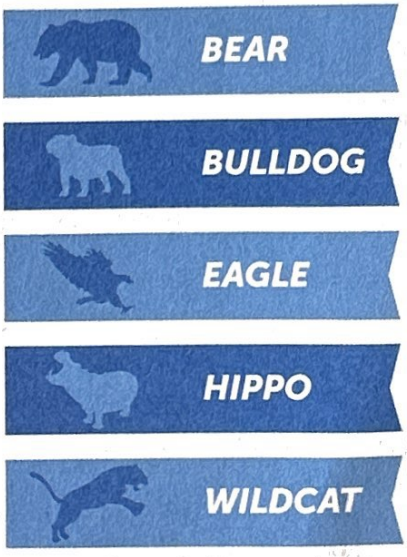
UNDERSTAND: How can you use samples to gain information about a population?

Develop Understanding of Random Sampling

Model It: Selecting Random Samples



➤ **Try these two problems involving random samples.**

1. The students at Carlos's middle school will attend a brand-new high school when they reach ninth grade. Carlos plans to survey a **random sample** of the students at his middle school about what the mascot of the new high school should be. With a random sample, every member of a population has an equal chance of being selected.

   a. Suppose Carlos lists each student's name on a slip of paper and mixes the slips in a hat. Then he pulls 20 names out of the hat without looking. Why is this sample a random sample?

   Each name has an equal chance of being selected

   b. Suppose Carlos selects all the members of the school's basketball team for his sample instead. Why is this not a random sample?

   The only students who have a chance of being selected are on the basketball team

2. Is each approach likely to result in a random sample of the students at Carlos's school? Explain.

   a. letting students volunteer to take an online survey

   No. This type of survey would probably include only students with strong feelings about the mascot. Not all students would have an equal chance of being included.

   b. spinning a spinner to select one of the first 10 names in the school directory and then selecting every 10th name after that

   Yes. All students have an equal chance of being selected.

   c. assigning each student a number, using a computer program to produce 30 numbers at random, and selecting the students with those numbers

   Yes. All students have an equal chance of being selected.

DISCUSS IT

Ask: Why is a random sample likely to be representative of a population?

Share: I think you can use a random sample to learn about a population because . .

Model It: Drawing Conclusions from Random Samples

➤ **Try this problem about drawing conclusions from random samples.**

3 Carlos surveys a random sample of 40 students at his school about the mascot they want. The table shows his results.

Mascot	Number of Votes
Bear	4
Bulldog	10
Eagle	16
Hippo	1
Wildcat	9

a. Based on the sample, should Carlos conclude that there are probably more students at his school who want an eagle mascot than a wildcat mascot? Explain.

Yes. Since the sample was random it should represent the population. About double the amount in the sample picked the Eagle so it should remain true for the entire population

b. Of the students surveyed, 25% voted for a bulldog. Should Carlos conclude that exactly 25% of the students at his school would vote for a bulldog? Explain.

No. the sample should be representative of the population, but it might not be perfectly representative

DISCUSS IT

Ask: Why can taking a random sample of a population be useful?

Share: I think Carlos could also use his sample data to conclude that . . .

CONNECT IT

➤ **Complete the problems below.**

4 Conclusions about a population are more likely to be correct when they are based on random samples than on samples that are not random. Why?

Random samples are more likely to be representative of the population than samples that are not random.

5 A farmer plants 50 orange trees. How could the farmer select a sample of 5 trees that is likely to be representative of the population of 50 trees?

Number the trees from 1-50. Put the numbers on slips of paper and mix the slips in a container. Select 5 of the slips of paper at random. Because this sample is random, it is likely to be representative.