What is Industrial Revolution Architecture?

Worksheet

Industrial Revolution architecture used new materials - cast iron, wrought iron, steel, and glass - and mass production to build factories, railway stations, and exhibition halls, prioritizing function and structural innovation over ornament.

Questions

1. Which material breakthrough allowed the Home Insurance Building (1885) to be called the first skyscraper?

A) Reinforced concrete
B) Full steel-frame skeleton
C) Load-bearing brick
D) Timber trusses

2. The Crystal Palace, built for the 1851 Great Exhibition, was made of

A) Marble and granite
B) Prefabricated iron and glass
C) Reinforced concrete
D) Timber and thatch

3. What structural problem did cast iron solve compared to masonry?

A) It resisted fire better
B) It allowed longer spans under compression
C) It was cheaper to carve
D) It required no foundations

4. Industrial Revolution architecture is best associated with

A) Gothic pointed arches
B) Function-driven use of iron, steel, and glass
C) Hand-carved marble friezes
D) Adobe construction

5. Explain why the Crystal Palace (1851), built in just 9 months, could span 92,000 square meters without interior stone walls.

6. The Home Insurance Building (Chicago, 1885, 10 stories) is called the first skyscraper. Why?

7. Compare the span of a traditional masonry arch bridge (~30 m typical) with the Ironbridge (1779, 30.6 m single cast-iron span) and later steel truss bridges (100+ m).

8. Define: What new materials defined Industrial Revolution architecture?

9. Define: What was the Crystal Palace (1851)?

10. Define: What is considered the first skyscraper?

Answer Key

1. B) Full steel-frame skeleton - Its steel skeleton, not the walls, bore the building's weight.

2. B) Prefabricated iron and glass - It used mass-produced iron modules and glass panes.

3. B) It allowed longer spans under compression - Cast iron's strength let architects span wider spaces with fewer supports.

4. B) Function-driven use of iron, steel, and glass - New industrial materials drove function-first design.

5. Prefabricated cast-iron columns and wrought-iron trusses were mass-produced off-site Standardized glass panes (about 1 million) slotted into a modular iron grid The modular system meant assembly, not on-site stone cutting Result: a vast column-grid interior erected in months, not years

6. It used a full steel/iron skeleton frame instead of load-bearing masonry The frame - not the walls - carried the building's weight This let walls be thinner and windows larger Combined with the safety elevator (patented 1861), it enabled true vertical growth

7. Masonry arches were limited by stone's weak tensile strength Cast iron (Ironbridge, 30.6 m) handled compression better, allowing a single wide arch Steel's superior tensile strength later enabled truss bridges over 100 m Each material leap enabled a longer unsupported span

8. Cast iron, wrought iron, steel, and mass-produced glass.

9. A prefabricated iron-and-glass exhibition hall built for London's Great Exhibition.

10. The Home Insurance Building, Chicago, 1885 - first full steel-frame structure.