FREE STARTER

GRADES 3–5

Time & Schedule Math: Clocks, Elapsed Time, and Timetables

6 complete activities from Time & Schedule Math, each with a worked answer.

HOW TO USE

1. Read the situation and the evidence first.
2. Show your thinking in the work boxes, not only an answer.
3. Explain how you know your answer makes sense.
4. Try the new problem at the bottom of the page.

6 activities • 3 answer pages • From the 32-activity collection

10 US Letter pages • Print at 100% / Actual Size

Original Bobotemp educational printable • Fictional names, places and prices

Name _____ Date _____

Clock Detectives: The Chess Club Photo

LEVEL 1 ●○○

Use the clock clues to find the one time card that fits every clue.

Ellis took a photo of the library clock just as the first game of the after-school chess club ended. In the photo, the hour hand is between the 4 and the 5. The minute hand is 3 small marks past the 7. Through the window, kids are walking home from school. Which time card matches the photo?

the photo

EVIDENCE TO USE

- Time cards: 4:38 a.m., 4:38 p.m., 5:38 p.m., 7:22 p.m.
- Each number is 5 minutes for the minute hand.
- Each small mark is 1 minute.
- a.m. = midnight to noon; p.m. = noon to midnight

1. Count by 5s to the 7, then add the small marks. Write the minutes.

2. Name the hour and explain how the hour hand shows it.

3. Choose a.m. or p.m. and name the clue that tells you.

TRY IT • The hour hand is just past the 9, and the minute hand is 4 small marks past the 2. The museum has just opened for the morning. What time is it?

Name _____ Date _____

Library Story Time Number Line

LEVEL 1 ●○○

Draw an open number line. Label each jump with its number of minutes.

Story time at the Maple Harbor Library starts at 3:25 p.m. The librarian closes the last book at 3:52 p.m. How long did story time last? On your number line, make a small jump to a friendly time, then a jump of tens, then one last small jump.

EVIDENCE TO USE

- Start: 3:25 p.m.
- End: 3:52 p.m.
- Friendly times end in 0 or 5.

1. Jump from 3:25 to the next time that ends in 0. How many minutes?

2. Jump by tens as far as you can without passing 3:52.

3. Add your jumps and check by counting forward from 3:25.

TRY IT • A craft demonstration at the art studio runs from 10:08 a.m. to 10:46 a.m. How long is it?

Name _____ Date _____

The Minutes Machine

LEVEL 2 ●●○

Complete the in/out table. Some rows go forward and some go backward.

The Minutes Machine at Starfield Station changes hours and minutes into total minutes. It can also run backward and change total minutes into hours and minutes. Complete the Minutes Machine table. Then explain: if the minutes part stays the same and the number of hours increases by 1, how does the total number of minutes change?

THE MINUTES MACHINE (1 H = 60 MIN)

Row	Hours and minutes	Machine runs	Total minutes
1	1 h 50 min	forward →	? min
2	3 h 5 min	forward →	? min
3	4 h 25 min	forward →	? min
4	? h ? min	← backward	200 min
5	? h ? min	← backward	275 min

1. Complete Rows 1-3 by multiplying the hours by 60 and adding the minutes.

2. Complete Rows 4-5 by taking out groups of 60.

3. Show every step for Row 3, then check it backward.

TRY IT • Convert 2 h 45 min to minutes. Then convert 310 min to hours and minutes.

Name _____ Date _____

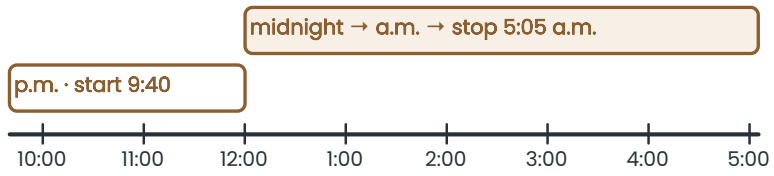
Overnight at Starfield Station

LEVEL 2 ●●○

Use 12:00 midnight as an anchor jump on the printed time line.

At Starfield Station, the telescope watch team starts recording the night sky at 9:40 p.m. and stops at 5:05 a.m. the next morning. How long is the telescope watch? Show your jumps and give the answer in hours and minutes and in total minutes.

