Inferencing/ Lexical Inferencing

Inferencing is the process which a reader must go through to get from the literal meaning of what is written to what the writer intended to convey. It involves using what you know to make a guess about what you do not know, or reading between the lines.
It involves the use of clues in a text along with the reader´s own experiences to help figure out what is not directly stated. This technique entails decoding information from a text and using mental resources to understand a text's deeper meaning.

Lexical inferencing is a great tool to use when encountering unfamiliar vocabulary. It involves guessing intelligently the meaning of new words by using the context.
When encountering unfamiliar words, clues from the text known as context clues can be used. Context clues can be definitions, descriptions, examples, explanations, synonyms, and antonyms.

Ultra-thin layers of rust generate electricity from flowing water

1. Predicting (5)
According to the cues provided, what is the text about?

a. Rust is a common problem on infrastructure
b. Iron oxide can convert kinetic energy of saltwater into electricity
c. The electrokinetic effect will replace solar power
d. A new discovery to be used in specific scenarios

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There are many ways to generate electricity-batteries, for example solar panels, wind turbines, and hydroelectric dams; and now there is rust. A new research conducted by scientists at Caltech and Northwestern University (US) shows that thin films of rust - iron oxide - can generate electricity when saltwater flows over them. These films represent an entirely new way of generating electricity and could be used to develop new forms of sustainable power production.

Interactions between metal compounds and saltwater often generate electricity, but this is usually the result of a chemical reaction in which one or more compounds are converted to new compounds. Reactions like these are what is at work inside batteries. In contrast, the new phenomenon discovered by Tom Miller, Caltech professor of chemistry, and Franz Geiger, Dow Professor of Chemistry at Northwestern, does not involve chemical reactions, but rather converts the kinetic energy of flowing saltwater into electricity.

The phenomenon, the electrokinetic effect, has been observed before in thin films of graphene and it is remarkably efficient. The effect is around 30 percent efficient at converting kinetic energy into electricity. For reference, the best solar panels are only about 20 percent efficient. "It is basically just rust on iron, so it is pretty easy to make in large areas," says Miller.

Though rust will form on iron alloys on its own, the team needed to ensure it formed in a consistently thin layer. To do that, they used a process called physical vapor deposition (PVD), which turns normally solid materials, in this case iron oxide, into a vapor that condenses on a desired surface. PVD allowed them to create an iron oxide layer 10 nanometers thick. When they took that rust-coated iron and flowed saltwater solutions of varying concentrations over it, they found that it generated several tens of millivolts and several microamps per cm-2.

The mechanism behind the electricity generation is complex, involving ion adsorption and desorption. The ions present in saltwater attract electrons in the iron beneath the layer of rust. As the saltwater flows, so do those ions, and through that attractive force, they drag the electrons in the iron along with them, generating an electrical current.

Miller says this effect could be useful in specific scenarios where there are moving saline solutions, like in the ocean or the human body. "For example, tidal energy, or things bobbing in the ocean, like buoys, could be used for passive electrical energy conversion," he says. "You have saltwater flowing in your veins in periodic pulses. That could be used to generate electricity for powering implants".

https://www.sciencedaily.com

2.Skimming (30)

Choose from the list **A-G** the main idea for paragraphs **1-6**. There is one extra letter that you do not need to use.

A. The phenomenon studied is 30 % efficient at turning power into electricity.
B. A new phenomenon has been discovered to convert electricity from rust.
C. According to scientists the electrokinetic effect could be practical in precise contexts with saline solutions.
D. Soon, this technology will be the most common way to generate electricity.
E. The study turns kinetic energy of flowing saltwater into electricity. Electric current is not generated by chemical reaction but by an attraction force of ions and electrons.
F. The process of physical vapor deposition enabled the creation of an iron oxide layer to be used with saltwater to generate power.

