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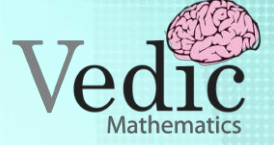
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## Environmental Science & Other Innovations:

### Environmental Science

**Solar Fuels Breakthrough:** A research team has created a plant-inspired molecule that can store four charges using sunlight, a significant step toward artificial photosynthesis. This innovation is notable for its ability to work with dimmer light, bringing it closer to real-world application for solar fuel production.

**Glacier Erosion Modeling:** Scientists have used machine learning to create a model that shows how glaciers erode land at varying speeds, depending on factors like climate and geology. This research will help guide global environmental management and planning.

**Kelp Forest Resilience:** A study from UCLA found that kelp forests within Marine Protected Areas (MPAs) are better able to recover from marine heatwaves. The findings suggest that fishing restrictions and predator protection enhance the ecosystem's resilience to climate change.

**Plastic-Eating Caterpillars:** A new discovery has found that waxworm caterpillars can break down polyethylene plastic, one of the most common plastic pollutants. These "plastivores" metabolize the plastic in just 24 hours, offering a potential natural solution for plastic waste management.

**Greenland's Glacial Runoff:** NASA-backed simulations have revealed that meltwater from Greenland's Jakobshavn Glacier is lifting deep-ocean nutrients to the surface, causing large summer blooms of phytoplankton. These

blooms are a vital food source for the Arctic ecosystem.

### Other Innovations

**Structural Battery Composites:** The World Economic Forum's "Top 10 Emerging Technologies of 2025" report highlights structural battery composites (SBCs). Unlike conventional batteries, SBCs are weight-bearing materials that can also store energy, which could make electric vehicles and aircraft lighter and more efficient.

**Green Nitrogen Fixation:** A new technology for green nitrogen fixation is being developed to reduce the enormous environmental impact of fertilizer production, a process that currently consumes about 2% of the world's energy. This innovation aims to produce fertilizer with significantly less environmental harm.

**Advanced Nuclear Technologies:** There is a renewed wave of innovation in nuclear energy, with a focus on developing Small Modular Reactors (SMRs) and alternative cooling fuels. These advancements aim to lower costs and simplify designs, boosting power generation from nuclear sources globally.

**Tumor-Homing Bacteria:** A groundbreaking study describes a new cancer treatment that uses bacteria to smuggle cancer-killing viruses directly into tumors. This method effectively cloaks the viruses from the immune system, leading to a more targeted and powerful therapy.

**New Blood Test (NasRED):** Arizona State University engineers have developed a new, inexpensive, and portable blood test called NasRED. It uses gold nanoparticles to quickly

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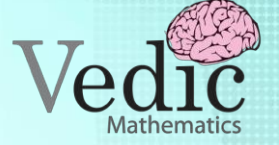
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detect a range of deadly infections like COVID-19, Ebola, and HIV with high sensitivity in just 15 minutes.

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## MCQS

**1. According to the text, what is a key advantage of the new plant-inspired molecule developed for artificial photosynthesis?**

- a) It can store energy as a conventional battery.
- b) It can only work in bright sunlight.
- c) It can work with dimmer light, making it more practical.
- d) It is made from polyethylene plastic.

**Answer: c)**

The text states, "This innovation is notable for its ability to work with dimmer light, bringing it closer to real-world application for solar fuel production."

**2. What is the environmental benefit of the newly discovered waxworm caterpillars?**

- a) They produce a new type of biofuel.
- b) They can break down polyethylene plastic quickly.
- c) They help fertilize soil for agricultural use.
- d) They increase the phytoplankton blooms in the Arctic.

**Answer: b)**

The text mentions that "waxworm caterpillars can break down polyethylene plastic, one of the most common plastic pollutants" and "metabolize the plastic in just 24 hours."

**3. How do Marine Protected Areas (MPAs) help kelp forests, according to the UCLA study?**

- a) By increasing the number of phytoplankton.
- b) By providing a source of artificial light.
- c) By enhancing the ecosystem's resilience to marine heatwaves.
- d) By breaking down plastic pollution.

**Answer: c)**

The text states that "kelp forests within Marine Protected Areas (MPAs) are better able to





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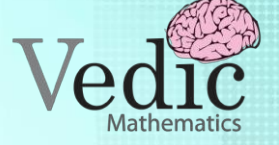
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recover from marine heatwaves," suggesting that fishing restrictions and predator protection enhance the ecosystem's resilience to climate change.

#### 4.What is a key feature of Structural Battery Composites (SBCs)?

- a) They are designed to be a new type of fertilizer.
- b) They are lightweight materials that can also store energy.
- c) They are used to create more powerful nuclear reactors.
- d) They help smuggle viruses into tumors.

**Answer: b)**

The text describes SBCs as "weight-bearing materials that can also store energy," which makes them unique from conventional batteries.

#### 5.What is the purpose of the new blood test called NasRED?

- a) To help researchers model glacier erosion.
- b) To detect a range of deadly infections using gold nanoparticles.
- c) To help bacteria smuggle viruses into tumors.
- d) To help plants store solar energy.

**Answer: b)**

The text explicitly states that the NasRED test "uses gold nanoparticles to detect a range of deadly infections like COVID-19, Ebola, HIV, and Lyme disease."

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