GED Connection is the product of PBS LiteracyLink®, a service of PBS initiated by a five-year grant from the United States Department of Education Star Schools program. This generous grant has made it possible to reach more adult basic education learners than ever before through the power of public television and the Internet. We offer our thanks and appreciation to the Department of Education for its support of this project and the adult learners who benefit from it.

Many people worked very hard to create these GED Connection workbooks, videos, and online lessons. They brought skills, knowledge and, most of all, a deep spirit of dedication to their task: creating instructional tools to help adult learners find their way to lifelong learning and the benefits of full participation in our society.

We dedicate these GED Connection materials to the hundreds of thousands of GED learners, past, present, and to come, and to those who serve them.
Inside This Preview Guide

Social Studies/Science Teacher's Guide pages for Program 22: Passing the GED Science Test

For each of the thirty-nine GED Connection lessons you’ll find two pages in the LiteracyLink Teacher’s Guide. Each lesson plan is loaded with practical information to help you prepare students to get the most out of every lesson using a multi-media combination of videos, workbooks, and online activities.

Social Studies/Science Workbook pages 149-160 for Program 22: Passing the GED Science Test

The GED Connection workbooks are designed to provide a foundation from which to build new skills; that’s why we recommend you start each lesson with a look at the workbook and have students return to the book as they watch segments of the video and work through the online lessons.

Each workbook chapter corresponds to a video program and a set of Internet lessons and activities. Look for these workbook sections to guide students through the lesson:

The Before You Watch section orients students to the video program.
- Objectives form the focus for each lesson.
- Sneak Preview provides a short chapter pre-test, answers, and feedback.
- Vocabulary defines key content area terms.
- Program Summary explains what students are about to see in the video.

The After You Watch section provides direct instruction and skill practice.
- Key Points to Think About and GED Tips relate the lesson to the GED exam.
- Skill Practice exercises and instruction expand on concepts presented in the video program
- Links relate skills to family life, the community, and the workplace.
- Interdisciplinary Connection bridges the lesson to other GED subject areas.
- GED Practice is a chapter post-test with items and formats similar to those on the new GED Test.

Each workbook also contains a GED Pretest and a GED Practice Test to help students evaluate their GED readiness in that subject area; an Answer Key, complete with explanations; a Reference Handbook, with additional resources for GED preparation; a Glossary; and an Index.
Major Ideas in the Video Program

- **GED Content Areas** – 45% Life Sciences (biology); 20% Earth and Space Science; 35% Physical Science (chemistry and physics).
- **Types of Questions** – Multiple-choice questions are based on reading passages and graphics. (More than half of the items on the test are based on either charts and graphics or text and graphics together.)
- **Contexts** – Questions are based on science topics in real-world contexts. Students will not have to recall isolated facts.
- **Themes** – Many of the science items will be based on general themes in science education as described in the National Science Education Standards (NSES). These themes are:
  - Science as Inquiry
  - Science and Technology
  - Science in Personal and Social Perspectives
  - History and Nature of Science
  - Unifying Concepts and Processes
- **Thinking Skills** – Students will answer questions that require the skills of:
  - **Comprehension** – understanding the meaning or intent of what they read in text or see in a graphic
  - **Application** – using information in a concrete situation
  - **Analysis** – exploring relationships among ideas
  - **Evaluation** – judging the soundness or accuracy of scientific information or methods

People and Ideas to Watch For

- Joan Auchter, Director of the GED Testing Service, stresses that this test does not focus on recall of specialized knowledge; rather, the GED Science Test assesses critical thinking in real-world science contexts.
- GED students and instructors discuss the GED Science Test. The students state that even though they were “rusty” on their scientific knowledge, they were pleased at how well they did when they were initially assessed with sample GED items. They point out that some science knowledge seemed to “come back” to them.
- One GED instructor indicates that much of the information a student needs to answer a question is provided in a reading passage or graphic. However, he also stresses that the likelihood for success on the test is improved if students have a fundamental knowledge of basic scientific concepts (such as the ones covered in the LiteracyLink materials).
- Various scientists discuss how they do their work by using the **Scientific Method**:
  - Observe
  - Ask questions
  - Hypothesize
  - Test
  - Collect and analyze data
  - Draw conclusions

FYI – Students will have eighty-five minutes to answer fifty multiple-choice questions.
Set Up the Video Program

1. Before showing Program 22, explain that it provides an overview of the GED Science Test. Make it clear that students should pay careful attention to the information about the test and that the main points are elaborated in the accompanying workbook lesson.

