

Students Learning Outcomes

After reading the lesson the students will be able to:

- apply critical thinking to interact with text and use intensive reading strategies (while-reading) to
 - scan to answer short questions.
 - deduce meaning of difficult words from context.
 - comprehend / interpret text by applying critical thinking.
- write a unified paragraph on a given topic to show
 - appropriate pronoun-antecedent relationship and transitional devices within a paragraph.
 - chronological / sequential / spatial order of arranging detail.
- classify, use, convert and make declarative (affirmative and negative), interrogative, exclamatory, and imperative sentences.
- identify and differentiate between simple, compound and complex sentences.
- utilize appropriate informational sources including encyclopedias and internet sources.
- use critical thinking to respond orally and in writing to the text (post-reading) to
 - give a personal opinion and justify stance related to viewpoints/ ideas and issues in the text read.
 - explore causes and consequences of a problem or an issue and propose various solutions.
 - evaluate material read.
- write a persuasive/argumentative essay on a given topic:
 - distinguish fact from opinion.
 - state an opinion on the topic.
 - list ideas and arguments that support opinion.
 - organize ideas and supporting arguments in a clear, structured and logical manner.
 - distinguish between language used for persuasion and propaganda.
 - use persuasive language to enhance ideas.

Pre-reading

- Look at the pictures and predict what the lesson is about.



1957 - 840g



1978 - 945g



2005 - 2202g



Reading

Several centuries ago, when people started domesticating crops and animals, they also began selection of better plants and animals for breeding, initially unknowingly and later on intentionally. Over thousands of years, farmers have developed plants with desirable traits, such as increased resistance to disease, larger yield, and greater nutritional content. Scientific discoveries and technological advances have continuously improved agriculture to improve plant and animal stocks to meet changing societal needs. But the turning point in this field was the discovery of the gene and the consequent development of genetics.

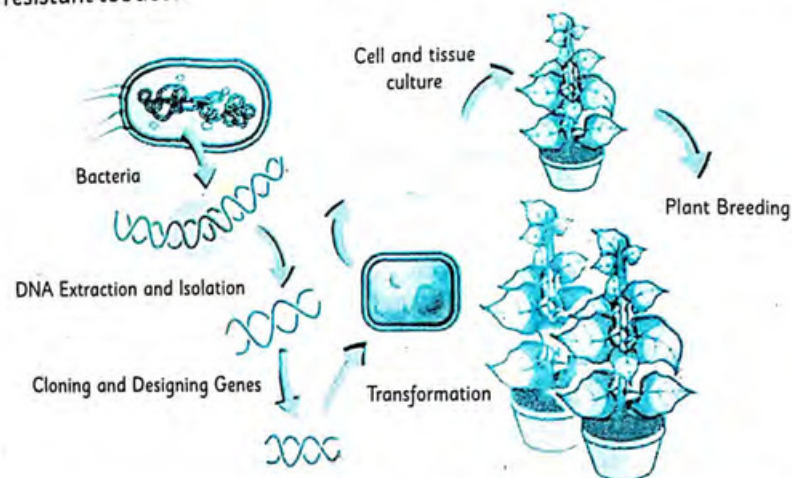
Genetics is the study of genes, genetic variation, and heredity in living organisms. It is generally considered a field of biology, but intersects frequently with many other life sciences. Genes are subunits of DNA (Deoxyribonucleic acid), the information database of any organism that is contained inside the cell nucleus. DNA carries many pairs of genes that transmit character traits of parents to their offsprings.

Genetically modified food or GM food is food produced from plants or animals whose DNA has been altered through genetic engineering. These genetically modified organisms are often shortly called GMOs. Genetic engineering is the process of manipulation of an organism's genes directly by transplanting DNA from other organisms in its cells. It is different from the conventional method of selection and breeding of plants and

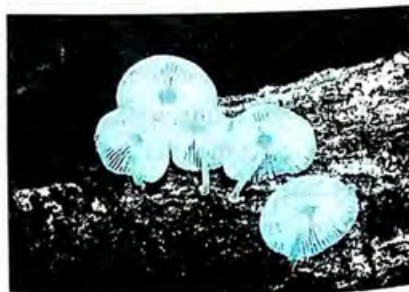


animals to get desired traits.

Scientists first discovered in 1946 that DNA can be transferred between organisms. It is now known that there are several mechanisms for DNA transfer and that these occur in nature on a large scale. The transfer of DNA between disease causing bacteria for developing resistance against antibiotic is a major example of this mechanism. The first genetically modified plant was produced in 1983, using an antibiotic-resistant tobacco plant. China was the first country to commercialize a transgenic crop in the early 1990s with the introduction of virus resistant tobacco.



