

## Artifact 15

*Search the Internet for five informal and five formal assessment instruments designed for the age group and subject level you intend to teach. Include copies of all 10 assessment instruments in your portfolio.*

The assessment instruments described below are intended (or can be adapted) for high school aged students studying math.

### Formal Assessment Instruments

High school students have at times the opportunity and at other times the requirement to partake in very formal assessments of their mathematical ability in the form of standardized tests. As a teacher I should prepare students to take advantage of the opportunities and to meet the requirements related to these assessments. A thorough understanding of the examinations, including the content they cover and the procedures they stipulate, helps me prepare students. This collection of documents is one way to prepare myself.

Passing the AIMS (Arizona's Instrument to Measure Standards) test is a high school graduation requirement in this state. AIMS is a criterion-based assessment administered up to five times to tenth, eleventh, and twelfth graders. The document [AIMS.pdf](#) contains a sample reading, writing, and math test.

Ninth graders in Arizona take the TerraNova test rather than AIMS. No official practice tests are available over the Internet from the publisher, CTB/Macgraw Hill. However, in part because the test is administered nationwide, study guides and review problems are available, mostly in book form. I have collected 17 separate online document excerpts containing test preparation and review questions and merged them into [TerraNova.pdf](#) for this artifact.

Seniors intending to continue studies at the college or university level are likely to register for the SAT (Scholastic Aptitude Test), which is frequently used in the admissions process. It is produced by the College Board, which also makes available a practice test to registered users of their website. It is attached as [SAT.pdf](#) and includes several mathematical sections.

Another popular college entrance examination is the ACT (American College Test) test produced by ACT, Inc. Available from the website are a complete sample test in the ACT preparation booklet ([ACTBooklet.pdf](#)) and five sets of online sample questions and answers, which I have converted to PDF files and merged into [ACTSamples.pdf](#). As with the competing SAT test, many study guides are available from third party publishers and test preparation services.

Prelude to the SAT is the PSAT/NMSQT (Preliminary Scholastic Aptitude Test/National Merit Scholarship Qualifying Test) sponsored by the College Board and National Merit Scholarship Corporation. Students take the test in eleventh grade. Numerous study guides are available from third parties, but the official website makes available only an unlucky thirteen sample math test questions and answers, which are included in [PSAT.pdf](#).

Also from the College Board are AP (Advanced Placement) tests, which can be used to earn college credit or advanced standing at colleges and universities. Seniors and some juniors enrolled and excelling in AP courses, such as calculus, regularly take the test. Two calculus tests are available: Calculus AB and Calculus BC. Both are described in the test booklet ([APBooklet.pdf](#)) and I have merged smaller collections of sample questions from the website into [APSamples.pdf](#).

Until recently the Stanford 9 test was administered to ELLs in the local school district. In the meantime version 10 of the test has appeared. No official practice test or sample questions could be located online, but study guides are produced by third parties, which make excerpts available. I have collected several into [Stanford.pdf](#).

In addition, students in the local Tucson Unified School District are expected to pass a quarterly district-wide math assessment administered by math teachers. No pertinent information is available online, but the details will doubtlessly become apparent shortly after I begin teaching.

An unusual opportunity to demonstrate mathematical ability is the annual state high school math contest sponsored by the Arizona Association of Teachers of Mathematics. The most recent test, obtained via email, is contained in [StateContest.pdf](#). Similar national competitions are held, including the American Regions Math League (ARML) contest. Individual questions from the 2006 competition are provided in [NationalContest.pdf](#).

### **Informal Assessment Instruments**

The (in)formality of an assessment cannot be unequivocally classified into discrete categories of formal and informal. Formality is a continuous function and opinions will differ about the appropriate cutoff point. To inform my decision, I have consulted two textbooks used in my teacher education program: *Making Content Comprehensible for English Learners* by Echevarria, Vogt, and Short and *Strategies for Effective Teaching* by Ornstein and Lasley.

According to Ornstein and Lasley, "[Q]uizzes are brief informal assessments of student knowledge." Math quizzes, many dynamic but some static, abound on the Internet. I have combined two static documents explicitly classified by their creators as quizzes, each in geometry but of widely varying difficulty, into [Quiz.pdf](#). Their long lengths strain the informality constraint, but they can readily be shortened.

As a teacher I am occasionally reminded that I am not the solitary person in the classroom capable of performing assessment. Ornstein and Lasley include group and peer evaluation in their assessment chapter. The document [PartnerChecklist.pdf](#) includes on page fourteen a simplified rubric that students can use to assess their partner's work. The particular exercise is not designed for high school students, but the rubric can easily be adapted to specific course content.

Teachers (or peers) should of course be using a student's independent practice, including potential homework, in assessing the student's (hopefully) continued understanding of material. The range of potential homework assignments is large. The file [Homework.pdf](#) contains a simple worksheet that students should be able to complete independently at home to reinforce their classroom learning and that can subsequently be checked at school.

Back at school, class participation is a good indicator of understanding and "[m]any teachers consider a student's participation in class to be an essential source of data for evaluation," according to Ornstein and Lasley RubiStar (<http://rubistar.4teachers.org>) provides access to numerous rubrics that instrument class participation, including the three I have combined into [ClassParticipation.pdf](#).

Several less formal but more specific assessment ideas are suggested by Echevarria, Vogt, and Short. Thumbs up/thumbs down is similar to the more widespread hands up/hands down, except that everyone gestures actively and it is not as obvious who is indicating an incorrect answer, which might increase participation. The authors suggest that older students use pencils, but the rate at which students arrive to class without a writing utensil may prove prohibitive. [ThumbsUpThumbsDown.pdf](#) describes one version of the technique in which the teacher asks students whether another student has produced a correct answer. Other yes/no or true/false questions are probably more appropriate, depending on how amenable students are to peer criticism.

Response boards are small dry erase white boards on which students can work problems and display answers so that the teacher can quickly survey the entire group for understanding. When most or all students have completed a problem, boards are shown simultaneously and en masse to the teacher as described in [ResponseBoards.pdf](#). I observed this technique in a fifth grade math class, but have doubts about distributing markers and boards to high school students who leave the room so often and whose teachers are nearly as itinerant.

Students maintain math notebooks at Tucson's AmeriSchool high school, a practice suggested by Ornstein and Lasley. They include in-class assignments, class notes, definitions of vocabulary terms in students' own words, personal assessments of problem solving difficulties, rules of thumb for solving specific types of problems, and so on. They are periodically evaluated by the teacher with the kinds of rubrics collected in [Notebooks.pdf](#).

Many math games can be used as informal assessment instruments. Math Jeopardy is presently popular at the AmeriSchool high school in Tucson. Students can play in teams or individually with performance assessed by overall score or by achievement in separate Jeopardy categories. Questions, or rather answers, are devised by students. The file [MathJeopardy.ppt](#) explains how to create the game and [ProbabilityJeopardy.ppt](#) provides a concrete example.

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