2. Ask, What are some major scientific discoveries that have affected your life or the life of someone in your family? List responses on the board.

3. Tell students that the video will contain interviews from actual scientists. Say, As you watch the program, think about what motivates these men and women to devote themselves to science.

Show Program 22

Follow Up the Video Program

1. Ask students, How did you react to these scientists? Did anything about them surprise you? What kind of person becomes a scientist?

2. One of the main focuses of the program is The Scientific Method. Ask, What is the Scientific Method? Review the steps with the students. Explain that understanding how scientists think about problems and issues will help them to answer some of the questions on the GED Science Test.

3. Discuss the sample questions that were shown on the videotape. You can photocopy and discuss the science questions from the Passing the GED Science Test program that are in the GED Connection Copymasters. Discuss why the correct answers are correct and why the incorrect choices are wrong.

Use Workbook Instructions and Practices

1. Discuss the GED Science Test Overview on page 150.

2. Assign instruction and GED Practice questions on pages 151 - 155. Go over the sample questions, and discuss why the correct answers are correct. Discuss incorrect answer choices that have some appeal for students, and explain why they are wrong (doesn’t answer the question, contradicts the information in the source material, etc.).

3. Work with students on the graphic literacy instruction and items on pages 156 - 160. Review the instructional material and the sample questions. After students have tried the GED Practice questions, discuss each one.

Have Students Use the Internet

1. Have students go to the PBS LiteracyLink website at www.pbs.org/literacy. Students should log in to their Home Space and then follow the links to the GED Science online learning module, where they will be able to take an extended, interactive course related to applying science concepts. Students can also use Internet activities to practice taking GED-type questions that focus on science skills and content.

2. A teacher may view the GED online learning modules from the LitTeacher Home Space. Use your own username and password to log in to the PBS LiteracyLink website at www.pbs.org/literacy. Then follow the link to the GED Connections online curriculum.

Lead Group Activities

Activity 1: Passing the GED

Ask students to list ways that they will prepare for the GED Science Test. In addition to using curricular activities, stress other ways that they can increase their science knowledge and skills: watching science programs on PBS, the Discovery Channel, and Animal Planet; helping their children apply the scientific method to science projects, reading science articles in the newspaper; going to a science museum, aquarium, or planetarium, etc.

Activity 2: Graphic Connections

Bring in recent popular news and science magazines - Time, Newsweek, Discover, etc. Conduct a Science Pictures are Worth a Thousand Words activity. Students should choose a science graph, table, or diagram about a current issue in the news. Have students write a brief context for the graphic, mount the graphics and descriptions, and create a science display in the classroom. Explain that about half of the questions on the GED Science Test will be based on charts and graphics, so it is important that students practice for the test by interpreting science graphics that they see on TV and in the newspapers.
GED Connection
Video Programs/Workbook Chapters

1. GED Connection Orientation

- LANGUAGE ARTS: WRITING
  2. Passing the GED Writing Test
  3. Getting Ideas on Paper
  4. The Writing Process
  5. Organized Writing
  6. Writing Style and Word Choice
  7. Effective Sentences
  8. Grammar and Usage
  9. Spelling, Punctuation, and Capitalization
  10. The GED Essay

- LANGUAGE ARTS: READING
  11. Passing the GED Reading Test
  12. Nonfiction
  13. Fiction
  14. Poetry
  15. Drama

- SOCIAL STUDIES
  16. Passing the GED Social Studies Test
  17. Themes in U.S. History
  18. Themes in World History
  19. Economics
  20. Civics and Government
  21. Geography

- SCIENCE
  22. Passing the GED Science Test
  23. Life Science
  24. Earth and Space Science
  25. Chemistry
  26. Physics

- MATHEMATICS
  27. Passing the GED Math Test
  28. Number Sense
  29. Problem Solving
  30. Decimals
  31. Fractions
  32. Ratio, Proportion, and Percent
  33. Measurement
  34. Formulas
  35. Geometry
  36. Data Analysis
  37. Statistics and Probability
  38. Introduction to Algebra
  39. Special Topics in Algebra and Geometry

The preceding pages from the Teacher's Guide and the workbook pages which follow refer to one of thirty-nine GED Connection lessons.

