Graphing Lines: Weekly Planning for Teachers (Online)

Chapter 8, Graphing Lines · November 2026 · draft for review · all three weeks written

How the chapter runs

This plan covers Chapter 8, Graphing Lines, taught online after Chapter 7: 13-year-olds with five maths lessons a week of about 55 minutes, each student working on a device in the course pages. It takes 3 weeks (15 lessons): 11 teaching lessons, a mixed practice day, a review day, the chapter check and a buffer lesson at the end.

The chapter joins algebra to pictures. A pair of numbers is a point on the grid, and the solutions of a linear equation in two letters make a straight line. Students find distances and midpoints, first on the number line and then between points; graph lines; measure their steepness with the slope; write the equation of a line from a point and a slope, from two points or from a graph; read intercepts; and compare two lines: where they meet, and when they are parallel or perpendicular. Week 1 is points, distances and slope; week 2 uses the slope and writes equations of lines; week 3 compares lines, then review and the chapter check. All units are metric.

Every day is a normal lesson. Monday to Friday, each lesson teaches one skill (or half of a harder one) with the same 55-minute plan. When a skill is finished, its mastery check is the last part of that lesson. The page marks the check straight away.

Below the pass mark is “not yet”, never a fail. The student practises that skill again, then retakes the check with new questions at the end of a later lesson. The mixed days and the buffer lesson have time for retakes built in.

Two routes. The mandatory route is 11 skills for every student; the chapter is mastered when all of them are. The advanced route has six optional skills (absolute value equations, points that move with one letter, lines in a triangle, swapped coordinates, beyond the segment and shortest paths, and pairs of lines), proposed to fit three weeks and still to be written.

Week	Focus	Lessons
1	Points, distances and slope	GL01, GL02, GL03, GL04, GL05
2	Using slope, then equations of lines	GL06, GL07, MX17, GL08, GL09
3	Comparing lines, review and the chapter check	GL10, GL11, MX18, CH8, BUF8

Numbering. Skills are numbered GL01 to GL17 (graphing lines); PR stays Chapter 7, RP Chapter 6, SY Chapter 5, MV Chapter 4 and LE Chapter 3. Mixed practice and review days are numbered MX17 and MX18, after Chapter 7’s MX15 and MX16: they practise several skills at once and have no mastery check of their own, so they are not skills. CH8 is the chapter check and BUF8 the buffer lesson.

Answers. Answers come in four shapes: a number (fractions such as -7/3 and decimals are both fine); a point, typed in one box with its brackets, (3, -2); a square root in simplest form, 2√13, with a √ key under the box; and the equation of a line in the form the question asks for (standard form 3x + 2y = 7, or slope-intercept form y = -2x + 5). Some questions ask students to click points onto a grid, with the keyboard as an alternative. Wrong answers that match a common mistake are named: x and y swapped, the run on top of the slope, a sign lost, a root left unsimplified, the right line not yet in the asked form.

Metric units only. The chapter is mostly about the grid, so units are rare. Where they appear (a taxi fare per kilometre, the heights of two flagpoles), they are metric: the book’s flagpole problem in feet is in metres here; money stays in dollars, as in the book.

What you do

- In each lesson: lead the Learn part with the class, then walk round while students practise. There is nothing to prepare, print or mark.

- After each lesson, five minutes in the class view: who is “not yet” on today’s check, and the mistakes each student makes most often (see The class view after each lesson).
- Use what you see there in the next lesson’s warm-up.

A normal lesson

Every lesson, Monday to Friday, follows the same four parts, so students know what to expect and you never plan from scratch.

