29 Both lightning and thunder are caused by the same force; or lightning causes thunder.

2.30 Fires need oxygen

2.31 Altitude affects boiling point.

2.32 a. State the problem.
b. Form hypothesis.
c. Investigate or experiment.
d. Interpret data or observation.
e. Form conclusion.

SECTION THREE

3.1 a. Greek *astron* = star + *nemein* = dictate the laws of
b. Latin Greek (al) *chemy* = art of alloying metals; *-ist* = a person who does or makes; *-iry* = occupation or result
c. Greek *ge* = earth; *logos* = word, study
d. Latin Greek *physis* = nature

3.2 a. Greek *bios* = life; *logos* = word or study
b. Greek *botanikos* or *botane* = plant
c. Greek *oikos* = dwelling; *logos* = word or study
d. Greek *paleo* or *palaios* = ancient; *ontos,* a being; *logos* = word or study
e. Greek *zoion* = animal; *logos* = word or study

3.3 a. Greek *anthropos* = man; *logos* = word, study
b. Greek *oikos* = house; *nemein* = manage or arrange
c. Greek *ge* = earth; *graphein* = write about
d. Greek *philo* = love; *sophos* = wisdom
e. Greek *psyche* = soul, mind; *logos* = word, study
f. Latin and Greek *socius* = companion; *logos* = word, study

3.4 a. Greek *logos* = word or study
b. Greek *mathema* or *manthanein* = science, to learn; *techne* = art, method, system

3.5-3.6 teacher check

3.7-3.10 Any order:

3.7 Astronomy is the study of space.

3.8 Physics is the study of matter and energy.

3.9 Chemistry is the study of substances.

3.10 Geology is the study of the earth's crust, its layers and their history.

3.11-3.14 Any order:

3.11 Zoology is the science that deals with animals and animal life.

3.12 Botany is the science that deals with plants and plant life.

3.13 Paleontology is a science of the forms of life existing in pre historic time (or time before recorded history) as represented by fossil animals and plants.

3.14 Ecology is a science that studies the effect of the environment upon animals and plants.

3.15-3.20 Any order:

3.15 Sociology is the study of the nature, origin, and development of human society and community life.

3.16 Psychology is the science of the study of the mind.

3.17 Anthropology is the science of man dealing with his physical characteristics, the development of races, and the cultures, customs, and beliefs of mankind.

3.18 Economics is the science of production, distribution, and consumption of goods and services.

3.19 Philosophy is the study of the truth or principles underlying all real knowledge.

3.20 Geography is a study of the earth's surface, climate, continents, countries, peoples, industries, and products.

3.21-3.22 Any order:

3.21 Mathematics is the process of

3.22 Logic is the process of thinking.

SECTION FOUR

4.1 Either order:
- a. A theoretical scientist uses his mind to understand scientific principles.
- b. An experimental scientist proves or disproves theories through testing.

4.2 Engineers are called *applied scientists* because engineers apply the principles of science to the needs of mankind.

4.3 A technician assists engineers and scientists in operating equipment and collecting data.

4.4 Either order:
- a. The teacher directs the learning process.
- b. The teacher interprets complex, unfamiliar ideas and translates them into understandable language.

4.5 Any order:
- a. teaching
- b. government
- c. private industry, medicine, dentistry, etc.

4.6 Job descriptions will vary

4.7 Graph

4.8 Graph

Self Test Keys

SELF TEST 1

1.01 b

1.02 g

1.03 e

1.04 a

1.05 c

1.06 f

1.07 Any order:
- a. sight
- b. hearing
- c. taste
- d. smell
- e. feel (touch)

1.08 a

1.09 d

1.010 b

1.011 c

1.012 a

1.013 a

1.014 d

1.015 Any order:
- a. lion
- b. horse
- c. (canary) elephant
- d. lizard
- e. (eagle) mouse
- f. giraffe
- g. rattlesnake

1.016 Any order:
- a. canary
- b. rattlesnake
- c. alligator
- d. elephant

1.017 a

1.018 b

1.019 b. Some football players are good students.

1.020 a. All mothers see their babies as beautiful.

