UNIT 1

BIOLOGY

BRAINS AND GENDER

Unit Description

Content: This course is designed to familiarize the student with concepts in neuroscience.

Skills: Main Ideas and Supporting Details

- Skimming: Finding the main ideas quickly
- Scanning: Finding specific information quickly
- Identifying supporting details
- Preparing to listen
- Getting the gist: Understanding a speaker’s main ideas
- Listening for supporting details
- Understanding essay introductions and their relationships to the body of the essay
- Planning for writing: Thesis, major points, and supporting details

Unit Requirements

- “Brain scan images” (captions)
- Lecture: “Different Genders, Different Medicines?”
- Integrated Writing Task: Writing an essay about the implications of the differences between male and female brains for the development of medicine
- Assignments: www.MyAcademicConnectionsLab.com
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4 BUILDING ACADEMIC WRITING SKILLS
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   Focused Writing
   Integrated Writing Task

GRAMMAR CHART: Comparisons with Adjectives, Adverbs, and Nouns

UNIT 1 ANSWER KEY
1 PREVIEW

Go to www.MyAcademicConnectionsLab.com for Vocabulary Check.

Previewing the Academic Content, page 2

Biology focuses on the study of living organisms in the environment and is one of the broadest areas of life science. Graduates with a degree in biology have many options and typically begin careers in the fields of health care, environmental management and conservation, research, and education. There are also many relatively new career paths that a biologist might choose, including biotechnology, forensic science, neuroscience, politics and policy, business and industry, economics, mathematics, science writing and communication, and even art. Neuroscience is the scientific study of the nervous system, which includes the brain. In this unit, students will explore:

• new research suggesting that structural differences in the human brain are related to gender
• the implications for medical care of gender differences in the structure of the human brain

Activating Background Knowledge

Before students read and study about structural differences in the human brain, explore some of their beliefs and attitudes about gender differences in general.

• In their home cultures, are there certain roles or professions that are pursued primarily by men? What are they?
• Are there certain roles or professions that are pursued primarily by women? What are they?
• What are some of the qualities or characteristics that distinguish each gender? How are these qualities or characteristics related to the roles and professions men and women pursue in the students’ home cultures?

Examine the Key Words on page 2. This vocabulary will be helpful for comprehension of the text and lecture and useful for the Integrated Writing Task.

The first question in Exercise 1, page 2, is designed to be easy and can be done by looking at the introductory text, which also provides hints to the other answers. The rest of the questions require some speculation, for example: Is it realistic that the brain has only 1,000 neurons? Are 10,000 connections to one cell realistic? (There actually are, but few would guess that.) Questions are designed so that educated guesses, rather than general knowledge on the topic (which some students won’t have), will help them answer the questions. This is a good place
to emphasize that speculating about a topic when first introduced to it is a good academic and language skill; it helps listening and reading comprehension about the topic. This is reinforced in the later skills sections.

Go to www.MyAcademicConnectionsLab.com for Key Words and Key Words: Practice.

Previewing the Academic Skills Focus, page 3

Highlight the purpose of this section, stated on the left. This unit focuses on strategies for:

- identifying main ideas and supporting details in texts and lectures
- skimming and scanning
- the structure of an academic essay

The main idea of the short paragraph in this section is that although there are many things we know about the brain, there are still many mysteries about it.

Review the academic skills focus: Main Ideas and Supporting Details.

Examine the information about main ideas and supporting details in the skills section. Elicit from students the basic structure of an academic essay: the introduction, body, and conclusion.

Go to www.MyAcademicConnectionsLab.com for Comprehension.

Go to www.MyAcademicConnectionsLab.com for Discussion Board.

2 BUILDING ACADEMIC READING SKILLS

Go to www.MyAcademicConnectionsLab.com for Vocabulary Check.

Highlight the purpose of this section, stated on the left. Tell students that in this section, they will read an article about gender differences in the human brain. They will also practice skimming a text for main ideas and scanning it for supporting details.
Before You Read, page 4

- Examine the Key Word on page 4 before students begin Exercise 1. This vocabulary will be useful for the exercise and the brief reading in this section.
- After partners have completed Exercise 1, discuss the answers as a class. The cartoons may be the basis for a lively discussion about gender differences.

