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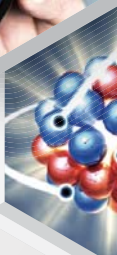
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Strategies for Better Reading Comprehension of English in Science and Technology Fields

All readers encounter words they don't know while reading. The first response of the reader may be to look up the word in a dictionary. However, it is not always possible or the best strategy to look up new words in the dictionary when you read. Many sentences and paragraphs include enough information for a reader to use **context clues** and **word analysis** to figure out the meaning of new words.



Strategy 1

CONTEXT CLUES

Readers use the words surrounding the unknown word to help determine the unknown word's meaning. There are many different types of context clues; the clues may appear within the same sentence as the word, or they may be in a preceding or subsequent sentence.

1. Definition

Sometimes a word is clearly defined in a sentence or paragraph.

- 1 The unknown word can be defined immediately following its use by using a brief definition, separated from the unknown word by punctuation—commas, parentheses or dashes.
- 2 The use of a "to be" verb indicates that the two ideas are the same.
 - **Archaeologists**, anthropologists who study prehistoric people and their culture, search ancient sites for artifacts.

Light-Emitting Semiconductors



1

Through **innovations** in technology, natural lighting substitutes have rapidly **proliferated** over the past two centuries.

Incandescent light experiments began in the early 1800s. Incandescence is produced by light **photons emitted** from **atoms** heated to a high temperature (about 2200°C) by electrically-generated **electrons** moving along the **filament** in the bulb. Nearly 90 percent of the heat is lost in this process, creating a soft



▲ incandescent light bulb



▲ fluorescent light bulb

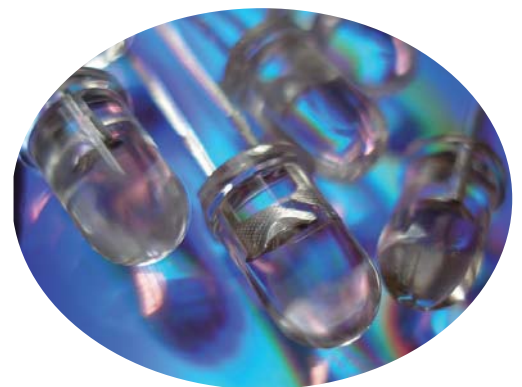
light and virtually no energy efficiency. **Fluorescent** lamps soon followed, and they produced a much brighter light by using a coating of **phosphor** powder in the tube. When the heated **mercury** atoms collide with the phosphor, the phosphor atoms heat even hotter, giving off a bright light. Little energy or heat is wasted in a fluorescent lamp, so it is much more energy efficient than incandescent lamps.

2 Far exceeding the energy efficiency of the incandescent and fluorescent light is **solid** state lighting, which utilizes light-emitting diodes (LED) for **illumination**. LED's were first developed in the 1960s, but they did not become widely used until the 1980s. The light of the LED is emitted from a solid semiconductor rather than from a filament or tube. The most common **semiconductor** is **silicon**, although other chemical elements or compounds can be used, and it conducts electricity according to its impurities, either by adding more electrons to create more energy (N-type materials) or by creating holes defined by electron deficiencies (P-type materials). Either **impurity** creates more electron movement, thus generating more energy.

3 The solid semiconductor used to produce light is called a **diode**, which is a combination of n and p materials that conducts electrons from one to the other, but not in **reverse**. When the semiconductor diode is subjected to electrical **current** (it is encased in a housing attached to an electrical current source), it produces visible light. Initially, LEDs emitted only low light and were too expensive for most lighting applications. Early applications, then, were mostly as solid-state indicator lights on devices such as instrument panels, appliances, and dashboards. LED brightness has



▲ LED lights



▲ light emitting diodes



Conservation Farming



1

Conservation farming or **husbandry** is a type of farm management that **preserves** natural resources and potentially increases crop production. One of the primary tasks in conservation husbandry is soil management, which includes specific **tilling** practices, or conservation tillage, and appropriate crop **rotation** patterns. Other significant conservation practices are water and pest management.



▲ conservation farming

2 Conservation tillage is any planting system in which after planting at least 30% of the soil surface remains covered with residue — the material left after harvest and processing of crops. The residue cover helps to reduce soil erosion, control weeds, and improve **nutrient** levels in the soil. There are several types of conservation tillage available to farmers.

- **No-till:** leaves the soil and crop residue undisturbed except for the crop row where the seed is placed in the ground. Weeds are controlled by small amounts of **herbicides**.
- **Ridge-till:** roughly 10-15 centimeter high ridges are formed and rebuilt during row **cultivation** for weed control. Residue is left on the surface between ridges.
- **Mulch-till:** entire fields are tilled before planting, but at least 30 percent of the soil surface is left covered with residue after planting.
- **Reduced-till:** entire fields are tilled before planting, but 15-30 percent of the soil surface is left covered with residue after planting.



▲ Soil erosion is a serious problem for farmers.



▲ Young soybean plants both thrive in and are protected by the residue of a wheat crop. This form of no-till farming provides good protection for the soil from erosion. (Wikipedia)



▲ corn harvest on a field planted with the ridge-till method in southwestern Minnesota



▲ the mulch-till method used on a sugar beet field, Switzerland (cc by Volker Prasuhn)

Forests and Their Threats



▲ A forest is land with at least 10% tree cover.



