Draw Scaled Picture and Bar Graphs

Teacher		**Class**	Grade 3
Subject	Math	**Topic**	Scaled bar graphs
Date		**Room**	
Lesson length	60 minutes	**Country**	United States

Students learn how one picture or one scale step can stand for several votes. They draw a scaled picture graph and a scaled bar graph for the same fruit data.

Curriculum links

- Create frequency tables, scaled picture graphs and bar graphs to represent a data set with several categories [1]
- Choose and use an appropriate scale (increments limited to multiples of 1, 2, 5, or 10) [2]

Learning objectives

- Students will draw a scaled picture graph with a key where one symbol stands for several votes.
- Students will draw a scaled bar graph with title, labels, and a scale counting by 2s, 5s, or 10s.

Success criteria

- I can draw a picture graph where 1 picture stands for 5 votes.
- I can draw a bar graph with equal bars, gaps, and a scale by 5s.

What students already know

Count aloud together by 2s to 20, by 5s to 50, and by 10s to 100. Show 15 on a number line and ask how many jumps of 5 make 15.

Key words

scale	the jumps you count by, like 0, 5, 10, 15 [2][3]
key	a box that tells how many votes one picture stands for [1]
category	one group that we count, such as apples or bananas
scaled picture graph	a chart that uses little drawings where one drawing stands for more than one vote [1]
scaled bar graph	a chart that uses long blocks where the numbers on the side go up by more than one [1]

Materials

- slides 1-5 and 8-10 and 12
- pencils, rulers, graph paper
- frequency table handout: Apples 20, Bananas 10, Grapes 15, Oranges 5
- Worksheet Task D
- mini whiteboards and markers

Before the lesson

- Print frequency table handout and Worksheet Task D, one per pair, plus pre-drawn graph paper with axes and scale by 5s for support
- Test slide 8 and Video clip 2 Draw Scaled Bar Graphs (0:00-5:00) with sound and full screen
- Set out pencils, rulers, graph paper, and crayons for coloring bars

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Lesson outline

0–7 min **Starter** 7 min · Whole class

Hook the class and recall skip-counting needed for scaled graphs.

YOU DO

1. Show Slide 1 Graph Like a Pro! and say the hook from the main activity.
2. Show Slide 2 photo of 50 favorite fruits and ask why drawing one by one would take forever.
3. Lead quick choral counting by 5s to 50 and ask a student to show 20 as jumps of 5.
4. Link counting by jumps to today's goal of drawing both kinds of scaled graphs.

STUDENTS DO

1. Look at Slides 1-2 and share with a partner why 50 single marks would be slow.
2. Count aloud by 2s, 5s, and 10s and show jumps on fingers.
3. Tell a partner how many jumps of 5 make 20.

Say: No computers, no tablets. Just you, a pencil, and data like real graph makers. We counted 50 favorite fruits, so counting by 1s is too slow. Today we will let one picture and one scale step stand for 5 votes.

Ask: If we have 50 votes, why not draw 50 pictures? (It would take too long and take too much space; scaled graphs let us show larger numbers [4].) · How many jumps of 5 make 20? (4 jumps, because 5, 10, 15, 20 is 4 steps.)

Check understanding: Hold up fingers for how many jumps of 5 make 15. If many show wrong, count together by 5s pointing to a number line before moving on.

Support: Let students count aloud with a number line marked by 5s and clap each jump. **Stretch:** Ask how many jumps of 10 would make 50 and why that would be even shorter.

Use: Slides 1-2

7–20 min **Teaching: scaled picture graph** 13 min · Whole class

Model how to draw a scaled picture graph with a key.

YOU DO

1. Show Slide 3 and explain one star can mean 5 votes and each symbol stands for more than one data point as shown by the key [1].
2. Show Slide 4 key words and have class repeat scale, key, and category with actions.
3. Model Apples 20 with key 1 picture = 5 votes: draw 4 fruit pictures in a row, title, labels, and key.
4. Think aloud for Grapes 15: 15 divided into 5s is 3 pictures, so half pictures are not needed here.

STUDENTS DO

1. Repeat key words and point to title, labels, and key on the model.
2. Skip-count with teacher to check Bananas 10 equals 2 pictures.
3. Draw the 3 pictures for Grapes on mini whiteboards and hold up.

