

Name: _____

Date: _____

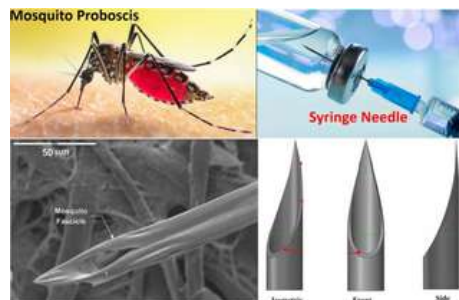
Class: _____

Biomimicry

Part 1: Read the passage carefully. Do the following statements agree with the information in the passage?

THE SECRET OF PAINLESS NEEDLES

In recent years, biomimicry has become an important approach in medical innovation. One of the most fascinating developments is the creation of painless needles inspired by mosquitoes. These insects are able to bite human skin without causing noticeable pain, making them a valuable model for scientists.



Traditional needles are often uncomfortable, which can discourage patients from receiving treatment. To solve this issue, researchers decided to start from scratch and rethink how needles are designed. Instead of following methods strictly by the book, they chose to break the mold and explore ideas from nature.

Mosquitoes use a highly specialized feeding system made up of microscopic structures. These tiny components work together to pierce the skin smoothly while reducing pain. Scientists studied how these insects mimic a gentle entry into the skin, allowing them to avoid detection. In addition, mosquitoes release substances that help repel the body's natural pain response.

Based on these observations, engineers have designed new types of needles with extremely thin, flexible tips. Some models include vibrating mechanisms that use sonic technology to reduce resistance when entering the skin. Others have multiple tiny needle points that imitate the mosquito's structure, allowing for a smoother and less painful injection.

This innovation is considered a game changer in medical technology, especially for patients who require frequent injections. It may also reduce the need for regular maintenance of equipment, as the new designs cause less damage to tissue and materials. In addition, these needles are being developed as a more sustainable option, using fewer resources and producing less medical waste.

The development process has placed scientists ahead of the curve, as they continue to explore how nature can inspire better healthcare solutions. Early testing results suggest that these new needles are both effective and practical. In fact, some researchers believe they have truly nailed it in creating a design that could transform patient experience.

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- TRUE** *if the statement agrees with the information in the passage*
- FALSE** *if the statement does not agree with the information in the passage*
- NOT GIVEN** *if the statement is not mentioned in the passage*

1. Scientists copied traditional needle designs when developing painless needles.
2. Mosquitoes use very small structures to pierce the skin.
3. Some new needle designs use vibration to reduce pain.
4. The new needle design completely removes all pain during injections.
5. The new needles may require less maintenance than traditional ones.
6. The passage states that these needles are already used in all hospitals worldwide.

- | | | |
|----------|----------|----------|
| 1. _____ | 3. _____ | 5. _____ |
| 2. _____ | 4. _____ | 6. _____ |

Part 2: Complete the summary using **NO MORE THAN THREE WORDS** from the passage.

Scientists developed painless needles by studying mosquitoes. These insects use (1) _____ structures to pierce the skin gently. Researchers observed how mosquitoes (2) _____ a smooth entry into the skin and reduce pain. Instead of following traditional methods (3) _____, scientists redesigned the needle. As a result, the new design is considered (4) _____ in medical technology. It may also reduce the need for regular (5) _____ and provide more (6) _____ solutions in healthcare.