Oregon University System

Science

2005 – 2006 edition

Guide to Teaching and Assessing Proficiency for University Admission

Proficiency-based Admission Standards System

PASS

Oregon University System
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"Promoting access and success for students in higher education."

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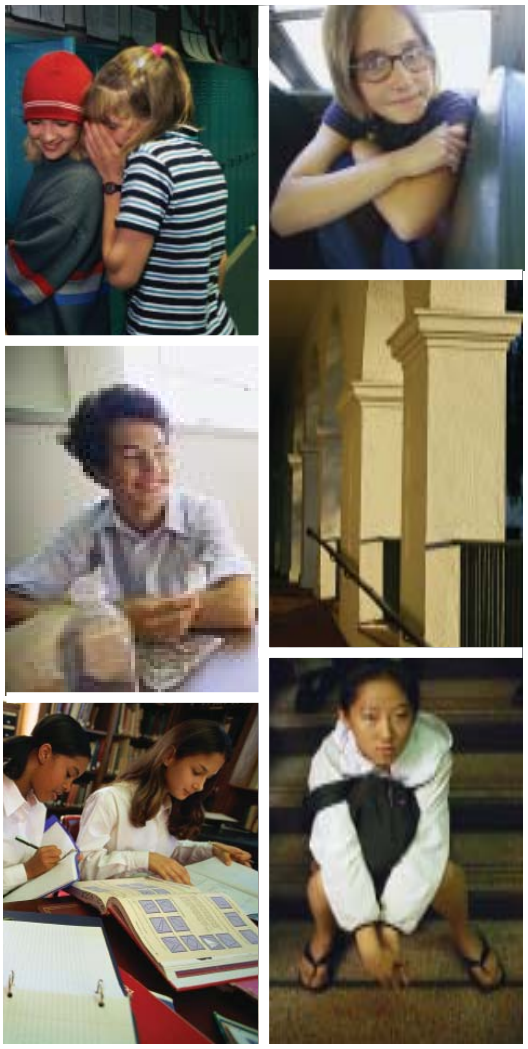

http://pass.ous.edu/

PASS

Proficiency-based Admission Standards System

Contents:

PASS Is Part of OUS Admission

Introduction

The PASS standards describe the level of knowledge and skills students need for successful entry into Oregon's public universities. Because PASS aligns college preparation, entry, and placement with students' attainment of standards in middle and high school, students can use it to track their progress and make informed decisions about how to develop the proficiency needed to succeed in higher education.

The PASS standards provide evidence of proficiency that, when added to the four existing requirements for OUS admission (high school graduation, subject area requirements, GPA, and SAT or ACT), paint a comprehensive picture of student preparation. Currently, PASS information may give applicants advantages such as increased competitiveness for scholarships, advanced class placement, and entry into limited-enrollment programs. See each OUS campus's specific application for details on standards and proficiency.

Aligning Undergraduate Admission with K-12 Student Learning

Oregon is already seeing positive outcomes as the result of its pioneering work in aligning K-12 standards and assessments with OUS expectations for student admission, as directed by the Joint Boards of Education.

As reported to both Boards and the legislature in 2003, *The First Year Study* – based on data from more than 6,000 OUS freshmen and 10,000 community college students – found that students who met benchmarked standards in high school were more likely to attain academic success in their first year of college than those who did not. Subsequent data from *The First Year Study* confirms these results with even stronger correlations.

The Joint Boards of Education has been tasked by the Governor with creating a Unified Education Enterprise (UEE), building a student-centered pipeline that maximizes educational opportunity for all Oregon students. In partnership with ODE and the Department of Community Colleges and Work Force Development (CCWD), OUS is examining the current framework of standards and assessments to close the gap between high school exit expectations and the proficiency needed to take the next step into postsecondary education.

To implement the UEE fully, Oregon's high schools and postsecondary institutions need improved student data connections. Much progress has been made in the past three years toward the design and implementation of an electronic K-16 Integrated Data-Transfer System (IDTS). The ODE, CCWD, and OUS are collaborating in constructing the system, with funding from the Oregon legislature. When the system is in place, student applicants will be able, through their high schools, to send OUS and community colleges a more comprehensive set of information about their performance for use in admission and placement.

Even with the targeted completion schedule for the data-transfer system, statewide implementation is still unlikely to be complete for all high schools and students by fall 2007. Therefore, students applying in 2007 are encouraged, but not required, to include evidence of proficiency, if it is available to them, to complement undergraduate admission requirements. Evidence of proficiency may include scores from state assessments, national assessments, and teacher-verified PASS information.