The brief reading in Exercise 2, page 5 discusses two books about gender differences. In *Men Are from Mars, Women Are from Venus*, author John Gray suggests that relationships between men and women can be improved if they realize that there are differences in the way each gender thinks, communicates, and behaves. For example, he says that while men try to solve problems quietly on their own, women tend to discuss problems with others. His work was criticized, however, for encouraging stereotypes.

In *The Myth of Mars and Venus: Do Men and Women Really Speak Different Languages?*, Professor Deborah Cameron points out that years of research shows there are many more similarities than differences in the way the genders think and communicate and that any differences are insignificant. She stresses that the differences between *individuals* are usually greater than those between men and women. She says it is dangerous to predict an individual’s behavior based on a stereotype because most people are not typical and their behavior may be different from the stereotype.

Global Reading, page 6

Students skim an article about gender differences in the brain and make notes about the main ideas.

Review the academic skills focus: Skimming: Finding the Main Ideas Quickly.

Examine the information in the skills section. Point out to students that particularly in an academic setting, skimming for main ideas does not replace a detailed reading of a text, but rather precedes it.

In *Academic Connections 2*, students skimmed a text that had all the typographical elements mentioned here: bold type, italic type, and subheadings. There are none of these extra clues to the main idea in the article they are about to read. This is closer to the way authentic texts are printed, i.e., without the typographical clues that textbooks often provide. It is important that students get used to skimming texts that are progressively more authentic.
Examine the Key Words on page 6. This vocabulary will be helpful for comprehension of the article and useful in the Integrated Writing Task. Point out the different forms of related words: assumption and assume; instinct and instinctive; proportionately and proportionate.

Once students have completed Exercise 3, page 9, you might want to point out that the process they have just completed is a good exam technique: first, skim a text. Then try to get a mental map of where the different main ideas/topics are so that you know where to look first for answers to the questions. You may also want to point out that it is often helpful to look over the questions before skimming a text.

Summary of the Reading

“One Human Brain, or Two?,” by H. Hoag, pages 6–8

A. Change in thinking about male and female brains
1. Until recently, researchers believed that differences in the way men and women think were due to social pressures and hormones and that the structure of men’s and women’s brains was mostly the same.
2. Now research is revealing structural differences in the brains of men and women and other differences in how their brains function, suggesting that there are actually two kinds of human brains.
3. This discovery is problematic for neuroscientists because most research has been done with male brains.
   a. Researchers avoided studying female brains because the presence of female hormones made interpreting results difficult.
   b. Thus a massive body of research may be wrong.

B. Structural differences between male and female brains
1. The hypothalamus, which regulates basic instincts, such as food intake, differs slightly from male to female.
2. The size of brain structures differs in men and women (research of Goldstein at Harvard Medical School, 2001).
   a. Structures larger in women: frontal lobe (decision-making and problem-solving area of the brain); limbic cortex (control center for emotions); hippocampus (related to short-term memory and spatial navigation)
   b. Structures larger in men: parietal cortex (related to sense perception and spatial perception); amygdala (locus of control for emotions and social behavior)
C. Differences in the way men and women use brain structures (research of Cahill at UC Irvine)
   1. In an experiment, men and women were asked to remember images that produced strong emotional reactions.
      a. Both men and women used the amygdala, but men used the right side and women used the left.
      b. Men remembered the gist of the situation and women remembered the details.
   2. These results indicate that the ways men and women process information from emotional events is very different.
D. Limitations of current knowledge
   1. These types of studies are in their early stages, so there’s a lot to be learned.
   2. Brain-imaging techniques are still basic, so a lot of information is lacking. If researchers want to see a brain in action, a test subject must lie down inside a scanner or be wired to a machine, conditions very different from those in the real world.
E. Potential applications of this kind of research
   1. It could explain why men and women have different mental health problems and why medications affect one gender but not the other.
   2. It could lead to more effective remedies and preventative care.

Go to www.MyAcademicConnectionsLab.com for Key Words and Key Words: Practice.

