



SCIENCE

TEACHER'S GUIDE

► **6th Grade**

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SCIENCE 600

Teacher's Guide

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STRUCTURE OF THE LIFE PAC CURRICULUM

The LIFE PAC curriculum is conveniently structured to provide one teacher handbook containing teacher support material with answer keys and ten student worktexts for each subject at grade levels two through twelve. The work-text format of the LIFE PACs allows the student to read the textual information and complete workbook activities all in the same booklet. The easy to follow LIFE PAC numbering system lists the grade as the first number(s) and the last two digits as the number of the series. For example, the Language Arts LIFE PAC at the 6th grade level, 5th book in the series would be LAN0605.

Each LIFE PAC is divided into 3 to 5 sections and begins with an introduction or overview of the booklet as well as a series of specific learning objectives to give a purpose to the study of the LIFE PAC. The introduction and objectives are followed by a vocabulary section which may be found at the beginning of each section at the lower levels, at the beginning of the LIFE PAC in the middle grades, or in the glossary at the high school level. Vocabulary words are used to develop word recognition and should not be confused with the spelling words introduced later in the LIFE PAC. The student should learn all vocabulary words before working the LIFE PAC sections to improve comprehension, retention, and reading skills.

Each activity or written assignment has a number for easy identification, such as 1.1. The first number corresponds to the LIFE PAC section and the number to the right of the decimal is the number of the activity.

Teacher checkpoints, which are essential to maintain quality learning, are found at various

locations throughout the LIFE PAC. The teacher should check 1) neatness of work and penmanship, 2) quality of understanding (tested with a short oral quiz), 3) thoroughness of answers (complete sentences and paragraphs, correct spelling, etc.), 4) completion of activities (no blank spaces), and 5) accuracy of answers as compared to the answer key (all answers correct).

The self test questions are also number coded for easy reference. For example, 2.015 means that this is the 15th question in the self test of Section 2. The first number corresponds to the LIFE PAC section, the zero indicates that it is a self test question, and the number to the right of the zero is the question number.

The LIFE PAC test is packaged at the centerfold of each LIFE PAC. It should be removed and put aside before giving the booklet to the student for study.

Answer and test keys have the same numbering system as the LIFE PACs and appear throughout of this handbook. The student may be given access to the answer keys (not the test keys) under teacher supervision so that he can score his own work.

A thorough study of the Curriculum Overview by the teacher before instruction begins is essential to the success of the student. The teacher should become familiar with expected skill mastery and understand how these grade level skills fit into the overall skill development of the curriculum. The teacher should also preview the objectives that appear at the beginning of each LIFE PAC for additional preparation and planning.

TEST SCORING AND GRADING

Answer keys and test keys give examples of correct answers. They convey the idea, but the student may use many ways to express a correct answer. The teacher should check for the essence of the answer, not for the exact wording. Many questions are high level and require thinking and creativity on the part of the student. Each answer should be scored based on whether or not the main idea written by the student matches the model example. "Any Order" or "Either Order" in a key indicates that no particular order is necessary to be correct.

Most self tests and LIFEPAC tests at the lower elementary levels are scored at 1 point per answer; however, the upper levels may have a point system awarding 2 to 5 points for various answers or questions. Further, the total test points will vary; they may not always equal 100 points. They may be 78, 85, 100, 105, etc.

Example 1

<div>58</div> <div>72</div>	<div>SCORE _____</div> <div>TEACHER _____</div> <div>initials _____</div> <div>date _____</div>
-----------------------------	---

Example 2

<div>84</div> <div>105</div>	<div>SCORE _____</div> <div>TEACHER _____</div> <div>initials _____</div> <div>date _____</div>
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A score box similar to ex. 1 above is located at the end of each self test and on the front of the LIFEPAC test. The bottom score, 72, represents the total number of points possible on the test. The upper score, 58, represents the number of points your student will need to receive an 80% or passing grade. If you wish to establish the exact percentage that your student has achieved, find the total points of his correct answers and divide it by the bottom number (in this case 72.) For example, if your student has a point total of 65, divide 65 by 72 for a grade of 90%. Referring to ex. 2, on a test with a total of 105 possible points, the student would have to receive a minimum of 84 correct points for an 80% or passing grade. If your student has received 93 points, simply divide the 93 by 105 for a percentage grade of 89%. Students who receive a score below 80% should review the LIFEPAC and retest using the appropriate Alternate Test found in the Teacher's Guide.

