



SCIENCE

TEACHER'S GUIDE

▶ **8th Grade**

SCIENCE 800

Teacher's Guide

Curriculum Overview **3**

LIFEPAC® Management **11**

Teacher Notes **25**

Alternate Tests **45**

Answer Keys **71**

Self Test Keys **117**

Test Keys **147**

Alternate Test Keys **157**

Author:

Alpha Omega Publications

Editor:

Alan Christopherson, M.S.



804 N. 2nd Ave. E.

Rock Rapids, IA 51246-1759

© MCMXCVI by Alpha Omega Publications, Inc. All rights reserved. LIFEPAAC is a registered trademark of Alpha Omega Publications, Inc.

All trademarks and/or service marks referenced in this material are the property of their respective owners. Alpha Omega Publications, Inc. makes no claim of ownership to any trademarks and/or service marks other than their own and their affiliates, and makes no claim of affiliation to any companies whose trademarks may be listed in this material, other than their own.

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 8th Grade Science Experiments video, SD0801. 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 801

pp 23 (1) S & V

Science 802

pp 7 (1) H & V

8 (1) S

11 (1) S

14 (2) E & V

16 (1) H & V

18 (2) H

20 (2) S

38 (1) S

39 (2) H

48 (1) H & V

Science 803

pp 7 (1) H & V

11 (1) H

12 (3) E & V

17 (1) S & V

20 (1) S & V

25 (1) H & V

38 (1) H & V

39 (1) H & V

46 (1) S & V

48 (1) S

54 (1) S

Science 804

pp 12 (1) H

22 (1) H

Science 805

None

Science 806

pp 7 (1) S

8 (1) S

11 (1) S & V

24 (1) S & V

44 (2) H

Science 807

pp 23 (1) S

41 (1) S

Science 808

pp 8 (1) H

9 (1) H

12 (1) H

16 (2) H

30 (1) H or S

32 (1) H

36 (2) H

43 (1) H

Science 809

pp 7 (1) S

10 (1) H

53 (3) E

Science 810

pp 12 (1) S

16 (2) H

21 (1) S

23 (3) H

24 (2) S

33 (2) S

37 (1) H

41 (1) S

51 (1) H

Materials Needed for LIFEPAC:

Required:

Encyclopedia
ruler at least 10 centimeters long
graduated cylinder marked in milliliters
balance scale (triple beam or other type)

Suggested:

8th Grade Science Experiments video

Additional Learning Activities

Section 1: Science Today

1. Direct the student(s) to make a chart of events of science and technology in chronological order.
2. Use the charts to develop a time line of events in science and technology. This time line could be used also in the social sciences. Additional reference materials may be used to complete this activity.
3. Take a friend and a recording device and talk to someone who is over sixty years old. Ask questions about how the person lived when he or she was a child. What kind of medicine did the doctors have? Be certain to prepare a list of questions in advance.
4. Read a book on the history of science, one area of science, or one scientist.

Section 2: Science and Technology

1. With a friend develop a method to test the tensile strength of materials such as rubber bands, string, fine wire, etc. Test several items.
2. With friends make designs using potatoes. Slice the potatoes to make a flat surface. Cut in a design. Ink the potatoes with a stamp pad. Compare what can be done by this method with what can be done with Gutenberg's movable type.
3. Make squares one centimeter on each side on index cards. Spread the cards with petroleum jelly. Place the cards around school and home. Leave them for three days. Count the number of particles stuck to each square. Take the average of the cards. Where was the pollution greatest? Why?
4. Read the newspaper or online news sources. Clip or printout articles which relate to conflicts between science, technology, and society.
5. Design and build a model bridge. Test it to see how strong it is. Use straws, balsa, or toothpicks.

Section 3: Science and Technology of Tomorrow

1. From old magazines have students cut pictures of futuristic living. Explain how to make a collage. Have the students make a collage.
2. In the public library or online look up architecture. See changes that have taken place in buildings. Check names like Frank Lloyd Wright and Paolo Soleri.
3. From the encyclopedia, almanac, or online get figures on the United States population for the ten-year intervals since 1790. Make a graph.

Administer the LIFEPAC Test.

