

DESIGN ENGINEERING

Watch the video and answer the questions

1. What key issue did the Shinkansen bullet train in Japan face in 1989 that prompted the redesign efforts?

- A. The train was too slow and inefficient.
- B. The train generated excessive noise when exiting tunnels.
- C. The train was too expensive to maintain.
- D. The train's environmental impact was unacceptable.

2. Which specific bird species inspired the design of the pantograph on the redesigned Shinkansen train?

- A. The Adelie penguin
- B. The owl
- C. The hummingbird
- D. The kingfisher

3. What innovative testing method did the engineering team use to evaluate different nose designs for the Shinkansen train?

- A. They launched scale models down a wind tunnel.
- B. They dropped scale models into water to measure splash patterns.
- C. They built and tested full-size prototypes of the train.
- D. They combined both pipe and water testing to assess pressure and splash.

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4. What were the primary improvements achieved with the redesigned Shinkansen train compared to the original?
- A. It was 10% faster, used 15% less electricity, and remained within noise limits.
 - B. It was 20% faster, used 10% less electricity, and was quieter.
 - C. It was 15% faster, used 20% less electricity, and had a longer range.
 - D. It was 5% faster, used 5% less electricity, and had enhanced safety features.
5. What term is used to describe the process of drawing design inspiration from nature, as exemplified by the Shinkansen train redesign?
- A. Biomimetics
 - B. Bioinspiration
 - C. Biophilia
 - D. Biomimicry
6. According to the passage, what are the three primary ways that designers can mimic nature in their work?
- A. Replicating natural forms, natural processes, and natural functions.
 - B. Incorporating natural materials, natural textures, and natural colors.
 - C. Studying natural behaviors, natural ecosystems, and natural evolution.
 - D. Observing natural aesthetics, natural efficiencies, and natural adaptations.
7. What key advice does Janine Benyus provide for designers who want to benefit from nature-inspired design?
- A. Designers should take biology classes to better understand natural systems.
 - B. Designers should consult with biologists when working on design projects.
 - C. Designers should dedicate more time to observing and studying the natural world.
 - D. All of the above.