UNIT 6

Brain Food

In this unit, you will

- read about some ways that food can affect psychological and cognitive functions.
- review scanning.
- increase your understanding of the target academic words for this unit.

READING SKILLS Summarizing

Self-Assessment

Think about how well you know each target word, and check (✓) the appropriate column. I have...

TARGET WORDS	never seen the word before	seen the word but am not sure what it means	seen the word and understand what it means	used the word, but am not sure if correctly	used the word confidently in *either* speaking *or* writing	used the word confidently in *both* speaking *and* writing
AWL						
affect						
allocate						
commit						
compile						
coordinate						
discrete						
journal						
mental						
overall						
paradigm						
period						
promote						
prospect						
react						
team						

Outside the Reading What do you know about nutrition?
Watch the video on the student website to find out more.

Oxford 3000™ keywords

Before You Read

Read these questions. Discuss your answers in a small group.

1. Name three or four foods you often eat even though you know they're not good for you. Why are they unhealthful? Why do you eat them anyway?
2. Name three or four foods you eat that are healthful. Why are they healthful? Do you like the way they taste?
3. Have you ever felt a significant improvement in your mood or in your concentration after a meal or snack? What do you think caused this effect?

MORE WORDS YOU'LL NEED

cognitive: related to thought and learning
diet: the set of foods a person usually eats
intolerant: unwilling or unable to accept certain behavior or circumstances

Read

This excerpt from a nutrition manual explains the psychological benefits of eating certain fats.

FAT FOR BRAINS

As the old saying goes, you are what you eat. The foods you eat obviously **affect** your body's performance. They may also influence how your brain handles its tasks. If it handles them well, you think more clearly, and you are more emotionally stable. The right foods can help you concentrate, keep you motivated, sharpen your memory, speed your **reaction** time, reduce stress, and perhaps even prevent brain aging.

GOOD AND BAD FAT

Most people associate the term *fat* with poor health. We are encouraged to eat fat-free foods and to drain fat away from fried foods. To understand its nutritional benefits, however, we have to change the **paradigm** for how we think about fat.

The first step is gaining a better understanding of fat. Instead of conceiving of it as a single thing, we have to recognize it as several **discrete** types of a similar compound. Not every fat is your enemy. Fats—the right kinds and in the right amounts—are among your best friends. It is smart to **commit** to a balanced-fat diet, not to a no-fat diet.

Foods high in saturated fats

Foods high in unsaturated fats

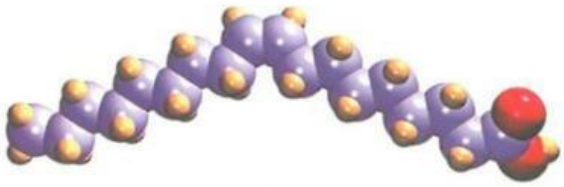
Fats are broadly classified as either "saturated" or "unsaturated." Most foods that contain fat contain both kinds, in varying proportions. Foods that are high in saturated fats include meat, butter, and other animal products. In general, saturated fats are solid at room temperature. Foods high in unsaturated fats include vegetable oils, nuts, and avocados. Unsaturated fats, if separated out, are usually liquid at room temperature.

The key to health is to **allocate** a percentage of your fat intake to each type of fat. Saturated fat in moderate amounts poses no problem. In general, you will be fine if less than 20 percent of the fat you consume is saturated. Beyond that level, saturated fat may **promote** heart disease and perhaps some types of cancer. A diet high in saturated fat can also make you depressed and antisocial, and impair your general **mental** performance. Unsaturated fats should make up most of your fat intake. But beware. Unsaturated fats are especially high in calories and could cause weight problems. The smart approach is to keep your **overall** fat intake low and make sure that most of it is in the form of unsaturated fats.

FATTY ACIDS

Keeping your fat intake too low, on the other hand, could also be dangerous. Fat in food is broken down into chemicals called fatty acids. The body uses them for many purposes. They go into all hormones[1]. They are critical to body metabolism[2]. And they are part of the outer membrane[3] of every cell in the body, including those in the brain. You need these fatty acids in order to stay physically healthy and **mentally** sharp.

Of the many fatty acids the body uses, two are called "essential fatty acids" (EFAs). Your diet must contain foods that provide them, because the body cannot make them on its own. The most important are omega-3 fatty acids. They are crucial for the proper development of the human brain. All brain-cell membranes need to refresh themselves continually with new supplies of omega-3s.