Say: A scaled picture graph uses pictures where each picture stands for more than one vote. The key tells what one picture stands for. We have to add a title, labels for each fruit, and the key [2].

Worked example: Apples 20, key 1 picture = 5 votes. Step 1: skip-count 5, 10, 15, 20 = 4 jumps. Step 2: draw 4 fruit pictures in the apples row. Step 3: repeat: Bananas 10 = 2 pictures, Grapes 15 = 3 pictures, Oranges 5 = 1 picture. Each picture = 5, so 3 pictures = 3 x 5 = 15 [3].

Ask: What does the key 1 picture = 5 tell us? (One picture stands for 5 votes, so we count pictures by 5s.) · How many pictures do we draw for Bananas 10? (2 pictures, because 2 x 5 = 10.) · Why use 5 per picture instead of 1 per vote? (It saves space and lets us show larger numbers without drawing 20 boxes [4].)

Check understanding: All hold up whiteboards showing 3 pictures for Grapes 15. Reteach counting by 5s and redraw if more than a few show 15 single marks.

Support: Give a pre-drawn row for each fruit and key that says 1 sticker = 5, so students only place stickers and count by 5s [3]. **Stretch:** Ask students to re-draw the same data with 1 picture = 10 and explain which key saves space.

Use: Slides 3-4

20–35 min **Teaching: scaled bar graph** 15 min · Whole class

Model how to choose a scale and draw tall, correct bars.

YOU DO

1. Show Slide 5 mystery bar stopping halfway between 10 and 20 and model reading it as 15.
2. Play Video clip 2 Draw Scaled Bar Graphs (0:00-5:00) on Slide 8 and pause to name title, labels, and numbers.
3. Model bars for Apples 20 and Bananas 10 on graph paper with scale by 5s: the length of bars shows the data and intervals are greater than 1 [1].
4. Think aloud checking equal width, gaps between bars [5][6], and following the top across to the scale to read 20 [3].

STUDENTS DO

1. Watch Slide 5 and Video clip 2, then call out title, category labels, and scale.
2. Count steps with teacher: point to 5, 10, 15, 20 while teacher colors the apples bar.
3. On whiteboards, mark how tall the grapes bar for 15 should be on a scale by 5s.

Say: In a scaled bar graph the numbers on the side count by 2s, 5s, or 10s. We pick a jump that fits the biggest number. Bars must be the same width with gaps, and the top of the bar tells the amount.

Worked example: Scale by 5s: 0, 5, 10, 15, 20, 25. Apples 20 = color up 4 steps because 4 x 5 = 20. Bananas 10 = 2 steps because 2 x 5 = 10. Grapes 15 = 3 steps, halfway past 10. Follow the top across to the scale to check [3].

Ask: This bar stops halfway between 10 and 20 on a scale by 10s. How many could it be? (15, halfway between 10 and 20.) · Why pick a scale by 5s for 5, 10, 15, 20? (All totals are multiples of 5, so every bar ends exactly on a line and the tallest bar still fits.)

Check understanding: Show thumbs up if the grapes bar for 15 reaches the 15 line. If split, redraw the scale by 5s together and count steps again.

Support: Provide graph paper with the scale by 5s already numbered to 25, so students only color bars to the right height [3]. **Stretch:** Ask what problem a scale of 10 would cause for totals like 15, with bars landing halfway between lines.

Use: Slides 5, 8, Video clip 2 (0:00–5:00)

35–52 min **Main activity** 17 min · Pairs

Draw a scaled picture graph and a scaled bar graph for the same data in pairs.

YOU DO

1. Show Slide 9 task: Apples 20, Bananas 10, Grapes 15, Oranges 5; use 1 picture = 5 votes and bars by 5s.
2. Hand out frequency table, graph paper, rulers, and Worksheet Task D and remind pairs to add titles, labels, key, and gaps.
3. Circulate, prompt Student A to count pictures by 5s while Student B checks bar tops against the scale.
4. Stop class halfway to show one good pair with matching totals taped side by side.

STUDENTS DO

1. In pairs, Student A draws the picture graph with key while Student B counts by 5s to check totals.
2. Both draw the bar graph on graph paper with ruler, equal-width bars, and gaps.
3. Swap with another pair and check title, labels, key or scale by 5, and bar height with Slide 10 checklist.