The list to the right shows how this lesson fits in the comprehensive curriculum you'll find in GED Connection.
This program helps you get ready to watch the other four science programs by introducing you to science and the scientific method. You’ll also learn what’s expected of you on the GED Science Test, and you can try some sample test questions.

OBJECTIVES

1. Introduce the types of passages and graphics on the test.
2. Determine the number of items and how long you will have to take the test.
3. Investigate the types of questions on the test.
4. Explore the general science concepts on the test.

Passing the GED Science Test

We eat genetically engineered tomatoes, get vaccinated against polio, and go to the beach when the forecaster predicts hot, sunny weather. We get X-rayed when we break a bone. At work, we use computers and other technology to improve productivity. So science and technology play important roles in our daily lives.

The purpose of the GED Science Test is to assess your ability to apply what you know about science, to analyze scientific information you see or read, and to evaluate the scientific information that comes your way.

This lesson and the four that follow will help you prepare for the GED Science Test. You can also prepare on your own. Pay attention when science stories appear on TV or in the newspaper. Observe the world around you and analyze causes and effects in nature and with technology. If you do these things, you will soon become familiar with many of the topics that are on the GED Science Test.

For additional practice, visit LiteracyLink online at http://www.pbs.org/literacy.
GED Science Test Overview

The GED Science Test assesses your ability to understand, analyze, and apply science information. It does not require that you memorize science facts. However, familiarity with key science concepts will help you pass the test.

You will have eighty-five minutes to answer fifty multiple-choice questions. Each question has five possible answers, and you must select the best answer. The questions will test your understanding of reading passages, tables and charts, bar graphs, line graphs, circle graphs, and diagrams. This workbook will give you plenty of practice with these types of materials.

The questions on the GED Science Test come from four main content areas. These correspond to the videos you will see and the next four workbook lessons.

- **Life Science (45%)**—including cells, genetics, evolution, organisms, and ecosystems.
- **Earth and Space Science (20%)**—including the universe, the solar system, Earth itself, and interactions between people and the environment.
- **Physical Science (35%)**
  - **Chemistry**—including the structure and states of matter, chemical bonds and reactions, and specific types of substances such as solutions and hydrocarbons.
  - **Physics**—including the laws of motion, work, and heat; waves; nuclear physics; and electricity and magnetism.

Many of the questions on the GED Science Test cover core concepts in the content areas above. The other questions on the GED Science Test fall into major themes in science. The video you are about to see and this lesson will explain these themes further. The themes include:

- **Science as Inquiry**
- **Science and Technology**
- **Science in Personal and Social Perspectives**
- **History and Nature of Science**
- **Unifying Concepts and Processes**

Finally, GED Science Test items assess your ability to use thinking skills to answer questions about science reading passages and graphics. These skills, covered in depth in Lesson 16: Passing the GED Social Studies Test, are:

- **Comprehension**—requires an understanding of the meaning or intent of science material.
- **Application**—requires the use of information in a concrete situation.
- **Analysis**—requires an exploration of the relationship between ideas, such as a cause-and-effect relationship.
- **Evaluation**—requires a judgment about the soundness or accuracy of scientific information or methods.

→ **NOW WATCH PROGRAM 22:**

Pay particular attention to the host’s explanations of why answer choices are correct or incorrect. You’ll pick up some tips to use as you practice additional questions in the workbook and online.

**After you watch the program, work on:**
- pages 151 – 160 in this workbook
- Internet activities at http://www.pbs.org/literacy
KEY SKILLS

The GED Science Test will assess your knowledge and understanding of science topics through the following types of skill questions:

- Comprehension
- Application
- Analysis
- Evaluation

You can review these skills on pages 13-19 of this book.

