

# 79 Scientific English

## A Research

### Scientific method

Scientific research proposes **hypotheses** as explanations of **phenomena**, and then designs **experimental** studies to gather **empirical** evidence and test them out. It is important these procedures can be repeated in order to predict future results with some certainty. A feature shared by other fields of enquiry is the **conviction** that the process must also be **objective** in order to reduce a **biased** interpretation of the results. Another basic expectation is to make all the data available for **scrutiny** by other scientists. This provides the opportunity to **conduct** further **experiments** to try to **verify** the results.

### GLOSSARY

<b>hypothesis</b> (pl <b>hypotheses</b> )	a possible explanation of sth, based on a few facts but not yet proven: <b>formulate/confirm a hypothesis</b> ; <b>SYN theory</b>
<b>phenomenon</b> (pl <b>phenomena</b> )	sth that happens or exists, especially sth that is not fully understood
<b>experimental</b>	connected with scientific experiments
<b>empirical</b> <i>formal</i>	based on experiments or experience rather than ideas: <b>empirical evidence/knowledge/research</b>
<b>conviction</b>	a strong opinion or belief: <b>a political/moral conviction</b>
<b>objective</b>	based on fact and not influenced by personal feelings or opinion <b>OPP subjective; objectivity</b> <i>n</i>
<b>biased</b>	influenced by personal feelings <b>OPP unbiased</b>
<b>scrutiny</b>	careful and thorough examination: <b>come under close scrutiny</b> <b>SYN inspection; scrutinize</b> <i>v</i>
<b>conduct</b> <i>formal</i>	organize and/or do a particular activity: <b>conduct an experiment / a survey</b>
<b>verify</b>	check or show that sth is true and accurate <b>verification</b> <i>n</i>

1 The pronunciation of the underlined letters is the same as in *sit* in six words, and the same as in *site* in the other three. Divide into them two groups. Use the  to help you.

hypothesis      experimental      empirical      objective      scrutiny  
biased            scrutinize        verify            conviction        conviction

2 Replace the underlined word(s) with a word that keeps the same meaning.

- I don't think the results are influenced by personal feelings. ....
- The results will come under very close examination. ....
- At the moment it's just a working theory. ....
- His views are completely objective. ....
- It is their personal belief that this new drug is completely safe. ....
- They are hoping to carry out a similar experiment. ....

3 Complete the sentences.

- Violence in society is not a new ....
- By repeating the experiment, we can see if we are able to .... the results.
- Do you have any .... evidence to support your theory?
- I'm pleased that the results .... my hypothesis.
- It's a very .... report and lacks objectivity.
- We will need to .... the results carefully.
- They need to carry out further .... studies to confirm the results.

4 Answer the questions.

- What's the opposite of **objective**? ....
- What's the plural of **phenomenon**? ....
- What noun is formed from **objective**? ....
- What's the opposite of **biased**? ....
- What's a synonym for **theory**? ....
- What noun is formed from **verify**? ....
- What nouns can be used with **conduct**? ....
- What nouns can be used with **empirical**? ....
- What verbs can be used with **hypothesis**? ....
- What adjectives can be used with **conviction**? ....



## B Genetics

**GENE THERAPY:** Genes are the units which control the particular qualities inside a living thing. The process of passing these qualities on from parents to their children is known as **heredity**. *Gene therapy* is a technique for correcting **defective** genes responsible for diseases. It works by **inserting** a normal gene into the **genome** (the complete set of genes in a living **cell**) to replace an **abnormal** gene. A carrier **molecule** called a **vector** must be used to deliver the normal gene to the patient's target cells. But there are many **limitations**:

- the **rapidly** dividing nature of many cells means that gene therapy may be **short-lived**
- the normal gene may be attacked by the patient's **immune system**
- gene therapy works best on disorders **arising** from the **mutation** of a single gene.

### GLOSSARY

<b>therapy</b>	the treatment of a physical problem or an illness as explained in the text
<b>heredity</b>	<b>hereditary</b> adj
<b>defective</b>	having a fault or faults <b>SYN</b> <b>faulty</b> ; <b>defect</b> n
<b>insert</b> (sth into sth)	put sth into sth else, or between two things <b>insertion</b> n
<b>cell</b>	the smallest unit of living matter that can exist; all plants and animals are made up of <b>cells</b> : <b>blood</b> / <b>brain cells</b>
<b>abnormal</b>	different from what is expected, and often harmful or unwanted
<b>molecule</b>	the smallest unit (of two or more <i>atoms</i> ) that a substance can be divided into, without changing its chemical nature <b>molecular</b> adj
<b>limitation</b> (usually pl)	a limit on what sb/sth can do or how good they/it can be
<b>rapidly</b>	very quickly <b>rapid</b> adj
<b>short-lived</b>	only lasting for a short time <b>OPP</b> <b>long-lived</b>
<b>immune system</b>	the system in your body that produces substances to help it fight against infection and disease <b>immunity</b> n
<b>arise</b>	(especially of a problem) start to happen or exist <b>SYN</b> <b>occur</b>
<b>mutation</b>	(in biology) a process in which genetic material changes in structure when it is passed on <b>mutate</b> v

### SPOTLIGHT unit

A **unit** can be a thing, person or group that is complete in itself but can also form part of something larger.

- The **basic unit** of society is the **family**.
- a **maternity unit** in a hospital
- the **central processing unit** of a computer

#### 5 Underline the stress on these words. Use the to help you.

therapy hereditary abnormal molecule molecular immune mutate defect n

#### 6 Circle the correct answer.

- 1 The unit is **defective** / **defaulty**.
- 2 Is this particularly **unnormal** / **abnormal**?
- 3 The ward is in the **maternity unit** / **system**.
- 4 Arthritis can be **heredity** / **hereditary**.
- 5 The effects are **short-living** / **short-lived**.
- 6 a healthy **immune** / **immunity** system
- 7 The fault's in the central **processor** / **processing** unit.
- 8 The spread of the disease is a **rapid** / **rapidly** process.
- 9 Happily, the benefits are **short** / **long**-lived.
- 10 This vaccine provides **immunity** / **heredity**.

#### 7 Complete the sentences.

- 1 Gene ..... has been used to restore the function of ageing brain ..... in monkeys.
- 2 The problem was caused by the ..... of the genes as they were passed on.
- 3 The doctor ..... a tube into the patient's stomach.
- 4 Cancer ..... are constantly dividing, and that can happen very .....
- 5 Problems can ..... when there is a ..... in one or more genes in the body.
- 6 If an illness can be passed from parents to their children, it's a problem of .....
- 7 The technique involves the ..... of genes for nerve growth into the brain.
- 8 In ..... science, a ..... is a stable unit comprising two or more atoms.

### TEST YOURSELF