What Is Glass and Contemporary Materials in Architecture?

Worksheet

Contemporary building materials - glass curtain walls, low-E coatings, ETFE, and composite panels - let architects create transparent, lightweight, energy-efficient envelopes that go far beyond traditional load-bearing walls.

Questions

1. What does a Low-E coating on glass primarily do?

A) Tint the glass a color
B) Reflect infrared heat while letting visible light through
C) Make glass unbreakable
D) Increase glass weight

2. What is a major advantage of ETFE over glass for large canopies?

A) ETFE is heavier and stiffer
B) ETFE is far lighter, around 1% the weight of glass
C) ETFE blocks all UV light
D) ETFE cannot be inflated

3. What is a curtain wall?

A) A load-bearing masonry wall
B) A non-structural glass-and-frame facade hung on the building frame
C) An interior fabric curtain
D) A concrete retaining wall

4. Why do double-glazed windows insulate better than single-pane?

A) They are simply thicker glass
B) They trap an insulating air or gas gap between panes
C) They are always tinted
D) They block all sunlight

5. A skyscraper facade uses double-glazed, low-E coated glass instead of single-pane windows. Why?

6. The Eden Project's biomes use ETFE cushions instead of glass panels. What advantage does this give?

7. A museum uses a structural glass curtain wall with no visible mullions on the ground floor. How is this achieved?

8. Define: What is a curtain wall?

9. Define: What does Low-E glass do?

10. Define: What is ETFE?

Answer Key

1. B) Reflect infrared heat while letting visible light through - Low-E coatings reflect infrared radiation, cutting heat transfer while keeping visible light.

2. B) ETFE is far lighter, around 1% the weight of glass - ETFE's very low weight lets it span large areas without heavy structural support.

3. B) A non-structural glass-and-frame facade hung on the building frame - Curtain walls hang off the building's frame and carry only their own weight plus wind.

4. B) They trap an insulating air or gas gap between panes - The trapped air/gas gap between panes reduces heat transfer significantly.

5. Single-pane glass transmits heat easily, raising cooling/heating costs Double glazing traps an insulating air or gas gap between two panes Low-E (low-emissivity) coatings reflect infrared radiation, cutting heat gain in summer and heat loss in winter

6. ETFE (a fluoropolymer) weighs about 1% of equivalent glass Inflated cushions span large curved areas without heavy structural support ETFE transmits more UV light than glass, benefiting plant growth inside

7. Laminated structural glass fins or cables replace steel mullions Glass panels are bolted through point fixings rather than framed edges This creates a nearly seamless, transparent wall while still resisting wind loads

8. A non-load-bearing glass-and-frame facade hung on a building's structure, common in modern towers.

9. A microscopic coating that reflects infrared heat, improving insulation while keeping visible light through.

10. A lightweight, transparent fluoropolymer film/cushion used instead of glass for large canopy structures.