Say: In pairs, draw our fruit votes twice. First draw the picture graph with 1 picture for 5 votes. Then draw the bar graph by 5s. Keep the same title and fruit order, leave gaps, and check the top of each bar.

Worked example: Check together: Apples 4 pictures x 5 = 20, bar to 20. Bananas 2 x 5 = 10, bar to 10. Grapes 3 x 5 = 15, bar to 15. Oranges 1 x 5 = 5, bar to 5. Both graphs show the same totals.

Ask: How do you know your pictures and bars match? (Counting pictures by 5s gives the same number the bar top points to on the scale.) · How many more chose apples than oranges? (15 more, because 20 minus 5 is 15.)

Check understanding: Pairs tape picture and bar graphs side by side and underline matching totals. Collect Worksheet Task D to spot wrong heights before plenary.

Support: Give graph paper with axes and scale by 5s already drawn, so students focus on drawing equal-width bars to the right height. **Stretch:** Ask students to solve a two-step question from their graph, like how many fruit votes in all and how many more chose apples than oranges.

Use: Slide 9, Worksheet Task D

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52–60 min **Plenary** 8 min · Whole class

Check drawings against success criteria and fix scale mistakes.

YOU DO

1. Show Slide 10 Graph Check mindmap and have pairs self-check clear title, labels, key or scale by 5, height, gaps.
2. Pick two graphs with a scale mistake and ask class to find the wrong step and fix it.
3. Show Slide 12 exit ticket and have students write answers on paper.
4. Sum up: let the scale do the heavy counting when numbers are large.

STUDENTS DO

1. Check own graphs with the mindmap and fix one thing with a colored pencil.
2. Vote with hands for best scale for 18, 22, 30 and explain why by 2s fits best.
3. Complete exit ticket on their own: stars, learning, and question.

Say: Great graphs have a clear title, labels for each fruit, and the right key or scale. Bars need the right height and gaps. Tell me one thing you learned and one question you still have.

Ask: What makes a scaled bar graph easy to read? (Title, labels, numbers that go up by 2s, 5s, or 10s, same-width bars with gaps [2][5].) · For votes 18, 22, 30, would you count by 2s, 5s, or 10s? (Count by 2s, because 18 and 22 land on 2s but fall between 5s and 10s [2].)

Check understanding: Read exit tickets as they leave. If many miss the star value, start next lesson with key 1 = 5 counting again.

Support: Let students answer with a partner first and use a bar graph where the scale by 2s is highlighted for easier counting [3]. **Stretch:** Ask students to predict what would happen to the number of pictures if each picture stood for 10 instead of 5.

Use: Slides 10, 12

Common mistakes

Mistake	How to spot it	How to fix it
Drawing one picture for each vote instead of using the key	20 pictures for apples or very crowded rows	Point to the key and skip-count: 1 picture = 5, so draw 4 and check 4 x 5 = 20 [1][3].
Reading halfway bars as the lower number, like 15 as 10	Grapes bar drawn to 10 or 20 on a scale by 5s or 10s	Follow the top across to the scale and count the step: halfway between 10 and 20 is 15 [3] [6].
Bars with different widths and no gaps, or missing title and labels	Bars touching or uneven, no title on top	Use a ruler for equal width, leave finger gaps between bars, and add title and labeled axes [2][5].

Support

- Pre-drawn rows, axes, and scales by 2s or 5s so students only place pictures and color bars
- Multiplication strips for x2, x5, x10 and sentence frames for comparing bars
- Partner checking with checklist for title, labels, key, height, and gaps

Stretch

- Re-draw same data with 1 picture = 10 and explain which key saves space
- Write and solve a two-step how-many-in-all and how-many-more question from the graph [1]

For the LSE or teaching assistant

Sit with pairs using pre-drawn paper. Prompt skip-counting by 5s, check bar tops match picture totals, and help with ruler grip for straight bars.

Check for understanding

Question	Answer
3 stars stand for how many if 1 star = 5?	15, because 3 x 5 = 15
Apples 20 and Oranges 5: how many more chose apples?	15 more, because 20 - 5 = 15
Name two things every good scaled bar graph must have.	Any two: clear title, labels for categories, scale by 2s/5s/10s, equal-width bars with gaps

Homework

Ask family for 4 favorite fruits, tally votes, and sketch a bar graph by 2s with title and labels.

Sources

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