The following is a guideline to assign letter grades for completed LIFEPAACs based on a maximum total score of 100 points.

Example:

LIFEPAAC Test	=	60% of the Total Score (or percent grade)
Self Test	=	25% of the Total Score (average percent of self tests)
Reports	=	10% or 10* points per LIFEPAAC
Oral Work	=	5% or 5* points per LIFEPAAC

*Determined by the teacher’s subjective evaluation of the student’s daily work.

Example:

LIFEPAAC Test Score	=	92%	$92 \times .60 = 55$	points
Self Test Average	=	90%	$90 \times .25 = 23$	points
Reports			=	8 points
Oral Work			=	4 points

TOTAL POINTS	=	90 points
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Grade Scale based on point system:

100 – 94	=	A
93 – 86	=	B
85 – 77	=	C
76 – 70	=	D
Below 70	=	F

TEACHER HINTS AND STUDYING TECHNIQUES

LIFEPAC Activities are written to check the level of understanding of the preceding text. The student may look back to the text as necessary to complete these activities; however, a student should never attempt to do the activities without reading (studying) the text first. Self tests and LIFEPAC tests are never open book tests.

Language arts activities (skill integration) often appear within other subject curriculum. The purpose is to give the student an opportunity to test his skill mastery outside of the context in which it was presented. Writing complete answers (paragraphs) to some questions is an integral part of the LIFEPAC Curriculum in all subjects. This builds communication and organization skills, increases understanding and retention of ideas, and helps enforce good penmanship. Complete sentences should be encouraged for this type of activity. Obviously, single words or phrases do not meet the intent of the activity, since multiple lines are given for the response.

Review is essential to student success. Time invested in review where review is suggested will be time saved in correcting errors later. Self tests, unlike the section activities, are closed book. This procedure helps to identify weaknesses before they become too great to overcome. Certain objectives from self tests are cumulative and test previous sections; therefore, good preparation for a self test must include all material studied up to that testing point.

The following procedure checklist has been found to be successful in developing good study habits in the LIFEPAC curriculum.

1. Read the introduction and Table of Contents.
2. Read the objectives.
3. Recite and study the entire vocabulary (glossary) list.
4. Study each section as follows:
 - a. Read the introduction and study the section objectives.
 - b. Read all the text for the entire section, but answer none of the activities.
 - c. Return to the beginning of the section and memorize each vocabulary word and definition.
 - d. Reread the section, complete the activities, check the answers with the answer key, correct all errors, and have the teacher check.
 - e. Read the self test but do not answer the questions.
 - f. Go to the beginning of the first section and reread the text and answers to the activities up to the self test you have not yet done.
 - g. Answer the questions to the self test without looking back.
 - h. Have the self test checked by the teacher.
 - i. Correct the self test and have the teacher check the corrections.
 - j. Repeat steps a-i for each section.
5. Use the SQ3R* method to prepare for the LIFEPAC test.
 - Scan** the whole LIFEPAC.
 - Question** yourself on the objectives.
 - Read** the whole LIFEPAC again.
 - Recite** through an oral examination.
 - Review** weak areas.
6. Take the LIFEPAC test as a closed book test.
7. LIFEPAC tests are administered and scored under direct teacher supervision. Students who receive scores below 80% should review the LIFEPAC using the SQ3R study method and take the Alternate Test located in the Teacher Handbook. The final test grade may be the grade on the Alternate Test or an average of the grades from the original LIFEPAC test and the Alternate Test.

GOAL SETTING AND SCHEDULES

Each school must develop its own schedule, because no single set of procedures will fit every situation. The following is an example of a daily schedule that includes the five LIFE-PAC subjects as well as time slotted for special activities.

Possible Daily Schedule

8:15	-	8:25	Pledges, prayer, songs, devotions, etc.
8:25	-	9:10	Bible
9:10	-	9:55	Language Arts
9:55	-	10:15	Recess (juice break)
10:15	-	11:00	Math
11:00	-	11:45	History & Geography
11:45	-	12:30	Lunch, recess, quiet time
12:30	-	1:15	Science
1:15	-		Drill, remedial work, enrichment*

***Enrichment:** Computer time, physical education, field trips, fun reading, games and puzzles, family business, hobbies, resource persons, guests, crafts, creative work, electives, music appreciation, projects.

