YOUNG SMART CITIES

Co-funded by the European Union

Student Worksheet: Bringing Old Buildings Back to Life

Name	Class	Date

Big Question: How can renovating and revitalising old buildings reduce emissions and waste while preserving the character of a city?

Renovating old buildings can improve energy performance without demolition, while revitalisation can give an existing building a new purpose. Reusing buildings can reduce embodied emissions and waste, preserve architectural and cultural heritage, and add smart, efficient technologies.

Lesson 1: Why Reuse Old Buildings?

Activity 1: Building Reuse Starter

Think of an old or disused building in your city. Choose the **three top priorities** for bringing it back to life..

Reason		Reason	
Save energy		Add modern or smart technology	
Reduce construction waste		Reuse existing materials	
Protect architectural heritage		Create a new use for an empty building	
Avoid unnecessary new construction		Support net-zero goals	

Outline your reasoning for picking these three:

_____

_____

Activity 2: Renovation or Revitalisation?

Renovation upgrades how a building works and uses energy; revitalisation changes or renews its purpose. Decide which description fits best and explain.

Building action	R / V	Why?
Add better insulation		
Turn an old station into a community centre		
Modernise heating and cooling		
Add energy monitors and smart lights		
Turn an old factory into apartments		
Install new windows		
Keep old features but create a new use		

Choose one action. Explain how it could reduce emissions, waste, or the need for new construction?

_____

_____

Activity 3: Building Reuse Vocabulary

Match each term to the correct definition.

Term	Definition
1. Renovation	A. Emissions created through making and transporting materials and the construction process.
2. Revitalisation	B. Energy used in buildings for heating, cooling, lighting, and appliances.
3. Embodied emissions	C. A building designed to produce little or no greenhouse gas emissions.
4. Operational energy	D. Upgrading an existing building to improve performance, lifespan, and energy use without demolishing it.
5. Zero-carbon-ready building	E. Giving an existing building a renewed or different purpose.

Answers: 1 = ___ 2 = ___ 3 = ___ 4 = ___ 5 = ___

Activity 4: What Does a Reused Building Create?

Choose one old building in your city or imagine one. Explain how bringing it back to life could create value for different groups.

Group / value	Possible benefit
Local residents	
Local businesses	
People who value heritage	
People who need homes or community space	
Workers and the local economy	
Urban nature / biodiversity	

Most important benefit you have observed:

_____

_____

Lesson 2: Design a Building Reuse Project

Activity 5: Reuse Challenge Lab

Choose an old building in your city, or imagine one. Then choose the main challenge your team wants to solve.

Challenge	Tick
Reduce building energy use	
Reduce construction waste	
Preserve cultural heritage	
Give an empty building a new purpose	
Add smart energy technology	
Create green roofs or gardens	
Combine several aims	
Other: _____	

Activity 6: Bring a Building Back to Life

Which renovation or revitalisation actions will you use? Tick all that apply.

Tool	Tick	Tool	Tick
Better insulation		Smart lighting	
New windows		Reuse existing materials	
Modernised heating/cooling		New building use	
Energy monitors		Green roof / garden	

Give a brief outline of the new or improved use:

_____

_____

_____

Identify what parts of the building or its heritage you would keep:

_____

_____

_____

Outline how your idea reduces energy use, waste, or embodied emissions:

_____

_____

_____

Identify who benefits from the project:

_____

_____

_____

Check at least two project questions you need to consider.

Consideration	Tick	Consideration	Tick
Will the new use meet local needs?		Will support from the local authority be needed?	
Will the local community support the project?t		Can the project be maintained affordably over time?	
Could anyone be disadvantaged by the changes?		Will smart technology improve performance?	
Who will maintain the building after renovation?		Other: _____	

Explain how you will respond to these project questions:

_____

_____

_____

_____

_____

Activity 7: Draw Your Prototype

Draw the building before and after. Show the retained features, the new or improved use, at least one energy upgrade, and one way the project reduces waste or supports nature.

Activity 8: 60-Second Pitch

Prepare a 60-second pitch for your idea by addressing each of these 6 steps:

Starter	Notes
1. The old building/problem is	
2. Our renovation or revitalisation idea is	
3. We keep and reuse	
4. We improve energy performance by	
5. It benefits the city and citizens because	
6. One project challenge is	

Activity 9: Peer Review

Ask your peers for feedback on your pitch, addressing these 4 steps:

Question	Feedback
Strongest part of the reuse idea	
What heritage or materials are kept?	
How does it reduce emissions or waste?	
One improvement suggestion	

Exit Ticket

Complete these sentences to show what you understand about bringing old buildings back to life.

Sentence starter	Complete the sentence
Renovation is different from demolition because	
Revitalisation can help a city by	
Embodied emissions matter because	
My favourite reuse idea from today was	

Teacher Notes

Learning objectives

- Explain why renovating and revitalising existing buildings can support net-zero goals.
- Distinguish renovation from revitalisation.
- Identify operational energy and embodied emissions in the building sector.
- Design a reuse project that combines energy performance, material reuse, and heritage value.
- Explain or ask students to read the YSC Knowledge Pill:
https://youngsmartcities.com/learn/construction-and-renovation-of-buildings/bringing-old-buildings-back-to-life/

Suggested timing

Lesson	Timing
Lesson 1	10 min Activity 1 | 20 min Activity 2 | 10 min Activity 3 | 15 min Activity 4
Lesson 2	10 min Activity 5 | 20 min Activity 6 | 15 min Activity 7 | 15-20 min Activities 8-9 | 5 min Exit Ticket

Differentiation

Younger students: focus on before/after uses and visible upgrades. Older students: ask students to distinguish operational energy from embodied emissions, justify what should be preserved, and explain whether renovation or revitalisation is the better approach for their chosen building.