HOW DRUGS ARE STUDIED

Words

Write the letter of each definition with the word it defines. If you don't know the definition, use the context of the reading passage to help you. Look for the words in bold as you read the passage.

PARAGRAPHS 1–2

Words	Definitions
1 ..... theoretical	**A** n., a small part
2 ..... investigation	**B** v., to focus on
3 ..... fraction	**C** n., a study
4 ..... target	**D** adj., abstract; based on theory

PARAGRAPH 2

Words	Definitions
5 ..... manufacture	**E** v., to improve
6 ..... culture	**F** v., to produce
7 ..... desirable	**G** n., result
8 ..... enhance	**H** n., organic materials grown in a laboratory setting
9 ..... outcome	**I** adj., wanted; worth having

PARAGRAPHS 3–4

Words	Definitions
10 ..... absorb	**J** v., to take in
11 ..... toxic	**K** adj., long-lasting
12 ..... deem	**L** adj., poisonous
13 ..... recur	**M** v., to believe; judge
14 ..... chronic	**N** v., to happen or occur again

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PARAGRAPHS 6–8

Words	Definitions
15 ..... ascertain	**O** v., to lessen; ease
16 ..... combat	**P** v., to determine; find out
17 ..... monitor	**Q** v., to watch; observe
18 ..... interval	**R** n., the period between two times or events
19 ..... alleviate	**S** n., material
20 ..... substance	**T** v., to fight against

Reading

How Drugs Are Studied

A

It takes years, and sometimes decades, for a drug to move from the **theoretical** stage to the pharmacy shelf. Of the thousands of drugs under **investigation** at any one time, only a small **fraction** will produce the desired result without unacceptable side effects.

B

First, scientists **target** a step in the disease process where they believe a drug can have an effect. Then they **manufacture** compounds or take them from organisms such as viruses and fungi and test them in laboratory **cultures**. Once scientists isolate a chemical that produces a **desired** effect, they analyze[1] its structure and alter it as necessary to **enhance** the **outcome**.

C

The next step involves testing the drug on animals. Scientists look at how much of the drug is **absorbed** into the bloodstream, how it spreads to different organs, how quickly it is excreted, or leaves the body, and whether it has any **toxic** by-products. Researchers usually test at least two animal species because the same drug may affect species differently.

[1]BrE: analyse

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D

If a chemical passes laboratory and animal testing and is **deemed** appropriate to analyze in human volunteers, it is ready for clinical trials. Researchers follow a protocol that describes who may participate in the study, tests and procedures to follow, the length of the study, and outcomes to be measured. Drug trials may focus on treating a disease, preventing a disease from occurring or **recurring**, or enhancing the quality of life for people living with incurable, **chronic** conditions.

E

There are four phases of clinical trials; the first three phases study whether the drug is effective and can be safely administered to patients, and the fourth phase evaluates long-term safety and use once a drug is on the market.

F

Phase I clinical trials test a drug in small groups of healthy volunteers (fewer than 100) to **ascertain** its safety and the appropriate dose range. These studies last for six months to one year.

G

Phase II clinical trials test several hundred volunteers to determine how effectively the drug **combats** the disease being studied. These trials continue to evaluate safety, side effects, and optimal dose. Phase II studies also last for six months to one year.

H

Phase III trials test thousands of volunteers for several years, with researchers closely **monitoring** study participants at regular **intervals**. These studies typically compare the drug under investigation with a control: either a drug known to cure or **alleviate** a specific disease or, if one does not exist, a **substance** that has no medicinal effects, known as a placebo. Phase III trials are typically blind studies (participants do not know which drug they are receiving) or double-blind studies (neither participants nor researchers know which drug an individual is receiving until the trial is completed).

I

Once a drug passes the first three phases and is found to be safe and effective, drug companies may apply for the right to market the product. After a drug is approved and on the market, Phase IV trials may investigate longer-term effects, effects in different groups of patients such as the elderly, or use of the medication for a different condition such as using a cancer drug to treat AIDS.

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Answer the questions about **How Drugs Are Studied**.

Questions 1–4

The reading passage contains nine paragraphs, ***A–I***.
Which paragraph discusses the following information?
Write the correct letter, ***A–I***.

..... **1** Drug tests that involve growing biological material in a laboratory

..... **2** Investigations of the effects of drugs on animals

..... **3** Studies to determine how safe a drug is and how much a patient should take

..... **4** Studies to monitor how well a drug fights a disease

Questions 5–7

Choose the correct letter, ***A***, ***B***, ***C***, *or* ***D***.

5 Drug tests on animals look at
- **A** how the drug is absorbed by the body.
- **B** how effective the drug is for chronic conditions.
- **C** how well the drug prevents a disease from recurring.
- **D** how quickly the drug alleviates the disease.

6 During Phase II clinical trials, study participants are monitored for
- **A** chronic conditions.
- **B** toxic doses.
- **C** speed of cure.
- **D** possible side effects.