OPEN TIME LINE FOR YOUR JUMPS



EVIDENCE TO USE

- Start: 9:40 p.m.
- Stop: 5:05 a.m. (next morning)
- 12:00 midnight is where p.m. changes to a.m.

1. Jump from 9:40 p.m. to 10:00 p.m., then to 12:00 midnight.

2. Jump from midnight to 5:00 a.m., then to 5:05 a.m.

3. Add all the jumps. Check by counting forward from 9:40 p.m.

TRY IT • A ferry crew's night run leaves at 11:25 p.m. and docks at 3:50 a.m. How long is the run?

Name _____ Date _____

Fraction Hours Match-Up at Starfield Station

LEVEL 3 ●●●

Change each fraction of an hour into minutes, then combine the times and find the end time.

Starfield Station campers do three training tasks back to back. Moon Base Building lasts 3/4 hour, Rover Driving lasts 1 1/2 hours, and Star Map Drawing lasts 2 3/4 hours. Change each length to minutes. Find the total time in minutes and in hours. If the session starts at 8:15 a.m., when does it end?

EVIDENCE TO USE

- Moon Base Building: 3/4 h
- Rover Driving: 1 1/2 h
- Star Map Drawing: 2 3/4 h
- Start: 8:15 a.m.
- 1/4 h = 60 ÷ 4 = 15 min

1. Change each task length to minutes. Show how you used 1/4 h = 15 min.

2. Add the minutes and change the total back to hours.

3. Find the end time with a.m. or p.m.

TRY IT • A garden workshop has three parts lasting 1/2 h, 1 1/4 h, and 2 3/4 h. What is the total time in minutes and in hours and minutes?

Name _____ Date _____

Museum Tour Builder

LEVEL 3 ●●●

Find every plan that fits. More than one answer is correct.

Mateo can spend from 1:15 p.m. to 3:15 p.m. at the museum. He wants to visit exactly 3 of these 5 exhibits. He needs a 5-minute walk between exhibits, with no walk before the first exhibit or after the last. Test every set of 3 exhibits. List all the sets that fit the time window. Which valid plan uses the whole window?

EVIDENCE TO USE

- Dinosaur Hall (D): 50 min
- Space Gallery (S): 35 min
- Ocean Room (O): 40 min
- Clock Workshop (C): 25 min
- Map Room (M): 30 min
- Window: 1:15 p.m. to 3:15 p.m.

1. Find the window length and the total walking time for 3 exhibits.

2. Test all 10 sets of 3 exhibits. List each set that fits.

3. Which plan ends exactly at 3:15 p.m.? Show the check.

TRY IT • Mateo decides he must see Dinosaur Hall. Which valid plans are still possible?

1. Clock Detectives: The Chess Club Photo

LEVEL 1

4:38 p.m.

WORKED REASONING • Minute hand: the 7 means 7 × 5 = 35 minutes, and 3 more small marks makes 38 minutes. Hour hand: it has passed the 4 but has not reached the 5, so the hour is 4. Context: kids walk home from school in the afternoon, so the label is p.m. Only 4:38 p.m. passes all three clues. Check: at 4:38 the hour hand should sit a little more than halfway from the 4 to the 5, which matches the photo.

WATCH FOR • Students may read the hour as 5 because the hour hand is close to the 5, or may read the minute hand at the 7 as 7 minutes. The hour hand does not reach the next number until the top of the hour, and each number on the face stands for 5 minutes.

TRANSFER • 9:14 a.m. (2 × 5 = 10, plus 4 = 14 minutes; morning means a.m.)

2. Library Story Time Number Line

LEVEL 1

27 minutes

WORKED REASONING • Jump 1: 3:25 to 3:30 is 5 min. Jump 2: 3:30 to 3:50 is 20 min. Jump 3: 3:50 to 3:52 is 2 min. Total: 5 + 20 + 2 = 27 min. Check: 3:25 + 5 min = 3:30, and 3:30 + 22 min = 3:52 p.m.

WATCH FOR • Some students count the number of jumps (3) instead of adding the size of each jump. Others subtract only the ones digits (5 - 2). The elapsed time is the total of the minutes written on the jumps.