Basically, two factors need to be considered when assigning work to a student in the LIFE-PAC curriculum.

The first is time. An average of 45 minutes should be devoted to each subject, each day. Remember, this is only an average. Because of extenuating circumstances a student may spend only 15 minutes on a subject one day and the next day spend 90 minutes on the same subject.

The second factor is the number of pages to be worked in each subject. A single LIFE-PAC is designed to take 3 to 4 weeks to complete. Allowing about 3-4 days for LIFE-PAC introduction, review, and tests, the student has approximately 15 days to complete the LIFE-PAC pages. Simply take the number of pages in the LIFE-PAC, divide it by 15 and you will have the number of pages that must be completed on a daily basis to keep the student on schedule. For example, a LIFE-PAC containing 45 pages will require 3 completed pages per day. Again, this is only an average. While working a 45 page LIFE-PAC, the student may complete only 1 page the first day if the text has a lot of activities or reports, but go on to complete 5 pages the next day.

Long range planning requires some organization. Because the traditional school year originates in the early fall of one year and continues to late spring of the following year, a calendar should be devised that covers this period of time. Approximate beginning and completion dates can be noted on the calendar as well as special occasions such as holidays, vacations and birthdays. Since each LIFE-PAC takes 3-4 weeks or eighteen days to complete, it should take about 180 school days to finish a set of ten LIFE-PACs. Starting at the beginning school date, mark off eighteen school days on the calendar and that will become the targeted completion date for the first LIFE-PAC. Continue marking the calendar until you have established dates for the remaining nine LIFE-PACs making adjustments for previously noted holidays and vacations. If all five subjects are being used, the ten established target dates should be the same for the LIFE-PACs in each subject.

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 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 601

- 601.A (2) S & V
- 601.B (1) H & V
- 601.C (1) S & V
- 601.D (1) H, S & V
- 601.E (1) H, S & V
- 601.F (1) S V
- 601.G (2) H

Science 602

- 602.A (1) H & V
- 602.B (1) H & V
- 602.C (1) H & V
- 602.D (2) S & V
- 602.E (2) S

Science 603

- 603.A (2) H
- 603.B (2) H
- 603.C (2) H

Science 604

- 604.A (1) S
- 604.B (1) H
- 604.C (1) S & V
- 604.D (3) H
- 604.E (2) H

Science 605

- 605.A (3) H & V
- 605.B (1) H & V
- 605.C (1) S & V
- 605.D (1) S & V

Science 606

- 606.A (1) H, S & V
- 606.B (1) E
- 606.C (1) H
- 606.D (1) H
- 606.E (2) H
- 606.F (1) H & V
- 606.G (1) H
- 606.H (1) S
- 606.I (1) H

Science 607

- 607.A (1) S
- 607.B (1) S or H
- 607.C (1) H
- 607.D (1) H

Science 608

- 608.A (2) H
- 608.B (1) H
- 608.C (2) H

Science 609

- Star Colors (1) H
- 609.A (1) S & V
- 609.B (1) S
- 609.C (2) S
- 609.D (2) H
- 609.E (3) H
- 609.F (2) E

Science 610

None

TEACHING SUPPLEMENTS

The sample weekly lesson plan and student grading sheet forms are included in this section as teacher support materials and may be duplicated at the convenience of the teacher.

The student grading sheet is provided for those who desire to follow the suggested guidelines for assignment of letter grades as previously discussed. The student's self test scores should be posted as percentage grades. When the LIFEPAAC is completed the teacher should average the self test grades, multiply the average by .25 and post the points in the box marked self test points. The LIFEPAAC percentage grade should be multiplied by .60 and posted. Next, the teacher should award and post points for written reports and oral work. A report may be any type of written work assigned to the student whether it is a LIFEPAAC or additional

learning activity. Oral work includes the student's ability to respond orally to questions which may or may not be related to LIFEPAAC activities or any type of oral report assigned by the teacher. The points may then be totaled and a final grade entered along with the date that the LIFEPAAC was completed.

The Student Record Book, which was specifically designed for use with the Alpha Omega curriculum, provides space to record weekly progress for one student over a nine week period as well as a place to post self test and LIFEPAAC scores. The Student Record Books are available through the current Alpha Omega catalog; however, unlike the enclosed forms, these books are not for duplication and should be purchased in sets of four to cover a full academic year.

