Proportion: Weekly Planning for Teachers (Online)

Chapter 7, Proportion · November 2026 · draft for review · all three weeks written

How the chapter runs

This plan covers Chapter 7, Proportion, taught online after Chapter 6: 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 is about quantities that change together. When one doubles, the other doubles (direct proportion), halves (inverse proportion), or depends on two others at once (joint proportion). Rates are the most common joint proportion: distance = rate × time, rates of work, and speeds that add or take away. Week 1 is direct and inverse proportion; week 2 joint proportion, then distance and average speed; week 3 working together, relative speeds, 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 five optional skills (chains of proportion, diagram puzzles, races and head starts, laps of a circular track, and teams that change part-way), proposed to fit three weeks and still to be written.

Week	Focus	Lessons
1	Direct and inverse proportion	PR01, PR02, PR03, PR04, PR05
2	Joint proportion, then rates	PR06, PR07, MX15, PR08, PR09
3	Rates, review and the chapter check	PR10, PR11, MX16, CH7, BUF7

Numbering. Skills are numbered PR01 to PR16 (proportion); RP stays Chapter 6, LE Chapter 3 and SY Chapter 5. Mixed practice and review days are numbered MX15 and MX16, after Chapter 6’s MX12 to MX14: they practise several skills at once and have no mastery check of their own, so they are not skills. CH7 is the chapter check and BUF7 the buffer lesson.

Answers. Answers are numbers: fractions such as 126/5 and decimals such as 25.2 are both fine, and a unit may be typed after the number (45 km). Some questions are choices (direct, inverse or neither; a time of day). Wrong answers that match a common mistake are named: adding instead of multiplying, treating an inverse proportion as direct, adding times instead of rates, averaging speeds.

Metric units only. Distances in kilometres and metres, speeds in km/h (and m/s), masses in kilograms, volumes in millilitres, areas in hectares. Where the book uses miles, mph, feet, pounds, cups or acres, the lessons use metric units instead; 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 proportion problems: what stays the same, which factor, which units)	Lead it from the front on your own screen. Ask "if this doubles, what happens to that?" and "what stays the same?" 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: Direct and inverse proportion

Monday students meet direct proportion: the ratio stays the same, so multiply, never add. Tuesday they solve direct proportion stories: shadows, doses, recipes, maps and tagged fish, writing the ratio in words first. Wednesday is inverse proportion: the product stays the same. Thursday workers and time: find the size of the job, then share it out. Friday squares and cubes in a proportion: square first, finish with a root.

Day	Lesson	Warm-up	Exit	Watch for
Mon	PR01 Direct proportion “The Ratio Stays the Same”	read and write ratios (RP01, an earlier chapter); clear fractions with the LCD (LE12, Chapter 3)	PR01 check (5 of 6)	Adding instead of multiplying (x goes up by 9, so y goes up by 9 too). Turning one of the two ratios upside down (14/y = 9/5)
Tue	PR02 Direct proportion stories “Shadows, Doses and Maps”	PR01; convert with a conversion factor (RP09, an earlier chapter)	PR02 check (4 of 5)	Mixing the order of the quantities in the two ratios (height/shadow = shadow/height). Mixing units, such as centimetres on the map with kilometres on the ground
Wed	PR03 Inverse proportion “The Product Stays the Same”	PR01; PR02	PR03 check (4 of 5)	Treating an inverse proportion as direct (p/q kept the same). Adding or taking away instead of dividing (q goes down by 12, so p goes up by 12)
Thu	PR04 Workers and time “Workers and Time”	PR03	PR04 check (4 of 5)	Treating workers and time as directly proportional (fewer workers, less time). Adding or taking away people and hours (3 fewer people, so 3 more hours)
Fri	PR05 Squares and cubes in a proportion “Squares and Cubes”	squares, cubes & square roots (PRE13, earlier work); PR03	PR05 check (3 of 4)	Using the number instead of its square (a/b = 5/9 when a is proportional to b^2). Forgetting the root at the end ($z^3 = 64$, answer 64 instead of 4)

Week 2: Joint proportion, then rates

Joint proportion on Monday (group what varies; the gas law), joint proportion stories on Tuesday (woodchucks, hens, workers and hectares), mixed practice on Wednesday (which kind of proportion?), then distance, rate and time on Thursday and average speed on Friday.