Key Science Concepts and Skills

The video program presented an overview of the GED Science Test. The rest of this workbook lesson will give you the opportunity to learn some of the basic skills and concepts you will need to pass the GED Science Test.

Science as Inquiry

Science is not simply a group of facts. Science is actually a process of asking and answering questions. Scientists use inquiry to build on accepted concepts and to test new ideas. They collect data and analyze evidence. Then they try to explain the evidence. Slowly, a body of scientific knowledge grows.

On the GED Science Test, you will be expected to evaluate scientific data, studies, explanations, and conclusions. You will need to use logic and common sense. Try it on the following passage.

Dr. James S. Reilly and his colleagues reviewed 5,588 cases in which children were admitted to the hospital for choking. Of these cases, 78 percent involved children under four. Researchers reported that the foods most likely to choke children were nuts (544), chunks of meat (125), chicken parts (121), seeds (116), carrots (83), hotdogs and sausages (70), fish bones (52), apples (47), and hard candy (34). Dr. Reilly said that most young children don’t have all their teeth and thus have trouble with certain foods.

GED PRACTICE

This question requires you to identify an implication of the study.

Based on the results of the study, what advice would you give caregivers of young children?

(1) Never leave a young child alone.
(2) Supervise young children when they eat.
(3) Cut food into small pieces for young children.
(4) Do not give young children meat.
(5) Feed pureed baby food to children under five.

Answers and explanations start on page 263.
Science and Technology

Understanding the relationship between science and technology is important. The knowledge gained through scientific inquiry is often put to use by technology. For example, physicists’ research in magnetism (science) led to the development of the television (technology). However, technology also influences science. A dramatic example is the invention of the microscope (technology). By allowing us to see tiny organisms, the microscope opened up new fields of study (science).

On the GED Science Test, many passages involve technology. Here is an example.

One source of geothermal energy is underground hot water. Cold groundwater seeps downward until it reaches hot rocks. The water heats up and some of it turns to steam and expands. The pressure of the steam forces the rest out in a jet of boiling water, called a geyser. When a geyser is capped, the steam can be forced through a turbine to generate electricity.

Most electrical power plants produce steam by burning coal or oil or using nuclear reactions. In a geothermal power plant, steam is produced by

a. the natural heat of the underground rocks.

b. cold groundwater seeping downward.

In a geothermal plant, steam is produced by a. the natural heat of the underground rocks. This is stated in the passage and shown in the diagram.

GED PRACTICE

This question requires you to identify a summary of an important scientific principle.

When rocket fuel burns, a jet of gas is propelled out the back of the rocket, causing the rocket to move forward. Which of the following scientific principles describes how a rocket works?

(1) For every action there is an equal and opposite reaction.
(2) An object moving in a straight line continues to do so unless acted upon by a force.
(3) Gravity is a force that pulls objects toward one another.
(4) Gaseous elements combine in proportions by volume, expressed as simple whole numbers.
(5) The pressure of a gas stays the same if the temperature and the volume both double.

Answers and explanations start on page 263.
Science in Personal and Social Perspectives

Science and technology affect individuals, nations, and the whole human race. In turn, social and political forces influence the directions science and technology take. For example, unless nations agreed to cooperate, the International Space Station would probably not have been started even though the technology to build it exists. Science, people, and societies interact in areas of personal health and nutrition, population growth, the use of natural resources, environmental quality, and natural and man-made disasters. Many passages on the GED Science Test address these issues. Here is an example.

There are more elderly Americans today than ever before, and in general they are healthier. The number of people over 65 with high blood pressure, arthritis, and emphysema has declined. The death rates from stroke and heart disease have also declined. One reason that older people are healthier today is that they are better educated, and educated people tend to make changes in diet and life style to improve their health. They also tend to seek medical treatment when needed. In addition, the elderly of today have benefited from 20th-century improvements in public health, nutrition, and medical care.

What are two reasons that older Americans are healthier today than in the past?

To find the answer, review the paragraph. Reasons for improved health are listed from the fourth sentence to the end. The reasons are (1) more education, which leads people to improve their diet and life style and to seek medical treatment; and (2) improved public health, nutrition, and medical care.