Minutes	Part	Students	You
0 to 8	Warm-up	Answer one or two quick questions on earlier skills, in the page	Read the answers out in a minute. Add the mistake the class view showed most often yesterday, if there was one
8 to 20	Learn	Open the day’s lesson and follow it together: the narrated video (a minute or so), the explanation, and the activity (step-by-step problems on the grid: which point, which difference, which form)	Lead it from the front on your own screen. Ask “what does the picture say?” and “how could you check it?” more than “what is the answer?”
20 to 45	Practise	Work through the practice, easiest first. Each answer gets instant feedback that names the mistake. Hints are there when stuck. Students who finish early do the two extra exercises	Walk round. Look for the mistakes listed in the day’s plan and stop the class if you see one several times
45 to 55	Exit	If the skill finishes today: its mastery check (about 10 minutes), plus any retakes. Otherwise: redo, without hints, the hardest practice question they got right	Make sure everyone submits before the bell. The page marks the checks and gives every student different questions

A student who finishes the practice early may take the mastery check before the Exit.

Mastery checks and retakes

1. **Check at the end of the skill.** On the day a skill finishes, its mastery check takes the last 10 minutes of the lesson. The page builds a new set of questions for every student and every attempt, so there is nothing to copy.
2. **The page marks it.** Students see their score, which rows they missed and why, straight away. A row counts only when it is exactly right and finished. The result appears in the class view at the same moment.
3. **Below the pass mark: “not yet”.** The student practises that skill again (the lesson’s practice and its extra exercises), then retakes the check at the end of a later lesson, with new questions. The mixed practice and review days (Wednesday of weeks 2 and 3) end with retakes, and in week 3 every check of the chapter can be retaken on the week 3 page.
4. **The chapter check has no pass mark.** On Thursday of week 3 it shows, skill by skill, what each student still knows. Every skill a student misses goes on their review list for Friday’s buffer lesson.

Some students cannot get online at home. Let them practise and retake in a lunchtime or after-school session on the school’s devices.

The three weeks

Week 1: Points, distances and slope

Monday students find distances and midpoints on the number line: bigger minus smaller, and a distance is never negative. Tuesday they plot and read points: x first, across; then y, up or down. Wednesday is the distance between two points: across, up, then Pythagoras, leaving a square root in simplest form. Thursday every solution of a linear equation is a point, and the points make a line. Friday slope: rise over run, the same order on top and underneath.

Day	Lesson	Warm-up	Exit	Watch for
Mon	GL01 Distance and midpoint on the number line “How Far Apart?”	signed-number arithmetic (PRE01, earlier work); number line (PRE07, earlier work)	GL01 check (5 of 6)	Subtracting a negative as if it were positive: 9 − (−3) = 6. Giving a negative distance (−3 − 9 = −12) instead of its absolute value
Tue	GL02 Plot and read points “Where Is the Point?”	GL01; signed-number arithmetic (PRE01, earlier work)	GL02 check (5 of 6)	Swapping the coordinates: plotting (4, 3) at 3 across and 4 up. Going the wrong way for a negative coordinate (right for −3, or up for −5)
Wed	GL03 The distance between two points “As the Crow Flies”	squares, cubes & square roots (PRE13, earlier work); signed-number arithmetic (PRE01, earlier work)	GL03 check (4 of 5)	Adding the two differences (8 + 6 = 14) instead of squaring, adding and taking the root. Getting a difference wrong with a negative coordinate: 5 − (−3) = 2
Thu	GL04 Graph a linear equation “Every Solution Is a Point”	solve for one letter in terms of the others (MV10, Chapter 4); solutions of an equation in two letters (SY01, Chapter 5)	GL04 check (4 of 5)	Putting the x-value into y’s place (or the y-value into x’s) when testing a point. A sign slip when solving for y: 2x − y = 6 becomes y = 2x + 6
Fri	GL05 Slope “Rise Over Run”	GL04; signed-number arithmetic (PRE01, earlier work)	GL05 check (5 of 6)	Putting the change in x on top: $(x_2 - x_1)/(y_2 - y_1)$. Taking the points in a different order on top and underneath (the book’s bogus solution)

Week 2: Using slope, then equations of lines

Stepping along a line with its slope on Monday (and testing whether three points are on one line), midpoints and points that split a segment on Tuesday, mixed practice on Wednesday (which tool: distance, slope or midpoint?), the equation of a line on Thursday (from a point and the slope, from two points, from a graph) and intercepts and slope-intercept form on Friday.