The structure of oleic acid, an omega-3 fatty acid

North Americans are famous for consuming too much saturated fat and too much total fat. They also consume far too little food that provides omega-3s. The vegetable oils most commonly used in cooking—corn, safflower, and sunflower oils—have almost no omega-3s.

Using canola (rapeseed), soy, and walnut oils, which contain a lot of omega-3s, would be far more healthful. A diet with a lot of olive oil, such as the traditional diets of Italy, Greece, and other Mediterranean regions, would also be better. And the old saying about fish being brain food is true. Fatty fish that live in cold water—such as salmon, tuna, and herring—are rich in omega-3s, especially in one called DHA. It is identical to a material in human nerve cells. Even if you don't eat fish, you can still get the DHA you need from green vegetables, sesame seeds, and egg yolks.

OMEGA-3S AND THE BRAIN

There is evidence that DHA plays a big role in the intellectual development of humans. In one study, doctors measured the DHA levels of mothers at the time they gave birth. Their children were then tested at 12 and 18 months of age to see how well they paid attention to things around them. The research **team compiled** data on how long each child focused on a toy. The toddlers whose mothers had the highest DHA levels at birth showed the greatest attention spans. These children focused for longer **periods** and spent much less time simply looking around, unfocused.

In psychology and physiology **journals**, articles routinely confirm the value of omega-3 fatty acids. One published study demonstrated that fish oil reduced the degree of brain damage in cats experiencing stroke. A study by

[1] *hormones:* chemicals that control body processes such as growth
[2] *metabolism:* the body process that changes food into chemicals the body needs
[3] *membrane:* a thin covering around a cell or larger body part

researchers at the University of Pittsburgh showed that adults with low levels of omega-3s in their bodies were far more depressed, pessimistic, and impulsive than those with normal or high levels. This evidence improves the **prospects** for treating depressed patients effectively. Many therapists now say they are determined to **coordinate** psychological therapy with dietary therapy in order to rely less on drugs.

As research continues to show, new ways of thinking about fat can open the door to better physical, **mental,** and emotional health. ■

Reading Comprehension

Mark each sentence as *T* (true) or *F* (false) according to the information in Reading 1. Use the dictionary to help you understand new words.

___ 1. Foods affect a person's moods and motivation.

___ 2. Ideally, more people should commit to no-fat diets.

___ 3. At room temperature, you could pour unsaturated fat out of a bottle.

___ 4. It is not healthful to eat a very large amount of unsaturated fat.

___ 5. Omega-3 fatty acids promote intellectual development.

___ 6. A study showed that children born from high-DHA mothers are better able to pay attention.

___ 7. Research journals reported that people with a lot of omega-3 fats in their systems were very depressed.

___ 8. Patients with psychological problems should coordinate their therapy so that it includes dietary as well as psychological treatment.

READING SKILL Summarizing

LEARN

A summary of a reading text should be short. It should cover all the main ideas and give an overall idea of the text. It may include some important supporting points, but it should NOT emphasize smaller points. Think of a summary as an outline or a graphic organizer in paragraph form (see Unit 4 for more on outlining).

The best summaries come from a good understanding of the whole reading. There are, however, some techniques that can help you prepare a good summary:

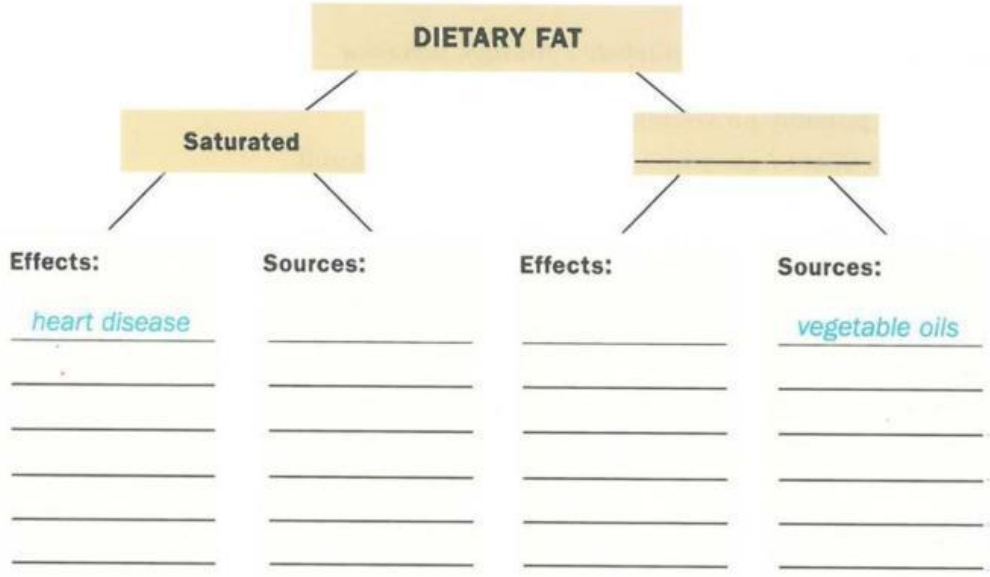
- State the main idea of the whole text in your first sentence.
- Look at headings to help you identify some of the main ideas.
- Scan paragraphs to identify their topics. Do not simply look for "topic sentences." Not every paragraph has one, and those that exist are not always easy to locate.
- For each main point, add one reason from the text that explains why it is important.

