

Quick start

Chinese Inventions That Changed the World • Grades 6–7 • 60 minutes

Core question: How did these inventions change people's lives?

Prepare before class

Open the PPTX or slide PDF. Print one regular handout or one language-support handout per student, one two-page Group Evidence and Scenarios set per group, one Exit Quiz per student, and one Homework page per student. Keep group pages together. No student device, login, internet, cutting, special apparatus, or experiment material is needed.

Materials and printing

File	Print
Regular OR language-support handout	2 pages per student; support version replaces regular
Group evidence and scenarios	2 pages per group; do not cut
Exit quiz	1 page per student; final 5 minutes
Homework	1 page per student; about 10 minutes after class

Exact 60-minute route

Minutes	Slides	What happens
0–5	1–2	Core question; picture hook; silent think, partner talk, one share.
5–11	3	Meet four inventions, basic functions, brief time context.
11–29	4–7	Paper and printing; methods; object observation and record.
29–35	8–9	Compass direction; gunpowder uses, effects, and harm.
35–47	10–12	One seated group task; scenarios A and B; write reasons.
47–55	13–14	Two short reports; every student writes three sentences.
55–60	15–16	Three-question exit quiz; one-minute core-question close.

Timing already includes directions, reading, thinking, talking, writing, two brief reports, and material changes. This is a desktop workflow walkthrough, not a real-class trial.

Goals, background, and language

Keep the history precise without turning the lesson into a long background lecture.

Learning objectives

1. Name the basic function of paper, printing, the compass, and gunpowder.
2. Explain the difference and connection between paper and printing.
3. Use one image or reading detail to explain one change.

Teacher background

Paper existed in China before 105 CE. A court record from 105 describes Cai Lun presenting or reporting improvements; it is not the first-paper date. Paper is the writing surface. Printing is the copying method. Whole-page woodblocks can repeat one fixed page; movable pieces can be rearranged when selected text changes. Bi Sheng developed clay movable type in the 1000s. The 868 Diamond Sutra is the earliest complete dated printed book known to survive, not the first book. An early written report describes maritime compass use in 1119; the year does not date the compass invention. Gunpowder had entertainment and military uses and could cause harm. Do not show ingredients, ratios, or construction steps.

Key terms

Term	Student-friendly meaning
paper	a surface for writing
printing	a way to make copies
whole-page woodblock	one carved surface that holds one whole page
movable type	separate pieces that can be rearranged
compass	a tool that gives direction information
evidence detail	something visible or stated that supports an idea

Use the language-support handout

Give it instead of the regular handout. The pages use the same image, IDs, objectives, and number of tasks. Read the short meanings aloud, allow partner rehearsal before writing, and point to the word bank. Accept short accurate sentences. Do not ask support students to complete both versions.

Assessment rule

For independent work, require one change + one relevant detail + an explanation. Do not require two sources, a counterargument, a ranking, or a source-limitation paragraph.

Slide notes 1–4

Launch, the four inventions, and paper

1 Cover — 0.5 minute

Read the core question. Say: “Today we will explain changes, not choose one winner.” Move immediately to the image hook.

2 Picture hook — 4.5 minutes

Give 20 seconds of quiet looking. Students point to a school task, think, partner-talk, then hear two ideas. Accept writing homework, keeping records, giving everyone the same page, or saving a text. Ask which missing function each answer needs.

3 Four functions — 6 minutes

Students complete H1-Q1. Paper = writing surface; printing = copies; compass = direction; gunpowder = energy with different uses. Say that the dates are selected evidence points: before 105, 868, 1044, and 1119. They are not four exact invention dates. Allow about two minutes to fill, two to check, and two for the brief context.

4 Paper — 5 minutes

Students start H1-Q2. Ask what paper provided and what it did not do. State the careful 105 wording. Identify the 1637 image as a later process illustration, not a Han portrait or eyewitness image. Suggested response: paper provided a portable writing surface, but did not copy words by itself.

Watch for

Students may use “paper” and “printing” as synonyms. Point to the object/function distinction: a surface can hold writing; a prepared printing surface repeats marks on it.

