

Content-related questions

1. How would you describe statistics to a friend?

Are students thinking about statistics primarily in terms of mathematical calculations and making graphs? Or do they recognize its role in making best estimates given inherent uncertainty?

Possible Follow-Up Questions:

** How is statistics different from other branches of mathematics?*

** Why do we emphasize the difference between a “population” and a “sample” when we do statistics?*

2. Suppose a classmate takes one random sample of 50 students and computes the mean height. They report their result as: “The mean height of college students is 67.2 inches.” Is there anything you would change about either how they performed the study, and/or how they reported their result?

Do the students see the sample mean as an estimate of the true parameter value? Do they indicate that a different sample would likely have a different result? Do they mention anything about how the sample size impacts the amount of uncertainty in the estimate?

3. Suppose we want to estimate the average number of hours college students sleep per night.

Which of these samples would you trust more, and why? Explain your reasoning.

(a) A sample of 5,000 students who responded to an online survey.

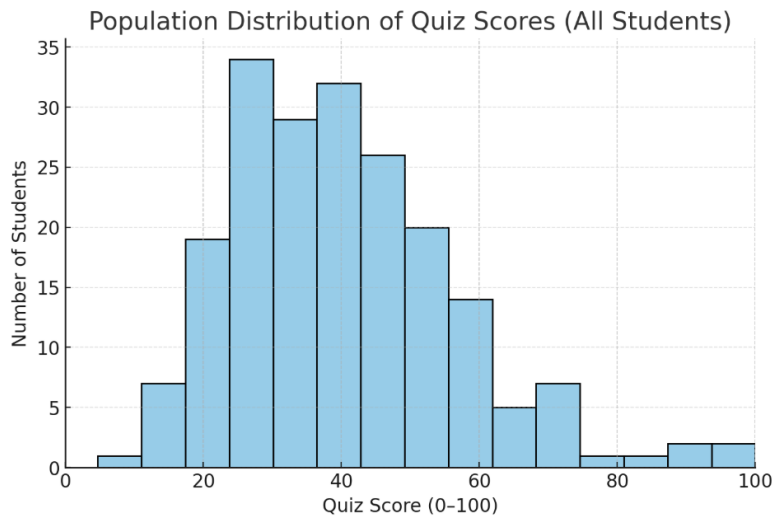
(b) A random sample of 100 students selected from the university’s enrollment list.

Do students overvalue a larger sample size, in spite of possible bias? Do they discuss the actualized trade-off between the sampling methods?

4. The histogram below shows the **population distribution** of quiz scores for all students in a large class.

You take many random samples of 20 students each and compute the sample mean for each sample.

Describe how you think the distribution of the sample means will look.



Do the students seem to understand the distinction between the population distribution and the sampling distribution? Does the student comment on the shape, center, and spread of the sampling distribution?

5. Imagine two researchers each construct confidence intervals for the same population mean.

- Researcher A: 95% confidence interval = (48, 52)
- Researcher B: 99% confidence interval = (47, 53)

What do we mean when we say Researcher B is “more confident” in their result? What is the tradeoff between these two results?

Do students discuss the connection between the width of the interval and the confidence level?

Table of RM Questions

Question	Possible Follow-Ups	Rationale
1. How would you describe statistics to a friend?	• How is statistics different from other branches of mathematics? • Why do we emphasize the differences between a population and a sample in our class?	Gain an overall sense of whether students see statistics as a bunch of mathematical processes or as a way of estimating unknown values in the context of uncertainty.
2. What has the process of learning statistics been like for you?	• How has the pacing/speed been for you? • What class examples or activities have you found to be the most helpful to your learning?	Understand the student experience in class so far: their struggles and successes; what motivates or interests them.
3. How do you or people you know - your friends or family - usually use statistical reasoning in their lives?	• Can you give some specific examples? • Do you think this comes from formal learning (i.e., from taking a class), or is it intuitive? Is it maybe both?	Get students to connect what they understand about statistics to less formal ways of reasoning quantitatively or reasoning when dealing with uncertainty.
2, 3 from content - Rodrigo and Issa one of 2,3 plus 4 - Wai Tak		
(content question)		
6. What would help you to feel more connected to what we are learning in class?		Gain possible sources of evidence for focal student engagement during the lesson study.