TRANSFER • 38 minutes (2 min to 10:10, 30 min to 10:40, 6 min to 10:46)

11. The Minutes Machine

LEVEL 2

Row 3: 4 h 25 min = 265 minutes. Full table: 110 min; 185 min; 265 min; 3 h 20 min; 4 h 35 min.

WORKED REASONING • Row 1: 60 + 50 = 110 min. Row 2: 3 × 60 = 180, and 180 + 5 = 185 min. Row 3: 4 × 60 = 240, and 240 + 25 = 265 min. Row 4: 200 = 180 + 20, so 3 h 20 min. Row 5: 275 = 240 + 35, so 4 h 35 min. Check Row 3 backward: 265 - 240 = 25, so 4 h 25 min. Pattern: if the minutes part stays the same, each additional hour increases the total by 60 minutes.

WATCH FOR • Students may write 4 h 25 min as 425 min, or 200 min as 2 h 0 min, as if each hour were 100 minutes. An hour holds 60 minutes, so multiply the hours by 60.

TRANSFER • 2 h 45 min = 165 min; 310 min = 5 h 10 min

12. Overnight at Starfield Station

LEVEL 2

7 h 25 min = 445 minutes

WORKED REASONING • Jump 1: 9:40 p.m. to 10:00 p.m. = 20 min. Jump 2: 10:00 p.m. to 12:00 midnight = 2 h = 120 min. Jump 3: midnight to 5:00 a.m. = 5 h = 300 min. Jump 4: 5:00 a.m. to 5:05 a.m. = 5 min. Total: 20 + 120 + 300 + 5 = 445 min = 7 h 25 min. Check: 9:40 p.m. + 7 h = 4:40 a.m., and 4:40 + 25 min = 5:05 a.m.

WATCH FOR • Students may subtract 5:05 from 9:40 and get 4 h 35 min, as if both times were on the same side of midnight. When a duration crosses midnight, jump to 12:00 first and then keep counting forward into the a.m. hours.

TRANSFER • 4 h 25 min = 265 minutes (35 min + 3 h + 50 min)

21. Fraction Hours Match-Up at Starfield Station

LEVEL 3

300 minutes = 5 hours; the session ends at 1:15 p.m.

WORKED REASONING • 1/4 h = 60 ÷ 4 = 15 min, so 3/4 h = 3 × 15 = 45 min. 1 1/2 h = 60 + 30 = 90 min. 2 3/4 h = 120 + 45 = 165 min. Total: 45 + 90 + 165 = 300 min, and 300 ÷ 60 = 5 h. With fractions: 3/4 + 1 2/4 + 2 3/4 = 3 8/4 = 5 h. End: 8:15 a.m. + 5 h crosses noon and lands at 1:15 p.m. Check: 1:15 p.m. minus 5 h is 8:15 a.m.

WATCH FOR • Students may read 3/4 h as 34 or 75 minutes, or 1 1/2 h as 1 h 50 min. A fraction of an hour is a fraction of 60 minutes, so find 1/4 of 60 first and build from there.

TRANSFER • 30 + 75 + 165 = 270 minutes = 4 h 30 min (4 1/2 h)

22. Museum Tour Builder

LEVEL 3

6 valid plans: D+S+C, S+O+M, D+C+M, S+C+O, C+O+M, S+C+M. The plan D+S+C uses all 120 minutes: 50 + 35 + 25 + 5 + 5 = 120, ending exactly at 3:15 p.m.

WORKED REASONING • Window: 1:15 to 3:15 = 120 min. Walks: 2 × 5 = 10 min, so the exhibits can total at most 110 min. Test all 10 sets. Valid: D+S+C 110, S+O+M 105, D+C+M 105, S+C+O 100, C+O+M 95, S+C+M 90. Too long: D+S+O 125, D+O+M 120, D+S+M 115, D+C+O 115. D+S+C uses 110 + 10 = 120 min. Check: 1:15 p.m. + 120 min = 3:15 p.m.

WATCH FOR • Students may forget the walks and accept any set with up to 120 minutes of exhibits, such as Dinosaur, Ocean, and Map (120 min). With walks, that plan needs 130 minutes. Students may also stop after finding one plan when the task asks for every plan.

TRANSFER • D+S+C (110 min of exhibits) and D+C+M (105 min of exhibits)