PASS Assessment

Teachers can use any of three methods for assessing PASS proficiency.

1. PASS Teacher Verification (PTV). Teachers are the best source of information about student performance. PTV allows teachers and students to work together to generate a collection of evidence over time that targets specific academic standards. PTV is usually the most accessible way for students to meet the PASS standards. The PASS website, PASS online training, and the *PASS Guides* to each content area contain specific information about PTV. One-day training sessions are available around the state through regional ESDs. To schedule a training, an ESD can call PASS at (800) 961-7277. The Events section of the PASS website lists sessions as they are scheduled.

2. Specific scores from national tests – such as the Advanced Placement, SAT II, ACT, International Baccalaureate, and second-language proficiency tests – can contribute to the determination of PASS proficiency. See the Assessment Guidelines on page 19 for details.

3. State tests and CIM requirements. The Oregon Department of Education and OUS have collaborated to design the Juried Assessment Process, which offers reciprocal agreements for assessing CIM and PASS. Meeting or exceeding the state assessments can be used to meet several of the PASS standards. For example, meeting CIM math problem-solving requirements also meets PASS Mathematics Standard A. Students can also use PASS to meet some state assessments, or meet CIM through designated PASS standards. (See "Reciprocal Assessment Agreements" on page 20 for details.)

PASS offers resources and trainings for teachers.

PASS assessment builds on practices currently used by teachers to evaluate student performance. Additional training is required for teachers who want to assess PASS collections of student work via PASS Teacher Verification (PTV). Teachers can become "PASS trained" by 1) completing online training, along with a "verification test," at pass.ous.edu/training; 2) attending one of the training sessions PASS offers through ESDs; or 3) through the departmental validation process.

The PASS website contains several resources for teachers, including example collections of student work at varying levels of proficiency, self-paced tutorials on judging student collections, classroom resources that enhance standards-based teaching, PDFs of PASS publications, and dates for scheduled training sessions at ESDs.

PASS Ratings

Students receive a rating for each PASS standard. There are five possible ratings:

PASS Rating	*Description*
(E) Exemplary*	The collection demonstrates an exemplary mastery of the standard and exhibits exceptional intellectual maturity or unique thinking, methods, or talents.
(H) Highly proficient*	The collection demonstrates mastery of the standard at a level higher than entry-level college coursework.
(M) Meets the standard	The collection demonstrates that the student is prepared for entry-level college coursework. (This is the level of proficiency that the majority of admitted students will achieve.)
(W) Working toward the standard	The collection approaches readiness for entry-level college coursework. The level of performance may be improved by: • providing a broader variety of opportunities and conditions of assessment; • providing sufficient evidence to address the range of criteria for the standard; • enrolling in more classes that target this standard.
(N) Not meeting the standard	The collection contains evidence that the student is not prepared to do entry-level college coursework.

* these scores require external verification

Foundation, College Prep, and Specialized Standards

There are three types of PASS standards – foundation, college prep, and specialized. OUS applicants who want to use the PASS standards to meet the OUS subject-area requirement of completing two units of science (a unit is equal to one year) must meet all the foundation and college prep standards in science. Meeting the specialized standards is recommended for scholarships, class placement, and college credit.

The PASS Science Standards	Foundation	College Prep	Specialized
A. Know Fundamental Concepts of the Sciences*	✓		
B. Design and Conduct Scientific Inquiry**		✓	
C. Analyze Scientific Knowledge, Theories, and Research			✓
D. Understand, Use, and Investigate a Field of Science			✓

* may be met by receiving a score of 239 or better on statewide assessment for CIM on Science Knowledge and Skills

** may be met by exceeding CIM requirements in Scientific Inquiry: three work samples with at least one score of 5 or 6 in each dimension

Making a Summary Judgment

PASS uses three assessment methods: PASS teacher verification (PTV), state tests and work-sample requirements, and national tests. PTV is the preferred method for most PASS standards because it creates the closest link between instruction and assessment.

A teacher verifies proficiency by judging a collection of student work. This "collection of evidence" contains examples of work that have been assembled by the student and teacher over time in one or more classes. Evidence may include state-required work samples, classroom assignments and tasks, teacher-made tests, projects, exams, and quizzes. Individual work samples – or, in some cases, entire collections – may be used as evidence for more than one standard.

Making a Summary Judgment

Teacher verification is a two-step process:.

Step 1: Consider sufficiency and proficiency

Because sufficiency and proficiency are interrelated, it's important to determine both before you make a summary judgment. For each standard the collection addresses, reacquaint yourself with the descriptions of proficient performance in the Scoring Guide and with the standard's Sufficiency Guidelines.