Materials Needed for LIFEPAK

Required:

Encyclopedia or Chemical Reference Book
metric ruler
small block of wood
string
small rock
water
graduated cylinder
balance
4 jars
4 iron nails
vinegar
ammonia
lemon
water
labels
sugar
test tube
fire source (Bunsen burner)
test-tube holder
salt
sand
measuring cup
filter paper

Suggested:

rock or mineral
Celsius thermometer
3 beakers (250 ml)
hot plate
3 cups of sugar
spoon
cotton thread
paper clip or tack
pencil
2-250 ml beakers
marbles
BB's or gravel about $\frac{1}{8}$ inch diameter
8th Grade Science Experiments video

Additional Learning Activities

Section 1: Properties of Matter

1. Demonstrate various crystal shapes using a good magnifying glass or a microscope. Common crystals are salt, boric acid, epsom salts, and sugar.
2. Using sugar on a plate (or in a beaker) add a small amount of sulfuric acid (H_2SO_4). Observe the oxidation of sugar without fire.

DO NOT TOUCH THE RESULTING CARBON UNTIL IT IS COOL AND RINSED.

3. Weigh out 5 grams of salt. Record the weight and volume. Repeat with 10 grams of salt. Repeat with 15 grams of salt. Make a line graph. What pattern do you see?
4. Water boils at $100^{\circ}C$ at sea level. At what temperature does water boil where you are? Do not use a thermometer to stir.
5. Collect samples of ten different liquids and classify them according to their special properties.
6. Freeze 10 ml of water. What is its volume frozen? What happens when a bottle of soda is frozen?

Section 2: Atoms and Molecules

1. Draw an atom naming the parts. Include the orbitals.
2. Draw a water molecule. One is shown in your LIFEPAC. Be certain to measure the angle made by the two hydrogen atoms with the nucleus.

Section 3: Elements, Compounds, and Mixtures

1. Study the appearance of iron filings and powdered sulfur. Mix them together. Can you separate them? Try water and filter paper. Try a magnet. Which worked?
2. Heat the iron filings and sulfur. Can you separate them with a magnet now?
3. Make a poison poster illustrating common household chemicals that are poisonous and tell what to do if they are swallowed. Have other students check their homes and add to the list.
4. Check the Periodic Table to see if the mass of each atom is in the same order as the atomic number. If some are out of order, identify them.
5. Using information from the Periodic Table draw and label atoms of carbon, oxygen, sodium, chlorine, aluminum, and neon.

Administer the LIFEPAC 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 LIFEPAC Test.

Alternate Tests

Reproducible Tests
for use with the Science 800
Teacher's Guide

Name _____

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

1. _____ Aristotle was an ancient philosopher.
2. _____ Newton used mathematics to develop the Law of Universal Gravitation.
3. _____ The theory of Lamarck was disproved.
4. _____ The number $6.23 \cdot 10^4$ is the same as 62.34.
5. _____ Experiments are used to prove a hypothesis.
6. _____ Polio vaccine was developed by Salk.
7. _____ Copernicus invented the wheel.
8. _____ The first book printed on Gutenberg's press was the Bible.
9. _____ The production of cotton increased when the light bulb was invented.
10. _____ Our imperfect technology is a cause of pollution.

Solve these problems (each answer, 3 points).

11. Write $5.34 \cdot 10^2$ in numerals. _____
12. How many millimeters make one meter? _____
13. Add and write the answer with the proper number of significant figures.

$$\begin{array}{r} 8.3 \\ 4.56 \\ +6.83 \\ \hline \end{array}$$

Match these terms (each answer, 3 points).

- | | |
|------------------------------|---|
| 14. _____ technology | a. scientifically correct |
| 15. _____ biodegradable | b. more certain than a hypothesis |
| 16. _____ Bible | c. a goal of life science |
| 17. _____ radium | d. scientific notation |
| 18. _____ theory | e. Marie Curie |
| 19. _____ $3.124 \cdot 10^2$ | f. capable of being broken down by the action of bacteria |
| 20. _____ cancer cure | g. metric system |
| | h. applied science |

Science 801 Alternate Test

Complete these statements choosing from the terms listed below (each answer, 3 points).

shaduf

Copernicus

solar energy

God

coal

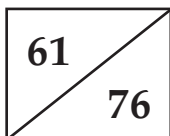
Einstein

- 21. One in control of everything is _____.
- 22. The Egyptians developed the _____ for irrigation.
- 23. A non-polluting, safe form of energy is _____.
- 24. _____ developed the equation, $E = mc^2$.
- 25. Galileo agreed with the theory of _____ that the earth was not the center of the universe.

Answer these questions (each answer, 3 points).

