Tips for Case Study

Question #1: How is the proposed research important?

Core concepts:
1. Caffeine is the most highly used drug in the world so understanding its effects on our body could be important and informative.
2. Understanding how caffeine affects memory could help us understand more about the mechanisms behind memory formation.
3. Depending on its effects, caffeine could be used to treat memory related diseases that currently have little to no effective treatments (i.e., Alzheimer's Disease, PTSD).

Guide students to uncover these core concepts using probative questions like the ones below:
- Why do we care about what happens when we have caffeine?
- Do a lot of people have caffeine? How many? How much? How often?
- Why would anyone be interested in researching memory?
- How would understanding more about memory help humans?
- Can you think of any memory-related diseases that afflict humans?
- If research shows that caffeine affects memory, how could this information about used to help humans?

Question #2: What additional information do you need to make your decision?

Core concepts:
1. Dr. Smith must provide more detailed information to allow for an accurate evaluation of this research proposal that includes but is not limited to details regarding the scientific significance of the study, research hypothesis(es), experimental design, appropriateness of the animal of choice, animal care and husbandry and how animals will be treated at the conclusion of the study.

Guide students to uncover the specifics of this concept by using probative questions like the ones below:
- How many animals does Dr. Smith say he needs?
- How is the caffeine being administered? What type of injection method is being used?
- Will animals be housed together or individually?
- How many caffeine injections will be required? How often?
- Will environmental enrichment be provided to study subjects?
- How does Dr. Smith justify the use of this particular animal for his study?

Question #3: How are the three Rs of research relevant to your evaluation of this proposal?

Core concepts:
1. Dr. Smith should use only as many animals as necessary to achieve statistical significance (Reduce)
2. The study could be refined to minimize pain and distress to the animals by changing the route of caffeine administration in particular.
3. Depending on the animal model being used, Dr. Smith may be able to replace his proposed subjects with an equally appropriate but phylogentically lower species.
4. Informative data may be obtainable from a human population avoiding the need for animal research altogether.

Guide students to uncover these core concepts using probative questions like the ones below:
-   How many animals does Dr. Smith say he needs? What would be an unacceptable sample size?
-   Is there any aspect of the proposed study that could be painful or stressful to the animals?
-   Has anyone here ever received an injection (intramuscularly, intravenously, etc)? Did it hurt?
-   Is there an alternative to administering the caffeine via injection? We are modeling the human condition here. How do humans typically administer caffeine?
-   Do you think findings from fruit flies will be reflective of the human condition? Would you expect different research results if the study was done in rats versus monkeys?
-   Could we just use humans for this study? Why or why not? What if the study required subjects who had never been exposed to caffeine before? Are there any other variables that can affect memory in humans (i.e., diet, sleep, etc)? How can we control for those things in a human study?

Just remember:

▪ **Don't say no.** Try not to tell students "no" or that their response was "wrong" when answering your questions. Your job as discussion facilitator is to create an approachable environment where everyone feels comfortable speaking their opinion. Students may be less likely to respond to your questions if you tell them outright that they are wrong. Instead, try being more affirmative while also redirecting the discussion in the direction you were hoping by saying things like "okay, but what about . . ." or "that wasn't what I was thinking of but good point, what about . . ."

▪ **"I don't know" is OK.** One of the worst things you can do as an instructor is make up an answer to a question. It only takes one student who knows you are wrong to lose credibility. Prepare appropriately but feel free to say I don't know if the circumstances arise. Follow up with informed opinions or educated guesses but be sure to reiterate to students that you're not sure what the answer is. Importantly, follow up with the class the following day with the answer to their question (whether you are a guest speaker or the regular instructor).