A *sufficient* collection contains enough evidence to serve as the basis for reliable scoring. The evidence also addresses the range of criteria described in the Scoring Guide and includes work collected under varied opportunities and conditions, including some in-class, on-demand work as well as independent projects.

To determine sufficiency, consider the three bulleted questions at the top of the next page. Also, **carefully examine the descriptions of sufficiency** on the standard's Sufficiency Guidelines page. These were written by experienced PASS teachers and list what a collection should or must include. Many collections that contain proficient work receive a score of W because they do not include sufficient evidence – for example, a piece of on-demand work to supplement the out-of-class work.

***Proficiency* defines student learning in terms of the level and depth of knowledge and skills.** To determine proficiency, you don't need to rate each piece in the collection; a summary judgment is a holistic rating of a collection, not an averaging of its pieces. Some of the standard's criteria may be more crucial than others; refer to the top of each Sufficiency Guidelines page to find the relative importance of the criteria.

You may infer proficiency about some criteria that the collection does not specifically address. The key is to remember that **the overall level of work must convince an objective scorer** that the student would perform at the same level in similar settings and on related criteria.

Step 2: Assign a summary judgment score

When you give a summary judgment score, you're assessing the degree to which the work indicates readiness for entry-level college coursework. **A collection should be scored M if most of the work in it meets the criteria listed in the applicable scoring guide**, even if the level of performance within and across the work in the collection varies.

The PASS ratings are described on page 5. Note that an M (meets the standard) does NOT equal a "C" in the traditional letter-grading system: an M indicates that the student is prepared to do entry-level college work. In an evaluation of more than 4,000 collections, 40% were in the M range, 13% were in the H (highly proficient) range, and only 2% were in the E (exemplary) range.

To increase the confidence of your judgments, it's a good idea to cross-score some of your collections with other teachers in your content area. Cross-scoring helps you feel confident that, given the same collection, properly trained colleagues would reach the same conclusion about its merits.

Summary Judgment Score Sheet

STEP 1 Consider Sufficiency of Evidence and Proficiency of Performance

Note: Sufficiency and proficiency are interrelated. Determine both before making a summary judgment.

SUFFICIENCY:

Determine sufficiency of evidence.

PROFICIENCY:

Determine proficiency of performance.

Exceeds the Standard (E or H)

Most of the work in the collection shows an exemplary (E) mastery of the standard or mastery at a level higher (H) than entry-level college coursework.

Meets the Standard (M)

Most of the work in the collection is consistent with the descriptions of proficient performance in the standard's Scoring Guide and allows inferences about knowledge and skills.

Does Not Meet the Standard (W or N)

STEP 2 Assign a Summary Judgment Score

Proficient

☐ E	**Exemplary***	If there is sufficient evidence to make a confident judgment AND if the student's work consistently exceeds the criteria in the Scoring Guide, then the summary judgment score is E.
or		
☐ H	**Highly proficient***	If there is sufficient evidence to make a confident judgment AND if the student's work meets and regularly exceeds the criteria in the Scoring Guide, then the summary judgment score is H.
☐ M	**Meets the standard**	If there is sufficient evidence to make a confident judgment AND if the student's work meets the criteria in the Scoring Guide, then the summary judgment score is M.

* needs some form of external verification

Not Proficient

☐ W	**Working toward the standard**	If there is insufficient evidence to make a confident judgment OR if the collection does not include enough work at the proficient level to meet the criteria in the Scoring Guide, then the summary judgment score is W.
or		
☐ N	**Not meeting the standard**	If the collection doesn't address the standard OR if the student clearly doesn't possess the skills addressed by the standard, then the summary judgment score is N.