WEEKLY LESSON PLANNER

Week of:

Monday	Subject	Subject	Subject	Subject
Tuesday	Subject	Subject	Subject	Subject
Wednesday	Subject	Subject	Subject	Subject
Thursday	Subject	Subject	Subject	Subject
Friday	Subject	Subject	Subject	Subject

WEEKLY LESSON PLANNER				
Week of:				
Monday	Subject	Subject	Subject	Subject
Tuesday	Subject	Subject	Subject	Subject
Wednesday	Subject	Subject	Subject	Subject
Thursday	Subject	Subject	Subject	Subject
Friday	Subject	Subject	Subject	Subject

Student Name _____

Year _____

Bible

LP	Self Test Scores by Sections					Self Test Points	LIFEPAC Test	Oral Points	Report Points	Final Grade	Date
	1	2	3	4	5						
01											
02											
03											
04											
05											
06											
07											
08											
09											
10											

History & Geography

LP	Self Test Scores by Sections					Self Test Points	LIFEPAC Test	Oral Points	Report Points	Final Grade	Date
	1	2	3	4	5						
01											
02											
03											
04											
05											
06											
07											
08											
09											
10											

Language Arts

LP	Self Test Scores by Sections					Self Test Points	LIFEPAC Test	Oral Points	Report Points	Final Grade	Date
	1	2	3	4	5						
01											
02											
03											
04											
05											
06											
07											
08											
09											
10											

Student Name _____

Year _____

Mathematics

LP	Self Test Scores by Sections					Self Test Points	LIFEPAAC Test	Oral Points	Report Points	Final Grade	Date
	1	2	3	4	5						
01											
02											
03											
04											
05											
06											
07											
08											
09											
10											

Science

LP	Self Test Scores by Sections					Self Test Points	LIFEPAAC Test	Oral Points	Report Points	Final Grade	Date
	1	2	3	4	5						
01											
02											
03											
04											
05											
06											
07											
08											
09											
10											

Spelling/Electives

LP	Self Test Scores by Sections					Self Test Points	LIFEPAAC Test	Oral Points	Report Points	Final Grade	Date
	1	2	3	4	5						
01											
02											
03											
04											
05											
06											
07											
08											
09											
10											

INSTRUCTIONS FOR SCIENCE

The LIFEPAAC curriculum for grades two through twelve was written with the daily instructional material written directly in the LIFEPAACs. The student is encouraged to read and follow his own instructional material, thus developing independent study habits. The teacher should introduce the LIFEPAAC to the student, set a required completion schedule, complete teacher checks, be available for questions regarding both subject 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 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 LIFEPAACs and provides additional learning activities for the students. The materials section refers only to LIFEPAAC 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 LIFEPAAC 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 LIFEPAACs. 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.

If you have limited facilities and are not able to perform all the experiments contained in the LIFEPAAC 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 LIFEPAACs. 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 6th Grade Science Experiments video, SD0601. 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 LIFEPAAC where the video is available.

SCIENCE 601

Unit 1: Plant Systems

TEACHING NOTES

MATERIALS NEEDED FOR LIFE PAC	
Required	Suggested
<ul style="list-style-type: none">• growing plant• 4 kernels of corn• 4 tall, thin bottles• soda crackers• iodine solution• 2 small baby-food jars• Benedict’s solution or glucose test strips• 4 radish or corn seeds• 1 plastic bag• paper towels• scissors• stapler• 2 thumbtacks• hand lens• water• food coloring (red or blue)• celery stick with leaves• tall baby food jar or glass• metric ruler• fresh leaf of lettuce• single-edged razor blade• microscope• microscope slide and slip cover	<ul style="list-style-type: none">• plant publications from county agent• Pyrex container (about 250 ml)• alcohol• hot plate• iodine solution• test tube• encyclopedia or online resources• 6th grade Science Experiments video

ADDITIONAL LEARNING ACTIVITIES

Section 1: Photosynthesis System

1. Have your students place several plants on the window sill. Turn several of them slightly each day. Let others remain in one position. Compare the plants at the end of two weeks.
2. Place several plants in different types of light, including the darkness of a closet. Compare plants at the end of two weeks.
3. Have the students examine different fall leaves under a microscope. How are they different from the green leaf section?
4. Have the students examine the root of a plant. Then, have them describe the nodules on the plant.
5. Look up several desert plants in an encyclopedia or online. Compare these plants to plants with leaves.
6. Plant some morning glory plants. Observe the time that the flower blooms. Why does this happen?

