



College of Medicine

Team Learning Writing Effective Items for IRAT/GRAT & GAP

OMSE
Office of Medical Student Education

The TL Process

Phase 1
Advance
Preparation

Phase 2
Readiness
Assurance

Phase 3
Application of
Key Concepts

Individual
Study

Group Test
GRAT

Team-based Activities &
Large Group Discussion
GAP

Instructor Feedback

Individual Test
IRAT

Characteristics of Readiness Assurance Test (IRAT/GRAT) questions

Instructional Goal: To bring students to a common level of understanding

► Questions designed to distinguish students who construct meaning and integrate concepts/principles/frameworks to what they already know from those who memorize the advance preparation material.

1. Questions that require the manipulation of concepts/principles/frameworks (“If X, increased, decreased, were knocked-out, etc., then ____ ...”)
2. Questions concerning commonly misunderstood concepts: Think of common pitfalls students fall into when learning difficult concepts.
3. Questions that assess appropriate level (depth) of understanding. Based on learning objectives, the TL designer may consider writing questions that require students to think about the concepts/principles/frameworks at the comprehension (be able to explain, describe, paraphrase) and application (be able to apply, use, compute, etc.) level.

In summary, some IRAT/GRAT questions should require higher level of thinking rather than just recall.

Sample Items

Which of the following would NOT produce lactic acidosis?

- A. Carbon monoxide poisoning
- B. Impaired gluconeogenesis
- C. Impaired pentose phosphate shunt
- D. Impaired pyruvate oxidation
- E. Cyanide poisoning

Which two features in this patient’s history and mental status exam reflect deficits in cognitive domains other than memory, and are therefore suggestive of dementia?

- A. Getting lost while driving downtown and mixing up the names of grandchildren
- B. Getting lost while driving downtown and inability to name the vice-president and governor
- C. Getting lost while driving downtown and taking excessive time to get dressed
- D. Mixing up the names of grandchildren and inability to name the vice-president and governor
- E. Mixing up the names of grandchildren and taking excessive time to get dressed
- F. Inability to name the vice-president and governor and taking excessive time to get dressed

Characteristics of Group Application Problems (GAP)

Instructional Goal: To elicit discussion and provide opportunity to use new information and link it to existing knowledge.

- ▶ **Premise of GAP: Designed for both the rationale (argument) and the answer.**
 1. Base question a “real world” situation (i.e. scenarios) to build a rich context. This allows for students to consider/account many factors to arrive at a decision.
 2. Consider describing different patients and have students rank them in order of priority in terms of care, or give students a compare/contrast problem to distinguish between similar concepts.
 3. Bring in Thread content (i.e. patients in the real world) in terms of medical knowledge and how it relates to the impact on the patient in terms of side effects, psychological, financial, cultural, ethnicity, age, gender, ethics/humanities, EBDM, etc.)

- ▶ **Premise of GAP: There are several plausible answers depending on the situation. Therefore, what matters is the rationale used to support students’ answer.**
 1. Considering the resulting “shades of grey” provided by the rich context of a “real world” situation posed in a GAP, the answer/rationale will depend on the situation and have to be made explicit in the rationale provided by the students.
 2. A typical rationale may address all the answer possibilities like, “It depends. If the situation is X, then A is the answer because However, if the situation is Y, then B is the answer, because.... But, if the situation is Z, then C is the answer, because..., etc.”

- ▶ **Premise of GAP: Students are required to think through multiple logical steps and/or understand how seemingly unrelated concepts/principles/frameworks are in fact related.**

The stem of the question may describe an earlier step in a mechanism, pathway or process, and the question requires students to determine the impact of a variable (the introduction or a deficit of) on a product later on in the same or related mechanism, pathway or process.

In summary, GAPs should require the use of new information thereby constructing “meaning” for it.

Sample Item

1. Upon completion of Mr X’s history, mental status exam, and his physical and neurological exams, you elect to order a limited number of lab tests to evaluate for possible reversible causes of cognitive impairment. Which two lab tests would be MOST appropriate and why?
 - A. Serum B6 and B12
 - B. Serum B6 and potassium
 - C. Serum B6 and free thyroxine
 - D. Serum 12 and potassium
 - E. Serum 12 and free thyroxine
 - F. Serum potassium and free thyroxine

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