Collection ID: _____ Judge: _____ Date: _____

Summary Chart of Standards and Criteria for Science

Standard What students must be able to do:	Criteria What students should demonstrate:
A: Know Fundamental Concepts of the Sciences* Know and apply fundamental and unifying concepts from the physical, life, and earth and space sciences, demonstrating general scientific literacy.	**A1: Knowledge of Unifying Scientific Concepts:** Know and apply fundamental concepts that unify the sciences. **A2: Knowledge of Physical Science Concepts:** Know and apply fundamental concepts of the physical sciences. **A3: Knowledge of Life Science Concepts:** Know and apply fundamental concepts of the life sciences. **A4: Knowledge of Earth and Space Science Concepts:** Know and apply fundamental concepts of the earth and space sciences.
B: Design and Conduct Scientific Inquiry** Design and conduct investigations using principles of scientific inquiry, investigative processes of the sciences, scientific instruments, and technology. Collect and analyze data, critique experimental designs, and communicate scientific problems, results, and arguments.	**B1: Formulation of Questions and Hypotheses:** Determine areas of inquiry, frame scientific problems, and pose research questions and hypotheses involving scientific relationships. **B2: Design of Investigations:** Design scientific investigations that use precise and appropriate methodology to address questions, examine scientific relationships, and test hypotheses. **B3: Collection and Presentation of Data:** Conduct scientifically accepted procedures to collect, organize, and display data. **B4: Analysis and Interpretation:** Analyze and interpret data and relationships, evaluate investigations, and develop supported explanations.
C: Analyze Scientific Knowledge, Theories, and Research Analyze and evaluate scientific information and claims to understand the nature of scientific knowledge, the context in which scientific theories and concepts develop, and the implications of scientific research for society.	**C1: Analysis of Scientific Theories and Writings:** Abstract and analyze scientific writings, theories, research, and arguments. **C2: Understanding of Scientific Knowledge and Research:** Examine the work of scientists and the development of scientific theories or bodies of research. **C3: Evaluation of Scientific and Social Implications:** Evaluate scientific, social, or ethical implications of scientific research and writings.

* may be met by meeting CIM requirements

** may be met by exceeding CIM requirements as described on page 5

Standard What students must be able to do:	Criteria What students should demonstrate:
D: Understand, Use, and Investigate a Field of Science Understand, use, and investigate essential concepts, principles, theories, relationships, and experimental processes, exhibiting specialized scientific competency in a field of science.	**D1: Understanding of Concepts, Terms, and Principles:** Understand and correctly use essential principles, organizations, concepts, terminology, and notations from a field of science. **D2: Use of Information, Skills, and Processes:** Use information, skills, and investigative processes employed in a field of science. **D3: Investigation of Principles, Theories, and Relationships:** Investigate, through research and inquiry, important principles, theories, and relationships from a field of science.

A

Scoring Guide for PASS Standard A

Know Fundamental Concepts of the Sciences

Know and apply fundamental and unifying concepts from the physical, life, and earth and space sciences, demonstrating general scientific literacy.

Criteria

A1: Knowledge of Unifying Scientific Concepts

Know and apply fundamental concepts that unify the sciences.

A2: Knowledge of Physical Science Concepts

Know and apply fundamental concepts of the physical sciences.

A3: Knowledge of Life Science Concepts

Know and apply fundamental concepts of the life sciences.

A4: Knowledge of Earth and Space Science Concepts

Know and apply fundamental concepts of the earth and space sciences.

Descriptions of Proficient Performance

Descriptors define types of proficient performance; they are not a checklist.

- demonstrates knowledge and applied understanding of concepts in the following areas:*
  - change, constancy, and measurement
  - systems, order, and organization
  - evidence, models, and explanation
  - evolution and equilibrium
  - structure and function
- achieves a level of scientific literacy that is a foundation for informed citizenship and further learning in the sciences and other disciplines

- demonstrates knowledge and applied understanding of concepts in the following areas: *
  - structures and properties of matter
  - chemical and physical change
  - motions and forces
  - interaction of energy and matter
- achieves a level of scientific literacy that is a foundation for informed citizenship and further learning in the sciences and other disciplines

- demonstrates knowledge and applied understanding of concepts in the following areas: *
  - characteristics, structures, and functions of organisms
  - heredity and biological evolution
  - behavior and interdependence of organisms
  - natural selection and adaptation
- achieves a level of scientific literacy that is a foundation for informed citizenship and further learning in the sciences and other disciplines

- demonstrates knowledge and applied understanding of concepts in the following areas: *
  - structure, energy, and change in the earth's system
  - relationships within the solar system
- achieves a level of scientific literacy that is a foundation for informed citizenship and further learning in the sciences and other disciplines

* **Note**: Concepts to be learned are defined within the Oregon Content Standards, the Test Specifications for the Oregon Statewide Assessment, and the National Science Education Standards (National Academy of Sciences, 1996).

Sufficiency Guidelines for PASS Standard A

A

Over the past few years of judging collections of evidence, science teachers have determined the relative importance of the criteria for Standard A as follows:

- A1 is Important – some evidence required
- A2 is Important – some evidence required
- A3 is Important – some evidence required
- A4 is Important – some evidence required

Guidelines for a Sufficient Collection of Evidence

Note: The primary assessment method for Standard A is the Oregon Statewide Assessment of Science Knowledge and Skills – see the Assessment Guidelines on page 19 for qualifying scores.

Does the work sufficiently represent the standard?