Starlight Avatar is the first genetically engineered plant that is able to light up without the need for external treatments or stimuli such as chemicals or ultraviolet lighting. The plant has been developed through the introduction of DNA from luminescent marine bacteria into the chloroplast genome of a common houseplant. The stem and leaves of the plants constantly emit a faint light similar to that produced by fireflies and other luminescent organisms.



Similarly, an insect protection gene called *Bacillus thuringiensis* (Bt) has been transferred to several crops such as cotton, potatoes and corn in order to repel

pests. Tomato genes have been modified so that the fruit can stay on the vine for a long time and develop mature flavour. Highly fatty soya bean has been genetically modified to produce beans containing less fat. The commercial production of human insulin using a bacterium *E. coli* is another wonder of genetic engineering.

In 2007, South Korean scientists altered a cat's DNA to make it glow in the dark. In China, a group of scientists developed transgenic cows that were engineered to produce an antimicrobial enzyme that is present in large amounts in human milk. In another set of experiments, cows were genetically engineered that produce milk containing certain immunity-providing proteins of human milk.

A few decades ago, manipulation of genes in people, plants, and animals was just science fiction. Today, it is a reality, and genetic modification may have many positive applications in the future, including the eradication of many hereditary diseases. However like most scientific and technological advances, the genetic modification of organisms for our food supply can be as dangerous as it is beneficial. Because of the potential dangers of this technology, genetically altered plants and animals in the food supply is a practice that should be very tightly controlled and carefully studied before it becomes an accepted and common practice. Unfortunately, it may already be too late for that.

GMOs are already prevalent in supermarkets and grocery stores across the world, but manufacturers are not required to label foods as having been made

Bt gene is transferred from the *Bacillus* into corn



Corn borer feeds on the corn plant and ingests the protein encoded by the Bt gene.



The Bt protein penetrates and collapses the cell lining, the gut and the insect dies.



from GMOs. As a result, millions of people purchase and eat GMOs every day without even knowing it. Yet we do not even know if they are harmful to our health. We do not really know how GMOs may affect our bodies or our ecosystem. When we play with DNA, we may be making changes that have all sorts of dangerous repercussions, including some that we may not even realize for several generations. One of the main concerns about GMOs is the unpredictability of the behavior of altered genes and of the bacteria, plants, and animals that interact with the altered organism. For example, a crop of corn genetically modified to be less susceptible to a particular insect may take on other unwanted characteristics due to the change. It may, for example, become more susceptible to another disease, or it could develop a tougher skin on its kernels, or it could decrease the crop's ability to produce vitamin E. More frightening is the domino effect of genetically modifying foods. Any change in an organism's DNA has the potential to affect not only the organism but also anything that feeds on it, including us. Studies where, genetically modified soy and corn were fed to mammals found that a GMO diet often led to liver and kidney problems.

Further, genetically modified plants or animals could interbreed with wild populations, creating problems such as population explosions or crashes or offspring with dangerous traits which would go further to harm the delicate ecosystem.

With the rapid development of science and technology more variety of Genetically Modified food and organisms will come into our life and surrounding due to the desire to make more food available more quickly and more cheaply than ever before. The general behaviour of the developer of this type of organisms and food should be profit with safety of consumers and the environment. The agribusiness needs to slow down and stop selling us GMOs until their safety is certain.



Glossary

Words	Meaning
domesticate	to make a wild animal used to living with or working for humans
Genetics	the scientific study of the ways in which different characteristics are passed from each generation of living things to the next
modify	to change something slightly, especially in order to make it more suitable for a particular purpose
transplant	to take an organ, skin, etc. from one person, animal, part of the body, etc. and put it into or onto another
conventional	tending to follow what is done or considered acceptable by society in general; normal and ordinary, and perhaps not very interesting
genome	the complete set of genes in a cell or living thing
trait	a particular quality in your personality
manipulate	to control or influence somebody/something, often in a dishonest way so that they do not realize it
ultraviolet	light waves that are just shorter than those of violet light in the spectrum and that cannot be seen
eradicate	to destroy or get rid of something completely, especially something bad
hereditary	(especially of illnesses) given to a child by its parents before it is born
fluorescent	(of substances) producing bright light by using some forms of radiation