1 **N**early one third of the world's land is covered by forests. Forests are defined in various ways, but in general, a forest is land with at least 10 percent **canopy**, or tree cover. Over 60 percent of the world's biodiversity is contained in forests, providing essential ecological, cultural, and economic resources. For instance, trees **perpetuate** the water cycle to enhance **rainfall**. They absorb carbon dioxide to help regulate both the natural and the **human-induced greenhouse** effect. Also, forests help prevent flooding and soil erosion, and provide opportunities for recreation and tourism. Many economic resources, including **medicinal** plants, fruits, meat, firewood, and lumber, come from forests. For **indigenous** peoples, forests represent cultural identity and provide a place for special ceremonies or customs.

► Over 60% of the world's biodiversity is contained in forests.





▼ Forests represent cultural identity for indigenous people.

▲ ► Many economic resources come from forests.

2 Forests are **periodically** threatened by natural forces, such as weather disturbances, fire, or volcanic activity. Although these events can cause **widespread** forest damage, the loss is never complete. Forest biodiversity has a remarkable ability to regenerate relatively quickly (usually in less than 150 years) and return to or **exceed** its previous levels.

3 The greatest loss of forests, or deforestation, comes from human activity. Deforestation is the process of clearing the world's forests on a **massive** scale and converting the land to non-forest use. There are both direct and indirect, or **underlying**, causes of deforestation. Early efforts to mitigate deforestation and its damaging impact focused only on direct causes:

- The need for agricultural land causes much of the forest destruction. **Subsistence** farmers cut trees over a few acres and burn them, a process called "**slash** and burn." When the soil loses its **fertility**, the farmers then turn to cattle raising. After the land becomes so **severely degraded** that it is unusable, the farmers abandon the area.
- **Clearcut** logging (removing vast amounts of trees), **selective** logging, and construction of logging roads have caused catastrophic flooding in countries such as China, and have cleared over 90 percent of the primary forest in parts of Europe.
- Extensive migration and urbanization, which occurs often because of **population** pressures, consumes forest land and building materials. Construction and human **intrusion** due to tourism **deplete** and pollute forest resources.

► deforestation



A

Using the **root word** clues, identify the correct target word for each definition.

- 1 If **perpetual** means lasting or continuing indefinitely, then to cause something to exist continually, indefinitely, permanently is to _____
- 2 If **medicine** is an agent, such as a drug, used to treat disease or injury, then something having the properties of medicine is called _____
- 3 If **period** means the duration of one cycle of a regularly recurring action or event, then when something recurs or reappears from time to time, it is called _____
- 4 If **under** means beneath the surface of and **lying** means to be situated, then located beneath or below something is called _____
- 5 If **subsist** means to maintain or support with provisions, then the state of having minimal or marginal resources for subsisting is called _____
- 6 If **severe** means very bad in degree or extent, then to a severe or serious degree is called _____
- 7 If **grade** means a place on a scale of quality, rank, or size, then to fall below a normal state or deteriorate is called _____
- 8 If **select** means to choose something in preference to another or others, then characterized by very careful choice is called _____
- 9 If **intrude** means to thrust oneself in as if by force, then any entry into an area not previously occupied is called _____
- 10 If **extract** means to pull out or uproot by force, then the action of taking out something, especially by using effort or force, is called _____
- 11 If **populate** means to provide with inhabitants, then all the inhabitants of a place is called _____
- 12 If **mass** means a large quantity or number, then something that is large-scale, extensive, or of wide extent is called _____

B

Combine the following words to create **compound words** found in the article above, and match them with the correct definition. Some compound words are created using a **hyphen**.

clear	consumption	income	owner	rain	over	land
induced	low	spread	sensing	remote	impact	fall
house	human	green	wide	cut	high	

- () 1 having all of its trees cut down
 () 2 the amount of precipitation falling over a given area in a given period of time
 () 3 widely extended
 () 4 situations where consuming of available goods is so high that sustainability is not achieved.
 () 5 of or pertaining to those with a larger income than the average
 () 6 the technique or process of obtaining data or images from a distance, as from satellites or aircraft
 () 7 causing little or no damage to the surrounding environment
 () 8 an owner or proprietor of land
 () 9 relating to or contributing to the greenhouse effect
 () 10 brought on; brought about; caused by human actions

C Each of the following groups of words contains a target word and three words, two of them related to the target word. Choose the word which isn't related to the target word.

- | | | |
|--|--|---|
| () 1 canopy
a. cover
b. opening
c. sunshade | () 5 deplete
a. reduce
b. exhaust
c. increase | () 9 extraction
a. removal
b. insertion
c. withdrawal |
| () 2 indigenous
a. alien
b. native
c. original | () 6 tenure
a. occupation
b. residency
c. vacancy | () 10 degrade
a. promote
b. reduce
c. worsen |
| () 3 exceed
a. surpass
b. deduct
c. eclipse | () 7 subsistence
a. lack
b. support
c. maintenance | |
| () 4 massive
a. tiny
b. imposing
c. monolithic | () 8 intrusion
a. invasion
b. imposition
c. exit | |