Go to www.MyAcademicConnectionsLab.com for Reading Activities 1–4.

Focused Reading, page 9

Students read the article again and scan it for specific information and important details.

Review the academic skills focus: Scanning: Finding Specific Information Quickly.

Since one important aspect of scanning is reading quickly, you may want to give students a time limit to complete Exercise 1, page 9.

After students have completed Exercise 3, page 10, you may want to discuss the answers to the questions about strategies as a class.
Review the academic skills focus: Identifying Supporting Details.
Have partners work together to compare answers for the chart in Exercise 4, pages 11–12.

- Go to www.MyAcademicConnectionsLab.com for Reading Activity 5.
- Go to www.MyAcademicConnectionsLab.com for Checkpoint 1.

### 3 BUILDING ACADEMIC LISTENING SKILLS

- Go to www.MyAcademicConnectionsLab.com for Vocabulary Check.

Highlight the purpose of this section, stated on the left. Tell students that in this section, they will learn strategies and activities designed to help them understand a speaker’s main ideas and listen for details in a lecture.

**Before You Listen, page 13**

Students listen to the end of a lecture on how brain imaging techniques are contributing to our understanding of the brain and learn some tips for preparing to hear a lecture.

Review the academic skills focus: Preparing to Listen.

- Examine the information in the skills section. The first bullet point is useful information for students, but it is impractical to practice here. If you think your students might have some knowledge of the topic already, then you could provide some practice by asking them to think about what they already know about the topic and share with a partner or group.
- If there is time, you might want to give students an opportunity to practice the fourth point by having them see what they can find on the Internet—an opportunity to practice research skills, such as choosing good search terms.
- If you have time, talk about some research skills, such as how to recognize relatively good and bad sources of information on the Internet.
Summary of the End of a Lecture, page 13

- We’ve looked at ways modern brain-imaging techniques help improve our understanding of the brain, but there’s still a lot to learn.
- Discoveries about this exciting area of research will come very quickly in the next few years.
- The next lecture will address some recent results in the areas of pain and mental health, where there are some surprising differences between genders.

Go to www.MyAcademicConnectionsLab.com for Key Words and Key Words: Practice.

Global Listening, page 14

Students listen to a lecture about two specific areas of male-female brain differences: perception of pain and mental health. They outline the lecture’s main ideas.

Review the academic skills focus: Getting the Gist: Understanding a Speaker’s Main Ideas.

For clarity, extra words that go beyond what the students might write have been added to the notes in the Answer Key. Also, do not expect students to spell technical terms, such as serotonin correctly.

Summary of the Introduction to the Lecture, page 15

- The professor reminds students that in the last lecture he talked about research in gender differences in the brain.
- Scientists are discovering things that contradict ideas about male and female brains that they were previously certain about.
- In this lecture, two areas of male-female brain differences that may have a major impact on medicine will be addressed: perception of pain and mental health.

After students have completed Exercise 3, page 15, discuss their answers as a class to ensure that they fully understand the content of the lecture.
Summary of the Lecture

“Different Genders, Different Medicines?,” page 15 (For the complete audioscript, see Academic Connections 3, pages 180-181.)

In this lecture, two areas of male-female brain differences that may have a major impact on medicine are addressed: perception of pain and mental health.

A. Pain suppression may differ between males and females.
   1. Some research indicates that females experience more pain.
   2. Researchers have found that men and women use different circuits in the brain to block pain.
   3. This discovery may explain why some painkillers affect men and women differently.
      a. Nalbuphine works better for women, and may even increase pain in men.
      b. Other painkillers work better on men.
   4. As we understand more clearly how painkillers work, we may be able to make painkillers that are more effective for women, but more research is needed.

B. Mental health is also an area where there are significant gender differences.
   1. Women suffer from depression two times more often than men.
   2. Women’s brains produce about half as much serotonin—a brain chemical linked to depression. A researcher from Stockholm, Sweden found that there are major differences in the way male and female brains process this chemical. There are two reasons why this is interesting:
      a. Antidepressants such as Prozac® affect serotonin.
      b. Evidence indicates that women respond better to antidepressants that affect serotonin rather than other neurotransmitters.
   3. Boys are more likely than girls to have a broader range of problems related to the brain, such as autism, Tourette’s syndrome, dyslexia, stuttering, attention-deficit disorder, and early-onset schizophrenia.
   4. Designing medicines for one gender may benefit men, but more research is needed.

