MISSION WORKBOOK • CEFR A2–B1 • AGES 7–14

Sticky Rice and Smoke Signals: The True Secrets of the Great Wall

Seismic Mortar Chemistry & The 500-Mile Optical Telegraph | 萬里長城之謎：糯米灰漿與烽火狼煙

SCAN TO PLAY AUDIO
curioquestkids.com

EXPEDITION MAP — Where Are We Landing? 古代中國時空座標

Ming Dynasty (1368–1644 AD)

1500 AD • 40°N, 116°E

📍 **Badaling & Shanhaiguan Passes, Northern Ridges** (八達嶺與山海關長城關隘)

[Lin]: "Can astronauts see the Great Wall from the Moon? No way! But Ming builders used something even crazier: sticky rice pudding!"
[Leo]: "Boiled sticky rice porridge mixed with lime created an earthquake-proof glue that lasts 600 years! Plus wolf-dung smoke telegraphs!"

WARM-UP — Before You Warp: Predict True or False! 聽前真假預測

Guess the answers before listening to today's episode! (聽故事前先猜猜看！)

1. Astronauts can easily spot the Great Wall of China with their naked eyes from the surface of the Moon.
TRUEFALSE

2. Ming Dynasty masons mixed boiled sticky rice porridge into their mortar to create a shock-absorbing glue.
TRUEFALSE

3. Smoke signals from watchtower beacon fires could send emergency messages 500 miles in under 2 hours.
TRUEFALSE

READING PASSAGE

The Ancient Fortress Built with Breakfast Rice

糯米築長城：抗震灰漿與狼煙光學電報

A ~230-word standalone story covering core historical facts and all 12 vocabulary words. Works with or without audio! **（約 230 詞獨立精讀短文，底線標記全部 12 個核心單字，無音響設備亦可獨立教學）。**

Stretching over 13,000 miles across jagged mountain peaks and windswept deserts, the Great Wall of China is celebrated as the longest architectural wonder ever erected. Yet for decades, popular folklore claimed that astronauts could spot this stone dragon from the surface of the Moon. In truth, because the wall is only 15 to 30 feet wide, human optics make lunar viewing impossible. However, the real engineering secrets hidden inside the Ming wall are vastly more fascinating! Six hundred years ago, Ming builders tackled a daunting challenge: how to **fortify** steep mountain ridges against blizzards and devastating earthquakes. Their breakthrough was organic chemistry. Masons blended slaked lime with boiled sticky rice broth to produce an extraordinary **mortar**. The sticky rice's amylopectin starch bonded with calcium carbonate, creating a flexible, waterproof paste that sealed heavy **masonry** bricks together. This **seismic** cushion prevented walls from cracking during tremors. To defend thousands of miles with limited troops, each garrisoned **watchtower** served as an optical **telegraph**. By igniting wolf-dung smoke by day and blazing beacon fires by night, soldiers could **signal** enemy raids over 500 miles in hours. Built with breakfast grains and ingenious communication, this enduring **rampart** continues to **reinforce** human wonder across centuries.

SCIENCE FACT

The Chemistry of Amylopectin Mortar 糯米支鏈澱粉有機灰漿化學反應

Modern scientists discovered that amylopectin (the branched starch in glutinous rice) chemically locks calcium carbonate crystals into a tight, flexible lattice. It sealed out water so ice couldn't split the bricks in winter, outlasting pure cement!

READ & SPOT

Quick Story Check 閱讀關鍵線索任務

- Spot why astronauts cannot see the wall from the Moon: It's too narrow (~20 feet wide).
- Find the secret ingredient mixed with lime: Boiled sticky rice broth (amylopectin).
- Locate how fast smoke signals traveled: 500 miles in just a few hours.

LISTENING LOG

5-Act Time-Travel Mission Notes 五幕式聽力探險筆記

Listen to EP06 (use **0.8x speed** on curioquestkids.com if you want extra thinking time!) and record key details. **(邊聽播客邊記錄每一幕關鍵線索，官網播放器支援 0.8x 慢速跟聽)。**

Act 1 • The Moon Myth & Time Warp 從月球看得到長城嗎? — 00:00
Why is the popular belief about seeing the Great Wall from the Moon a scientific myth?