The collection should include:

- experience with the majority of fundamental science concepts expected in physical, life, and earth and space sciences, as well as the unifying concepts that integrate the sciences (A1-A4)

Have there been sufficiently varied opportunities, circumstances, and conditions for assessment?

The collection should include:

- assessment through exercises, projects, laboratories, and tests
- inquiry investigations demonstrating specific science concepts
- at least one research report demonstrating knowledge of specific science concepts

Is there sufficient evidence to be confident that the work represents the student?

The collection MUST include:

- reasonably consistent demonstration of scientific literacy
- several assessments conducted under teacher supervision, ideally representing all criteria (A1-A4)

B

Scoring Guide for PASS Standard B

Design and Conduct Scientific Inquiry

Design and conduct investigations using principles of scientific inquiry, investigative processes of the sciences, scientific instruments, and technology. Collect and analyze data, critique experimental designs, and communicate scientific problems, results, and arguments.

Criteria

B1: Formulation of Questions & Hypotheses

Determine areas of inquiry, frame scientific problems, and pose research questions and hypotheses involving scientific relationships.

B2: Design of Investigations

Design scientific investigations that use precise and appropriate methodology to address questions, examine scientific relationships, and test hypotheses.

B3: Collection and Presentation of Data

Conduct scientifically accepted procedures to collect, organize, and display data.

B4: Analysis and Interpretation

Analyze and interpret data and relationships, evaluate investigations, and develop supported explanations.

Descriptions of Proficient Performance

Descriptors define types of proficient performance; they are not a checklist.

- determines areas of inquiry and frames scientific problems that are focused, worthy of investigation, able to be investigated, and representative of a chosen field of science
- independently develops clear and concise questions and/or hypotheses (or re-frames them from general topics) that address and apply concepts, data, and research appropriate to a field of science
- focuses investigations on relationships involving interaction, dependency, correlation, or causation
- provides focused rationale for investigation using relevant background information, appropriately applying terminology, concepts, theories, and research
- suggests investigative design through clarity of questions/ hypotheses and supporting background information
- communicates questions, hypotheses and rationale with clarity, coherence, and conciseness

- describes and explains practical investigative designs that provide data sufficient to address questions, examine scientific relationships, and/or validly test hypotheses
- clearly describes scientific methods that are logical, precise, safe, ethical, and consistent with accepted scientific practices
- describes procedures that can be followed, replicated, and analyzed for sources of bias and error
- builds precision, flexibility, and appropriate adjustments into the structure of investigative designs, which can be monitored and adjusted when appropriate
- evaluates technology-based means of data collection and makes appropriate decisions about their use and limitations
- applies logical scientific models and methods
- communicates investigative methods with clarity, coherence, and conciseness

- uses scientifically accepted methods, procedures, and equipment or resources precisely to generate accurate data sets from complex procedures
- organizes and transforms data in scientifically accepted displays, with formats, layouts, scales, and graphics that highlight data and emphasize relationships to be analyzed and interpreted
- collects sufficient data to study questions, relationships, or hypotheses
- objectively observes and records details, properties, and patterns, avoiding interpretation and opinion (in most cases)
- correctly uses appropriate measurement tools and units to clarify observable characteristics and make comparisons
- uses instruments and equipment correctly and responsibly
- uses technology/software to accurately collect, analyze and display data
- communicates results using pictures, diagrams, and graphic displays that are clear, neat, accurate, and informative

- provides clear and detailed scientific analyses and interpretations of relationships, including those involving interaction, dependency, correlation, or causation
- explicitly analyzes patterns in results to explain questions, hypotheses, and relationships, and to support conclusions
- orders and classifies objects/ events using logical comparisons of similarities and/or differences in properties
- supports and justifies interpretations with specific data and results
- analyzes and critiques investigations for flaws, limitations, and sources of error or bias
- recognizes and explains the limitations of the observed relationships and the potential influences of other factors
- precisely uses terminology, symbols, notations, and formulas to report results, identify patterns in data, and propose explanations
- correctly applies concepts, information, theories, and research specific to a field of science to justify and explain relationships investigated
- communicates findings with clarity, coherence, and conciseness

Sufficiency Guidelines for PASS Standard B

B

Over the past few years of judging collections of evidence, science teachers have determined the relative importance of the criteria for Standard B as follows:

- B1 is Important – some evidence required
- B2 is Critical – substantial evidence required
- B3 is Critical – substantial evidence required
- B4 is Critical – substantial evidence required

Guidelines for a Sufficient Collection of Evidence

Does the work sufficiently represent the standard?

