

Where Water Waits

Graph water amounts and use evidence to describe where water is stored.

GRADE 5 • 5-ESS2-2

5-ESS2-2 "Describe and graph the amounts and percentages of water and fresh water in various reservoirs to provide evidence about the distribution of water on Earth. Assessment Boundary: Assessment is limited to oceans, lakes, rivers, glaciers..."

NAME _____

DATE _____

Materials and setup

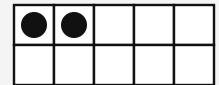
Materials: pencil and ruler. The graph titles, categories and scales are supplied. Draw the missing bars and label their values. Data are provided; no internet is needed.

KEEP THE WHOLE CLEAR

A reservoir stores water. Percent means parts out of 100. Always name the whole: ALL water or FRESH water. Rounded models show large patterns; small stores are not zero.

WORKED EXAMPLE

In this practice model, 2 of 10 counters are shaded. What percent is shaded? This is not Earth-water data.



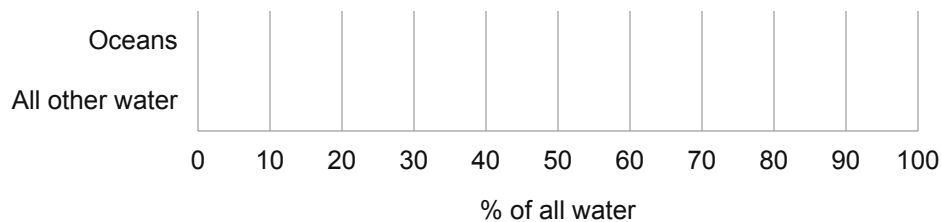
1. 2 out of 10 is 20 out of 100.
2. So 20% of the counters are shaded.

Answer:

20% shaded; the whole is all 10 counters.

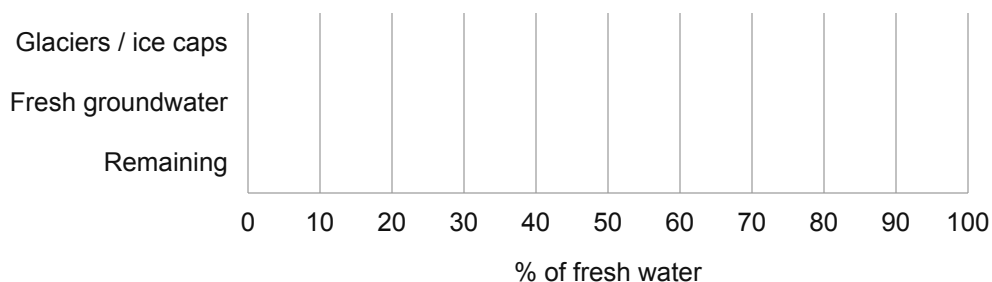
PRACTICE 4 problems

- 1** Draw bars on the supplied 0-100 scale for this rounded ALL-water model: oceans 97%, all other water 3%. Label the bar ends 97 and 3; estimate between grid marks. All other water includes both fresh and salty water.

ROUNDED ALL-WATER SHARES

ANSWER _____

- 2** Draw bars on the supplied 0-100 scale for this rounded FRESH-water model: glaciers and ice caps 69%, fresh groundwater 30%, remaining freshwater stores 1%. Label each bar end with its value. Which two stores hold almost all fresh water?

ROUNDED FRESHWATER SHARES

ANSWER _____

3 Which holds more fresh water: lakes or rivers? Use the table. Why would a tiny bar on a 0-100% graph not mean zero water?

SELECTED FRESHWATER STORES

Store	% of fresh water
Freshwater lakes	0.26
Rivers	0.006

ANSWER _____

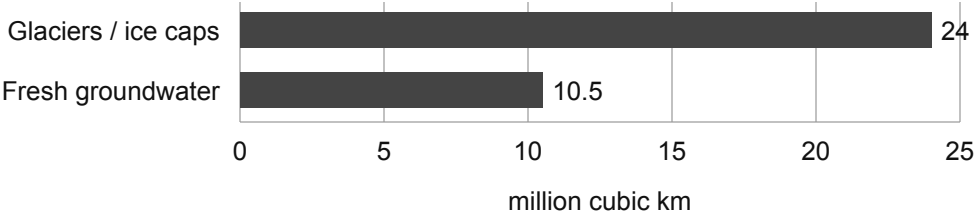
4 Is the 3% all-other bar in Question 1 exactly the same water as the whole 100% in Question 2? Explain.