Paragraph 1 ☐
Paragraph 2 ☐
Paragraph 3 ☐
Paragraph 4 ☐
Paragraph 5 ☐
Paragraph 6 ☐

2. Scanning (10)

1. ***What are some examples of electricity generation sources?***
   a. Solar Energy
   b. Wind Power
   c. Hydro Power
   d. All of the above

2. ***Why does iron oxide represent a new way to generate electricity?***

a. It is 100% efficient
b. It only needs batteries
c. It can be produced in South America
d. It has potential for sustainable power production

3. ***Which organizations of leading research are involved in the study?***

a. British
b. Spanish
c. American
d. Ukranian

4. ***What happens inside a battery?***

a. Metal compound interaction
b. Chemical reactions
c. Compound conversion
d. All of the above

5. ***Why is this new phenomenon discovered by Miller and Geiger particular?***

a. It does not use salt water
b. There is no chemical reaction
c. It uses graphenes
d. It is NOT mentioned

6. ***How efficient is the electrokinetic effect?***

a. Remarkably efficient
b. 30% efficient
c. More efficient than solar panels
d. All of the above

7. ***What does PVD stand for?***

a. Power Vapor Deposition
b. Physical Vapor Deposition
c. Phenomenon Vapor Desorption
d. It is NOT mentioned

8. ***What does the PVD process do to solid materials?***

a. It freezes solid materials
b. It carries solid materials from one place to another
c. It turns solid materials into vapor
d. It conserves solid materials

9. ***What important processes are mentioned to generate electricity in paragraph 4?***

a. Physical Vapor Deposition
b. Adsorption and Desorption
c. Kinetic and Potential energy
d. Alloying and Conversion

10. ***The text does NOT mention:***

a. What the electrokinetic effect is
b. How efficient the electrokinetic effect is to generate electricity
c. Where the electrokinetic effect can be used
d. When the electrokinetic effect to generate electricity will be used

3. Inferencing (25)

1. What does kinetic energy refer to?

a. Energy from fossil fuels
b. Energy due to motion
c. Energy due to a rise in temperature
d. None of the above

2. What is "Caltech"?

a. California Institute of Technology
b. California state
c. California cities
d. California map

3. What are instances of sustainable power production?

a. Solar power
b. Wind energy
c. Kinetic energy
d. All of the above

4. What are ions?

a. Particles of matter that uniquely define chemical elements
b. Atoms or molecules that carry an electric charge
c. A group of atoms bonded together
d. Subatomic particles without an electric charge

5. What are electrons?

a. Atoms
b. Iron alloys
c. Negatively charged subatomic particles
d. None of the above

6. What causes iron to rust?

a. Hot weather
b. Films of graphene
c. Iron, oxygen and moisture combination
d. All of the above

7. What is rust?

a. Iron oxide
b. Carbon monoxide
c. Nitrous oxide
d. Acid oxide

8. What does tidal power harness to produce energy?

a. Sunlight
b. Forces from tides
c. Wind
d. Heat from the earth

9. What makes an ideal location for tidal power plants in Argentina?

a. Córdoba
b. Santa Fe
c. Santa Cruz
d. Misiones

10. What is the message of the text?

a. Scientists are using saline solutions to generate electricity
b. The electrokinetic effect is more efficient than solar power
c. Ultra-thin layers of rust will replace solar panels
d. Kinetic energy from saltwater and iron oxide can generate electricity

4. Vocabulary (10)

1. The noun "films" in line 3 can be explained as a:

a. movies
b. plastic-like materials
c. thin layers of something
d. sheets of metal

2. The noun "compounds" in line 7 can be understood as:

a. areas
b. systems
c. layers
d. combinations

3. The noun "graphene" in line 13 can be explained as a:

a. drawing
b. small unit
c. form of carbon
d. system

4. The adverb "remarkably" in line 14 can be replaced by:

a. commonly
b. significantly
c. ordinary
d. meaningless

5. The adverb "pretty" in line 16 can be explained as:

a. quite
b. pleasant
c. elegant
d. enough

6. The verb "ensure" in line 17 can be replaced by:

a. save
b. expect
c. assure
d. trust

7. The verb "drag" in line 25 can be understood as:

a. pull
b. continue
c. force
d. access

8. The noun "scenarios" in line 27 can be understood as:

a. plots
b. books
c. summaries
d. situations

9. The verb "bobbing" in line 28 can be explained as:

a. vibrating
b. rolling
c. flowing
d. moving up and down

10. The verb "powering" in line 31 can be understood as:

a. working
b. having strength
c. providing energy
d. having the control of something