

Tips for writing good test questions for the Audience Response System.

- Use only multiple choice questions to assess a variety of learning outcomes or focus on higher-level thinking.
- Construct effective stems and solutions or alternatives.
- Stems should present a single, clear problem and form a question.
- Exclude irrelevant material.
- Avoid negative phrasing.
- State the solution/alternative clearly.
- Avoid including clues.
- Avoid using all of the above and none of the above.
- Present in logical order.
- Distractors must be plausible.
- Do not use true or false questions

Constructing an Effective Stem

1. **The stem should be meaningful by itself** and should present a definite problem. A stem that presents a definite problem allows a focus on the learning outcome. A stem that does not present a clear problem, however, may test students' ability to draw inferences from vague descriptions rather serving as a more direct test of students' achievement of the learning outcome.

STEM IS NOT MEANINGFUL

Which of the following is a true statement?

- A. Mitochondrial genomes are relatively constant in content (i.e., types of genes present).
- B. Mitochondrial genomes are relatively constant in organization.
- C. Mitochondrial genomes are relatively constant in size.

BETTER STEM

What characteristic is relatively constant in mitochondrial genomes across species?

- A. Content (i.e., types of genes)
- B. Organization
- C. Size

2. **The stem should not contain irrelevant material**, which can decrease the reliability and the validity of the test scores (Haldyna and Downing 1989).

3. **The stem should be negatively stated only when significant learning outcomes require it.** Students often have difficulty understanding items with negative phrasing (Rodriguez 1997). If a significant learning outcome requires negative phrasing, such as identification of dangerous laboratory or clinical practices, the negative element should be emphasized with italics or capitalization.

NEGATIVE PHRASING

Which of the following is not true about mitochondria?

- A. They contain DNA.
- B. They make some of their own proteins.
- C. They are static.

NEGATIVE PHRASING

All of the following are true about mitochondria except

- A. They contain DNA.
- B. They make some of their own proteins.
- C. They are static.

BETTER USE OF NEGATIVE PHRASING

A water-type extinguisher is suitable for putting out a fire caused by burning all of the following except

- A. alcohol
- B. cotton
- C. paper
- D. wood

Source: Cheung, Derek and Bucat, Robert. How can we construct good multiple-choice items? Presented at the Science and Technology Education Conference, Hong Kong, June 20-21, 2002.

4. **The stem should be a question or a partial sentence.** A question stem is preferable because it allows the student to focus on answering the question rather than holding the partial sentence in working memory and sequentially completing it with each alternative (Statman 1988). The cognitive load is increased when the stem is constructed with an initial or interior blank, so this construction should be avoided.

INTERIOR BLANK

In addition to the nucleus, _____ are organelles that contain DNA.

- A. Golgi bodies
- B. Mitochondria and chloroplasts
- C. Ribosomes

BETTER

In addition to the nucleus, which organelles contain DNA?

- A. Golgi bodies
- B. Mitochondria and chloroplasts
- C. Ribosomes