

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

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

- 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 APP to help you.

hypothesis experimental empirical objective scrutiny
biased scrutinize verify 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*?



TEST YOURSELF

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

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

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 **APP** 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