The collection MUST include:

- several lab reports or exercises in which the student demonstrates abilities in one or more phases of inquiry. The collection may include each of the four phases of inquiry more than once.
- at least one complete investigation designed so that the student independently addresses and integrates all phases of inquiry. (Note: the student need not meet all criteria on this piece as long as the collection demonstrates proficient performance.)

Have there been sufficiently varied opportunities, circumstances, and conditions for assessment?

The collection MUST include:

- examination of two or more science topics using a variety of methods and processes; different types of inquiry (observational, experimental, etc.) can be used

The collection should include:

- investigations or exercises undertaken in a variety of conditions: independent, co-operative, coached, supervised, and on-demand

Is there sufficient evidence to be confident that the work represents the student?

The collection MUST include:

- a reasonably consistent level of products developed by the individual student which document and communicate the processes and results of inquiry
- at least one investigation, with more than one phase of inquiry demonstrated, conducted under teacher supervision

C

Scoring Guide for PASS Standard C

Analyze Scientific Knowledge, Theories, and Research

Analyze and evaluate scientific information and claims to understand the nature of scientific knowledge, the context in which scientific theories and concepts develop, and the implications of scientific research for society.

Criteria

C1: Analysis of Scientific Theories and Writings

Informally analyze scientific writings, theories, research, and arguments.

C2: Understanding of Scientific Knowledge and Research

Examine the work of scientists and the development of scientific theories or bodies of research.

C3: Evaluation of Scientific and Social Implications

Evaluate scientific, social, or ethical implications of scientific research and writings.

Descriptions of Proficient Performance

Descriptors define types of proficient performance; they are not a checklist.

- summarizes information, allowing readers to understand the essence of the article, study, report, theory, presentation, or text in a brief reading
- correctly identifies and explains the scientific concepts, principles, or theories involved and applied
- clearly and completely restates scientific claims or arguments presented
- identifies observations, information, data, and/or assumptions used to support scientific claims or arguments
- identifies scientists, authors, or organizations cited or quoted in text in support of scientific claims or arguments
- uses own words, avoiding plagiarism

- examines the thinking and processes used by scientists to investigate a phenomenon, develop a theory, or test a hypothesis
- correctly and completely identifies the major components or ideas of a scientific theory (or body of research)
- correctly outlines the general historical development of a theory (or body of research)
- correctly describes influential aspects of the scientific, historical, social, and/or cultural context in which a scientific theory (or body of research) was developed
- correctly identifies major contributors and proponents and their contributions or support
- objectively identifies major critics and criticisms

- evaluates opposing views of a controversial scientific issue, using scientific criteria as a basis for judgments
- identifies the major scientific implications of a theory, discovery, body of research, or scientific writing
- discusses important social, cultural, or historical implications of a scientific theory, discovery, body of research, or scientific writing (when applicable)
- identifies philosophical or ethical questions and issues associated with a scientific theory, discovery, body of research, or scientific writing (when applicable)
- compares and analyzes opposing views of a controversial scientific issue

Sufficiency Guidelines for PASS Standard C

C

Over the past few years of judging collections of evidence, science teachers have determined the relative importance of the criteria for Standard C as follows:

- C1 is Critical – substantial evidence required
- C2 is Important - some evidence required
- C3 is Important – some evidence required

Guidelines for a Sufficient Collection of Evidence

Does the work sufficiently represent the standard?

The collection MUST include:

- more than one example of the student's ability to process and analyze scientific information (C1)
- at least one properly cited research-based examination of an established scientific theory or current topic of research (C2)
- impartial examination and discussion of at least one controversial scientific issue (C3)
- at least one opportunity to evaluate scientific or social implications of an example of scientific writings, theories, discoveries, or bodies of research. (Note: proficiency in this skill is not absolutely required, except in advanced performance.)

Have there been sufficiently varied opportunities, circumstances, and conditions for assessment?

The collection MUST include:

- research that involves varied perspectives and includes evidence of processing and analyzing scientific information presented in a variety of modes: textbooks, popular media, journals, lectures, reports, studies, or internet resources

Is there sufficient evidence to be confident that the work represents the student?

The collection MUST include:

- reasonably consistent evidence of skill in processing, presenting, and analyzing scientific information
- at least one assessment conducted under teacher supervision
- evidence that the student developed his or her own research products responsibly, avoiding plagiarism

D

Scoring Guide for PASS Standard D

Understand, Use, and Investigate a Field of Science

Understand, use, and investigate essential concepts, principles, theories, relationships, and experimental processes, exhibiting specialized scientific competency in a field of science.