GED Practice

This question requires you to draw a conclusion about the aging process.

The elderly of today are the parents of the baby boom generation born after World War II. Given the large size of the baby boom generation and continued progress in nutrition and health, over the next 50 years the number of elderly in the United States will probably

(1) decrease.
(2) remain about the same.
(3) continue to increase.
(4) decrease, then increase.
(5) increase, then decrease.

Answers and explanations start on page 263.
History and Nature of Science

Science is a human enterprise. It may involve individuals working alone, like Charles Darwin making observations and formulating the theory of evolution. Or, it may involve hundreds of people, like NASA planning and carrying out a planetary mission.

As we have seen, scientific knowledge changes and grows through the process of observation and experimentation. Over the years, scientists have contributed discoveries, observations, and theories that have advanced our understanding of the world and the universe. While doing so, they have confronted ethical, social, and political issues that influenced their work.

Some questions on the GED Science Test involve the history and nature of science. Here is an example.

In 1975, Polly Murray, a woman in the tiny wooded town of Lyme, Connecticut, became concerned about the number of children with symptoms of rheumatoid arthritis—swollen, stiff joints. She was put in touch with Dr. Allen C. Speere, a specialist in rheumatology.

Speere took Murray’s list of thirty-nine children and tried to discover what they had in common. Some residents blamed a nearby nuclear power plant; some blamed the drinking water; others thought the disease was communicable. But Speere observed that the children’s symptoms began in the summer or fall. He hypothesized that the children had an insect-related disease.

Two years later, Speere found the insect by chance. An ecologist brought him a tick that had bitten him. This tick, carried on the backs of deer and mice, was new to the area. When they compared the map showing the areas infested by this tick with the map showing where victims of the disease lived, they found a match. The cause of Lyme disease had been identified.

Why did Speere think that the children’s disease was insect-related?

The answer to this question is in the second paragraph. Because symptoms started in the summer or fall, when children played outdoors, Speere thought the cause might be an insect.

GED Practice

This question asks about how a scientist used data to solve a problem.

What was the primary means of data collection that led to the identification of the tick that carries Lyme disease?

(1) measurement
(2) reading
(3) experimentation
(4) modeling
(5) observation

Answers and explanations start on page 263.
Unifying Concepts and Processes

Scientific facts are very specific. For example, it is a fact that Earth is the third planet from the sun. Yet this specific fact can be thought of in a more general context: that of the solar system. Science has many systems that function in an orderly way, from the solar system to the digestive system.

Besides the concept of orderly systems, there are other unifying concepts in science. Unifying concepts are general ideas that cross science content areas. For example, the objective nature of scientific evidence, constancy and change, and evolution and equilibrium are some general scientific concepts that can be used to understand particular facts. On the GED Science Test, you will often be asked specific questions that involve these general ideas.

The following passage and diagram involve the unifying concept of systems.

All living things contain the element carbon. Through the carbon cycle, carbon is transferred between the atmosphere and Earth’s surface. Plants take carbon dioxide from the air during photosynthesis. They return some carbon dioxide to the air through respiration. Animals eat the plants. During respiration, they return carbon dioxide to the air. Both plants and animals eventually die. Decomposers, including fungi and bacteria, feed on plant and animal remains. In the process, they absorb the carbon and give out carbon dioxide.

What is the role of decomposers in the carbon cycle?

To find the answer to this question, read the last sentence of the passage or look at the label about decomposers in the diagram. Decomposers absorb carbon from decaying plants and animals and give off carbon dioxide.

GED PRACTICE

This question requires an application of a scientific principle to the problem of global warming.

Carbon dioxide is one of the “greenhouse gases” that contributes to the warming of Earth’s atmosphere. The more carbon dioxide in the atmosphere, the more heat is trapped, causing global warming. Based on the information above, which of the following would be a practical way to help decrease the amount of carbon dioxide in the atmosphere?

