Tick, Tock, Time to Build!

Grades K–3 · 3 sessions of 30–40 minutes · ELA · Math · Engineering · Social Studies · Art

Book: *Ticktock Banneker's Clock* by Shana Keller, illustrated by David C. Gardner (Sleeping Bear Press, 2016). CBC Best STEM Book. Lexile 720L.

Big idea: Benjamin Banneker, a free Black farmer in 1700s Maryland, borrowed a pocket watch, studied how it worked, and carved his own striking clock out of wood. Students follow his steps: wonder, look closely, plan, build, test and try again.

Learning goals

- Ask and answer questions about key details in a true story.
- Put the steps Banneker followed to build his clock in order.
- Tell and write time on an analog clock (hour/half hour in K–1, 5 minutes in grade 2, the minute in grade 3).
- Explain how parts work together, like gears that turn each other.

CCSS checklist

Check	Standard	What students do
☐	RI.K.1 · RI.1.1 · RI.2.1 · RI.3.1	Ask and answer who, what, where, when, why and how questions about the read-aloud.
☐	RI.1.3 · RI.2.3 · RI.3.3	Describe the connection between the steps Banneker took to build his clock (sequence cards).
☐	SL.K.1 · SL.1.1 · SL.2.1 · SL.3.1	Turn-and-talk and whole-group discussion, following agreed-upon rules.
☐	W.K.2 · W.1.2 · W.2.2 · W.3.2	Draw and write to share facts about Banneker (sequence sheet, exit ticket).
☐	1.MD.B.3	Tell and write time in hours and half-hours (paper plate clock, worksheet row A).
☐	2.MD.C.7	Tell and write time to the nearest five minutes, using a.m. and p.m. (row B).
☐	3.MD.A.1	Tell and write time to the nearest minute; solve elapsed-time problems (row C).

Cross-curricular connections

Subject	Connection
Science / Engineering	How gears turn each other; the design steps of ask, imagine, plan, create, test, improve (NGSS K-2-ETS1-1, K-2-ETS1-2).
Social Studies	Life on a Maryland farm in the 1700s; how one person's curiosity made a difference.
Art	Students sketch their own invention plan, just as Banneker drew his clock before carving it.
Math	Telling time, counting by 5s around the clock, and comparing gear sizes.

Materials

- The book or the read-aloud video (link below)
- Paper plates, brass fasteners (brads), crayons
- Printables in this packet: sequence cards, clock practice, gear wheels
- Optional: an old wind-up clock or toy with visible gears to pass around

Links for teachers

- Watch Shana Keller read *Ticktock Banneker's Clock* (YouTube)
- Hamilton cast read-along (Gilder Lehrman Institute)
- Ticktock activity guide & coloring page (shanakeller.com)
- A Walk Through Time: Early Clocks (NIST)
- Benjamin Banneker Historical Park & Museum (Baltimore County)

Lesson steps

Session 1 · Read and wonder (ELA)

- **Hook (5 min):** Pass around a watch or clock. Ask: "How do you think it knows what time it is?" Chart answers.
- **Read aloud (12 min):** Read the book or play the video. Pause to ask: "What did Benjamin notice?" "What problem did he have?" "What did he try next?"
- **Talk (5 min):** Turn-and-talk: "What would you want to take apart and study?"
- **Sequence cards (10–15 min):** Students draw (K–1) or draw and write (2–3) Banneker's steps in order on the printable.

Session 2 · Clock math (Math)

- **Build (10 min):** Make paper plate clocks. Write 1–12 and attach two hands with a brad. Grades 2–3 also write 5, 10, 15… around the outside.
- **Model (10 min):** "Benjamin finished farm chores at 5 o'clock. Show me 5:00." Continue with times from his day.
- **Practice (15 min):** Clock practice printable. Row A: K–1. Row B: grade 2. Row C: grade 3.

Session 3 · Gears and inventing (Engineering + Art)

- **Explore (10 min):** Show gear photos from the NIST link or a real clock. Gears push each other around, which is how a clock's hands move.
- **Make (15 min):** Cut out the two paper gears and pin them to cardboard so the teeth touch. Turn one. Which way does the other turn? Which one turns faster?
- **Invent (10 min):** Students sketch an invention they would build, labeling 2–3 parts like Banneker's plans.
- **Exit ticket:** "One thing Benjamin Banneker did when something didn't work was ___."

Differentiation

- **K–1:** picture-only sequence cards; hour times only; teacher cuts the gears.
- **Grade 3:** add elapsed time ("He started at 2:15 and worked 45 minutes. What time did he stop?").
- **English learners:** pre-teach *clock, watch, gear, carve, strike, farm* with pictures.

Assessment

- Sequence cards in a sensible order (RI.x.3)
- Clock practice row for the student's grade (MD standards)
- Exit ticket shows understanding of trying again (SL/W)

Answer key: Clock practice

Row A: 3:00 · 7:30 · 12:00 · Row B: 4:15 p.m. · 9:40 a.m. · 1:05 p.m. · Row C: 6:52 · 10:23 · elapsed: 2:15 + 45 min = 3:00 p.m.