Day	Lesson	Warm-up	Exit	Watch for
Mon	GL06 Use the slope: steps and points on one line “Step Along the Slope”	GL05; solve any linear equation (LE13, Chapter 3)	GL06 check (4 of 5)	Using the slope’s top number as the step to the right and the bottom number as the step up. Stepping up for a negative slope

Day	Lesson	Warm-up	Exit	Watch for
Tue	GL07 Midpoints and points that split a segment “Halfway and a Third of the Way”	GL01; share a total in a ratio (RP03, Chapter 6)	GL07 check (4 of 5)	Taking half the difference, $(x_2 - x_1)/2$, as the midpoint’s coordinate. Reading PT : TQ = 1 : 2 as half of the way, instead of 1/3
Wed	MX17 Which tool? Mixed practice (GL01 to GL07: points, distances, graphs, slope and midpoints). Distance, slope, midpoint, a table, or steps along a slope? Before each task, name the tool it needs “Which Tool?”	GL03; GL05; GL07	Hardest practice question; retakes	Mixing up the tools when the task doesn’t name them: a distance for a slope, a midpoint for a distance
Thu	GL08 The equation of a line “Find the Equation”	GL05; GL06	GL08 check (4 of 5)	A sign slip with a negative coordinate: y − (−2) written y − 2, or y + 3 for y − 3. Putting the point’s x-coordinate where y_1 goes (and the y-coordinate where x_1 goes)
Fri	GL09 Intercepts and slope-intercept form “Where It Crosses”	GL08; GL04	GL09 check (5 of 6)	Swapping the intercepts’ coordinates: the x-intercept of y = 2x + 3 given as (0, 3). Reading the slope of Ax + By = C as A, A/B or −B/A

Week 3: Comparing lines, review and the chapter check

Two lines on one graph on Monday (where they meet is the solution; check it in both equations), parallel and perpendicular lines on Tuesday (same slope; flip and change the sign), a review of the whole chapter on Wednesday, the chapter check on Thursday and the buffer lesson on Friday.

Day	Lesson	Warm-up	Exit	Watch for
Mon	GL10 Two lines on one graph “Two Lines on One Graph”	eliminate by adding or subtracting (SY05, Chapter 5); GL09	GL10 check (4 of 5)	Reading the meeting point with its coordinates swapped. Thinking that the same slope always means the same line
Tue	GL11 Parallel and perpendicular lines “Parallel and Perpendicular”	GL09; GL10	GL11 check (4 of 5)	Taking the reciprocal and forgetting the sign change (perpendicular to slope 2: slope 1/2). Changing the sign and forgetting the reciprocal (perpendicular to slope 2: slope −2)
Wed	MX18 Chapter review (GL01 to GL11: every skill of the chapter). A review of the whole chapter in no particular order, like tomorrow’s chapter check “Which Skill? Chapter Review”	GL03; GL05; GL09	Hardest practice question; retakes	Doing well when the skill is announced, but stalling or guessing when it is not
Thu	CH8 Chapter check: one or two questions from every mandatory skill, mixed (whole lesson)	None	None: the check is the whole lesson	Shows what each student still knows weeks later, skill by skill; it makes each student’s review list for Friday

Day	Lesson	Warm-up	Exit	Watch for
Fri	BUF8 Buffer lesson: warm-up, your review list from the chapter check, retakes	GL05; GL08; GL11	Retakes	Teach again any skill where many students missed the chapter check; then review lists and retakes

The lesson videos

Each teaching lesson opens its Learn part with a short narrated video; 11 videos in all. Every video has captions, a storyboard (one picture for each step, to print for students) and a teacher script (what to say and write on the board), so a class without screens can follow the same lesson. All of them are in Lesson videos on the course home.