Act 2 • Climbing the Ming Dynasty Wall 登上明朝萬里長城 — 02:02
What physical challenges did builders face when hauling 1,000-pound granite blocks up cliffs?

Act 3 • The Sticky Rice Mortar Secret 糯米灰漿的防震黑科技 — 04:44
How did sticky rice porridge turn ordinary mortar into an earthquake-proof adhesive?

Act 4 • Smoke Signals & Fire Beacons 五百英里極速烽火台 — 08:06
How did watchtower guards encode the exact size of an invading army using smoke and gunshots?

Act 5 • Kid Quiz & Safe Return 時光機問答與平安返航 — 09:54
What does the Great Wall symbolize about ancient human resilience and cooperation?

PART A Complete the Field Report (Cloze) 關鍵詞聽讀填空

Choose words from the word bank to complete Leo's mission debrief. **(從單字庫中選出正確單字填入空格)**

fortify mortar masonry seismic watchtower reinforce

To (1) _____ mountain borders, Ming builders mixed sticky rice soup into their (2) _____. This revolutionary glue bonded heavy (3) _____ bricks together with flexible (4) _____ shock resistance. Every (5) _____ communicated raid warnings with smoke signals, helping (6) _____ northern frontier defenses.

PART B Timeline Detective (Order 1–4) 歷史事件先後排序

Number the chronological events from 1 (earliest) to 4 (latest). **(依歷史發生順序填入數字 1 到 4)**

[ ]
Early dynasties build separate rammed-earth walls to defend against border raids.

[ ]
Ming Dynasty engineers rebuild walls using durable kiln bricks and sticky rice mortar.

[ ]
General Qi Jiguang designs double-tiered hollow watchtowers with optical smoke relays.

[ ]
The Great Wall becomes a UNESCO World Heritage site and global symbol of resilience.

WORD BANK 12 Core Mission Words 12 個核心歷史英語詞彙

Master these 12 power words to boost your historical reading, listening, and debate writing! **(掌握這 12 個核心詞彙，全面提升聽說讀寫實力)**

mortar n. · /ˈmɔː.tər/
A workable paste used to bind building blocks or bricks together.
"Masons poured sticky rice mortar between granite slabs to create an unbreakable bond."
✦ 中文釋義：灰漿・砌築黏合膏

signal v./n. · /ˈsɪg.nəl/
An electrical, light, or sound transmission conveying important warnings.
"Three plumes of smoke signaled that more than 500 enemy riders had arrived."
✦ 中文釋義：發出信號・信號

masonry n. · /ˈmeɪ.sən.ri/
Stone, brick, or concrete construction work built by skilled masons.
"Centuries of blizzards could not crack the tight brick masonry of the wall."
✦ 中文釋義：石工建築・磚石結構

telegraph n. · /ˈtel.ɪ.grɑːf/
A communication system for transmitting messages over long distances.
"The watchtowers formed an optical smoke telegraph that sent alerts across 500 miles."
✦ 中文釋義：電報・遠程通訊網絡

legend n. · /ˈledʒ.ənd/
A traditional story or widely accepted popular belief from historical times.
"The idea that you can see the wall from the Moon is an enduring modern legend."
✦ 中文釋義：傳說・不實名言

reinforce v. · /ˌriː.ɪnˈfɔːs/
To strengthen or support an existing structure with additional material.
"The sticky rice amylopectin helped reinforce the masonry against winter ice."
✦ 中文釋義：加固・強化

beacon n. · /ˈbiː.kən/
A fire or light set up on a high tower as a warning or signal.
"The watchtower beacon fire alerted the garrison to an approaching army."
✦ 中文釋義：烽火・信號燈

fortify v. · /ˈfɔː.tɪ.faɪ/
To strengthen a place with defensive works and walls to protect against attack.
"The Ming emperor ordered soldiers to fortify the northern mountain passes."
✦ 中文釋義：設防・加固壁壘

