Rate per 100: Find the Part, Find the Whole

Teacher		**Class**	Grade 6
Subject	Math	**Topic**	Percent
Date		**Room**	
Lesson length	60 minutes	**Country**	United States

Students learn percent as a rate per 100 to find parts and wholes. They work a paper chain from part to whole.

Curriculum links

- Find a percent of a quantity as a rate per 100 (e.g., 30% of a quantity means 30/100 times the quantity)
- Solve problems involving finding the whole, given a part and the percent

Learning objectives

- Students will find a percent of a quantity as 30/100 times the quantity.
- Students will find the whole when given a part and the percent.
- Students will check percent work with bar models and division.

Success criteria

- I can write 30% as 30/100 times the quantity.
- I can divide a part by the percent to find the whole.
- I can show my steps with an equation and check.

What students already know

Ask: What does 50% of 20 mean? Listen for half of 20 is 10 and links to 50/100.

Key words

percent	a number out of 100, meaning per hundred [5]
rate	a number that tells how many for each 100 [5]
part	a smaller piece taken from the full amount [4]
whole	the full amount that the pieces come from [4]
decimal	a number with a point that shows tenths and hundredths
bar model	a long box picture that shows the full amount and pieces

Materials

- Slides 1-4, 6-11
- Video clip 1 Finding a percent of a number (0:00–4:45) on Slide 7
- printed chain cards - 5 linked cards per team
- pencils
- scratch paper
- 10-by-10 grid sketch paper for support
- Worksheet Task A copies

Before the lesson

- Print chain cards - one set of 5 per team - and Worksheet Task A copies.
- Test Slide 7 Video clip 1 (0:00–4:45) with sound and captions.
- Load Slides 1-4, 6-11 and set out pencils, scratch paper, grid sketches and whiteboards.

Created with LessonDino.com · AI lesson planner with checkable sources

- mini-whiteboards and markers
- timer

Lesson outline

0–8 min **Starter** 8 min · Whole class

Activate fraction links to percent and launch the paper chain challenge.

YOU DO

1. Show Slide 1 Percent Power! Rate per 100: find the part, find the whole and Slide 2 objectives.
2. Show Slide 3 Did you know? 8% of 50 equals 50% of 8 and work both to 4.
3. Say the chain hook and show that no calculators or screens will be used.
4. Cold-call to connect 50% to 50/100 and to 0.5.

STUDENTS DO

1. Read Slides 1-3 and restate the two goals in own words.
2. Solve 8% of 50 and 50% of 8 on whiteboards.
3. Tell a partner why both equal 4.

Say: No calculators, no screens. Just paper. Can your team finish the chain from part to whole? First we will warm up. Percent means per hundred [5], so we will write it as out of 100 and multiply or divide.

Worked example: 8% of 50 = 8/100 x 50 = 400/100 = 4. 50% of 8 = 50/100 x 8 = 400/100 = 4. Both equal 4, because you multiply the same numbers in a different order.

Ask: What does percent mean? (Per hundred, so 30% means 30 out of 100 [5].) · Why do 8% of 50 and 50% of 8 give the same answer? (Both multiply 8 x 50 then divide by 100, just in a different order.) · What will you need for the chain today? (Just paper, pencil and scratch paper, no calculators.)

Check understanding: Whiteboards up for 8% of 50. If many show not 4, remodel 8/100 x 50 before moving on.

Support: Offer 10%, 50% and 100% first, noting 100% of any number is just the number, unchanged [22].
Stretch: Ask: what is 50% of 8% of 100? Listen for 4.

Use: Slides 1–3

8–20 min **Teaching - find the part** 12 min · Whole class

Model writing percent as n/100 times the quantity to find the part.

YOU DO

1. Show Slide 4 mindmap: part = percent (as a decimal) x whole and 30% = 30/100.
2. Show Slide 6 photo and model the store saving: 30% of $20.00.
3. Play Slide 7 Video clip 1 (0:00–4:45) and pause for students to try the example before the video shows it.
4. Model 30% of 60 step by step and link fraction to decimal 0.30.

