Grade 6 Math · Lesson 7 — The Sealed Jar

Expressions, one-step equations and inequalities · ages 10 to 13 · 45 minutes · the workbook, one screen, this page, a pencil and paper

At a Glance

- **The book:** 6th Grade Math Workbook: Real-World Problem Solving, Chapter 7 (The Stock Trader), by Dr. Gene A Constant.
- **Free tool:** Equation Explorer (solve for x, starting with one-step equations), free, no login, plays in the browser: globalsovereignuniversity.org/equation-explorer.
- **Ages and time:** Grade 6 · ages 10 to 13 · 45 minutes.
- **Prep (5 min):** read the Teaching Creed and have the workbook open to Chapter 7. Put some coins in a jar or cup with a lid, and set a few loose coins beside it.

Why this lesson

A variable is just a sealed jar: a number you have not looked at yet. Children who are told "x is the unknown" freeze. Children who are told "the jar plus 15 coins is 42 coins" solve it in their heads, and then see that writing x + 15 = 42 is only a short way of saying the same thing.

What the learner will be able to do

- Turn a sentence into an algebraic expression.
- Evaluate an expression by substitution.
- Solve a one-step equation with an inverse operation and check it.
- Write and solve a one-step inequality and explain what the answer means.

The 45-Minute Climb

How to read this: the gold box in each step is your lesson, word for word. Run it as written. The notes beneath are optional support. "The group" means your family; "host" means you.

1 · The Hook (5 min)

"This jar plus 15 loose coins makes 42 coins. How many coins are in the jar? Don't open it."

Say it like this: When your child says 27, ask how they knew. "I took away the 15" is inverse operations, and it is the whole lesson.

2 · Work It Together (15 min)

Open the workbook to Turning Words Into Algebra and read it aloud: three times the shares, minus 10, is 3n − 10. Then read A Stock's Gain: 120 + x = 156, subtract 120 from both sides, x = 36, and check it. Finish with Avoiding a Fee: 350 + x ≥ 500, so x ≥ 150.

Open the jar to check your answer to the hook. Then solve two one-step equations in Equation Explorer together.

3 · The Talk (8 min)

1. Why do we do the same thing to both sides of an equation? 2. What is the difference between x = 150 and x ≥ 150? 3. Why is “15 less than p” written p − 15 and not 15 − p?

You are not fishing for one right answer. You are listening for understanding:

- Q1: To keep it balanced. If you take 15 from one side only, the two sides are no longer equal.
- Q2: x = 150 is one answer. x ≥ 150 is every amount from 150 up; all of them avoid the fee.
- Q3: You start with p and take 15 away from it.

4 · Solo Climb (12 min)

Five problems on your own, with your work shown.
1. Write an expression: '5 more than triple a number n'.
2. Evaluate 2a + 3b when a = 4 and b = 5.
3. Solve: m ÷ 5 = 12
4. After losing $38, a portfolio is worth $412. Solve p − 38 = 412 to find what it was worth before.
5. A broker needs at least $2,500 to open an account. You have $1,800. Write and solve an inequality for how much more you need.

Why solo: a test, a job and real life ask you to work alone. Five problems rehearse exactly that. The answers are at the end of this plan.

Keep It Fresh (5 min, the next day)

Two review problems from earlier chapters.
1. Scale: 1 in : 50 mi. The map distance is 3.5 in. Find the actual distance.
2. Find the mean: 12, 18, 15, 21, 14.

Ready to move on? Four of the five Solo Climb problems right, with work shown, means this skill is solid. If not, reread the worked examples together and try two more problems from the chapter before the next lesson. Short review of old skills keeps them from fading.

5 · The Takeaway (5 min)

“A letter is a jar you have not opened yet. Undo what was done to it, do the same to both sides, and check.” · Homework: Write one equation about something real at home (savings, a game score, a recipe) and solve it.

The badge moment: finishing all five steps earns the Bronze ring of this lesson’s badge, The Analyst. Mark it on the Climber’s Passport now; the homework is how Silver and Gold are earned during the week.

Common Mistakes to Watch For

- Writing 15 − p for “15 less than p.”
- Doing an operation to only one side of the equation.
- Forgetting to check the answer in the original equation.

The Teaching Creed

You are not the expert; the book and the method are. Your job is to ask "how do you know?" one more time than feels natural, and to celebrate wrong answers out loud. In here, a wrong answer is where the lesson lives.

GENO, GSU's free tutor, can explain any step a second way, any hour, in 83 languages, with no login: globalsovereignuniversity.org/free-tutor. A prompt for the host: Ask GENO: "My child solved x + 8 = 25 and got 33. Help them see what went wrong without giving the answer."

Adapt It and Measure It

Differentiation

- Struggling: use the coin jar for every equation before writing it.
- Ahead: write a two-step problem, such as 3n + 7 = 22, and solve it.
- Large co-op: one team writes a story, the other writes and solves its equation.
- Reluctant: use video-game points or sports scores as the jar.

Evidence of learning (no exam)

Look for three things. **Tried**: finished all five Solo Climb problems with work shown. **Noticed**: can name the mistake in Common Mistakes that they almost made. **Changed**: the next day, solves one new problem from the same chapter without help. Those three words are the whole rubric, and they match the badge tiers below.

Gamify It — The Campus Climb

Every GSU lesson is one badge on the Climber's Passport, earned at four depths: Bronze, Silver, Gold and Platinum.

LESSON 7 BADGE — The Analyst · Bronze — The Climb: finished the 45-minute lesson, all five steps. · Silver — The Try: did the homework and explained it to the host. · Gold — The Proof: completed the chapter's Action Report in the workbook with every answer checked against the Answer Key. · Platinum — The Teacher: ran this lesson as host for someone else. The harvest of a teacher is teachers.

Answers for the Host

1. 3n + 5
2. 23
3. m = 60
4. p = 450, so $450
5. 1,800 + x ≥ 2,500, so x ≥ 700. At least $700.

Keep It Fresh: 1. 175 miles · 2. 16

Every answer above comes from the workbook's own Answer Key. The book behind this lesson: 6th Grade Math Workbook: Real-World Problem Solving, Chapter 7 (The Stock Trader).

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