1.021 Hint:
Through careful observation man can learn much about many things. Write of some of the useful things man learns through observing.

SELF TEST 2

2.01
- a. Stating the problem
- b. Forming the hypothesis
- c. Devising an experiment
- d. Interpreting data or observation
- e. Drawing conclusion

2.02 Examples:
- a. History of the area gathered from newspapers
- b. Colleagues or other knowledgeable people
- c. Professional publications

2.03 evening

2.04 calm

2.05 flat

2.06 No

2.07 white; From the North Pole, all directions are south; and polar bears live near the North Pole.

2.08 a. inquisitiveness

2.09 b. is about 150 words a minute

2.010 b. moisture and dust are important for rain

SELF TEST 3

3.01-3.04 Any order
3.01 astronomy
3.02 geology
3.03 chemistry
3.04 physics
3.05-3.08 Any order
3.05 botany
3.06 ecology
3.07 zoology

3.08 paleontology
3.09-3.014 Any order

3.09 geography

3.010 psychology

3.011 economics
3.012 philosophy

3.013 anthropology

3.014 sociology

3.015 i

3.016 a

3.017 c

3.018 b

3.019 f

3.020 j

3.021 k

3.022 n

3.023 g
3.024 l
3.025 m
3.026 h
3.027 d
3.028 e
3.029 Hint; ideas to be included:
a. Childhood – poor, slave, during Civil War, freed, frail, observed plants
b. Education – hardship, poor, eager, worked his way, Master's degree
c. Occupation – teacher, researcher, scientist of plants, greenhouse-keeper, laundryman
d. Experiments – peanut, sweet potato, a variety of products (list three), 300 or 400 products
e. Reliance on God – learned prayer early and prayed daily, learned from God the potential in plants, gave honor to God

3.030 ACROSS
5. environment
7. atom
8. culture
9. energy
10. weather

DOWN
1. valid
2. elements
3. molecule
4. atmosphere
5. earthquake
6. gravity

SELF TEST 4

4.01 e
4.02 c
4.03 b
4.04 g
4.05 d
4.06 a
4.07 i
4.08 f
4.09 j
4.010 l

4.011 k

4.012 theoretical

4.013 experimental

4.014 applied

4.015 chemists

4.016 Examples:
1. All scientists are engaged in making scientific observations.
2. They have a definite question in mind and are looking for specific information to answer that question.
3. They have a passionate devotion to investigation and discovery.

4.017 The things man invents should help him have a better life rather than hurting him (example: gunpowder used in war is harmful).

4.018 A. Stating the problem
B. Forming a hypothesis
C. Searching for information
D. Interpreting data
E. Drawing conclusions

4.019 A. Any order:
1. Astronomy
2. Chemistry
3. Geology
4. Physics

B. Any order:
1. Botany
2. Ecology
3. Zoology

C. Any order:
1. Anthropology
2. Economics
3. Geography
4. Psychology
5. Sociology

D. 1. Process of counting
2. Process of thinking

4.020 A. 1. a. Theoretical
b. Experimental
2. Engineer
3. Technician
4. Teacher

B. 1. a. Teaching
b. Government agencies
c. Industrial research
2. a. Medicine
b. Dentistry

Test Keys

Science 701
LIFEPAC Test

1. false
2. true
3. false
4. true
5. false
6. false
7. true
8. true
9. false
10. false
11. Any order:
    a. taste
    b. touch
    c. sight
    d. smell
    e. hearing
12. instruments
13. hypothesis
14. data
15. Either order
    a. peanuts
    b. sweet potatoes
16. Physical
17. Social
18. Biological
19. Mathematics
20. f
21. h
22. b
23. k
24. d
25. j
26. a
27. i
28. c
29. g
30. a. 2
    b. 3
    c. 1
    d. 3
    e. 2
    f. 3
    g. 3
    h. 1
    i. 1
    j. 2
    k. 2
    l. 1
31. deductive
32. inductive
33. a. Ecology is the study of relationship of plants and animals to their environment
    b. Science is systematically organized knowledge.

Examples:

34. fur, small
35. four legs
36. pets, ears, mammals

Examples:

37. offspring
38. trainability
39. sounds

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