Section 2: Transport System

1. Dissect a plant.
2. Make cuttings of a fast-growing plant such as philodendron or coleus. Have each student grow his cutting in water and then plant it.
3. Go outside with a friend and select several plant stems that look different. Try to locate the pith and vascular bundles.
4. With a classmate or friend, make a large poster showing the parts of a plant. Label the parts.

Section 3: The Regulatory System

1. Place several plants in your classroom. Let your students take care of them.
2. With several classmates, soak some radish seeds for three hours. Then plant them in cut-off milk cartons. In some of them, add nothing but water. In the others, add house plant fertilizer. Compare the growth of the plants.
3. Repeat the above activity, but plant the seeds in different types of soil (sandy, clay, etc.), adding no fertilizer, only water.
4. Visit a local nursery and ask one of the workers to explain how and why bushes are pruned to make them full. Encourage your students to ask any other questions that might interest them about landscaping, plant care, etc.
5. Investigate how plants are grown organically. Why are organically grown plants better for your body? Write a report (minimum 2 pages) about what you learn.

ANSWER KEYS

SECTION 1

- 1.1 The water level in both tubes dropped. The one in the light dropped more than the one in the dark
 1.2 yes
 1.3 the one in the light
 1.4 light
 1.5 amount of light
 1.6 chloroplasts
 1.7 palisade
 1.8 top
 1.9 As follows:

SEEDS IN THE DARK		
Date	Wet Seed	Dry Seed
1	no change in size	no change
3	seed larger	no change
5	root and stem have begun to grow	no change
7	root and stem about 4 cm long	no change
9	root and stem about 8 cm long; root white, stem white	no change
11	root and stem about 10 cm long; root and stem white	no change

SEEDS IN THE SUN		
Date	Wet Seed	Dry Seed
1	no change in size	no change
3	seed larger	no change
5	root and stem have begun to grow	no change
7	root and stem about 4 cm long	no change
9	root and stem about 9 cm long; root white, stem green	no change
11	root and stem about 12 cm long; root and stem green	no change

- 1.10 wet
 1.11 sunlight
 1.12 Any order:
 a. water
 b. sunlight
 1.13 sunlight
 1.14 those in sunlight
 1.15 sunlight
 1.16 sunlight
 1.17 palisade
 1.18 top
 1.19 The top of the leaf will get more sunshine. The bottom of the leaf will be in the shade (dark).

- 1.20 **(Across)** 1. chloroplast
 6. life
 7. plants
 9. algae
 11. energy
(Down) 1. complex
 2. root
 3. animal
 4. tree
 5. made or gave
 8. say
 10. God

- 1.21 **Record of Results**
 blue
 yellow
 orange or green
 red
 1.22 b. decreased
 1.23 a. blue to red
 1.24 a. glucose increased
 1.25 b
 1.26 a
 1.27 d
 1.28 e
 1.29 c
 1.30 right (red)
 1.31 left (green)
 1.32 red
 1.33 red
 1.34 red
 1.35 Because the leaf soaks up the rest of the colors. The green color bounces back so we can see it.
 1.36 Because all that light bounces off and the leaf doesn't have any sunlight to use in photosynthesis.

- 1.37** Any order:
 a. temperature
 b. amount of sunshine
 c. amount of rain (moisture)
- 1.38** Natural fertilizers that come from living things are called organic fertilizers.
- 1.39** d
1.40 a
1.41 e
1.42 b
1.43 f
1.44 c

SELF TEST 1

- 1.01** h
1.02 g
1.03 a
1.04 l
1.05 c
1.06 k
1.07 m
1.08 e
1.09 f
1.010 i
1.011 red
1.012 glucose
1.013 oxygen
1.014 organic
1.015 Any order:
 a. light (color)
 b. water
 c. minerals
 d. carbon dioxide
- 1.016** Any order:
 a. palisade
 b. spongy
- 1.017** b
1.018 c
1.019 d
1.020 b
1.021 d
1.022 a
1.023 b
1.024 a
1.025 c
1.026 d
- 1.027** The leaf factory takes water and carbon dioxide with chlorophyll and light energy to make starch and oxygen.
- 1.028** Hint: This is a good place to receive oral answers and discussion.
- 1.029** Refer to diagram in LIFE PAC.
- 1.030** Example: I would give the plants the best fertilizer for their growth. I would put them in red light, keep them watered, and obtain a high carbon dioxide level.