7 After a drug is deemed safe and effective, a drug company may do further tests to ascertain
- **A** the best way to market it.
- **B** possible effects over time.
- **C** how it compares with other drugs.
- **D** the best group of people to use it.

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Word Families

A

Complete each sentence with the correct word from the word family chart. Make nouns plural where necessary. Use the correct form of verbs.

noun	verb	adjective
absorption	absorb	absorbent

1 Cotton makes a good cleaning material because it is so ..... .

2 As part of their research, scientists look at the ..... of a drug into the bloodstream.

3 The body ..... some drugs very quickly.

noun	verb	adjective
desire	desire	desired

4 Even when a certain treatment is generally successful, it may not produce the ..... outcome in all patients.

5 The ..... to help others attracts many people to medical professions.

6 Patients ..... drugs that will treat their conditions effectively.

noun	noun	verb	adjective
investigation	investigator	investigate	investigative

7 An ..... report showed the drug to be ineffective in fighting the disease.

8 Researchers may ..... several possible uses of a new drug.

9 The ..... of a potential new drug costs a great deal of money and takes a long time.

10 The ..... submitted a report about the crime.

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noun	verb	adjective	adverb
theory	theorize	theoretical	theoretically

11 Scientists ..... that a substance will have a certain medical effect, and then they set up a research study.

12 It was a good idea ....., so they decided to test it.

13 Ideas are ..... before they are tested.

14 The scientists set up the study in order to test the ..... .

noun	noun	adjective	adverb
toxin	toxicity	toxic	toxically

15 Potential drug ..... is a part of every study.

16 Part of drug research involves testing for ..... effects.

17 If one drug reacts ..... with another, you cannot take them both together.

18 Some substances can release ..... into the blood.

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Word Families

B
Choose the correct word family member from the list below to complete each blank.

1	investigation	investigator	investigate
2	theory	theorize	theoretical
3	absorption	absorb	absorbent
4	toxins	toxic	toxically
5	desires	desire	desirably

A good deal of time, effort, and money is required to thoroughly **1**..... a new drug before it can be put on the market. Scientists develop a **2**..... about the ability of a certain substance to combat a specific disease or medical condition. Then they have to test their idea. After manufacturing the drug in the laboratory, they test it first on animals and then on people. They monitor the **3**..... of the drug by the body, and they look for any **4**..... that may be produced as the drug moves through the body. Then they test the drug's ability to combat the disease. If they get the outcome that they **5**..... and the drug cures the disease or alleviates the condition, then it's time to work on marketing the product.

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Paraphrases

Read the sentence from the reading passage. Then, choose the sentence that has the same meaning.

1 *Of the thousands of drugs under investigation at any one time, only a small fraction will produce the desired result without unacceptable side effects.* (paragraph 1)
- **A** Many drugs are studied, but only a few are found to be useable.
- **B** It may be hard to choose the right drug among the many that are available.
- **C** Although drugs are helpful to most people, a small number of people get no effects from them.

2 *Scientists look at how much of the drug is absorbed into the bloodstream, how it spreads to different organs, how quickly it is excreted or leaves the body, and whether it has any toxic by-products.* (paragraph 3)
- **A** Scientists try to find out which parts of the body are most affected by a drug.
- **B** Researchers want to know how much of a drug is needed to treat a specific condition without causing side effects.
- **C** Researchers study how a drug moves through the body, and whether it is poisonous in any way.

Dictionary Skill

DIFFERENT MEANINGS

Many words have more than one meaning.

Read the definitions below. Then read the sentences and write the letter of the correct definition for each sentence.

cul-ture [KUL-cher]
- **A** *noun.* organic materials grown in a laboratory setting
- **B** *noun.* a shared system of beliefs, customs, and language
- **C** *noun.* the arts

..... **1** It is always interesting to learn about the *culture* of another country.

..... **2** A clinic might use a *culture* from the patient to diagnose a disease.

..... **3** Because of their museums, theaters, and libraries, cities have a lot more to offer in terms of *culture* than small towns do.

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Listening

Track 15

*Listen to the conversation. Complete the notes below. Write **NO MORE THAN ONE WORD** for each answer.*

Laboratory Research Project

Steps to follow:

- Grow **1** ..... in the laboratory.
- Introduce different substances.
- **2**..... at regular intervals.
- **3**..... if there are changes.
- Describe the **4**..... in the final report.

Writing (Task 2)

Modern medical science has made it possible to combat many diseases. This is one reason that people are living longer lives now than they did in the past. Discuss the effects this might have on society.

Support your answer with reasons and examples from your own knowledge or experience.

Write at least 250 words.

Speaking

Talk about the following topics.

A lot of money is spent on investigating drugs. Do you think it is desirable to spend so much money on developing new drugs, or should more money be spent on other areas of health care?

What do you think are some of the most important health issues to target?

What do you think is the best way to combat common but potentially dangerous diseases such as influenza?

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