C. A few conclusions
   1. We’re just beginning to find out how pain control and mental health are different in men and woman.
   2. Most pain research has been conducted with men even though women more commonly experience pain. Researchers are increasingly aware that early research applies only to men. However, researchers are now considering women, and in the future, medicines better suited to female physiology may appear. Men and women with the same illnesses may be treated in different ways in just a few decades.

**Focused Listening, page 16**

Students listen to the lecture again and take notes on supporting details.

Review the academic skills focus: Listening for Supporting Details.

After examining the information in the skills section, you may want to elicit from students why they think the lecturers mention researchers’ names, universities, and so on (to acknowledge, to allow chances to find out more, to allow chances to check the references).

Before students begin Exercise 1, page 16, have them form their groups and go over the information in the charts.

- You may want to put more skilled listeners in Group A, because there is more information about pain.
- You may have to play the lecture more than once for students to get all of the information.

By the time students get to Exercise 2, page 17, they will probably have picked up some points from the part of the lecture they were not asked to focus on. This is OK. It is likely that students will know more about the particular point on which they focused, but the fact that the other students may have picked up some points allows some scope for discussion / negotiation.

Go to www.MyAcademicConnectionsLab.com for Listening Activity 5.

Go to www.MyAcademicConnectionsLab.com for Checkpoint 2.
4 BUILDING ACADEMIC WRITING SKILLS

Make sure that students are familiar with the grammar point covered in MyAcademicConnectionsLab for this unit (comparisons with adjectives, adverbs, and nouns) before they begin this section. Go to page 15 in these Teacher's Notes for the grammar chart.

Go to www.MyAcademicConnectionsLab.com for Grammar Check.

Highlight the purpose of this section, stated on the left. In this section, students identify the elements of an effective introduction, plan their writing, and write a short essay about the implications of gender differences in the brain on the future of medicine.

Before You Write, page 18

Students read an introduction to a student’s essay and learn the elements of a good essay introduction.

Review the academic skills focus: Understanding Essay Introductions and Their Relationship to the Body of the Essay.

More detail about writing body paragraphs is provided in Unit 3. The basic information provided here about what a topic sentence is should be sufficient to complete all activities in this section.

For Exercise 1, page 18, the correct answers are the ones that pick up on ideas in the scope. The idea in the first sentence doesn’t appear in the introduction at all. The last sentence picks up on an idea in the general statement, which is too general for a body paragraph; in fact, you could view the general statement as a topic sentence for the whole essay.
Focused Writing, page 19

Students learn how to write an essay plan.

Examine the Key Words on page 19. This vocabulary will be helpful for comprehension of the texts and useful for the Integrated Writing Task.

The chart in Exercise 1, page 19, helps students identify supporting details in the text. Most of these answers are obvious.

Summary of the Paragraphs, page 19

How PET Scans Produce Images of the Brain
1. The person gets an injection of a radioactive substance, which is carried by the blood to the brain.
2. There it collects in the most active areas.
3. When the person is in the machine, sensors detect positrons, or radiation, from the injected substance. This produces a single two- or three-dimensional color image.
4. Different colors indicate different levels of mental activity, and researchers can see which parts of the brain a person uses by looking at images generated while the person does different activities.

How fMRI Scans Produce Images of the Brain
1. Brain cells (neurons) need oxygen, which is carried by the blood.
2. Areas of the brain that are more active have increased blood flow.
3. Blood without oxygen reacts differently to a magnetic field than highly oxygenated blood.
4. fMRI scanners measure the differences between blood with low and high oxygen levels. Different colors indicate different amounts of brain activity. An fMRI scan can produce a film, or motion picture.


After students have completed Exercise 3, page 20, it may help to discuss their answers as a class before they begin the Integrated Writing Task, to ensure they realize that the two main ideas correspond to the different types of imaging.