seismic adj. · /ˈsaɪz.mɪk/
Relating to earthquakes, vibrations, and tremors in the earth's crust.
"Sticky rice starch gave the mortar seismic flexibility to withstand earthquakes."
✦ 中文釋義：地震的・抗震的

watchtower n. · /ˈwɒtʃˌtaʊ.ər/
A fortified tower from which guards keep a continuous lookout.
"Soldiers lived inside the two-story watchtower, sleeping above the armory."
✦ 中文釋義：烽火台・瞭望樓

rampart n. · /ˈræm.pɑːt/
A defensive wall of stone or earth surrounding a fort or frontier.
"Archers patrolled the broad stone rampart high above the deep valley."
✦ 中文釋義：城牆・防禦壁

garrison n./v. · /ˈgær.ɪ.sən/
The troops stationed in a fortress or town to defend it.
"A permanent garrison of 50 archers was stationed at the mountain pass."
✦ 中文釋義：駐軍・守備部隊

PRACTICE 1 Match the Word to Its Clue 單字線索配對

1. Mortar	A. Relating to earthquakes and ground tremors
2. Beacon	B. A workable paste used to glue bricks and stones together
3. Seismic	C. A signal fire lit on high towers to warn of danger
4. Watchtower	D. To strengthen a defensive position with walls
5. Fortify	E. A fortified lookout post where guards scan the horizon

PRACTICE 2 Upgrade Leo's Field Journal 語境進階詞替換

Replace the bracketed everyday words with power words from Page 05.

- Builders used a sticky [brick paste] made of rice. → **Upgrade:** _____
- They lit a fire [warning signal] on top of the ridge. → **Upgrade:** _____
- The wall had [earthquake-proof] flexibility. → **Upgrade:** _____
- The king wanted to [make the border stronger]. → **Upgrade:** _____

PRACTICE 3 Leo's Code Scramble & Power Sentence 解碼與造句

Brick glue mixed with sticky rice (A M O R R T) → _____

A signal fire on high towers (A B C E N O) → _____

Smoke puffs sent to warn troops (A G I L N S) → _____

A wide defensive stone wall (A A M P R R T) → _____

Write your own power sentence using at least one new mission word:

PART A History Detective Quiz 深度理解選擇題

1. Can human astronauts see the Great Wall with their naked eyes from the Moon?

A. Yes, it looks like a thick black snake

B. No, because it is only 20 feet wide and visually imperceptible from 238,000 miles C. Only during the full moon

D. Only if all the beacon fires are lit

2. What unusual food ingredient did Ming dynasty builders mix into their mortar?

A. Mashed tofu paste B. Boiled sticky rice broth (amylopectin starch) C. Crushed duck eggshells

D. Fermented soybean sauce

3. Why was sticky rice mortar superior to ordinary lime mortar?

A. It tasted delicious during winter famines B. It provided flexible seismic strength and sealed out ice from splitting bricks

C. It made the wall glow in the dark D. It prevented horses from climbing

4. How fast could smoke signals and cannon fire relay raid warnings along watchtowers?

A. 500 miles in several hours B. 10 miles per day C. It took three full weeks D. Only as fast as a running soldier

PART B Explain in Your Own Words 開放式簡答思考題

- **How did the beacon tower relay system act like an ancient 'optical internet'?**
- **If you had to construct an earthquake-resistant shelter today, what sustainable materials would you test?**

CRITICAL THINKING & OPINION WRITING • CCSS W.4.1 / CEFR B1

Was Building the Great Wall the Most Effective Strategy to Defend China?

The Great Wall took centuries and millions of lives to build. Did this colossal barrier successfully safeguard Chinese civilization, or were diplomatic alliances and trade a wiser investment? **修築萬里長城是防禦北方邊患的最佳戰略，還是代價沉重的負擔?**

STEP 1 Weigh Both Sides (Evidence T-Chart) 正反證據分析

YES — The Wall Provided Essential Security (堅固要塞保家園)

- The physical barrier prevented rapid nomadic cavalry raids, protected rich agricultural valleys, and gave garrisons time to mobilize.
- The watchtower communication network allowed small border garrisons to coordinate defense across thousands of miles of wilderness.