transgenic	(of a plant or an animal) having genetic material introduced from another type of plant or animal
antimicrobial	acting opposite of extremely small living thing that you can only see under a microscope and that may cause disease
explosives	easily able or likely to explode
susceptible	liable to be influenced or harmed by a particular thing
potential	that can develop into something or be developed in the future
alter	to become different; to make somebody/something different
prevalent	that exists or is very common at a particular time or in a particular place
grocery	connected with food and other goods sold by a grocer or at a supermarket
ecosystem	all the plants and living creatures in a particular area considered in relation to their physical environment
repercussion	an indirect and usually bad result of an action or event that may happen sometime afterwards
unpredictable	that cannot be predicted because it changes a lot or depends on too many different things
susceptible	very likely to be influenced, harmed or affected by somebody / something
kernel	the inner part of a nut or seed
domino effect	the situation in which one event causes a series of related events, one following another. The term is used as analogy to a falling row of dominoes
stimuli	something that helps somebody/something to develop better or more quickly

luminescent	The property of a substance emitting light without being heated
marine	connected with the sea and the creatures and plants that live there
genes	a unit inside a cell which controls a particular quality in a living thing that has been passed on from its parents
consequence	a result of something that has happened
agribusiness	an industry concerned with the production and sale of farm products, especially involving large companies

Exercise

Comprehension

A. Answer the following questions.

1. What is gene and genetics?
2. Why is the discovery of gene called a game changer in biological sciences?
3. What is genetic engineering? What role does genetic engineering play in producing genetically modified organisms?
4. Name some GMOs and describe their characteristics by showing how they are different from naturally occurring organisms.
5. Write at least two merits and two demerits of GMOs.
6. What in your opinion will be the effect of GMOs on our lives, life-style and environment in the future?
7. Have you ever used genetically modified foods? Give your suggestions and solutions for the safe use of genetically modified foods.

B. Choose the correct option in the following statements.

- The information database of an organism is called _____.
 a) cell
 b) genetic
 c) genetic engineering
 d) genes
- But turning point in this field was discovery of the gene. In this sentence the phrase "turning point" means _____.
 a) a point in a chain of events at which an important change occurs
 b) a point at which something rotates
 c) a point where road branches off into two
 d) a situation in which no change takes place in the chain of events
- "Scientists first discovered in 1946 that DNA can be transferred between organisms". The idea expressed in this statement is based on _____.
 a) fact
 b) opinion
 c) textual inference
 d) textual argument
- After carefully reading the text "Genetically Modified Organisms", it looks to be _____.
 a) narrative
 b) expository
 c) transactional
 d) argumentative
- "A few decades ago, manipulation of genes in people, plants, and animals was just science fiction". This sentence means _____.
 a) a few decades ago genes were multiplied and fixed in science lab with difficulty
 b) a few decades ago the movement of genes in people, plants and animals was not as fast as it is today
 c) a few decades ago control of genes was discussed in great detail in stories based on science
 d) a few decades ago control of genes in living organisms seemed imaginary and was not possible in the real world

Vocabulary

Deduce the meaning of unfamiliar words from the context by using evidence from the text and explain if you were correct, close, or totally off and why you think that happened.

Words/ phrase	What you infer the meaning is	Explain why and use evidence from text.	Dictionary definition	Correct, close, or totally off and why that happened?
breeding				
manipulation				
resistance				
stimuli				
luminescent				
evaporates				

Writing

- Keeping in view the text and recent advances of science, write argumentative essay on the topic "Truth Is Stranger than Fiction".
- Search the internet about genetic modifications made in animals and write a paragraph on the first sheep ever cloned called "Molly / Dolly".

Listening and speaking

Make groups comprising of five student each and discuss with each other the possible impact of genetically modified food on our future generations.

Grammar

Types of Sentences

There are four common types of sentences in English. Each sentence type has a different purpose:

- ▷ to make statements (declarative sentences)
- ▷ to ask questions (interrogative sentences)
- ▷ to give commands, suggestions, warnings (imperative sentences)
- ▷ to express strong emotions with statements (exclamatory sentences)

Classify the following sentences as declarative, interrogative, imperative or exclamatory.

1. Yikes! I feel terrible that you got into an accident this morning.
2. Where is the school?
3. The smoke alarm battery should be changed at least once a year.
4. Shut that door now.
5. I love this plant!
6. Slow down before you get into an accident.
7. How many students are in your class?
8. Did I say anything to make you angry?