SECTION 2

- 2.1 Hint: Look for detail and specifics.
 2.2 Hint: Detail is important.
 2.3 Stress accuracy and detail. Does it “really” look as it is drawn.
 2.4 Nearer the tip end.
 2.5 Yes. This is so the greatest amount of water and minerals will be able to be taken into the root. (Should get at concept of increased surface area.)
 2.6 Look for details.
 2.7 They spread out in the soil to take in water and minerals and to anchor the plant in the soil.
 2.8 xylem
 2.9 phloem
 2.10 cortex
 2.11
- | Time | Observation |
|---------|---|
| 15 min. | The food coloring has moved up the stalk about 3cm. The coloring is in streaks. The whole stalk is not colored. |
| 30 min. | The coloring has moved up about 15 cm. |
| 24 hrs. | The coloring has moved all the way up into the leaves. The color has concentrated at the leaf ends. |
- 2.12 Answers will vary. Probably will include the stringy nature of the celery.
 2.13 a. red or blue (whichever you use)
 b. They are the only parts that show the food coloring.
 2.14 red or blue (whichever you use) at tip
 2.15 The food coloring had moved all the way up the stem into the leaves.
 2.16 Teacher check

SELF TEST 2

- 2.01 true
 2.02 false
 2.03 false
 2.04 true
 2.05 true
 2.06 true
 2.07 true
 2.08 false
 2.09 false
 2.010 true
 2.011 b
 2.012 c
 2.013 a
 2.014 c
 2.015 d
 2.016 a
 2.017 a
 2.018 d
 2.019 a
 2.020 c
 2.021 a
 2.022 c
 2.023 d
 2.024 b
 2.025 e
 2.026 d
 2.027 b
 2.028 e
 2.029 a
 2.030 f
 2.031 c
 2.032 g
 2.033 stem
 2.034 starch or glucose
 2.035 starch
 2.036 cortex
 2.037 starch
 2.038 bark
 2.039 oxygen
 2.040 stem

SECTION 3

3.1 Record of observations of stem in water

Date	Observations
1	No change.
3	No change.
5	White bumps begin to show at the cut on the stem.
7	Roots appear to be growing on the stem.
9	Roots are about 2-5 mm long. Several are now visible.

3.2 It starts to grow roots.

3.3 yes

3.4 The stem produced chemicals to start the roots growing.

3.5 Use gibberellin.

3.6 Place the stem in water.

- 3.7**
- a. nongreen
 - b. abnormal
 - c. nonflowering
 - d. misuse
 - e. nontoxic
 - f. nonrigid
 - g. misinterpret
 - h. nonprotective
 - i. misplant

3.8 2, 4-D

3.9 cancer, liver decay, or disease

3.10 Examples: oats, soybeans, beets

3.11 Examples: Farmers and gardeners use chemical regulators to control harmful weeds in their crops.

3.12 Example: Some chemical regulators are harmful to man. Some chemical regulators pollute the soil and atmosphere.

SELF TEST 3

3.01 h

3.02 g

3.03 j

3.04 d

3.05 l

3.06 i

3.07 e

3.08 c

3.09 a

3.010 b

3.011 false

3.012 false

3.013 true

3.014 true

3.015 false

3.016 false

3.017 true

3.018 true

3.019 false

3.020 false

3.021 b

3.022 c

3.023 a

3.024 d

3.025 Any order:

- a. anchor plants
- b. transport water and minerals
- c. store food

3.026 broad

3.027 tissue decay

3.028 cortex

3.029 glucose

3.030 The grass will turn yellow because it can't get sunlight and the chloroplasts die.

3.031 Plant veins transport minerals and water from the roots to the leaf tips.

3.032 The stomata open and close, letting oxygen out and carbon dioxide into the leaf.

3.033 When the leaf dies, the chloroplast dies. This causes the green chlorophyll to be lost so the other colors can be seen.

