More Variables: Weekly Planning for Teachers (Online)

Chapter 4, More Variables · November 2026 · draft for review

How the chapter runs

This plan covers Chapter 4, More Variables, taught online after Chapters 2 and 3: 13-year-olds with five maths lessons a week of about 55 minutes, each student working on a device in the More Variables pages. It takes 3 weeks (15 lessons): 11 teaching lessons, 2 mixed practice and review days, the chapter check and a buffer lesson at the end.

Almost everything in this chapter is a Chapter 2 skill again, with more letters; the book says so itself. So each lesson's warm-up is the one-letter version, and a student who is "not yet" on a Chapter 4 check can go back to the Chapter 2 lesson it extends. The one new move is in week 3: solving an equation for one letter in terms of the others.

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 10 skills for every student; the chapter is mastered when all of them are. The advanced route has two optional skills (common denominators with brackets underneath, and multiplying two brackets), still to be written.

Week	Focus	Lessons
1	Several letters, same rules	MV01, MV02, MV03, MV04, MV05
2	Brackets and fractions	MV06, MV07, MX07, MV08, MV09
3	Solving for a letter, and the chapter check	MV10, MX08, CH4, BUF4

Numbering. Skills are numbered MV01 to MV12 (More Variables); EX stays Chapter 2 and LE Chapter 3. Mixed practice and review days are numbered MX07 and MX08, after Chapter 2's MX04 to MX06: they practise several skills at once and have no mastery check of their own, so they are not skills. CH4 is the chapter check and BUF4 the buffer lesson.

Answers are typed as expressions. Students type an answer as they would write it (6r^2s^5 for $6r^2s^5$) or use the keys under the box. An answer that is equal to the right one but not finished, such as 5ab + 2ba or $7(r^2s^2 - 3rs^3 + 2rs^4)$, gets "not yet" with what is left to do; it never counts as right in a mastery check. When solving for a letter, students may type "x = …"; an answer that still contains x is diagnosed.

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 (about a minute and a half), the explanation, and the activity (name the parts, which rule, cross out what cancels)	Lead it from the front on your own screen. Ask "why is that step allowed?" 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, or says what is left to do when the answer is equal but not finished. 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, its extra exercises, or the practice sets for the hardest skills), then retakes the check at the end of a later lesson, with new questions. Wednesday of week 2 and Wednesday of week 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: Several letters, same rules

Each lesson takes a Chapter 2 skill and adds letters: the warm-up is the one-letter version. Students give each unknown its own letter, evaluate with several letters, combine like terms (the whole letter part must match), and multiply and divide monomials letter by letter. Every lesson ends with its skill's mastery check.

Day	Lesson	Warm-up	Exit	Watch for
Mon	MV01 Write expressions with several letters "A Letter for Each Unknown"	build the equation (LE19, Chapter 3); combine like terms (EX03, Chapter 2)	MV01 check (5 of 6)	Using one letter for two different unknowns (x for the apples in a sack and for the oranges in a sack). Thinking two different letters must have different values

Day	Lesson	Warm-up	Exit	Watch for
Tue	MV02 Evaluate with several letters “Every Letter Gets Its Value”	evaluate an expression (EX02, Chapter 2)	MV02 check (7 of 8)	Swapping the values (putting r’s value where s is). Squaring more than the letter it is on ($2r^2s$ worked out as $(2rs)^2$, or r^2s as $(rs)^2$)
Wed	MV03 Combine like terms with several letters “Same Letter Part”	combine like terms (EX03, Chapter 2)	MV03 check (5 of 6)	Combining terms with different letters ($3x + 2y = 5xy$, or $ab + a = 2ab$). Combining terms whose powers differ (c^2d with cd, or x^2y with xy^2)
Thu	MV04 Multiply monomials with several letters “Letter by Letter”	multiply monomials & powers of products (EX05, Chapter 2)	MV04 check (5 of 6)	Adding the exponents of different letters (x^2y^3 written xy^5 or x^5y^5). Raising only some factors to the power ($(2xy^2)^5 = 2x^5y^{10}$)
Fri	MV05 Divide monomials with several letters “Cancel Letter by Letter”	negative exponents (EX07, Chapter 2)	MV05 check (5 of 6)	Cancelling a letter with a different letter (y/z taken as 1). Putting every leftover letter on top ($8x^4y^2/(x^3y^3) = 8xy$)

Week 2: Brackets and fractions

Students expand and subtract brackets with several letters, then factor out what every term shares. Wednesday mixes the rules of weeks 1 and 2: students name the rule before each task. Thursday multiplies algebraic fractions (factor first, then cancel), and Friday adds them over a common denominator built letter by letter.