Gears: the little gear turns the opposite way, and goes around 2 times for each turn of the big gear (16 teeth ÷ 8 teeth).

How Benjamin Built His Clock

Draw (and write) the steps in order: 1 first, 6 last.

Name: _____ Date: _____

1	**2**
3	**4**
5	**6**

Word bank: **borrow · watch · study · draw · carve · gears · test · fix · strike**

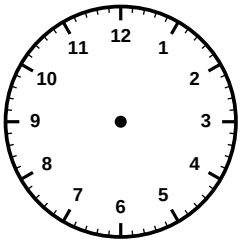
Banneker's Day: Clock Practice

Read the time. Draw the hands. Do your row: A, B or C.

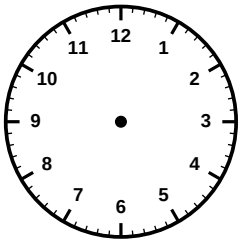
Name: _____ Date: _____

K–1: hours and half hours

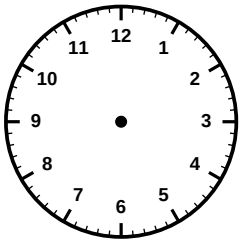
Row A



3:00



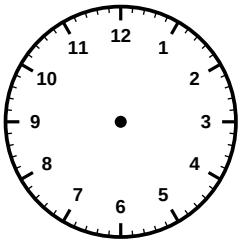
7:30



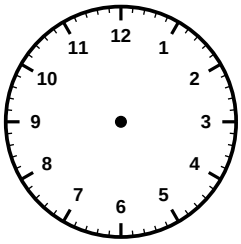
12:00

Grade 2: nearest 5 minutes

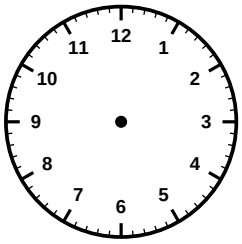
Row B



4:15 p.m.



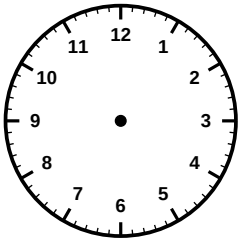
9:40 a.m.



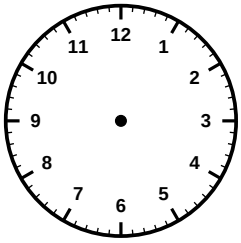
1:05 p.m.

Grade 3: nearest minute + elapsed time

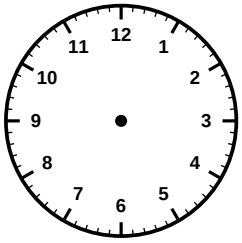
Row C



6:52



10:23



Stop time: ?

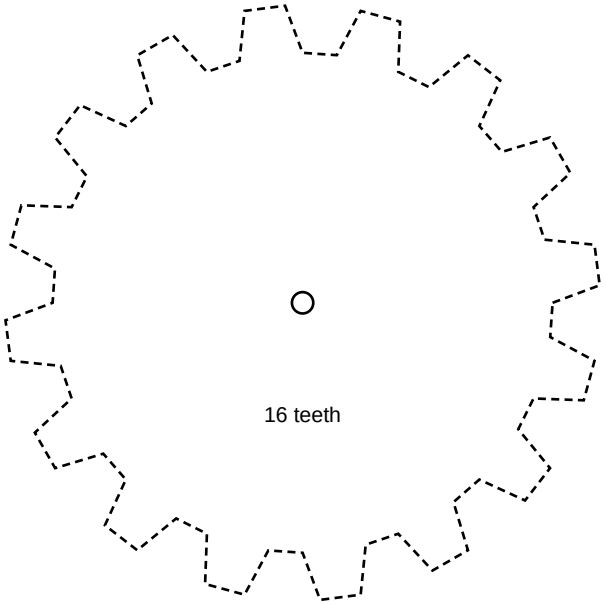
Row C, last clock: Benjamin started carving at 2:15 p.m. and worked for 45 minutes. Draw the time he stopped.

Write about it: Why do you think Benjamin wanted his own clock?

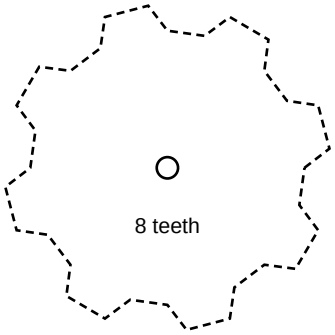
Make Your Own Gears

Color, cut on the dotted lines, and pin the centers to cardboard so the teeth touch.

Name: _____ Date: _____



Big gear



Little gear

1. Turn the big gear one way. Which way does the little gear turn? _____
2. Turn the big gear around one time. How many times does the little gear go around? _____
3. Sketch an invention you would like to build. Label 2 of its parts.