Go to www.MyAcademicConnectionsLab.com for Comprehension.
Integrated Writing Task, page 21

The Integrated Writing Task requires students to apply the knowledge they have acquired in this unit in order to write a short essay.

• Go over the Integrated Writing Task assignment.
• Go over Steps 1–7 on page 21.
• Although this unit does not address writing conclusions, you can still ask students to write a summary. Treat this as free writing and accept any reasonable answer.
• You may want to assign Steps 1, 5, and 7 for homework.

Academic Connections 3, Teacher’s Notes UNIT 1
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# GRAMMAR CHART: Comparisons with Adjectives, Adverbs, and Nouns

<table>
<thead>
<tr>
<th>Comparisons with Adjectives, Adverbs, and Nouns</th>
</tr>
</thead>
</table>

1. Use **comparative adjective / adverb + than** to show how two people, things, or actions are **different**.
   - Brain research on men is **better than** brain research on women. *(a comparison of two types of research)*
   - An fMRI scan takes pictures **more quickly than** a PET scan. *(a comparison of the way two machines take pictures)*

2. For one-syllable adjectives or adverbs, add **-er**. Add **-r** if the word ends in **-e**.
   - **large**: The amygdala is **larger** in men than in women.
   - hot – hotter
   - sad – sadder
   - thin – thinner

3. For adjectives and adverbs with two or more syllables, add **more / less . . . than**.
   - **effective**: Nalbuphine is **more effective** for women than for men.
   - **effectively**: Nalbuphine works **less effectively** on men than on women.
   - **often**: Women suffer from depression **more often** than men (do).

4. For adjectives ending in **-y**, change **-y** to **-i** and add **-er**.
   - **happy**: If men suffer from depression less often than women, does it mean that they are **happier**?

5. Irregular adjectives:
   - **good** better
   - **bad** worse
   - **far** farther
   - Irregular adverbs:
   - **well** better
   - **badly** worse
   - Current research on the human brain seems to be **better** than in the past.
   - Women respond **better** to Prozac than men (do).

6. The second part of a comparison with **than** must be parallel to the first part.
   - **Correct**: **Looking** at images of the brain in action is **more interesting** than **reading** about it.
   - **Incorrect**: **Looking** at images of the brain in action is **more interesting** than **to read** about it.

7. The second part of the comparison with **than** is often optional.
   - The amygdala is **larger** in men.
UNIT 1 ANSWER KEY

1 PREVIEW

Previewing the Academic Content

Exercise 1, page 2
1. b 2. a 3. c

Previewing the Academic Skills Focus

Exercise 1, page 3
There are some things we know about the brain, and there are other things that are still a big mystery.

Exercise 4, page 4
1. For example, the front part of the brain, the frontal lobe, deals with decision making and problem solving.
2. One reason for this is that we have only recently developed technology that can see deep inside a living brain.
3. As a consequence of this complexity, we are only at the very early stages of finding out in detail how the brain works.

2 BUILDING ACADEMIC READING SKILLS

Before You Read

Exercise 1, page 4
Answers will vary. Possible answers:
Cartoon 1: Women always talk a lot and men never listen.
Cartoon 2: Men never ask for directions.
Global Reading

Exercise 2, page 8

Answers will vary. Possible answers:

<table>
<thead>
<tr>
<th>Location in the Text</th>
<th>Main Ideas</th>
</tr>
</thead>
<tbody>
<tr>
<td>Introduction (paragraph 1)</td>
<td>• past: scientists thought gender differences were caused by social pressures and hormones</td>
</tr>
<tr>
<td></td>
<td>• new research: male and female brains are different</td>
</tr>
<tr>
<td>Middle (paragraphs 2 and 3)</td>
<td>• problem: most research in past done on males</td>
</tr>
<tr>
<td></td>
<td>• list of different structures</td>
</tr>
<tr>
<td>End (paragraphs 4–6)</td>
<td>• the sexes use the same brain area differently</td>
</tr>
<tr>
<td></td>
<td>• still much to be learned</td>
</tr>
<tr>
<td></td>
<td>• important uses</td>
</tr>
</tbody>
</table>

