Move a brickyard by rail

Engine, tender, and flatcar | Systems and scale

Grades 4-8 | Adaptable for families | **45-minute lesson** + model-building time

THE BIG QUESTION

How do different rail vehicles work together to move a load?

STUDENTS WILL

Identify engine, tender, and flatcar roles; describe the connection between fuel, water, and steam; use a shared scale; plan a balanced paper display.

PREPARE

Steam-train model or completed-model picture; student worksheet; pencils; ruler. For building: the 6-page train PDF and optional brick stacks, cardstock, scissors, and glue.

TEACH IT IN FOUR STEPS

Notice (5 minutes). Compare the three pieces and predict their roles.
Connect (10 minutes). Explain: fuel heats water in the boiler; steam drives pistons connected to the wheels. The tender carries fuel and water.
Plan (20 minutes). Complete the labels and scale problem; sketch a load for the flatcar.
Discuss (10 minutes). Explain how the pieces form a working system and how a flatcar differs from a passenger car.

ADAPT AND EXTEND

Younger learners can use three labeled picture cards to explain the train. Older learners can compare steam and later locomotive power sources. Group building can assign one rail vehicle to each team.

PRINT AND BUILD

Download the matching model at **restoringwhatwaslost.com/printables**. Print the model on US Letter at **Actual size / 100%**, single-sided; let the printer follow each page's orientation. Print this handout on plain paper. Use child-appropriate scissors and glue; adults should help with small cuts and difficult folds. The full train is a multi-session build. Its PDF mixes portrait and landscape sheets; use automatic page orientation. Glue a classroom display only after checking that parts sit flat.

Free to copy for classroom, community, and home learning. Suggested timing is an estimate, not a tested completion time.

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Name: _____ Date: _____

Shared scale: 1 model inch = 3 feet. The three pieces total about 16 inches before gaps; all dimensions are representative.

1. Label the three parts in the suggested display order: engine, tender, flatcar. Then write the job of each.

Job: _____	Job: _____	Job: _____
_____	_____	_____

2. Why does this type of steam locomotive need both fuel and water? Use the words heat and steam.

3. Our three paper pieces total about 16 inches before gaps. At 1 inch = 3 feet, how many feet does that represent? Show your work.

4. Plan a paper brick load for the flatcar. Sketch it or explain how you would keep the display balanced.

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WHAT TO LISTEN FOR

1. Suggested order: **engine** (provides the pulling power), **tender** (carries fuel and water), **flatcar** (carries a load).
2. Burning fuel provides heat to turn water into steam; the steam moves pistons linked to the wheels.
3. 16 x 3 = **48 feet represented**, before gaps. This describes the model scale, not the length of a documented local train.
4. Accept a load kept within the model flatcar with a stable arrangement. This is a paper-display exercise, not real railway loading guidance.

KEEP HISTORY AND THE MODEL DISTINCT

The kit represents a general early steam freight scene. It is not a verified locomotive type, railroad roster, or exact train used by Louisville Fire Brick Works. Some real steam locomotives carried supplies on the engine itself; this lesson concerns the separate-tender arrangement shown in the kit.

QUICK CHECK FOR UNDERSTANDING

Ask: "If the tender carries supplies, which part provides the power, and which carries our bricks?" Have students trace the fuel-to-motion explanation aloud.

SOURCES FOR THE TEACHER

Mid-Continent Railway Museum. What makes a steam locomotive work? Describes fuel, water, the boiler, pistons, and wheels.

https://www.midcontinent.org/kids-page/what-makes-a-steam-locomotive-work/

Restoring What Was Lost History Workshop. Current model collection, completed-model illustrations, dimensions, and printing guidance.

https://restoringwhatwaslost.com/printables

Model and lesson design: Restoring What Was Lost History Workshop. Sources document the historical context; they do not endorse or certify these paper models. Free to print and copy for educational use.