Slide notes 5–8

Woodblock, movable pieces, object observation, and compass

5 Whole-page block — 4 minutes

Trace the four conceptual actions: carve one page, ink, press paper, lift and repeat. Avoid procedural craft detail. Ask why saving the block can help. Expected: its arrangement is already prepared for the same page. Note that historical printing surfaces carried reversed characters.

6 Movable pieces — 4 minutes

Contrast paper and printing, then compare a fixed page with separate pieces. Mention Bi Sheng's clay movable type in the 1000s. Ask which part can change. Expected: selected pieces can move, be replaced, and be used again. Do not claim that movable type was always faster or cheaper.

7 Object observation — 5 minutes

Students look before reading the caption. On H1-Q3, they record one visible detail and what it supports. Accept rows of dark printed characters, repeated regular marks, or the printed image. Catalog data identifies Or.8210/P.2 and the 868 date; the crop does not display the end inscription. Do not call it the first book.

8 Compass — 3 minutes

Ask what a compass gives: direction. Ask for other travel information: position, coast and hazards, weather, water depth, supplies, or route knowledge. Explain that 1119 is an early written report of maritime use, not an invention date. The c.1938 photograph shows a later museum object, not a Song design.

Transition check

By minute 29, students should have H1-Q1–Q3 started or complete. Move on even if discussion could continue; students return to the evidence in the group reading.

Slide notes 9–12

Gunpowder and the one seated group task

9 Gunpowder — 3 minutes

Name entertainment and warfare as different uses. Ask how the same invention can lead to celebration and harm. Keep the discussion on impact and human choices. Do not give ingredients, ratios, weapon construction, or experiment directions. The image is a modern NPS photograph.

10 Begin one group task — 2 minutes

Distribute one two-page group set per group. Assign reader, recorder, and speaker. Students remain seated. Read both conditions aloud. Direct groups to G-R1 and the two method rows; no second activity or museum vote follows.

11 Scenario A — 5 minutes

Condition: identical page next year + original whole-page block saved in usable condition. Students complete G-A1 and H2-Q4. Expected reason: the whole arrangement is already carved, so the printer can reuse it for the exact page. The answer changes if the page changes or the block is damaged.

12 Scenario B — 5 minutes

Condition: selected text changes + separate movable pieces available. Students complete G-B1 and H2-Q5. In the teaching model $A B C \rightarrow A D C$, B is replaced by D. Expected explanation: selected pieces can move or be replaced instead of keeping one fixed page. The model uses English letters and omits mirror reversal.

Group workload

The twelve minutes include distribution, role assignment, the 105-word reading, marking G-R1, discussion, and short written reasons. Circulate to check that reasons name the condition rather than repeating a method name.

Slide notes 13–17

Reports, individual explanation, exit, close, and teacher reference

13 Two short reports — 3 minutes

Invite two groups, ideally one emphasizing A and one B. Allow about 45 seconds each plus one comparison prompt. Listeners check for condition, method, and reason. Do not hear every group.

14 Individual explanation — 5 minutes

Students complete H2-Q6 alone in exactly three connected sentences: change, one detail, why it mattered. Accept any one invention. Example: “Printing changed people’s lives by making copies of a page. The 868 Diamond Sutra is a surviving dated printed scroll. This mattered because a prepared page could reach more readers.”

15 Exit quiz — 4 minutes

Give one quiz per student. Students answer E1–E3 independently. Collect before the final minute. If time is short, keep E3; it directly checks the evidence explanation goal.

16 Close — 1 minute

Ask for one whole-class completion: “These inventions changed lives by ...” Accept record ideas, share copies, find direction, celebrate, wage war, or face new harms. End on the core question.

17 Teacher reference — no classroom time

Keep the slide hidden after teaching. It points to this guide and the full Sources and Image Use file. All 17 slides contain editable text and speaker notes with timing, materials, expected responses, misconceptions, transitions, and source URLs.

After class

Assign the one-page homework if desired. It takes about ten minutes and supplies its own evidence bank. No home internet or research is needed.

