

Article-Based Observation

Directions: After reading the article “Animal math,” answer these questions:

1. How does the author use interesting or unexpected language to engage the reader? What are a few examples?
2. “Animal math” summarizes many experiments attempting to determine if animals have a number sense — what question is posed about the evolution of this sense?
3. Define the term “numerosity.” Is it defined as a discrete or continuous quality? Explain with examples.
4. How do discrete versus continuous qualities cause experimental uncertainty for researchers trying to analyze animal “numerosity”? Find an example of a specific experiment.

5. What is subitizing? What is Weber's law, mentioned on Page 23? Compare and contrast the two.
6. You work at a pet store and want to use the scientific findings mentioned in the article to come up with a creative way to boost sales. Select one or more animals from the article and create the text for an e-mail blast that would be sent out to prospective customers. Be careful not to make assumptions about the information given in the article.

Responses to Article-Based Observation

1. **How does the author use interesting or unexpected language to engage the reader? What are a few examples?** Possible student response: The author uses language to create a heightened sense of competition (“fish versus humans face-offs”) and establish a relationship (“fish and people share some idiosyncrasies”). The author uses “barnyard” and “zoo” to convey the scope of animals scientists are studying.
2. **“Animal math” summarizes many experiments attempting to determine if animals have a number sense — what question is posed about the evolution of this sense?** Possible student response: Scientists want to determine if the animals’ quantitative abilities have a shared ancestry or if those abilities arose independently in different animals.
3. **Define the term “numerosity.” Is it defined as a discrete or continuous quality? Explain with examples.** Possible student response: “Numerosity” is a term scientists use to describe a number of items recognized nonverbally. If dogs were able to identify the specific quantity of treats in a bowl, they would be identifying a numerosity that changes in separate, specific units. Surface area or volume of treats are considered continuous qualities because they can vary over an infinite range of units.
4. **How do discrete versus continuous qualities cause experimental uncertainty for researchers trying to analyze animal “numerosity”? Find an example of a specific experiment.** Possible student response: Some quantitative judgments do not require numerosity. The experiment performed by Clive Wynne and Maria Elena Miletto Petrazzini at a doggie daycare tested whether dogs chose a bowl with a few large pieces of treats or a bowl of many smaller pieces but a lower total amount. Not surprisingly, the dogs chose the bowl with more food. The dogs chose based on a continuous quality, but the researchers can’t tell from this experiment whether the dogs recognize numerosity.
5. **What is subitizing? What is Weber’s law, mentioned on Page 23? Compare and contrast the two.** Possible student response: Subitizing is the idea that humans can see and know the number of a small group of items without counting. Weber’s law says that distinguishing a relationship between two quantities (e.g., which group contains a greater number of items) is easier when the quantities are very different or when the quantities are smaller. Both are phenomena observed by scientists studying sense of numbers. Subitizing works with single quantities, while Weber’s law applies to comparisons.
6. **You work at a pet store and want to use the scientific findings mentioned in the article to come up with a creative way to boost sales. Select one or more animals from the article and create the text for an e-mail blast that would be sent out to prospective customers. Be careful not to make assumptions about the information given in the article.** Possible student response: The ad might have a cute image of a new chick and say: “Need a buddy? In some cases, I’ve imprinted on quantity of buddies!”