1. increase the number of green plants
2. decrease the number of green plants
3. increase the number of animals
4. increase the number of decomposers
5. eliminate the decomposers

Answers and explanations start on page 263.
Reading Charts and Tables

Scientists often need to present data, or information. When the information is related to one topic—for example, the characteristics of the moons of Jupiter—it can be shown in a chart or table. Let us say that a chemist wants to present information about common esters. Esters are organic chemicals that have a sweet smell and are used in foods and scented products. The chemist summarizes the basic information in a table such as this.

<table>
<thead>
<tr>
<th>Name</th>
<th>Chemical Formula</th>
<th>Characteristic Odor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ethyl butyrate</td>
<td>C₃H₇COOC₂H₅</td>
<td>Pineapple</td>
</tr>
<tr>
<td>Amyl acetate</td>
<td>CH₃COOC₅H₁₁</td>
<td>Banana, pear</td>
</tr>
<tr>
<td>Methyl salicylate</td>
<td>C₆H₄(OH)COOCH₃</td>
<td>Wintergreen</td>
</tr>
<tr>
<td>Amyl valerate</td>
<td>C₄H₉COOC₅H₁₁</td>
<td>Apple</td>
</tr>
<tr>
<td>Methyl anthranilate</td>
<td>C₃H₄(NH₂)COOCH₃</td>
<td>Grape</td>
</tr>
</tbody>
</table>

When you read a chart or table, look for these parts.

- **Title.** The title tells you the topic—what the information is about. The topic of this table is common esters.
- **Columns.** Each vertical section of a table is a column. The column head tells what information is found in that column. For example, the third column tells what odor each ester has.
- **Rows.** Each horizontal section of a table is a row. The first item in a row indicates what the information in that row is about. For example, the last row of this table has information about methyl anthranilate.

To find information in a table, you must use the column heads and the first column as guideposts. For example, to find the characteristic odor of amyl valerate, look for the column head “Characteristic Odor.” Then go down that column until you get to the row for amyl valerate. The characteristic odor of amyl valerate is apple.

Using the table, find the answer to this question: What is the name of the ester whose chemical formula is CH₃COOC₅H₁₁?

First locate this chemical formula in the table. It is the second formula listed. Now, look at the name of the chemical in that row. It is amyl acetate.

**GED PRACTICE**

This question requires drawing a conclusion from the chart.

Which of the following esters would a chemist formulating a new purple chewing gum be most likely to use?

(1) ethyl butyrate  (4) amyl acetate
(2) methyl salicylate  (5) methyl anthranilate
(3) amyl valerate
Reading Bar Graphs

Scientists often use graphs to present numerical data. Graphs make numerical data easier to understand because they present information visually. For example, suppose you wanted to compare how much energy several nations produced and consumed. You could show this information using a bar graph. Bar graphs are used to compare quantities.

When you read a bar graph, you should note the following items.

- **Graph Title.** The title tells you the topic. The topic of this graph is energy production and consumption in several nations.
- **Axis Titles.** Each axis, or side, of a bar graph has a title. These titles tell what is shown on that axis. For example, the vertical axis shows the amount of energy in quadrillion Btus, a measure of energy.
- **Legend.** The legend explains any symbols or colors used: Purple bars show energy production, and red bars show energy consumption.
- **Bars.** The bars show numerical data. For example, Russia’s purple bar shows that Russia produced 40 quadrillion Btus of energy in 1996.

Note that this graph is a double bar graph. It compares two amounts—production and consumption—for each nation. Double bar graphs are used to compare and contrast data.

Now, look at the bar graph. Which nation consumes more energy than it produces?

If you answered the **United States**, you are correct. Of the nations shown, only the United States has a “taller” bar for consumption than production.

GED PRACTICE

This question asks for an evaluation of each statement to see if it is supported by the data on the graph.

Which of the following statements is supported by the graph?

1. Russia consumes about 10 quadrillion Btus more energy than China.
2. Most of Canada’s energy is produced in the form of natural gas.
3. Canada and China produce about the same amount of energy.
4. The United States produces more energy than any other nation shown.
5. The United Kingdom consumed about 20 quadrillion Btus in 1996.

Answers and explanations start on page 263.
Reading Line Graphs

As you’ve seen, a bar graph is useful for comparing quantities. Another type of graph, a line graph, shows how quantities change. Line graphs are useful for showing trends.