Focused Reading

Exercise 1, page 9

<table>
<thead>
<tr>
<th>Word</th>
<th>Location in the Article (Paragraph Number and/or Diagram)</th>
</tr>
</thead>
<tbody>
<tr>
<td>hormones</td>
<td>paragraphs 1 and 2</td>
</tr>
<tr>
<td>hypothalamus</td>
<td>paragraph 3</td>
</tr>
<tr>
<td>frontal lobe</td>
<td>paragraph 3 and diagram</td>
</tr>
<tr>
<td>limbic cortex</td>
<td>paragraph 3 and diagram</td>
</tr>
<tr>
<td>hippocampus</td>
<td>paragraph 3 and diagram</td>
</tr>
<tr>
<td>parietal cortex</td>
<td>paragraph 3 and diagram</td>
</tr>
<tr>
<td>amygdala</td>
<td>paragraphs 3, 4, and diagram</td>
</tr>
</tbody>
</table>

Exercise 2, page 10

1. a  2. b  3. e, d  4. f  5. c  6. a  7. g

“Hormones” is the item on the list that is the odd one out because the other items are parts of the brain, but hormones are chemicals.

Exercise 3, pages 10–11

2. Larry Cahill; a
3. 2001; b
4. controlling emotions; c
5. frontal lobe, limbic cortex, hippocampus, parietal cortex, amygdala; d
6. parietal cortex; c
## Exercise 4, pages 11–12

<table>
<thead>
<tr>
<th>Main Idea</th>
<th>Question</th>
<th>Supporting Detail(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Men and women are different.</td>
<td>What are the three reasons that researchers give for this difference?</td>
<td>• social pressures</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• hormones</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• brain differences</td>
</tr>
<tr>
<td>Neuroscientists are worried.</td>
<td>What is the reason that neuroscientists are worried?</td>
<td>• Experiments were previously done only on males. If these don’t apply to females, lots of research could be wrong.</td>
</tr>
<tr>
<td>Differences in male and female brain structure are now becoming clear.</td>
<td>What are three examples of differences?</td>
<td>• frontal lobe proportionately larger in females</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• limbic cortex proportionately larger in females</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• parietal cortex proportionately larger in males</td>
</tr>
<tr>
<td>Males and females sometimes use same structure differently.</td>
<td>What is an example of this?</td>
<td>• For emotions, males use right side of amygdala, females use right side.</td>
</tr>
<tr>
<td></td>
<td>What is a consequence of this?</td>
<td>• Males remember the gist of an emotional situation; females remember the details of the same situation.</td>
</tr>
<tr>
<td>This research is still in early stages.</td>
<td>What is a reason for this?</td>
<td>• Imaging techniques are still basic.</td>
</tr>
<tr>
<td></td>
<td>What is a possible solution to this?</td>
<td>• attach an MRI scanner to people’s heads, to measure everyday activity</td>
</tr>
<tr>
<td>There are important uses for this research.</td>
<td>What are two consequences of this?</td>
<td>• better treatments for some illnesses</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• better methods of prevention</td>
</tr>
</tbody>
</table>

## 3 BUILDING ACADEMIC LISTENING SKILLS

### Before You Listen

Exercise 1, page 13

*Answers will vary. Possible answers:*

1. brain imaging techniques
2. results of ongoing brain research, including pain and mental health
Exercise 2, page 14
1. suppress 2. circuits 3. mental health 4. depression 5. antidepressants

Exercise 3, page 14
Answers will vary. Possible answers:
1. depression 2. serotonin, neurotransmitters

Global Listening

Exercises 1 and 2, page 13

<table>
<thead>
<tr>
<th>Topic of lecture: male-female brain differences and their implications for medicine</th>
</tr>
</thead>
<tbody>
<tr>
<td>Main idea 1: Pain</td>
</tr>
<tr>
<td>General information:</td>
</tr>
<tr>
<td>• Women perhaps experience <em>more pain</em> than men</td>
</tr>
<tr>
<td>• Research suggests that females and males use different circuits to block pain</td>
</tr>
<tr>
<td>• Some painkillers have different effect on females and males</td>
</tr>
<tr>
<td>• In the future, maybe more effective painkillers for women</td>
</tr>
</tbody>
</table>

| Main idea 2: Mental health |
| General information: |
| • Women perhaps experience more depression than men |
| • Serotonin works differently in females |
| • Males have other mental health problems |
| • New medicines for one gender may help males |