APPLY

A. Use the headings in Reading 1 and any obvious paragraph clues to decide whether each of these topics belongs in a summary of the reading. Check (✓) the items that should be included. Discuss your choices with a partner.

___ a balance of fats
___ brain cells
___ canola oil
___ DHA
___ fish
___ IQ and depression
___ obesity
___ omega-3s
___ psychological therapy
___ saturated and unsaturated fats
___ the United States
___ the University of Pittsburgh

B. Complete the graphic organizer to show the structure of ideas in Reading 1.



C. Write a one-paragraph summary of Reading 1 using the main ideas and structure from the graphic organizer. Your summary should be no more than 80 words long.

REVIEW A SKILL **Scanning** (See p. 36)

Scan Reading 1 to find the answers to these questions. Before you begin, talk with a partner about what clues (e.g., capital letters or special puctuation) you will look for.

1. What two groups are fats classified into?
2. At the most, what percentage of the fats you consume should be saturated?
3. Which two countries are mentioned in the reading as having diets with a lot of olive oil?

Vocabulary Activities STEP I: Word Level

A. **Read these excerpts from another article on the psychological effects of food. In each excerpt, cross out the one word or phrase in parentheses with a different meaning from the other three choices. Compare answers with a partner.**

1. Many studies have tried to determine whether Attention Deficit Hyperactivity Disorder (ADHD) is (*influenced / affected / caused / impacted*) by the foods children eat. The goal is to test claims that ADHD symptoms, like poor concentration and impulsive behavior, are triggered by something in food.
2. If they are, eliminating these "provoking substances" would presumably (*complete / encourage / promote / facilitate*) healthier behavior.
3. Some researchers have focused on diets that eliminate many food additives and even ban some foods. Others study "few-foods" diets—those that (*convert / divide / distribute / allocate*) a child's total calorie intake among only a few types of food.
4. One study found that, (*overall / in total / as a whole / finally*), behavior problems increased in 69% of the children after they were given food containing colorings or other possibly provoking substances.
5. In another study, the research (*team / sponsor / group / squad*) monitored brain activity by looking at electroencephalograms (EEGs), which are graphs of electrical impulses in the brain.
6. First, they recorded brain activity during (*times / periods / sections / intervals*) when the children were on a few-foods diet with no suspected provoking substances. Then they took EEGs when the children ate only foods with suspected provoking substances.
7. After the researchers (*wrote / gathered / put together / compiled*) and compared the EEGs, they noted large increases in some brain-wave activity during the second stage of the test.

People and organizations usually have a plan for how they are going to use their resources—they *allocate* their resources. Notice that you *allocate* something *to* or *for* something else.

*We **allocated** 20% of our budget to advertising.*

The noun form is *allocation*, and the adjective is *allocable* (or *allocatable*).

*The highest priorities typically get the greatest **allocation** of resources.*

*Some **allocable** resources are money, fuel, space, time, and attention.*

CORPUS

B. During a typical week, how much time do you allocate to these activities (not how much time you spend doing them, but how much time you plan for them)? Estimate the time in hours. Compare answers with a partner.

1. watching TV _____
2. hanging out with friends _____
3. reading for pleasure _____
4. playing video games _____
5. going to the movies _____
6. studying _____
7. using the Internet _____
8. playing team sports _____

C. Check (✓) the activities that require you to coordinate with other people. Then decide what type of coordination is necessary (schedules, access, meeting times, etc.). Compare answers with a partner.

