

Constructing Questions

Writing the stem:

- Ensure that the directions in the stem are very clear.
- Include the central idea in the stem instead of the choices
- Avoid excessive verbiage
- Word stem positively, avoid negatives such as NOT or EXCEPT. If negative words are used, use the word cautiously and always ensure that the word appears capitalized and boldface.

Bloom's Cognitive Level	Student Activity (Anderson & Krathwohl, 2001, pp. 67-68)	Words to use in Question Stems
Creating	Putting elements together to form a coherent or functional whole; reorganizing elements into a new pattern or structure through generating, planning, or producing.	Design, construct, develop, formulate, imagine, create, change, write a poem or short story
Evaluating	Making judgments based on criteria and standards through checking and critiquing.	Appraise, evaluate, justify, critique, recommend, which would be better?
Analyzing	Breaking material into constituent parts, determining how the parts relate to one another and to an overall structure or purpose through differentiating, organizing, and attributing.	Differentiate, compare/contrast, distinguish from ____, now does ____, relate ____, why does ____ work?
Applying	Carrying out or using a procedure through executing, or implementing.	Apply, solve, show, make use of, modify, demonstrate, compute
Understanding	Constructing meaning from oral, written, and graphic messages through interpreting, exemplifying, classifying, summarizing, inferring, comparing, and explaining.	Explain, predict, interpret, infer, summarize, convert, translate, give example, account for, paraphrase
Remembering	Retrieving, recognizing, and recalling relevant knowledge from long-term memory	Define, list, state, identify, label, name, who? When? Where? What?

Writing answer choices:

- Develop as many effective choices as you can, but research suggests three is adequate.
- Make sure that only one of these choices is the right answer.
- Vary the location of the right answer according to the number of choices.
- Place choices in logical or numerical order
- Keep choice independent; choices should not be overlapping
- Keep choices homogenous in content and grammatical structure
- None-of-the-above should be used carefully
- Avoid All-of-the-above.
- Phrase choices positively, avoid negatives such as NOT.
- Make all distracters plausible
- Use humor if it is compatible with the teacher and the learning environment. (continued)



Additional tips:

- Base each item on important content to learn, avoid trivial content.
- Use novel material to test higher level learning, paraphrase textbook language or language used during instruction to avoid testing for simple recall.

Haladyna, T., Downing, S., & Rodrigues, M. (2002)

Constructing thought questions:

1. Choose a learning goal to assess.
2. Develop an open-ended thought question for the goal. An application-type question where the students have to predict the outcome works best for creating thought questions.
3. After presenting the thought question in lecture, organize the students up into groups of 3-4 and allow 5-7 minutes for discussion.
4. Choose one group to present an answer and rationale to the class. The instructor may need to repeat the group's rationale so that all students understand the explanation.
5. The class uses clickers to vote on the answer and rationale. (Clicker question: Do you agree with the answer and rationale? A. Agree, B. Disagree, C. Don't know)
6. If the majority of the class disagrees, ask another group to explain their rationale to the class.
7. Repeat the clicker voting until the majority of the group agrees.

Additional tips for using thought questions:

1. Start early and start simple. It is important to set the tone early in the quarter. On the first day of lecture, ask 1-2 easy-to-moderately challenging thought questions. This will send a clear message to the students that they need to be active participants in the classroom. The more challenging thought questions should be saved for later when the students have more confidence.
2. Be consistent and ask 2-3 thought questions per lecture. As for traditional clicker questions or any other in-class activities, consistency is important. Although you will cover less material during the semester with this approach, students will be more engaged and will learn more.
3. Personalize the questions by using real-life scenarios, clinical examples, or case studies. This will reinforce the importance of the material you are presenting.
4. Listen carefully for common misconceptions. As the students are generating the answer choices for the thought questions, this is a perfect opportunity for you to address student thinking and misconceptions. You can even create future thought questions to address these misconceptions.
5. Given the open-ended structure of thought questions, exams must include a short-answer component. There must be a match between in-class expectations and the format of the exams.

Clicker Resource Guide: An Instructors Guide to the Effective Use of Personal Response Systems (Clickers) in Teaching CU Science Education Initiative and the UBC Carl Wieman SEI