STUDENTS DO

1. Try each example on whiteboards before the video reveals it.
2. Write 15% of 200 as 15/100 x 200 and solve.
3. Choral-repeat the rule: part = percent/100 x whole.

Say: To find a percent of a quantity, write the percent as a fraction out of 100. So 30% of a quantity means 30/100 times the quantity. A percent can also be expressed as a decimal or a fraction [22], so 30% is 0.30.

Worked example: 30% of 60 = 30/100 x 60 = 1800/100 = 18. Store check: 30% of $20.00 = 30/100 x $20.00 = $600/100 = $6.00 saved, so pay $14.00.

Ask: How do you write 30% as a rate per 100? (30/100 times the quantity, which is 0.30 times the quantity.) · What is 15% of 200? (15/100 x 200 = 30.)

Check understanding: Hinge with whiteboards: show 30% of 60. If less than 80% show 18, re-model 30/100 x 60.

Support: Use money amounts $20.00 and $50.00 with 10% and 50% and fraction forms 10/100 and 50/100.
Stretch: Find 150% of 20 on two grids, noting 200% of any number is twice the number [22].

Use: Slides 4, 6–7, Video clip 1 (0:00–4:45)

Created with LessonDino.com · AI lesson planner with checkable sources

20–32 min **Teaching - find the whole** 12 min · Whole class

Model dividing the part by the percent to find the missing whole.

YOU DO

1. Draw a bar split to 100% and mark 40 parts as 12 pounds.
2. Show Slide 9 steps and think aloud dividing by 0.40.
3. Model check by multiplying back: 0.40 x 30 equals 12.
4. Hand out Worksheet Task A for guided bar-model practice.

STUDENTS DO

1. Copy the bar, label 40% = 12 pounds, 1% = 0.3, 100% = 30.
2. Start Worksheet Task A: use bar models to find the missing part or whole.
3. Explain to a partner why you divide to find the whole.

Say: When you know the part and the percent, you undo. The rule is (amount) = (proportion) x (base), which can be solved for (base) = (amount) ÷ (proportion) [3]. So whole equals part divided by percent as a decimal. Percent means ÷100 [3].

Worked example: 12 is 40% of what whole? 40% means 40/100, which is 0.40. Whole = 12 ÷ 0.40 = 30. Check: 0.40 x 30 = 12, so 30 pounds is correct.

Ask: If 12 is 40%, how do you find the whole? (Divide 12 by 0.40 to get 30.) · How do you change 40% to a decimal for division? (Divide by 100, move point 2 places left [3], to get 0.40.) · How do you check? (Multiply 0.40 x 30, it should equal 12.)

Check understanding: Check Task A first two bars by show of boards. If division is flipped, re-teach whole = part ÷ proportion [3].

Support: Give a conversion strip for percent to decimal by moving the point 2 places left [3], and pair roles: one converts, one divides. **Stretch:** Try 70 pounds is 140% of what? Listen for 70 ÷ 1.40 = 50.

Use: Slide 9, Worksheet Task A

32–50 min **Main activity** 18 min · Groups

Practise linked part and whole problems in the paper-only chain.

YOU DO

1. Show Slide 8 task and read the chain order aloud.
2. Give each team 5 linked chain cards, pencils and scratch paper and start timer.
3. Circulate, prompt teams to write both 40/100 x 80 form and divide form.
4. Stop at 14 minutes and have teams lay cards in order and circle the undo pair.

STUDENTS DO

1. Work cards in order, writing each equation as rate per 100.
2. Sketch grids or bars and divide for find-the-whole cards in feet and inches.
3. Lay finished chain in order and circle the multiply and divide that undo each other.

Say: Work in teams through 5 linked cards with only paper. Card 1 asks for 40% of 80, written as 40/100 x 80. The answer starts the next card. Your last card is a find-the-whole. You can use the shortcut that 8% of 50 is the same as 50% of 8 to check mentally [22].