Changing an affirmative sentence into negative, interrogative and exclamatory

Study the following sentences. They are in the pattern:

adjective + of + noun / pronoun + to-infinitive

Examples:

- ▷ It was good of him to help the poor man. (**affirmative**)
- It was not good of him to help the poor man. (**negative**)
- How good of him to help the poor man! (**exclamatory**)
- Was it good of him to help the poor man? (**interrogative**)
- ▷ Shazia passed the test. (**affirmative**)
- Shazia did not pass the test. (**negative**)
- Hurray! Shazia passed the test. (**exclamatory**)
- Did Shazia pass the test? (**interrogative**)

- ▷ Peshawar is a very big city. (**affirmative**)
- Peshawar is not a very big city. (**negative**)
- What a big city Peshawar is! (**exclamatory**)
- Is Peshawar a very big city? (**interrogative**)

Rewrite the following sentences in negative, exclamatory and interrogative forms.

1. It is kind of you to invite us.
2. He is very generous.
3. She is very knowledgeable.
4. Gold is very precious.
5. The wind is blowing from the west.

Simple Sentence

A simple sentence is the simplest form of a **sentence**. It contains the basic components that make a sentence, that is, **subject**, **verb**, and the complete thought. It has one subject and one predicate. A simple sentence has one independent clause and no dependent clause. Therefore, a simple sentence is also referred to as an independent clause.

Simple
Sentence

=

Independent
Clause

Examples:

She cried. (She = subject, cried = verb)

Sarah liked the book. (Sarah = subject, liked = verb, book = object)

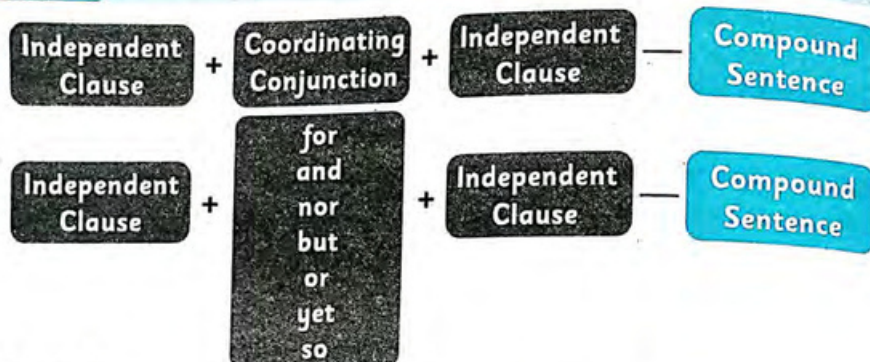
They were late. (They = subject, were = verb, late = adjective)

My mother and I waited for my father. (My mother and I = subject, waited = verb, for my father = object of preposition)

She didn't want to go to school. (She = subject, didn't want = verb, to go to school = object of preposition)

Compound Sentence

A compound sentence has two or more independent clauses. These clauses are combined with the use of a **coordinating conjunction**. (**for, and, nor, but, or, yet, and so**)

**Examples:**

It is also important to notice that punctuation can be used to form a compound sentence; using a dash or a semicolon between two independent clauses can also create compound sentences.

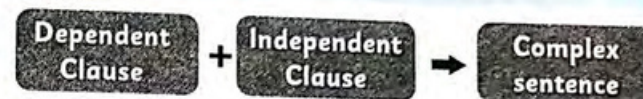
Example:

- He bought me a dress, but I didn't like its colour.
- Saleem has returned home, so we didn't meet him.
- He can lift it with one hand—I've seen him doing it.

Complex Sentence

A complex sentence is made up of an independent clause and one or more dependent clauses connected to it. In complex sentences, the clauses are connected by **subordinating conjunctions**. Some common subordinating conjunctions include **when, until, because, while, if, although, after, as, before, whenever, since, and whereas**.

You can construct a complex sentence by including the dependent clause first, followed by the independent clause.

**Example:**

Note that a comma should be used at the end of the dependent clause if you are writing the dependent clause first. However, if you are including the independent clause first, a comma should not be used.

State whether the following sentences are simple, compound or complex?

1. The house was destroyed in the fire, but the whole family was saved.
2. Walking through the wood, he saw a fox that was following him.
3. The large horses walked slowly.
4. If I do not get this job, I will start a business.
5. He said that he was so disappointed that he would not try again.
6. The men who rule the world with their pens are mightier than those who rule the world with their swords.
7. Javed and Palwasha went home.
8. The evil that men do lives after them.
9. All that glitters is not gold.
10. Neither the colour nor the design of this cloth appeals to me.