Day	Lesson	Warm-up	Exit	Watch for
Mon	MV06 Expand and subtract with several letters “Every Term, Every Sign”	subtract an expression (EX09, Chapter 2)	MV06 check (5 of 6)	Multiplying only the first term in the bracket ($3xy(x - y) = 3x^2y - y$). Changing the sign of only the first term of a subtracted bracket ($(t + 3r) - (2t - 5r + 1) = -t - 2r + 1$)
Tue	MV07 Factor out a common factor with several letters “What Every Term Shares”	factor out a common bracket (EX11, Chapter 2); factor out the greatest common factor (EX10, Chapter 2)	MV07 check (5 of 6)	Stopping with a common factor still inside the bracket ($7(r^2s^2 - 3rs^3 + 2rs^4)$). Taking out a letter that isn’t in every term
Wed	MX07 Mixed practice: name the rule (covers MV03 to MV07). Mixed practice on weeks 1 and 2: like terms, products, quotients, brackets and factoring, all mixed “Name the Rule”	MV02; MV03; MV05	Hardest practice question; retakes	Using one rule for every expression: adding exponents in a sum, combining unlike terms in a product, or expanding when the task says factor
Thu	MV08 Multiply algebraic fractions “Factor, Then Cancel”	simplify an algebraic fraction (EX13, Chapter 2)	MV08 check (4 of 5)	Cancelling a term of a sum instead of a factor. Multiplying out without factoring, and missing a factor that cancels

Day	Lesson	Warm-up	Exit	Watch for
Fri	MV09 Common denominator with several letters “Build the Common Denominator”	common denominator: single-term denominators (EX14, Chapter 2)	MV09 check (4 of 5)	Adding the tops and the bottoms (2/r + 3/s = 5/(r + s)). Rescaling the denominator but not the top

Week 3: Solving for a letter, and the chapter check

The one new move of the chapter: solving an equation for one letter in terms of the others, over two days. Part 2 (the letter in more than one term: collect, factor, divide) uses Tuesday’s factoring of week 2. Wednesday reviews the whole chapter, Thursday is the chapter check, Friday is the buffer lesson.

Day	Lesson	Warm-up	Exit	Watch for
Mon	MV10 Solve for one letter in terms of the others (part 1 of 2) “Solve for a Letter”	solve any linear equation (LE13, Chapter 3)	Hardest practice question (check on Tuesday)	Treating the other letters as unknowns to be found (looking for a number). Leaving the target letter on both sides of the answer
Tue	MV10 Solve for one letter in terms of the others (part 2 of 2) “Collect, Factor, Divide”	MV10; MV07	MV10 check (4 of 5)	Treating the other letters as unknowns to be found (looking for a number). Leaving the target letter on both sides of the answer
Wed	MX08 Chapter review (MV01 to MV10: every skill of the chapter). A review of the whole chapter in no particular order, like tomorrow’s chapter check “Which Skill? Chapter Review”	MV02; MV05; MV06	Hardest practice question; retakes	Doing well when the skill is announced, but stalling or guessing when it is not
Thu	CH4 Chapter check: 13 questions, one or two 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	BUF4 Buffer lesson: warm-up, your review list from the chapter check, retakes	MV03; MV07; MV10	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
MV01-V1	A Letter for Each Unknown	Monday, week 1: A Letter for Each Unknown	1:24
MV02-V1	Every Letter Gets Its Value	Tuesday, week 1: Every Letter Gets Its Value	1:13
MV03-V1	Same Letter Part	Wednesday, week 1: Same Letter Part	1:11
MV04-V1	Letter by Letter	Thursday, week 1: Letter by Letter	1:02
MV05-V1	Cancel Letter by Letter	Friday, week 1: Cancel Letter by Letter	1:00

Video	Title	Lesson	Length
MV06-V1	Every Term, Every Sign	Monday, week 2: Every Term, Every Sign	1:13
MV07-V1	What Every Term Shares	Tuesday, week 2: What Every Term Shares	1:14
MV08-V1	Factor, Then Cancel	Thursday, week 2: Factor, Then Cancel	1:26
MV09-V1	Build the Common Denominator	Friday, week 2: Build the Common Denominator	1:27
MV10-V1	Solve for a Letter	Monday, week 3: Solve for a Letter	0:55
MV10-V2	Collect, Factor, Divide	Tuesday, week 3: Collect, Factor, Divide	1:09

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 (MX08) to half a lesson and keep the chapter check. Two things never get cut: the two lessons on solving for a letter (MV10) and the mastery checks. A student stuck on a skill can also redo its Chapter 2 lesson.

Ahead. If most students pass first time, use the buffer lesson for the advanced skills or the practice sets. A class that is clearly fast can run MX07 as half a lesson and spend the other half on the practice sets.

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 the practice sets. 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

Material	Status
More Variables week 1 to week 3 pages: every lesson of this plan, each with warm-up, lesson, practice and its mastery check or exit question, one progress record across the three pages, and a class view	Ready (prototype)
11 lesson videos, each with captions, a storyboard and a teacher script	Ready (draft)
Practice sets for MV07, MV08, MV09 and MV10, and four exercise exemplars	Ready (draft)
Advanced skills MV11 (bracket denominators) and MV12 (two brackets)	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