NO — Diplomacy & Trade Were Superior (和親通商更明智)

- Maintaining 13,000 miles of wall demanded exhausting taxes and labor from ordinary peasants, sparking domestic rebellions.
- Invaders often bribed gatekeepers or bypassed walls through treacherous mountain corridors, proving that walls cannot replace good governance.

STEP 2 Write Your Historian's Verdict 撰寫歷史觀點短文

Lin's Opinion Starters: *"In my opinion, ... because ..."* · *"Evidence shows that ..."* · *"While some argue ..., I believe ..."*

Writing Checklist: [ ] Clear opinion stated [ ] 2 historical reasons with "because" [ ] Concluding statement [ ] Capital letters & periods

MUSEUM LAB

Construct a Ming Watchtower & Smoke Telegraph!

建造明代空心敵台與狼煙烽火台!

Draw the crenellated brick ramparts, two levels of arrow slits, a blazing beacon fire, and three smoke plumes rising to the clouds!



★ MING GREAT WALL & SMOKE BEACON ★

Historical Design Specs

1. **Color Palette:** Mineral pigment highlights.
2. **Special Feature:** Add tools, sails, or banners.
3. **Mission Symbol:** Hidden dynastic crest.

Explorer Tip

Use fine-tip markers or colored pencils to bring your ancient artifact to life!

MING DYNASTY • 1500 AD

★

EP06 • GREAT WALL BEACON SEAL

✂ CUTOUT EXPLORER PASSPORT SEAL • 探險護照專屬實體印章

Congratulations, Time-Traveler! Cut along the dashed border and glue this official seal into your CurioQuest Passport. **（恭喜完成任務！沿虛線剪下這枚官方印章並貼入你的探險護照）。**

Explorer Signature: _____

ADULT COACHING GUIDE • ZERO PREP

Standards, Complete Answer Key & Writing Models

CEFR A2–B1 CCSS Aligned

教學對標、完整解答與分級範文指南

Standards Alignment:

- **CEFR A2–B1:** Narrative comprehension & reasoned opinion writing.
- **CCSS:** SL.4.2 (Listening), RI.4.1 (Evidence), L.4.6 (Vocab), W.4.1 (Opinion).

3-Day Pacing Suggestion:

- **Day 1:** P1 Warm-up → Listen/P2 Reading → P3 Notes.
- **Day 2:** P4 Cloze/Timeline → P5–P6 Vocab → P7 Quiz.
- **Day 3:** P8 Debate Essay → P9 Museum Lab & Seal!

COMPLETE ANSWER KEY

P1 Warm-Up: 1-F, 2-T, 3-T.
P4 Cloze: (1) fortify, (2) mortar, (3) masonry, (4) seismic, (5) watchtower, (6) reinforce.
P4 Timeline: A=1, B=2, C=3, D=4.
P6 Match: 1-C, 2-D, 3-B, 4-A, 5-E.
P6 Upgrade: 1. mortar, 2. beacon, 3. seismic, 4. fortify.
P7 MCQ: 1-B, 2-B, 3-B, 4-A.

DIFFERENTIATED WRITING MODELS (P8):

Level 1 (CEFR A2 / Grades 3–5): "In my opinion, building the Great Wall was a smart engineering achievement. Ming masons used sticky rice mortar to make the walls earthquake-proof. The watchtowers could send smoke signals across 500 miles in hours. It kept farming families safe from raids."

Level 2 (CEFR B1 / Grades 6–8): "Evaluating the strategic efficacy of the Great Wall requires examining both architecture and geopolitical realities. As a static fortification, the wall was undeniably brilliant: the incorporation of amylopectin mortar provided unprecedented seismic resilience, while the beacon telegraph network solved the logistical nightmare of ancient border communication. However, history demonstrates that military fortifications are only as dependable as the soldiers garrisoning them. When dynasties suffered from internal corruption, the wall was repeatedly penetrated. Ultimately, the Great Wall's greatest power is not military invulnerability, but its enduring testament to human collective perseverance."

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