



# Light-bending material inspired by clouds for enhanced corner visibility

## Description

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Scientists have found a new way to bend light around corners, inspired by how clouds scatter sunlight. This discovery could lead to advancements in medical imaging, electronics cooling, and even nuclear reactor design.

Daniele Faccio and his team at the University of Glasgow in the UK were surprised that this type of light scattering had not been noticed before. It works similarly to clouds and snow, where light is scattered in all directions. When photons hit the surface of materials like these, they bounce off and are reflected back, instead of penetrating through.

To replicate this process, the team created 3D printed objects using opaque white material with clear tunnels inside. When light shines on the material, it enters these tunnels and scatters, similar to how light behaves on snow or clouds. However, instead of scattering randomly, the photons are directed back to the tunnels by the material. This allows the team to create objects that guide light in a specific way.

This new method of light-bending can improve light transmission compared to solid blocks without clear tunnels. It could be used in various applications, such as medical imaging, cooling systems, and nuclear reactors.

Topics: Light Bending, Scientific Discoveries, Applications in Engineering

## Vocabulary List:

1. **Scattering** /'skæt.ər.ɪŋ/ (noun): The process of spreading out light in different directions.
2. **Photons** /'fəʊ.tɒnz/ (noun): Particles of light that carry energy.
3. **Opaque** /ʊp'peɪk/ (adjective): Not able to be seen through; not transparent.
4. **Bend** /bend/ (verb): To shape or force something into a curve or angle.
5. **Transmission** /trænz'mɪʃ.ən/ (noun): The act or process of passing something from one place or person to another often related to light or signals.
6. **Reactors** /ri'æk.tərz/ (noun): Devices or structures that facilitate a nuclear reaction often for generating energy.

## Comprehension Questions

### Multiple Choice

1. What inspired scientists to find a new way to bend light around corners?

- Option: Clouds scattering sunlight
- Option: Tornadoes bending light
- Option: Underwater light refraction



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Option: Desert mirages

2. How do photons behave when they hit the surface of materials like clouds and snow?

- Option: Penetrate through
- Option: Bounce off and are reflected back
- Option: Get absorbed
- Option: Split into multiple beams

3. What did Daniele Faccio and his team at the University of Glasgow create to replicate the light scattering process?

- Option: 3D printed objects with clear surfaces
- Option: Opaque white material with clear tunnels inside
- Option: Transparent glass structures
- Option: Metallic blocks

4. How does the new method of light-bending improve light transmission compared to solid blocks without clear tunnels?

- Option: It decreases light transmission
- Option: It has no impact on light transmission
- Option: It reflects light away
- Option: It improves light transmission

5. In what applications could the new method of light-bending be used?

- Option: Agriculture and farming
- Option: Medical imaging, electronics cooling, and nuclear reactors
- Option: Fashion design
- Option: Petroleum exploration

6. How do photons interact with the 3D printed objects created by the team at the University of Glasgow?

- Option: They pass through the objects
- Option: They are absorbed by the objects
- Option: They scatter and are directed back to clear tunnels
- Option: They generate heat within the objects

### **True-False**

7. The new method of light-bending could lead to advancements in medical imaging, electronics cooling, and nuclear reactor design.



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8. The light scattering process had been noticed before the discovery by Daniele Faccio and his team.
  9. Light behaves the same way on snow and clouds as it does on the newly created opaque white material.
  10. The photons are randomly scattered by the material in the light-bending process.
  11. The team at the University of Glasgow used metallic blocks with clear tunnels instead of opaque white material.
  12. The new method of light-bending has no impact on light transmission.

### Gap-Fill

13. The team at the University of Glasgow created 3D printed objects using opaque white material with clear tunnels inside to replicate the light scattering process. When light shines on these objects, it enters the tunnels and \_\_\_\_\_, similar to how light behaves on snow or clouds.
14. The new method of light-bending could be used in various applications, such as medical imaging, cooling systems, and \_\_\_\_\_.
15. The discovery by Daniele Faccio and his team at the University of Glasgow could lead to advancements in fields like medical imaging, electronics cooling, and even \_\_\_\_\_ design.
16. The opaque white material with clear tunnels inside allows the team to create objects that guide light in a \_\_\_\_\_ way.
17. The new method of light-bending improves light transmission compared to solid blocks without clear tunnels, indicating that it \_\_\_\_\_ light transmission.
18. When light shines on the 3D printed objects created by the team, the photons are directed back to the tunnels by the material, demonstrating that the objects guide light in a \_\_\_\_\_ way.