LIFEPAC TEST

1. a
2. g
3. f
4. j
5. c
6. i
7. e
8. h
9. d
10. b
11. cuticle
12. epidermis
13. chloroplast
14. xylem
15. phloem
16. d. epidermis
17. b. root hair
18. a. vascular cylinder
19. e. root cap
20. c. cortex
21. a
22. b
23. a
24. d
25. c
26. d
27. d
28. a
29. a
30. c
31. Any order:
 - a. color of light
 - b. amount of water and/or minerals
 - c. amount of carbon dioxide
32. Answers may vary. Any order:
 - a. can cause cancer in man and animals
 - b. may kill plants you don't want killed

ALTERNATE LIFEPAC TEST

1. c
2. e
3. h
4. b
5. j
6. i
7. a
8. f
9. g
10. d
11. b
12. e
13. a
14. c
15. d
16. vascular cylinder
17. root hair
18. cortex
19. epidermis
20. root cap
21. b
22. a
23. c
24. c
25. c
26. a
27. c
28. b
29. c
30. d
31. Answers may vary. Examples; any order:
 - a. Auxin causes young cells to grow longer than normal.
 - b. Gibberellin helps corn and wheat grow three to five times as tall as normal.
 - c. Auxin can produce tomatoes with no seeds.
32. Answers may vary. Examples; either order:
 - a. Some artificial regulators are selective. They kill weeds but not crops.
 - b. Yields are greater so prices are lower.

SCIENCE 601

ALTERNATE LIFEPAK TEST

NAME _____

DATE _____

SCORE _____

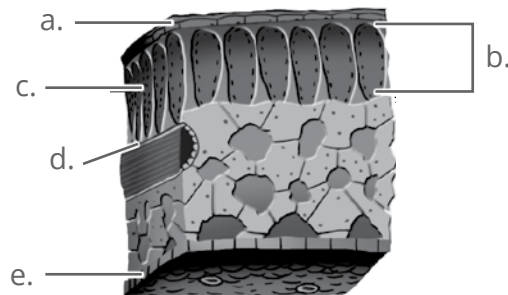


Match these items (each answer, 2 points).

- | | |
|----------------------|---|
| 1. _____ chlorophyll | a. sugar made during photosynthesis |
| 2. _____ light | b. a chemical produced in the growing tips of roots |
| 3. _____ oxygen | c. green "stuff" in plants |
| 4. _____ auxin | d. storage part of root |
| 5. _____ legume | e. energy for photosynthesis |
| 6. _____ enzyme | f. natural fertilizer |
| 7. _____ glucose | g. man-made |
| 8. _____ manure | h. by-product of photosynthesis |
| 9. _____ artificial | i. chemical used to help digestion |
| 10. _____ cortex | j. a plant which does not take nitrogen from the soil |

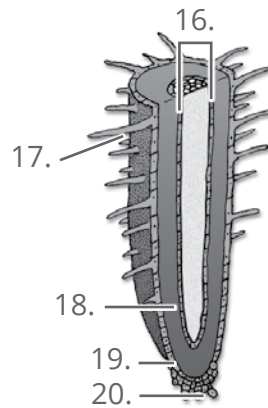
Write the correct letter to match with the part on the line (each answer, 3 points).

11. _____ palisade layer
12. _____ stomata
13. _____ cuticle
14. _____ chloroplast
15. _____ phloem



Complete this diagram with the name of each part (each answer, 4 points).

16. _____
17. _____
18. _____
19. _____
20. _____



Write the letter of the correct answer on each line (each answer, 3 points).

21. Iodine turns _____ bluish-black.
 a. sugar b. starch c. fats d. protein
22. The worst light for growing plants is _____.
 a. green b. blue c. orange d. red
23. Leaves appear green because the _____ light bounces off the leaf.
 a. white b. black c. green d. red
24. For plants to grow best, they must have _____.
 a. light and food
 b. oxygen and food
 c. light, food, water, and carbon dioxide
 d. air
25. Natural fertilizer is called _____ fertilizer.
 a. artificial b. liquid c. organic d. spongy
26. The use of _____ indicates the presence of glucose by turning red.
 a. Benedict's solution b. litmus c. iodine d. alcohol
27. Water and minerals are absorbed by _____.
 a. leaves b. stems c. root hairs d. cortex
28. Water and minerals are carried upward by _____.
 a. phloem b. xylem c. pith d. bark
29. The gas plants need to carry on photosynthesis is _____.
 a. oxygen b. nitrogen c. carbon dioxide d. methane
30. The chemical found in saliva is a(n) _____.
 a. legume b. bacteria c. starch d. enzyme

Complete these activities (each answer, 3 points).

31. List three ways plants regulate growth naturally.

- a. _____
- b. _____
- c. _____

32. Name two advantages of using artificial regulators.

- a. _____
- b. _____



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