Worked example: Card 1: 40% of 80 = 40/100 x 80 = 32. Card 5: 24 is 30% of what? Whole = 24 ÷ 0.30 = 80. Multiply finds the part, divide undoes to find the whole.

Ask: Card 1: how do you find 40% of 80? (40/100 x 80 = 32, since 50% of 80 is 50/100 x 80 = 40 [22].) · Last card: 24 is 30% of what? (24 ÷ 0.30 = 80.)

Check understanding: Teams hold up circled undo pair. Visit any team without multiply to get part and divide to get whole and remodel.

Support: Allow use of a 10-by-10 grid sketch for each card, shading the percent to see parts per hundred [13]. **Stretch:** Ask teams to write a sixth card where the whole is greater than 200.

Use: Slide 8

50–60 min **Plenary** 10 min · Whole class

Vote on methods and quiz parts and wholes to confirm learning.

YOU DO

1. Show Slide 10 Which Way Clicks for You? and take a quick vote.
2. Show Slide 11 Quick quiz and give 4 minutes for three questions on boards.
3. Cold-call winners to prove one part and one whole with equations.
4. Restate both success lines and preview next lesson.

STUDENTS DO

1. Vote for preferred method and justify to a partner.
2. Answer the three quiz questions on whiteboards with steps.
3. Self-check against success criteria with thumbs up or side.

Say: All ways work - pick your favorite. You can use 30/100 times the quantity, a double number line to 100%, or find 10% then times 3. Now show me. Write 30% as 30/100 times 50, and divide to find the whole.

Ask: What is 25% of $80.00? ($20.00.) · When do you multiply and when do you divide with percent? (Multiply percent/100 by whole to get part; divide part by percent to get whole.)

Check understanding: Exit boards for 9 is 30% of what whole? Expect 9 ÷ 0.30 = 30. Reteach small group if missed.

Support: Let students use the bar split to 100% and the hint divide 9 ÷ 0.30. **Stretch:** Make a tricky pair where the smaller percent gives the larger part, using different wholes.

Use: Slides 10–11

Created with LessonDino.com · AI lesson planner with checkable sources

Common mistakes

Mistake	How to spot it	How to fix it
Multiplying by 30 instead of 30/100 or 0.30 to find 30% of a quantity.	Answer far too large, like 30% of 50 shown as 1500.	Rewrite % as ÷100 [3]: 30% = 30/100 = 0.30, then multiply 0.30 x 50 = 15.
Multiplying instead of dividing to find the whole from a part and percent.	For 12 is 40% of what, student writes 12 x 0.40 = 4.8.	Use whole = part ÷ proportion [3]: 12 ÷ 0.40 = 30, then check 0.40 x 30 = 12.
Thinking a percent must be less than 100% and the part must be smaller than the whole.	Student says 130 is 130% of what cannot be done or must be over 130.	Show percent as parts per hundred can pass 100 [4]; model 130 ÷ 1.30 = 100 with two grids.

Support

- Allow 10-by-10 grid sketches shading the percent to see parts per hundred, plus percent-to-decimal strips.
- Use 10%, 50% and 100% money and inch examples first before 30%, 40% and 45%.

Stretch

- Ask teams to write a sixth chain card where the whole is greater than 200.
- Challenge pairs to build a tricky comparison where the smaller percent gives the larger part.

For the LSE or teaching assistant

Sit with target groups in Teaching-whole and Main; prompt conversion to decimal first, then division, and check bars for 12 is 40%.

Check for understanding

Question	Answer
What is 30% of 50? Show as 30/100 times 50.	30/100 x 50 = 15
9 is 30% of what whole? Hint: divide 9 ÷ 0.30.	30
What is 25% of $80?	$20

Homework

Find 20% of $60.00 and find the whole if 18 inches is 30% of it, showing each step.

