LESSON MAKER PRO

Magnitude Matchups

Use powers of 10 to estimate and compare quantities.

GRADE 8 · 8.NOS.B.5.a

8.NOS.B.5.a "Express numbers as a single digit times an integer power of 10 to estimate and compare magnitudes."

NAME _____ DATE _____

ONE DIGIT, ONE POWER

To estimate a number, keep its first nonzero digit and use the next digit to decide whether to round up. Write the result as a single digit times a power of 10. If 9 rounds up to 10, write 1 and increase the power of 10 by 1.

WORKED EXAMPLE

Estimate 73,600 as a single digit times a power of 10.

1. The first nonzero digit, 7, is in the ten-thousands place.
2. The next digit is 3, so keep the 7.
3. Write 7 ten-thousands as 7×10^4.

Answer: 7×10^4

PRACTICE 6 problems

1 Express 4,000,000 exactly as a single digit times a power of 10.

ANSWER _____

2 Express 0.00009 exactly as a single digit times a power of 10.

ANSWER _____

3 Estimate 682,000 as a single digit times a power of 10.

ANSWER _____

4 Estimate 0.00327 as a single digit times a power of 10.

ANSWER _____

5 Estimate 2,470,000 and 41,300 as a single digit times a power of 10. Using your estimates, about how many times as large is 2,470,000?

ANSWER _____

6 Estimate 0.00061 and 0.00634 as a single digit times a power of 10. Using your estimates, about how many times as large is 0.00634?

ANSWER _____

APPLY IT Show your work

1 One video from a school esports tournament has 5,240,000 views. Another has 4,890 views. Estimate each view count as a single digit times a power of 10. About how many times as many views does the first video have?

WORK SPACE

ANSWER _____

2 A game save uses 0.00039 GB of storage. A highlight clip uses 0.0392 GB. Estimate each size as a single digit times a power of 10. About how many game saves would use the same storage as one clip?

WORK SPACE

ANSWER _____

CHALLENGE One step up

One song has 9,640,000 plays, and another has 1,240,000 plays. Estimate each count as a single digit times a power of 10. Explain why the estimates have different powers of 10 even though both counts are in the millions. Using your estimates, about how many times as many plays does the first song have?

WORK SPACE AND ANSWER

ANSWER KEY

Magnitude Matchups

PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	Express 4,000,000 exactly as a single digit times a power of 10.	**4×10^{6}**
2	Express 0.00009 exactly as a single digit times a power of 10.	**9×10^{-5}**
3	Estimate 682,000 as a single digit times a power of 10.	**7×10^{5}**
4	Estimate 0.00327 as a single digit times a power of 10.	**3×10^{-3}**
5	Estimate 2,470,000 and 41,300 as a single digit times a power of 10. Using your estimates, about how many times as large is 2,470,000?	**2×10^{6} and 4×10^{4}; about 50 times as large**
6	Estimate 0.00061 and 0.00634 as a single digit times a power of 10. Using your estimates, about how many times as large is 0.00634?	**6×10^{-4} and 6×10^{-3}; about 10 times as large**

PART 2 · APPLY IT

1. **5×10^{6} views and 5×10^{3} views; about 1,000 times as many** Round each count to one nonzero digit. Divide 5×10^{6} by 5×10^{3} to get 10^{3}, or 1,000.
2. **4×10^{-4} GB per save and 4×10^{-2} GB per clip; about 100 saves** Round each size to one nonzero digit. Divide the clip estimate by the save estimate to get 10^{2}, or 100.

CHALLENGE

The estimates are 1×10^{7} and 1×10^{6}. The first count rounds up to ten million, so its power of 10 increases. Using the estimates, the first song has about 10 times as many plays.

For estimates, accept equivalent wording such as “about 50 times” or “about 1,000 times.” Require the written estimate to have a single-digit factor and an integer power of 10.