Activity	Type of coordination
___ 1. watching TV	_____
___ 2. hanging out with friends	_____
___ 3. reading for pleasure	_____
___ 4. playing video games	_____
___ 5. going to the movies	_____
___ 6. studying	_____
___ 7. using the Internet	_____
___ 8. playing team sports	_____

Vocabulary Activities STEP II: Sentence Level

Word Form Chart			
Noun	**Verb**	**Adjective**	**Adverb**
commitment	commit	committed	_____

D. **The word *commit* has several different meanings and uses, depending on context. Match each phrase with its example sentence. Then rewrite the example sentences using the matching phrase.**

a. commit a crime
b. not commit yourself
c. be totally committed to someone
d. have a commitment
e. have commitments
f. honor a commitment
g. get out of a commitment
h. make a (financial) commitment to something
i. a lack of commitment

i 1. I promised to give money every month to the Diabetes Research Foundation.
I made a financial commitment to the Diabetes Research Foundation.

___ 2. I can't meet at that time because I've promised to do something else then.
_____

___ 3. All she thinks about is her daughter.
_____

___ 4. His leaving early shows that he doesn't care about this team enough.
_____

___ 5. The government has fulfilled the promise to allocate more money to the school lunches program.
_____

___ 6. He went to prison for carrying out several illegal acts.
_____

___ 7. She thinks she can come tomorrow, but she won't promise until she talks to her sister.
_____

___ 8. They would love to take a vacation, but they have responsibilities that need their attention.
_____

___ 9. He's not really sick. He's just trying to avoid keeping a promise he made.
_____

Word Form Chart			
Noun	**Verb**	**Adjective**	**Adverb**
_____	affect	affected unaffected	_____
mentality	_____	mental	mentally
_____	_____	overall	overall
promotion promoter	promote	promotional	promotionally
prospect prospects	_____	prospective	prospectively
reaction	react	reactive	_____

E. Read more information about how diet affects cognitive functioning. Then restate the information in your notebook, using the word(s) in parentheses. Be prepared to read aloud or discuss your sentences in class.

1. Chemicals in your diet called antioxidants may influence your mental functions more strongly as you grow older. (*affect*)

   Dietary chemicals called antioxidants may ***affect*** *your thinking more strongly as you get older.*

2. A number of studies have suggested that antioxidants help maintain memory skills and other cognitive functions in older adults. (*mentally*)
3. By going through certain chemical processes, antioxidants limit the damage that some harmful chemicals called "free radicals" can do. (*react* or *reaction*)
4. Free radicals cause damage to tissues in nearly every part of the body. Their general effect on the body is partly responsible for the slow decline we call "aging." (*overall*, *promote*)
5. One of the most disturbing aspects of aging is what happens to the brain. Aging can cause slower reaction times, memory loss, and a dulling of the senses. (*affect*)
6. Some people seem to have improved their chances of staying sharp in old age by eating foods that contain adequate amounts of antioxidants. (*prospects*)
7. It seems, however, that the form of antioxidants matters. In several studies, older people who took antioxidants in the form of pills showed no improvement. (*unaffected*)

Before You Read

Read these questions. Discuss your answers in a small group.

1. War often causes widespread hunger. Why does this happen?
2. Have you ever seen someone suffering from long-term undernourishment, perhaps because of poverty or disease? Have you ever seen a picture of such a person? Describe the way he or she looked.
3. Have you ever been very hungry or very thirsty? How did that affect your mood? Did it affect your ability to think? How?

Read

This excerpt from a nutrition textbook tells the story of the first clinical study of the effects of starvation on physical and mental functioning.

The Minnesota Starvation Experiment

On November 19, 1944, 40 healthy young men entered the Laboratory of Physiological Hygiene at the University of Minnesota. They were ready to embark on a grueling medical experiment. The men had responded to a brochure that asked: "Will You Starve That They Be Better Fed?" World War II was coming to a close, and the Allied forces[1] needed to know how to deal with starving people in areas of Europe and Asia ruined by the war.

BASIC DESIGN

In 1944, the **prospect** of finding healthy young men to volunteer for such an experiment was dim. Many were overseas serving in the military. However, many conscientious objectors—those who refused to serve in the war for religious or moral reasons—remained in the United States doing various types of community service. The government eventually allowed them to volunteer for medical experiments. About 400 men volunteered for the Minnesota research, of whom 40 were eventually selected.