Video	Title	Lesson	Length
GL01-V1	How Far Apart?	Monday, week 1: How Far Apart?	1:11
GL02-V1	Where Is the Point?	Tuesday, week 1: Where Is the Point?	0:58
GL03-V1	As the Crow Flies	Wednesday, week 1: As the Crow Flies	1:02
GL04-V1	Every Solution Is a Point	Thursday, week 1: Every Solution Is a Point	1:01
GL05-V1	Rise Over Run	Friday, week 1: Rise Over Run	1:05
GL06-V1	Step Along the Slope	Monday, week 2: Step Along the Slope	0:55
GL07-V1	Halfway and a Third of the Way	Tuesday, week 2: Halfway and a Third of the Way	0:56
GL08-V1	Find the Equation	Thursday, week 2: Find the Equation	1:13
GL09-V1	Where It Crosses	Friday, week 2: Where It Crosses	1:09
GL10-V1	Two Lines on One Graph	Monday, week 3: Two Lines on One Graph	1:03
GL11-V1	Parallel and Perpendicular	Tuesday, week 3: Parallel and Perpendicular	1:01

The class view after each lesson

This replaces marking. Five minutes after each lesson, open the class view at the bottom of the week’s page. It is shown to teachers who can edit the course, and lists every student’s progress, lesson by lesson, live.

Look at	What it tells you	What to do
Who is “not yet” on today’s check	Who needs to practise that skill again and retake	Next lesson, check that their retake happened
How many are “not yet”	Whether the skill landed	Half the class or more: teach it again the next day (see If the class is behind or ahead)
“Watch for”: each student’s most frequent mistakes	What the class misunderstood, by the mistake behind it	Put one question on it in the next warm-up
Last active, and students two or more lessons behind	Who is falling away from the class	Pair them with a classmate during practice

If the class is behind or ahead

Let the check results decide, not the calendar.

Behind. If half the class or more is “not yet” on a skill, teach it again the next day before moving on, and shift the plan by a day. The buffer lesson in week 3 absorbs one day of delay; beyond that, shorten the chapter review (MX18) to half a lesson and keep the chapter check. The mastery checks never get cut. A student stuck on the distance between two points (GL03) usually needs plotting and reading points again (GL02); one stuck on the equation of a line (GL08) needs slope again (GL05): the same order on top and underneath.

Ahead. If most students pass first time, use the buffer lesson for the advanced skills. A class that is clearly fast can run a mixed practice day as half a lesson.

Individual students. Nobody waits for the class and nobody is dragged along with it. A student who is behind practises and retakes with new questions; one who is ahead does the extra exercises and, when they are written, the advanced skills. If a student is two or more lessons behind, pair them with a classmate during practice.

Materials status for the pilot

This plan describes the full chapter online. All content is a draft waiting for review by the maths expert.

Material	Status
Skill graph for the chapter, with the mandatory and advanced routes	Ready
Week 1 to week 3 pages: 15 lessons (GL01, GL02, GL03, GL04, GL05, GL06, GL07, MX17, GL08, GL09, GL10, GL11, MX18, CH8, BUF8), each with warm-up, lesson, practice and its mastery check or exit question, and a class view	Ready (prototype)
11 lesson videos, one for each teaching lesson (the mixed practice and review days have none), each with captions, a storyboard and a teacher script	Ready (draft)
Practice sets: 32 more exercises for the four hardest skills (the distance between two points, midpoints and points that split a segment, the equation of a line, parallel and perpendicular lines), and four exercise exemplars	Ready (draft)
Advanced skills GL12 to GL17	Not written yet
Catch-up practice set automatically as homework, with the retake opening once it is done	Designed, not built yet
Sign-in for a whole class through the school	Part of the production platform