

ASSESSMENT BACKGROUND

SREB and partner states in the Advanced Career Program are developing a series of four high school career/technical (CT) courses focused around high-demand and high-skill career fields important to the states and their economic growth. The four courses being developed incorporate project-based instruction, are sequential and range from foundational to advanced level courses with advanced courses being designed with the possibility of a dual credit option. Each of the four courses includes an online multiple choice end-of-course (EOC) exam that reflects college- and career-readiness standards in literacy, mathematics, science, career technical standards, and the use of technology and 21st-century skills. Items are being developed to assess student understanding of curriculum content of different levels of cognitive difficulty. The assessments also include teacher and student survey components that are administered during the same time frame as the online EOC exam. These surveys are designed to provide feedback about changes needed in the curriculum products and in the training and support provided to teachers.

Exam Purposes

The exam can develop and add value to students' academic readiness for the workplace and advance their cognitive skills. It also can help them acquire the skills and understanding to apply the technical concepts and use technology software.

Successfully passing the end-of-course exam has the potential for enabling students to: a) earn an industry certification; b) earn dual credit for one or both of the dual credit courses; and c) receive partial academic credit for the amount of math embedded in some Advanced Career courses.

It is expected that students will at least have to successfully complete three of the four courses in the sequence, and score at the required level on course EOCs to receive any type of advanced credit or industry certification.

Exam Construction

Steps involved in the development process:

- Test item-writing experts must provide a rationale as to why they are or are not using a particular standard from the set of standards addressed in the course.
- SREB assessment staff will decide if the developed exam items meet the criteria set forth in the exam item development guidelines.
- SREB content specialists review the exam items for Webb's Depth of Knowledge levels (degree of cognitive difficulty, standards, content and appropriateness for an EOC exam).
- Panels of university and industry experts are convened to determine the construct validity of the exam items before the items are adopted.
- The exams are piloted to determine reliability.

Each end-of-course exam is broken down roughly by these percentages:

- 50 percent CT exam items
- 20 percent math items
- 15 percent literacy items
- 15 percent science items

Exam items are being developed by state CT, literacy, math, science, and technical content experts (teachers, professors, industry) in the participating Advanced Career states. SREB provides the technical assistance, exam specifications and training to the state experts who are creating the exam items.

Sample Question

Here is an example of Webb's Depth of Knowledge Level 1 math question for Aerospace Engineering:

To maintain an airplane in flight, please identify the most critical component listed.

- A) Lift — the flow of air over the wing being greater than the flow of air under the wing producing an upward force.
- B) Thrust — the speed of the airplane through the air.
- C) Drag — the force acting on the airframe due to frictional forces.
- D) Stability — the ability of the airplane to maintain controlled flight.

Correct Response: A

Project-Based Learning and Advanced Career

Project-based learning (PBL) is a key instructional component for all Advanced Career courses. Traditionally when students have experienced PBL, the emphasis has been on the end project. In true PBL and in Advanced Career courses, students take part in an extended process of investigation in response to a question or problem. The PBL process is one that is planned, managed and assessed; true content is taught. The higher order skills that students are called on to use during PBL are 21st-century skills needed for the workplace. Students will learn to work in teams, think critically, identify problems, and propose solutions to design problems. Students will learn to read and comprehend complex technical materials and communicate effectively their understanding of these materials in written, oral, and electronic formats. Further, they will learn to apply mathematics understanding and science concepts and use technology to effectively solve real-world challenging problems.

For each Advanced Career course there are at least six project units. At the conclusion of each project unit, there is an end-of-project assessment. The assessment can be both formative and summative. These assessments help determine if students can read and comprehend technical materials and summarize big ideas. Have their cognitive skills been advanced in terms of the workplace? Can students apply technical concepts and use technology software?

For more information, email AdvancedCareer@sreb.org.