Focused Listening

Exercise 1, pages 16–17

Group A

<table>
<thead>
<tr>
<th>Main Idea: Pain</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>General Information</strong></td>
</tr>
<tr>
<td>Women perhaps experience more pain than men.</td>
</tr>
<tr>
<td>Research suggests that males and females use different circuits to block pain.</td>
</tr>
<tr>
<td>Some painkillers have different effects on females and males.</td>
</tr>
<tr>
<td>In the future, there may be more effective painkillers for women.</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>
Group B

**Main Idea:** Mental Health

<table>
<thead>
<tr>
<th>General Information</th>
<th>Supporting Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Women perhaps experience more depression than men.</td>
<td>Women appear to suffer from depression twice as often.</td>
</tr>
</tbody>
</table>
| Serotonin works differently in females. | • Serotonin is linked to depression.  
• Females produce half as much serotonin as men.  
• Sweden research: significant differences in how males and females use serotonin |
| Males have other mental health problems. | wide range of brain problems |
| New medicines for one gender may help males. | have to wait for more research |

**Exercise 3, page 17**
1. F; Anne Murphy did her research in the USA.
2. T
3. T
4. F; Nalbuphine increases pain in men.
5. F; There might be painkillers designed especially for women in the future.
6. T
7. F; It appears that women respond better to drugs that work on serotonin.

**Exercise 4, page 17**
*Answers will vary. Possible answers:*
1. People might think that men are better than women at certain tasks, or that women are better than men.
2. People may think that one sex is better than the other at certain things. They might encourage people of one sex to study certain subjects or take certain jobs.
3. Yes, the dangers of stereotyping are too great. OR No, society should learn to avoid stereotyping, and the medical benefits are too great.
4 BUILDING ACADEMIC WRITING SKILLS

Before You Write

Exercise 1, page 18

• Several areas of medicine have advanced rapidly due to the ability to produce images of the brain in action.
• Cognitive psychologists greatly appreciate what fMRI and PET can do.

Exercise 2, page 18

With new technology, such as PET and fMRI scans, more and more is being learned about the human brain. It is becoming clear that different people’s brains work in different ways. For example, it has recently been discovered that there are small differences in the brains of males and females. This is a very important discovery for neuroscience. For one thing, it could lead to the solutions to many long-standing mysteries. Also, it is likely to lead to differences in how research is carried out. For society, one benefit is likely to be that medicines will become better suited to the biology of females than they are now.

Exercise 3, page 19

Answers will vary. Possible answers:

• Several mysteries of neurology have been solved by modern scanning techniques.
• As a result of findings from fMRI and PET scanning, neuroscience can expect some changes to the way research is conducted.
• Ordinary people may benefit directly from these new research techniques.

Focused Writing

Exercise 1, page 19

<table>
<thead>
<tr>
<th></th>
<th>PET Scan</th>
<th>fMRI Scan</th>
</tr>
</thead>
<tbody>
<tr>
<td>Injection necessary?</td>
<td>yes</td>
<td>no</td>
</tr>
<tr>
<td>Uses radioactive</td>
<td>yes</td>
<td>no</td>
</tr>
<tr>
<td>substance?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Color images?</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>Motion pictures?</td>
<td>no</td>
<td>yes</td>
</tr>
</tbody>
</table>
Exercise 3, page 20

Answers will vary. Possible outline:

PET scans
- radioactive substance injected
- radioactive substance produces positrons
- sensors detect positrons
- color image: different colors = different amounts of mental activity

fMRI scans
- neurons use oxygen
- blood carries oxygen → neurons
- magnetic: different for blood with oxygen & blood without oxygen
- scans measure this difference
- different color = different amount of mental activity
- motion pictures