Criteria

D1: Understanding of Concepts, Terms, and Principles	D2: Use of Information, Skills, and Processes	D3: Investigation of Principles, Theories, and Relationships
Understand and correctly use essential principles, organizations, concepts, terminology, and notations from a field of science.	Use information, skills, and investigative processes employed in a field of science.	Investigate, through research and/or inquiry, important principles, theories, and relationships from a field of science.

Descriptions of Proficient Performance

Descriptors define types of proficient performance; they are not a checklist.

Specific principles, organizations, concepts, terminology, and notations are dependent on the selected field of science.	Specific information, skills, and investigative processes are dependent on the selected field of science.	Specific principles, theories, and relationships to be investigated are dependent on the selected field of science.

* **Note**: In many fields of science, the National Science Education Standards define appropriate content. It may be helpful to refer to the tests listed in the Assessment Guidelines on page 19 to get a sense of these correlations, and to look at the examples of conceptual topics on page 18.

Sufficiency Guidelines for PASS Standard D

D

Over the past few years of judging collections of evidence, science teachers have determined the relative importance of the criteria for Standard D as follows:

- D1 is Critical – substantial evidence required
- D2 is Critical – substantial evidence required
- D3 is Important – some evidence required

Guidelines for a Sufficient Collection of Evidence

Does the work sufficiently represent the standard?

The collection MUST include:

- demonstration of in-depth content knowledge in at least four major conceptual topics of a field of science. (See the table on page 18 for examples.)
- at least one complete inquiry-based or research investigation of a scientific relationship within the same field of science

Have there been sufficiently varied opportunities, circumstances, and conditions for assessment?

The collection should include:

- varied assessments through investigations, tests, reports and essays, presentations, diagrams and/or models
- inquiry and research undertaken in varied circumstances, for varied purposes, on varied topics, and to demonstrate varied skills in a field of science

Is there sufficient evidence to be confident that the work represents the student?

The collection MUST include:

- reasonably consistent understanding of the field of science at a reasonably sophisticated level
- several assessments conducted under teacher supervision

Examples of Conceptual Topics in Fields of Science that Might be Addressed in PASS Standard D

Biology
cells
evolution
ecology
genetics
density
classification
bio chem
body systems
botany
microbiology
respiration
ecology
zoology
classification/taxonomy

Chemistry
atomic theory
periodicity
bonding
states of matter
kinetics
electrochemistry
thermodynamics
acid-base
redox (?)
equilibrium
stoichiometry (?)
organic
inorganic

Physics
kinematics
dynamics
optics
waves
electricity
magnetism
atomic physics
nuclear
thermodynamics
motion
force (Newton's laws)
energy
momentum
gravitation
light / optics
quantum

Earth and Space Science
geology
plate tectonics
astronomy
star classification & life cycle
solar system
galaxies
deep space
meteorology
fronts
forecasting
climates
climate change
atmospheric pollution

Forensics
fingerprinting
facial reconstruction
hair analysis
odontology
DNA
blood
crime scene analysis
evidence analysis
handwriting & document analysis
microscopic analysis
soil and particle analysis

Agricultural Science
soils
animal husbandry
botany
plant pathology

Marine Biology
ocean taxonomy
ocean mapping
climate impact
tides & currents

PASS Science Assessment Guidelines for 2005-2006

Only one assessment is required per PASS standard. Choose the method that best serves the student.

PASS Standard		Assessment Method	Assessment Code	Working toward (W)	Meets (M)	Highly proficient (H)	Exemplary (E)
A. Know Fundamental Concepts		PASS Teacher Verification	PTV	W	M	H	E
		Oregon Statewide Assessment	OSA-S	233	239		
B. Scientific Inquiry		PASS Teacher Verification	PTV	W	M	H	E
		3 CIM work samples with at least one 5 or 6 in each dimension	CIM-S	W	M		
C. Analyze Scientific Knowledge		PASS Teacher Verification	PTV	W	M	H	E
D. Investigate a Field of Science	Biology	PASS Teacher Verification	PTV	W	M	H	E
		SAT II Biology	SAT II-B	490	530	690	750
		AP Biology	AP-B	2	3	4	5
		IB Biology	IB-B	2	3-4	5	6-7
	Chemistry	PASS Teacher Verification	PTV	W	M	H	E
		SAT II Chemistry	SAT II-CH	510	540	710	780
		AP Chemistry	AP-CH		2-3	4	5
		IB Chemistry	IB-C	2	3-4	5	6-7
	Physics	PASS Teacher Verification	PTV	W	M	H	E
		SAT II Physics	SAT II-P	540	570	730	800
		AP Physics B	AP-PB	2	3	4	5
		IB Physics	IB-P	2	3-4	5	6-7
	Other Science Fields	PASS Teacher Verification	PTV	W	M	H	E
		IB Environmental Systems	IB-ES	2	3-4	5	6-7