ANSWER _____

APPLY IT Show your work

1 Read the graph of rounded freshwater volumes. Name the larger store and state both amounts with units. How much larger is it? Explain what the difference means.

ROUNDED FRESHWATER VOLUMES



ANSWER _____

2

Use your graphs and the lake/river table to explain where most of Earth's water is stored and where most fresh water is stored. Include one all-water percentage, one freshwater percentage and one water amount with its unit.

ANSWER _____

CHALLENGE One step up

Why can the freshwater graph show only 1% for all remaining stores, while the table still lists lakes and rivers separately? Use the idea of a rounded model to explain what the graph shows and what it leaves out.

PRACTICE 3

Which holds more fresh water: lakes or rivers?
Use the table. Why would a tiny bar on a 0-100% graph not mean zero water?

Lakes: 0.26% versus rivers: 0.006% of fresh water.
Both are above zero; the graph scale makes these small shares hard to see.

PRACTICE 4

Is the 3% all-other bar in Question 1 exactly the same water as the whole 100% in Question 2? Explain.

No. All-other water includes some salty water; Question 2 includes only fresh water. The wholes differ, and 3% is rounded.

APPLY IT 1

Glaciers/ice caps: about 24 million cubic kilometers; fresh groundwater: about 10.5 million. The ice store holds about 13.5 million more.

$24 - 10.5 = 13.5$ million cubic kilometers. This is a volume difference, not a percentage.

APPLY IT 2

Most of all Earth's water is in oceans (about 97% in the model). Most fresh water is in glaciers and ice caps (about 69%), with about 24 million cubic kilometers there. Fresh groundwater is next; lakes and rivers hold much smaller freshwater shares.

Accept equivalent accurate evidence with clear wholes and units.

CHALLENGE

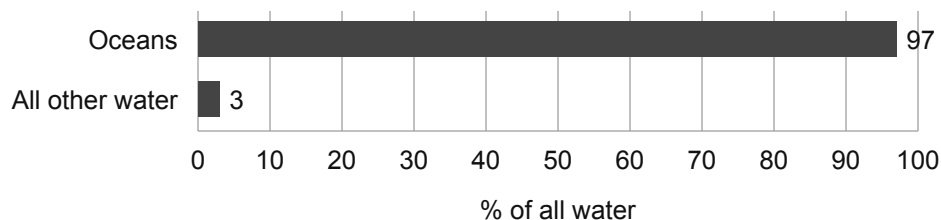
The rounded 1% groups all remaining freshwater stores to show the main pattern. Lakes and rivers are small, nonzero parts of that group. The detailed table separates them; the graph is not exact.

Keep the two percentage wholes distinct.
Oceans 96.54% rounds to 97% of all water; ice 68.7% and fresh groundwater 30.1% round to 69% and 30% of fresh water. Remaining stores include more than lakes and rivers. The ice category includes permanent snow. Accept estimates between marks with correct value labels. Volumes round from 24.064 and 10.530 million cubic kilometers. Source: USGS, How Much Water is There on Earth? (2019), distribution table based on Shiklomanov (1993): usgs.gov/water-science-school/science/how-much-water-there-earth.

PRACTICE 1

Draw bars on the supplied 0-100 scale for this rounded ALL-water model: oceans 97%, all other water 3%. Label the bar ends 97 and 3; estimate between grid marks. All other water includes both fresh and salty water.

Bars start at zero and end at 97 and 3, labeled percent of all water. The ocean bar is much longer; all other water must not be labeled fresh water.

ROUNDED ALL-WATER SHARES**PRACTICE 2**

Draw bars on the supplied 0-100 scale for this rounded FRESH-water model: glaciers and ice caps 69%, fresh groundwater 30%, remaining freshwater stores 1%. Label each bar end with its value. Which two stores hold almost all fresh water?

Bars at 69, 30 and 1, with percent of fresh water as the unit. Glaciers/ice caps and fresh groundwater together hold 99% in this rounded model.

ROUNDED FRESHWATER SHARES