For example, a scientist who studies a particular disease may want to show the number of people who die from that disease over a period of time. She could make a chart listing each year and the number of deaths. The data would be there but it would be hard to see a trend. In contrast, if she plotted the years and numbers of deaths in a line graph, the trend would be visible right away.

When you examine a line graph, look for the following items.

- **Graph title.** The title tells you the topic. The topic of this graph is deaths from congestive heart failure from 1979 to 1996.
- **Axis titles.** The axis titles tell what data is shown on that axis. For example, the horizontal axis shows the years, and the vertical axis shows the number of deaths.
- **Data points and trends.** A point on the line gives a single value; for example, the numbers of deaths in 1988. The line itself indicates the trend—rising, falling, or remaining the same.

Now, answer this question: In what year did about 20,000 people die of congestive heart failure?

To find this answer, you must first locate 20,000 on the vertical axis, then draw an imaginary or real horizontal line from that point on the axis to the trend line. Once you have a point on the trend line, draw a real or imaginary line down to the horizontal axis to locate the year: 1980.

GED PRACTICE

This question requires an analysis of the data on the graph.

During which of the periods below did the number of deaths from congestive heart failure decrease?

(1) 1979 to 1988
(2) 1988 to 1989
(3) 1989 to 1992
(4) 1992 to 1993
(5) 1993 to 1996

Answers and explanations start on page 263.
**Reading Circle Graphs**

A circle graph is a good way to show the parts of a whole. The whole is the circle, and the parts are the wedges.

For example, suppose a chemist wanted to show the most common elements in Earth’s crust. He could draw a circle graph that looks like this.

When you read a circle graph, look for these items:

- **Title.** The title of the graph tells you the topic. In this case, the topic is the most common elements in Earth’s crust.
- **Labels.** The labels identify each wedge, or part, of the whole and tell the amount. In this case, you can see that oxygen is the most common element, accounting for almost half of the crust by mass.

Look at the circle graph. Which element makes up about one quarter of Earth’s crust?

To answer this question, you can look for the wedge that is about one-quarter of the circle. Or, you can read the labels for each element and look for a label close to 25%. The answer is silicon.

**GED Practice**

This question requires comparing the parts of the circle to draw a conclusion.

Most of the nutrients in this cookie are in the form of

1. saturated fat.
2. monounsaturated fat.
3. carbohydrates.
4. sugar.
5. protein.

To determine the most common nutrient, you can look for the wedge that is the largest.

- **Carbohydrates** (35%) is the largest piece of the circle graph.
- **Saturated Fat** (12%) is the second largest piece.
- **Other Fats** (8%) is the third largest piece.
- **Protein** (5%) and **Fiber** (5%) are smaller pieces.
- **Sugar** (30%) is the fourth largest piece.
- **Other Carbohydrates** (35%) is the smallest piece.

Therefore, the most common nutrient in the cookie is carbohydrates.
Interpreting Science Diagrams

In science, diagrams usually show the parts of something, like an electric circuit, or the steps in a process, like the life cycle of a frog. In addition to providing the “big picture,” diagrams provide many details as well. This diagram shows how muscles work in pairs to move the forearm.

When you read a science diagram, look at these parts first to get an idea of what is being shown. Then study the details.

- **Title or caption.** Most GED science diagrams have a title that tells the topic and possibly the main idea; a few have captions. The main idea of this diagram is that muscles work in pairs to move a bone.
- **Labels.** Labels are words that describe a part of the diagram. They point to the part being described. In this diagram, the labels point to the two upper arm muscles and explain what they do.

Now, study the diagram and answer this question: Which muscle contracts to bend the arm at the elbow?

First look at the part of the diagram that shows the arm bent. Then read the label to find which muscle is contracting. The label says that the **biceps** is contracting.

**GED PRACTICE**

This question involves an analysis of a cause/effect relationship.

The muscles work in pairs to bend the arm because as the biceps contracts, the

1. triceps contracts.
2. triceps relax.
3. shortened biceps alone pulls the forearm.
4. triceps pulls the shoulder.
5. triceps pulls the forearm.

Answers and explanations start on page 263.
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