Sources

1. Grade 6 | Common Core State Standards Initiative · thecorestandards.org · https://www.thecorestandards.org/Math/Content/6/
2. Grade 6 Math Curriculum - Fairfax County Public Schools · fcps.edu · https://www.fcps.edu/academics/elementary/sixth-grade/year-at-a-glance/math
3. Some percent Problems · math.sci.ccny.cuny.edu · https://math.sci.ccny.cuny.edu/document/Percents.pdf
4. Percents - mital.uaa.alaska.edu · mital.uaa.alaska.edu · https://mital.uaa.alaska.edu/v2025/section-percent.html
5. Math 1010 on-line - The Real Number Line · math.utah.edu · https://www.math.utah.edu/online/1010/percent/
6. To Determine Percent of Slope and Angle of Slope · usgs.gov · https://www.usgs.gov/educational-resources/determine-percent-slope-and-angle-slope
7. Calculating percent changes - U.S. Bureau of Labor Statistics · bls.gov · https://www.bls.gov/cpi/factsheets/calculating-percent-changes.htm
8. Percent for art - Wikipedia · wikipedia.org · http://wikipedia.org/wiki/Percent_for_art
9. Percent for Art | dgs · dgs.dc.gov · https://dgs.dc.gov/page/percent-art
10. Percent for Art Call to Artists | Eugene, OR Website · eugene-or.gov · http://www.eugene-or.gov/4386

Created with LessonDino.com · AI lesson planner with checkable sources

11. US autoworkers vote by 97 percent for strike authorization, expr… · wsws.org · http://www.wsws.org/en/articles/2023/08/26/qarz-a26.html
12. U.S. Unemployment Dips Below 4 Percent For The First Time In Mor… · npr.org · https://www.npr.org/transcripts/608582949
13. The meaning of percent (video) | Percentage | Khan Academy · en.khanacademy.org · https://en.khanacademy.org/math/mr-class-6/x4c2bdd2dc2b7c20d:percentage/x4c2bdd2dc2b7c20d:meaning-of-percentage/v/the-meaning-of-percent-indian-accent
14. Percentage Calculator · calculator.net · https://www.calculator.net/percent-calculator.html
15. Percent for Art - Cvillepedia · cvillepedia.org · http://www.cvillepedia.org/Percent_for_Art
16. Record yield of 73 percent for admitted Class of 2017 | The Tech · thetech.com · http://thetech.com/2013/06/14/yield-v133-n28
17. Yoon's approval rating exceeds 40 percent for 1st time in 8 mont… · en.yna.co.kr · https://en.yna.co.kr/view/AEN20240226002600315
18. S. Korea pays 73 percent for defense cost-sharing: civic group · koreaherald.com · http://www.koreaherald.com/view.php?ud=20180522000199
19. Percent for Art | Observer · observer.com · https://observer.com/tag/percent-for-art/
20. Covid infections down ten percent for the week | NL Times · nltimes.nl · http://nltimes.nl/2021/01/10/covid-infections-ten-percent-week
21. Percent for Art Archives - Hyperallergic · hyperallergic.com · https://hyperallergic.com/tag/percent-for-art/
22. Introduction to Percents - Math is Fun · mathsisfun.com · https://www.mathsisfun.com/percentage.html
23. Andhra announces 10 percent stipend hike for MBBS, BDS interns, 5 percent for PG, MDS, DNB, super speciality students · medicaldialogues.in · https://medicaldialogues.in/state-news/andhra-pradesh/andhra-announces-10-percent-stipend-hike-for-mbbs-bds-interns-5-percent-for-pg-mds-dnb-super-speciality-students-179750
24. International Girls Day: With Tata Steel Foundation’s Help, Daughters Script a Success Story as 97% Pass Class 10 - Town Post · townpost.net · https://townpost.net/2026/10/10/international-girls-day-tata-steel-foundation-97-percent-pass-west-bokaro/
25. amp · turkishminute.com · https://turkishminute.com/2019/07/17/survey-shows-66-percent-of-turkish-students-do-not-understand-what-they-read/amp/

Created with LessonDino.com · AI lesson planner with checkable sources