- PTV ratings of H or E require external validation. This can be done (1) through the OUS~ODE Moderation Panel, available biannually at no cost, or (2) by department or regional validation, or (3) by attaining H- or E-level scores on national assessments including AP, IB, and SAT II.
- AP and IB assessments at the H or E level do not need additional verification because they include a method of external validation.
- SAT II assessments at the H or E level require external validation by a PTV, AP, or IB rating at the H or E level.
- As data on student proficiency is received and analyzed, required scores may be adjusted. See PASS website for current information.

2005-06 Reciprocal Assessment Agreements between ODE and OUS

The Oregon University System and the Oregon Department of Education offer reciprocal agreements for assessment in the following areas:

- State assessments to meet PASS standards;
- PASS assessment data to meet state requirements for CIM and CAM;
- PASS collections of evidence for juried CIM requirements

State Assessment to PASS

1. Exceeding the Oregon State **writing** requirements (state assessment and work samples) meets PASS English Standard A (Write for Varied Purposes)
2. Meeting or exceeding the Oregon State **math** problem-solving requirements (work samples) meets PASS Math Standard A (Solve Mathematical Problems)
3. Meeting **math** knowledge and skills requirements (score of 239 or better on the Oregon Statewide Assessment) meets PASS Math Standard B (Perform Algebraic Operations)
4. Meeting **science** knowledge and skills requirements (score of 239 or better on the Oregon Statewide Assessment) meets PASS Science Standard A (Know Fundamental Concepts of the Sciences)
5. Exceeding three Oregon State **science** inquiry work samples with at least one score of 5 or 6 in each dimension meets PASS Science Standard B (Design and Conduct Scientific Investigations)
6. Exceeding three Oregon State **social science** analysis work samples with at least one score of 5 or 6 in each dimension meets PASS Social Science Standard A (Analyze Issues and Events)

PASS to State Assessment

1. Meeting PASS **English** Standard A (Write for Varied Purposes) can be used to meet Oregon State **writing** requirements
2. Meeting PASS **English** Standards B (Read from a Variety of Literary Genres and Periods), C (Interpret Literary Works), and D (Conduct Inquiry and Research) can be used to meet Oregon State **reading** requirements.
3. Meeting PASS **English** Standard F (Communicate in Oral, Visual, and Written Forms) can be used to meet Oregon State **speaking** requirements
4. Meeting PASS **Math** Standard A (Solve Mathematical Problems) can be used to meet Oregon State **problem-solving** requirements
5. Meeting PASS **Math** Standards B (Perform Algebraic Operations), C (Use Geometric Concepts and Models) and D (Use Probability and Statistics to Collect and Study Data) can be used to meet Oregon State **math knowledge and skills** requirements
6. Meeting PASS **Science** Standard A (Know Fundamental Concepts of the Sciences) can be used to meet Oregon State science **knowledge and skills** requirements
7. Meeting PASS **Science** Standard B (Design and Conduct Scientific Inquiry) can be used to meet Oregon State **scientific inquiry** requirements
8. Meeting PASS **Social Science** Standard A (Analyze Issues and Events) can be used to meet Oregon State **social science analysis** requirements

Note: Second language requirements for both the state 10th grade benchmark (CIM) and for PASS (M level) are equivalent to the ACTFL Benchmark IV (Novice-High) level. See the PASS Second Language Assessment Guidelines on the PASS website for assessment options. Oregon State (CIM) subject-area endorsements in the arts and the social sciences are determined by local school districts in conjunction with requirements detailed by the Oregon Department of Education.

For information about the **ODE Juried Assessment Process,** which offers reciprocal agreements for assessing CIM and PASS, contact Tony Alpert, Director of Assessment, at (503) 947-5827, or read the 2005-06 Juried Assessment Manual at www.ode.state.or.us/teachlearn/testing/admin/juried/asmtjuriedmanual0506.pdf.

Oregon
University
System

The Oregon University System schools:

- Eastern Oregon University (La Grande)
- Oregon Institute of Technology (Klamath Falls)
- Oregon State University (Corvallis)
- Portland State University (Portland)
- Southern Oregon University (Ashland)
- University of Oregon (Eugene)
- Western Oregon University (Monmouth)

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Delivery Address: 506 SW Mill, Suite 530 / Portland, OR 97201

PASS Website: http://pass.ous.edu/