## Answer

**Multiple Choice:** 1. Clouds scattering sunlight 2. Bounce off and are reflected back 3. Opaque white material with clear tunnels inside 4. It improves light transmission 5. Medical imaging, electronics cooling, and nuclear reactors 6. They scatter and are directed back to clear tunnels

**True-False:** 7. True 8. False 9. True 10. False 11. False 12. False

**Gap-Fill:** 13. scatters 14. nuclear reactors 15. nuclear reactor 16. specific 17. improves

## Vocabulary quizzes

### Multiple Choice ( Select the Correct answer for each question. )

1. Which term describes someone who is easily affected by external influences?

- Option: A) Sensitive
- Option: B) Safeguarding
- Option: C) Struggling
- Option: D) Turmoil

2. Which term means to fall or drop straight down quickly?

- Option: A) Plummeted
- Option: B) Uncertainties
- Option: C) Reactors
- Option: D) Saga

3. Which term means to express complete disapproval of something?

- Option: A) Condemned
- Option: B) Enrich
- Option: C) Development
- Option: D) Principles

4. Which term describes ignoring or paying insufficient attention to something?

- Option: A) Neglecting
- Option: B) Groundbreaking
- Option: C) Trademark
- Option: D) Struggling

5. Which term refers to the possible effects or consequences of an action or event?

- Option: A) Implications
- Option: B) Tragic
- Option: C) Skeletal



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Option: D) Scatterings

6. Which term denotes a serious disagreement or argument typically a protracted one?

- Option: A) Conflict
- Option: B) Development
- Option: C) Transparent
- Option: D) Neglecting

7. Which term describes something complex and advanced?

- Option: A) Sophisticated
- Option: B) Manipulative
- Option: C) Saga
- Option: D) Tragedy

8. What is a radioactive isotope of carbon known as?

- Option: A) Scatterings
- Option: B) Radiocarbon
- Option: C) Opaque
- Option: D) Transmission

9. Which term means to improve or enhance the quality or value of something?

- Option: A) Devastating
- Option: B) Enrich
- Option: C) Bend
- Option: D) Tragedy

10. Which term refers to the process of growth or advancement?

- Option: A) Saga
- Option: B) Development
- Option: C) Skeletal
- Option: D) Turmoil

**Gap-Fill ( Fill in the blanks with the correct word from the vocabulary list. )**

11. \_\_\_\_\_ measures are essential to protect vulnerable individuals from harm.

12. When light passes through an \_\_\_\_\_ material the photons disperse in random directions.

13. An \_\_\_\_\_ object does not allow light to pass through it.



14. The process of sending data from one location to another is known as \_\_\_\_\_.
15. Light rays undergo \_\_\_\_\_ when passing from one medium to another.
16. Nuclear \_\_\_\_\_ are used to control nuclear fission reactions.
17. The loss of innocent lives in the accident was a \_\_\_\_\_ event.
18. His actions were seen as \_\_\_\_\_ by the community.
19. The family \_\_\_\_\_ spanned over several generations.
20. Historians study the \_\_\_\_\_ of civilizations to understand their development.

**Matching Sentences ( Match each definition to the correct word from the vocabulary list. )**

21. The company was to stay afloat during the economic downturn.
22. After the scandal broke the CEO's reputation overnight.
23. The future of the project is surrounded by due to budget cuts.
24. are elementary particles that constitute light.
25. are utilized in nuclear power plants to generate electricity.
26. The unexpected loss of a loved one is a profound .
27. The framework of the building had to be reinforced for safety.
28. The new technological innovation was considered in the industry.
29. Reading diverse literature can one's understanding of different cultures.
30. One should adhere to ethical even in challenging situations.

## Answer

**Multiple Choice:** 1. A) Sensitive 2. A) Plummeted 3. A) Condemned 4. A) Neglecting 5. A) Implications 6. A) Conflict 7. A) Sophisticated 8. B) Radiocarbon 9. B) Enrich 10. B) Development

**Gap-Fill:** 11. Safeguarding 12. Scattering 13. Opaque 14. Transmission 15. Bend 16. Reactors 17. Tragic 18. Reprehensible





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19. Saga 20. Origins

**Matching sentence:** 1. Struggling 2. Plummeted 3. Uncertainties 4. Photons 5. Reactors 6. Tragedy 7. Skeletal  
8. Groundbreaking 9. Enrich 10. Principles

## CATEGORY

1. Sci/Tech - LEVEL3

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### Author

aimeeyoung99

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