- 26. What are three problems of modern society?
 - a. _____
 - b. _____
 - c. _____
- 27. What was the result of Johann Gutenberg's invention?

- 28. What are three benefits of modern technology?
 - a. _____
 - b. _____
 - c. _____



Date _____
Score _____

Answer Keys

SECTION ONE

- | | |
|--|---|
| <p>1.1 Science is knowledge.</p> <p>1.2 Science is orderly knowledge.</p> <p>1.3 Science is orderly knowledge proved by experiments.</p> <p>1.4 experiment</p> <p>1.5 knowledge</p> <p>1.6 Either order:</p> <p style="padding-left: 20px;">a. true</p> <p style="padding-left: 20px;">b. false</p> <p>1.7 Orderly knowledge demonstrated by repeated experiments.</p> <p>1.8 I would feed fish to several cats and if they ate them, my hypothesis would be proved.</p>
<p>1.9 b.</p> <p>1.10 a.</p> <p>1.11 c.</p> <p>1.12 b.</p> <p>1.13 false</p> <p>1.14 true</p> <p>1.15 false</p> <p>1.16 They were not able to prove their ideas, so many of their ideas were false.</p>
<p>1.17 d</p> <p>1.18 f</p> <p>1.19 a</p> <p>1.20 c</p> <p>1.21 e</p> | <p>1.22 b</p> <p>1.23 Possible answers include: Christianity would have suffered; Western science may have progressed more quickly due to the Moors advanced ideas and contributions</p> <p>1.24 Renaissance</p> <p>1.25 Copernicus</p> <p>1.26 Galileo</p> <p>1.27 Universal Gravitation</p>
<p>1.28 Sir Isaac Newton</p> <p>1.29 true</p> <p>1.30 false</p>
<p>1.31 false</p> <p>1.32 true</p>
<p>1.33 false</p>
<p>1.34 true</p>
<p>1.35 true</p>
<p>1.36 teacher check</p>
<p>1.37 That pitchblende, an ore of radium, gives off radiation.</p>
<p>1.38 It means energy equals mass times the square of the speed of light. $E = mc^2$ is read, "energy equals mass times the square of the speed of light."</p> <p>1.39 God is perfect and never makes the mistakes men do.</p>
<p>1.40 a. electron</p> <p style="padding-left: 20px;">b. neutron</p> <p style="padding-left: 20px;">c. proton</p> <p>1.41 f</p> <p>1.42 d</p> <p>1.43 a</p> |
|--|---|

Science 801 Answer Key

1.44	b	1.70	$4.3 \cdot 10^2$
1.45	Choose a problem.	1.71	$6.282 \cdot 10^3$
1.46	Make a hypothesis.	1.72	$5 \cdot 10^4$
1.47	Research what others have done.	1.73	$2.85 \cdot 10^2$
1.48	Perform experiments.	1.74	$7.96 \cdot 10^3$
1.49	If true, restate the hypothesis as a theory.	1.75	5,000
		1.76	3,230
1.50	If not true, state a new hypothesis and begin again.	1.77	582
		1.78	12,000
1.51	Write and publish a paper.	1.79	64,000,000
1.52	Change the theory should it be proved wrong.	1.80	4
1.53	Restate the theory as a law.		
1.54	c. A certain substance will kill a rat.	1.81	2
1.55	b. Similar substances have killed rats.	1.82	5
1.56	e. Give the substance to many rats.	1.83	2
1.57	a. The rats died.	1.84	1
1.58	d. State the theory of Rat-Kill.	1.85	7
1.59	g. Publish a paper.	1.86	630
1.60	f. State the law of Rat-Kill.	1.87	5,200
1.61	The use of the scientific method will help to ensure reliability of the findings and conclusions.	1.88	73
		1.89	8,500
		1.90	146.0
1.62	ten	1.91	1,007
1.63	defined	1.92	14.3569
1.64	derived	1.93	8
1.65	20	1.94	12.3
1.66	gram	1.95	2
1.67	one thousand	1.96	1
1.68	one-hundredth	1.97	4
1.69	one-thousandth	1.98	4