Day	Lesson	Warm-up	Exit	Watch for
Mon	PR06 Joint proportion “Several Quantities at Once”	solve for one letter in terms of the others (MV10, Chapter 4); PR03	PR06 check (4 of 5)	Adding the factors instead of multiplying them (V tripled and P halved: 3 + 1/2). Treating every quantity as directly proportional, even the one that is inversely proportional

Day	Lesson	Warm-up	Exit	Watch for
Tue	PR07 Joint proportion stories “Woodchucks and Workers”	PR04; PR06	PR07 check (3 of 4)	Making one of the pairs inverse when it is direct (more workers, less work done). Mixing time units (days on one side, hours on the other)
Wed	MX15 Which proportion? Mixed practice (PR01 to PR07: every kind of proportion). Direct, inverse or joint? Before each task, decide which kind of proportion it is “Which Proportion?”	PR01; PR03; PR06	Hardest practice question; retakes	Treating every proportion as direct, without asking what happens when one quantity doubles
Thu	PR08 Distance, rate and time “Distance = Rate × Time”	units in the denominator (RP11, an earlier chapter)	PR08 check (4 of 5)	Mixing minutes and hours (72 km/h × 40 = 2880 km). Multiplying when you should divide (time = distance × rate)
Fri	PR09 Average speed “Average Speed”	PR08	PR09 check (3 of 4)	Averaging the speeds when the distances (not the times) are equal: the book’s bogus 37.5 mph. Using one leg’s distance with the whole trip’s time

Week 3: Rates, review and the chapter check

Working together on Monday (rates add, times don’t), speeds that add or take away on Tuesday (meeting, catching up, rivers and walkways), 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	PR10 Working together “Working Together”	common denominators (LCM) (PRE08, earlier work); PR08	PR10 check (3 of 4)	Adding the times instead of the rates (12 h + 8 h = 20 h together). Averaging the times (together in 10 h)
Tue	PR11 Speeds that add or take away “Speeds That Add or Take Away”	PR08; two letters, two equations (SY08, Chapter 5)	PR11 check (3 of 4)	Adding the speeds when one is catching up with the other (or taking them away when they come towards each other). Forgetting the current or the wind (rowing 5 km/h both ways in a river)
Wed	MX16 Chapter review (PR01 to PR11: every skill of the chapter). A review of the whole chapter in no particular order, like tomorrow’s chapter check “Which Skill? Chapter Review”	PR02; PR04; PR08	Hardest practice question; retakes	Doing well when the skill is announced, but stalling or guessing when it is not
Thu	CH7 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
Fri	BUF7 Buffer lesson: warm-up, your review list from the chapter check, retakes	PR03; PR09; PR10	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
PR01-V1	The Ratio Stays the Same	Monday, week 1: The Ratio Stays the Same	1:11
PR02-V1	Shadows, Doses and Maps	Tuesday, week 1: Shadows, Doses and Maps	1:23
PR03-V1	The Product Stays the Same	Wednesday, week 1: The Product Stays the Same	1:16
PR04-V1	Workers and Time	Thursday, week 1: Workers and Time	1:01
PR05-V1	Squares and Cubes	Friday, week 1: Squares and Cubes	1:13
PR06-V1	Several Quantities at Once	Monday, week 2: Several Quantities at Once	1:05
PR07-V1	Woodchucks and Workers	Tuesday, week 2: Woodchucks and Workers	1:07
PR08-V1	Distance = Rate × Time	Thursday, week 2: Distance = Rate × Time	1:09
PR09-V1	Average Speed	Friday, week 2: Average Speed	1:15
PR10-V1	Working Together	Monday, week 3: Working Together	1:09
PR11-V1	Speeds That Add or Take Away	Tuesday, week 3: Speeds That Add or Take Away	1:22

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 (MX16) to half a lesson and keep the chapter check. The mastery checks never get cut. A student stuck on workers and time (PR04) usually needs inverse proportion again (PR03): the product stays the same; one stuck on average speed (PR09) needs d = rt again (PR08).

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 (PR01, PR02, PR03, PR04, PR05, PR06, PR07, MX15, PR08, PR09, PR10, PR11, MX16, CH7, BUF7), 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 (joint proportion stories, average speed, working together, speeds that add or take away), and four exercise exemplars	Ready (draft)
Advanced skills PR12 to PR16	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