The study took place in three **discrete** stages. The first, starting in November 1944, was a "standardization" **period** of 3 months. So they could be observed under non-stressful conditions, the men received a substantial 3,200 calories of food per day. This was followed by a 6-month semi-starvation **period,** beginning on February 12, 1945, in which they received only 1,800 calories per day. The semi-starvation diet reflected what was available in the war-torn areas of Europe—potatoes, turnips, rutabagas, dark bread, and macaroni. The final 3 months

Cover of a brochure for the Minnesota Starvation Experiment

[1] *Allied forces:* the group of nations working together in World War II consisting primarily of the United States, the United Kingdom, the Soviet Union, and China

were a nutritional rehabilitation **period.**

Throughout the study, participants were given various housekeeping and administrative duties within the laboratory. They were also allowed to participate in university classes and activities. The participants were expected to walk 22 miles (35.4 kilometers) per week and to expend 3,009 calories per day.

THE GOOD DAYS

Those selected to participate were a well-educated group. All had completed some college coursework. Many took advantage of the opportunity to take more courses at the University of Minnesota during the experiment. Initially, their blue pants, white shirts, and sturdy walking shoes were all that distinguished them from other people on campus. During the standardization **period,** the men felt well-fed and full of energy. Many initially volunteered for local charities, participated in music and drama productions, or otherwise contributed to community projects in the area.

Participants in the Minnesota Starvation Experiment

SEMI-STARVATION

On the first day of semi-starvation (February 12, 1945), the men sat down to a meal that included a small bowl of hot cereal, two slices of toast, a dish of fried potatoes, a dish of Jello, a small portion of jam, and a small glass of milk. Each was now **allocated** less than half the calories he was used to consuming. The men ate their meals together in Shevlin Hall on the campus. Participants were supposed to lose 2.5 pounds (1.1 kg) per week to reach the desired 25% weight reduction by the end of the semi-starvation **period.**

As semi-starvation progressed, the men became irritable and intolerant of one another. Many of them kept **journals** during the experiment, which recorded their feelings and **reactions** as they happened. One of the men, Carlyle Frederick, later remembered "noticing what's wrong with everybody else, even your best friend. Little things that wouldn't bother me before or after would really make me upset." Another, Marshall Sutton, noted, "We were impatient waiting in line if we had to, and we'd get disturbed with each other's eating habits at times. We became, in a sense, more introverted[2], and we had less energy." The men reported feeling cold much of the time and asked for extra blankets even in the middle of summer. They experienced dizziness, extreme tiredness, muscle soreness, hair loss, reduced **coordination,** and ringing in their ears. They felt weak **mentally** as well as physically. Several were forced to quit their university classes because they simply didn't have the energy or motivation to attend and concentrate. Food became an obsession.

The men became more noticeable around campus as they began to show visible signs of starvation—sunken faces and bellies, protruding ribs, and swollen legs, ankles, and faces. Despite the challenges of starvation, there was a determination among the men that somehow kept them **committed.** When each of the 36 men who completed the experiment was asked if he had ever considered withdrawing, the reply was repeatedly firm and succinct: "No."

SLOW RECOVERY

The three-month rehabilitation **period** began at the end of July 1945 and continued until October 20, 1945. With the end of the war that summer, the results of the experiment were becoming increasingly relevant. How can the winners of the war best **promote** the recovery of starving populations in Europe and Asia? As the experiment showed, the answer was far more complex than simply, "Give them food."

[2] *introverted:* quiet and shy, concerned only with one's own thoughts and feelings

Many of the men reported that, **overall,** the rehabilitation **period** was the hardest of all. Their strength came back only slowly, and many were depressed by this delayed recovery. Their feelings of hunger remained. They continued to be dizzy, confused, and irritable.

The research **team** eventually **compiled** and published these results in academic **journals.** They also prepared a relief worker's manual that focused on the psychological effects of food deprivation. The experiment helped create a new **paradigm** for understanding starvation. Previously, starvation was seen as only a physical thing. The experiment showed that it dramatically alters personality and that nutrition directly and predictably **affects** the mind. ■

Reading Comprehension

Mark each sentence as *T* (true) or *F* (false) according to the information in Reading 2. Use the dictionary to help you understand new words.