Answers: handouts and group work

Accept equivalent accurate wording. Student files do not include this page.

H1-Q1

Paper: writing. Printing: copies. Compass: direction. Gunpowder: uses. Longer acceptable forms: a surface for writing; copies of text and images; direction information; different entertainment and warfare uses.

H1-Q2

Paper provides a surface for letters, records, and books. Printing makes copies on paper. Paper does not copy words by itself; printing needs a surface such as paper. Connection example: paper holds the words and printing repeats them, helping people share ideas with more readers.

H1-Q3

Accept one specific visible detail, such as rows of regular dark characters or a printed image, plus a cautious conclusion. Example: "I see repeated lines of regular marks. This supports that a prepared printing surface made the page." Catalog data, not the crop alone, supplies the object name and 868 date.

H2-Q4 / G-A1

Reuse the saved whole-page block because the identical page is needed and the complete arrangement already survives. It can be inked and used again. The condition-specific value is avoiding rearranging or preparing the page again.

H2-Q5 / G-B1

The B piece changes to D in the model. Separate pieces allow selected text to be moved, replaced, and reset for a changed page. Accept "change only the needed pieces" if the student also names the separate-piece feature.

G-R1

Underline: "Paper is a surface for writing." Box: "Printing is a method for making copies on paper." Circle the two condition statements: saved block/identical page and separate pieces/text changed. Method table: whole-page block—identical repeat page; movable pieces—selected text changes.

G-C1

Scenario A: whole-page block fits because the identical arrangement is saved. Scenario B: movable pieces fit because selected parts can change. Difference: one holds a fixed complete page; the other uses separate rearrangeable pieces.

H2-Q6 acceptable examples

Paper: "Paper changed lives by giving people a lighter writing surface. Evidence shows Chinese paper existed before 105 CE. This mattered because records and books could be made on sheets." Compass: "A compass helped travelers judge direction. A 1119 report describes sea use. This mattered because direction information supported navigation, although sailors still needed routes and weather." Gunpowder answers may name celebration or warfare and should acknowledge harm when relevant.

Answers, misconceptions, and final checks

Use this page for the exit quiz, homework, and language support.

Exit quiz answers

E1: 1–B, 2–C, 3–A, 4–D. E2: Paper provided a writing surface; printing repeated text or images to make copies on that surface. E3: accept one accurate lesson detail + one supported change + why it mattered. Example: “The 868 Diamond Sutra is a surviving dated printed scroll. It supports that woodblock printing could make a complete book by then. This mattered because prepared pages could be copied for readers.”

Homework answers and quick scoring

HW1 must name one function accurately. HW2 must use one supplied detail without turning a record date into an invention date. HW3 must connect change, detail, and significance in three sentences. Score 0–1 each for function, relevant detail, and explanation; 3 = meets the lesson goal. Accept different inventions and impacts.

Common misunderstandings and responses

Misunderstanding	Teacher response
“Cai Lun invented the first paper in 105.”	Paper existed earlier; 105 is a court report about improvements.
“The Diamond Sutra was the first book.”	Call it the earliest complete dated printed book known to survive.
“The compass was invented in 1119.”	1119 is an early written record of use at sea.
“Movable type is always fastest and cheapest.”	Return to the exact job conditions in A and B.
“A compass gives a safe route.”	It gives direction; sailors also need location, weather, depth, and hazard knowledge.
“A major impact is always helpful.”	Gunpowder effects included celebration, warfare, and harm.

Language-support checks

Same IDs and image: H1-Q1, H1-Q2, H1-Q3, H2-Q4, H2-Q5, H2-Q6. Same three objectives and number of answers. The support page adds short meanings, word banks, and sentence starts; it does not add work.

Validation statement

Run the classroom in the printed order: slides 1–9 with Handout p.1–2; Group pp.1–2 during slides 10–13; independent H2-Q6 on slide 14; Exit Quiz during slides 15–16; Homework after class. Timing and workload were checked by desktop walkthrough. The lesson has not been tried with a real class.