1.99	9	1.120	2
1.100	29	1.121	1
1.101 - 1.104	teacher check	1.122	3
1.105	approximately 1 kilogram, or 1,000 grams	1.123	4
1.106	approximately 20 g	1.124	5
1.107	approximately 4,000 g	1.125	C
1.108	$8.2 \cdot 10^1$	1.126	I
1.109	$1.263 \cdot 10^3$	1.127	I
1.110	$1 \cdot 10^6$	1.128	C
1.111	$5.41 \cdot 10^2$	1.129	8.43
1.112	$2.000004 \cdot 10^6$	1.130	90,900
1.113	$1.063 \cdot 10^2$	1.131	566
1.114	$8.205 \cdot 10^2$	1.132	10,400
1.115	410	1.133	$4.8 \cdot 10^2$
1.116	50,000,000,000	1.134	$8.4 \cdot 10^6$
1.117	183,000	1.135	$5.5 \cdot 10^3$
1.118	1,546.3	1.136	4.3
1.119	96,254.8		

SECTION TWO

2.1	true	2.10	true
2.2	false	2.11	c
2.3	true	2.12	b
2.4	true	2.13	c
2.5	false	2.14	a
2.6	false	2.15	c
2.7	false	2.16	e
2.8	false	2.17	a
2.9	true	2.18	b

Self Test Keys

SELF TEST 1

1.01	knowledge	1.014	a
1.02	experimentation	1.015	c
1.03	Aristotle	1.016	c
1.04	gold	1.017	b
1.05	hypothesis or theory	1.018	a
1.06	Renaissance	1.019	a
1.07	earth	1.020	c
1.08	Sir Isaac Newton	1.021	milliliters
1.09	Charles Darwin	1.022	4.142×10^3
1.010	microorganisms or organisms	1.023	5,200
1.011	b	1.024	29.6
1.012	f	1.025	4
1.013	d		

SELF TEST 2

2.01	significant figures	2.014	false
2.02	technology	2.015	false
2.03	tensile strength	2.016	true
2.04	wheel	2.017	false
2.05	crossbow	2.018	true
2.06	Democritus	2.019	true
2.07	metric	2.020	false
2.08	dynamo (generator)	2.021	c. "animalcules"
2.09	Leeuwenhoek	2.022	a. irrigation
2.010	communication	2.023	a. 5
2.011	true	2.024	c. radiation
2.012	true	2.025	c. gunpowder
2.013	false		

SELF TEST 3

- | | | | |
|-------|---------------------------------|-------|--|
| 3.01 | cancer | 3.015 | Perform experiments. |
| 3.02 | pollution-control | 3.016 | If true, restate the hypothesis as a theory. |
| 3.03 | imperfect | 3.017 | If false, make a new hypothesis and begin again. |
| 3.04 | fuels | 3.018 | Write and publish a paper. |
| 3.05 | cloning | 3.019 | Change the theory if it should be proved wrong. |
| 3.06 | space | 3.020 | Restate the theory as a law. |
| 3.07 | shaduf | 3.021 | e |
| 3.08 | $8.24 \cdot 10^2$ | 3.022 | f |
| 3.09 | Greek | 3.023 | b |
| 3.010 | $E = mc^2$ | 3.024 | d |
| 3.011 | God's Word | 3.025 | c |
| 3.012 | Choose a problem | | |
| 3.013 | Make a hypothesis. | | |
| 3.014 | Research what others have done. | | |

Test Keys

1. false
2. true
3. true
4. false
5. true
6. false
7. true
8. false
9. false
10. true
11. 620,000
12. 1,000
13. 11.1
14. e
15. h
16. b
17. d
18. c
19. g
20. a
21. God's Word
22. Darwin
23. solar energy
24. inclined plane
25. Galileo
26. Any three; any order:
good medicine, life-support
machines, synthetic foods,
improved food supply, comforts,
conveniences
27. Many ancient writings were lost.
28. Example; any order:
 - a. pollution—produced by industry
 - b. food shortages from increased
population
 - c. possible harm from synthetic
foods

Alternate Test Keys

1. true
2. true
3. true
4. false
5. true
6. true
7. false
8. true
9. false
10. true
11. 534
12. 1,000
13. 19.7
14. h
15. f
16. a
17. e
18. b
19. d
20. c
21. God
22. shaduf
23. solar energy
24. Einstein
25. Copernicus

26. Examples; any order:
 - a. food shortage
 - b. fuel shortage
 - c. transportation

27. Example:

The Bible was read more widely
by people in their homes.
Later other books were printed.

28. Examples; any order:
 - a. space exploration
 - b. communication
 - c. medical advances



804 N. 2nd Ave. E.
Rock Rapids, IA 51246-1759

800-622-3070
www.aop.com

SCI0820 – Mar '17 Printing

ISBN 978-0-86717-268-3