___ 1. The Minnesota Starvation Experiment involved soldiers from the Allied Forces.

___ 2. The experiment compiled data to help deal with starvation problems in Europe and Asia.

___ 3. In the first stage of the experiment, the men ate so much they became obese.

___ 4. In the second stage of the experiment, the men continued walking 22 miles per week.

___ 5. In the third stage of the experiment, the men quickly regained their previous health.

___ 6. The men's journals record that they became depressed and irritable as they began to lose weight.

___ 7. Eventually, the participants lost all mental motivation to continue in the experiment.

___ 8. The study showed that rehabilitating starved populations involved more than food supplies.

READING SKILL Summarizing

APPLY

A. Using subheadings and paragraph clues, plan a 100-word summary of Reading 2. Outline your plan below, but do not write the summary yet. Discuss your plan with a partner.

_____

_____

_____

_____

B. Keeping in mind your partner's comments, revise your plan. Then write a 100-word summary of Reading 2 in your notebook.

Vocabulary Activities STEP I: Word Level

A. Many academic words are also considered formal words. Which of the target words in this unit (see the chart on page 81) are more formal synonyms for these informal words? Be sure to use the right forms of the target words.

Informal	Formal
1. length of time	_____
2. put together	_____
3. magazine	_____
4. set aside	_____
5. separate	_____
6. push	_____

B. Complete the sentences about nutrition and child development using the target vocabulary in the box. Use each item one time. Use the synonyms in parentheses to help you. (Note: The sentences are not yet in the correct order.)

affect	mental	paradigm	prospect
compiled	overall	promote	reacted
coordination			

___ a. At the other end of the weight spectrum, obesity may negatively _____ (*have an impact on*) a child's image of himself or herself. This may lead to lower academic performance for overweight children.

___ b. Data _____ (*gathered together*) by government agencies suggest that providing breakfast to school-age children has lessened these problems.

___ c. Nutritionists use the term *food-insecure* to mean "not sure whether healthy meals will be consistently available." By emphasizing a child's attitudes and expectations instead of actual food intake, this reflects a change in the current _____ (*way of thinking*) among experts.

___ d. One study showed that children in food-insecure households scored lower on mathematics tests, were more likely to have repeated a grade, and _____ (*responded*) more violently when teased by other children.

___ e. Other studies have found that child hunger raises the _____ (*possibility*) of severe behavior problems and long-term anxiety/depression.

___ f. Overweight children are often slower than others in developing physical _____ (*integrated movement*) and stamina. Because they cannot keep up with others at play, they are more likely to be socially isolated than children who are not overweight.

___ g. Some schools reportedly have tried to _____ (*increase the chances of*) better test scores for the school _____ (*as a whole*) by providing healthier school lunches.

___ h. Under-nutrition in children probably affects their _____ (*related to the mind*) development. Presumably, a lack of food deprives the brain of essential nutrients. Also, difficulties involving food probably have emotional consequences.

C. Put the sentences in activity B into a logical order to describe some effects of nutrition on child development. (More than one order may be possible.) Read your sequence to a partner.

D. **Read the sample sentences that feature forms of the word *coordinate*. Then answer the questions below in your notebook, using a dictionary as suggested. Compare answers with a partner.**

a. The school superintendent **coordinates** the operations of 12 schools.
b. Members of the choir are required to wear color-**coordinated** outfits for performances.
c. Bad nutrition can affect a person's hand–eye **coordination**, making it difficult to play sports or music instruments.
d. The camp hired an athletic **coordinator** to run its sports programs.

1. Check (✓) the word closest in meaning to *coordinate*. Consult your dictionary before you answer.

   ___ command

   ___ organize

   ___ reminisce

   ___ recur

2. Each of these sentences indicates that things were coordinated. What are they?

   a. _____

   b. _____

   c. _____

   d. _____

3. Look at the sample sentences in your dictionary for *coordinate* and its forms. What is being coordinated in each of those samples?

4. Does *coordinate* have any forms that are not used in the sample sentences in the box above? If so, what are they? Consult your dictionary.

Vocabulary Activities STEP II: Sentence Level

The adjective *discrete* describes something that is separate from or independent of other things of the same type. The adverb form is *discretely*.

Fats can be divided into ***discrete*** *types.*

Note the spelling of *discrete*, and do not confuse it with another adjective, *discreet*, which means "careful not to attract attention and cause embarrassment."

E. **Rewrite each of these sentences in your notebook, using *discrete* or *discretely*. Then go on to provide the information introduced in each sentence. Compare results with a partner.**

1. A person's life can be divided into a few significant time periods.
2. A college career usually follows a series of levels.
3. Sometimes job responsibilities can include many highly varied tasks.
4. The Minnesota Starvation Experiment was broken into three distinct stages.
5. The people in my life promote my health and well-being in different ways.