

PROGRAM OUTCOMES ASSESSMENT SUMMARY REPORT

PROGRAM: AS DEGREE - OPTIONS I AND II

DATE: 3 DECEMBER 2007

DEMONSTRATION OF LEARNING: *What assignments or projects demonstrate student learning outcomes are achieved?*

[Note: evidence of learning contained in Assessment methods and Findings sections.]

Learning Outcomes	Assessment methods
<p>Have college-level knowledge and skills in critical thinking, quantitative analysis, and written composition.</p>	<p>Critical thinking is embedded and integral to the science and math curriculum and the criteria for evaluating critical thinking are integrated into these assignments so that students have a variety of opportunities for practice and feedback. Some examples of this integration include:</p> <ul style="list-style-type: none"> • Physics word problems: Students are asked to apply the concepts of physics to problems by asking what tool can be used to solve the given problem (such as conservation of energy) • Physics students use the Physics Education Group's Tutorial for labs and homework. These tutorials were crafted through research to lead students to explicitly examine their misconceptions in physics theory • Chemistry pedagogy has shifted from teaching formulas first to asking students to describe what is happening first so they understand the formulas used to analyze the process. This strategy is used in both CHE 101 (nursing and biotechnology) and CHE 140 (general chemistry) and has lead to a much higher success rate for students. • BIO 100 students are asked to dissect owl pellets and identify the number and kind of prey. From these results students are then asked to construct a food web food web. The webs should contain a Barn Owl at the highest trophic level, and plants at the lowest and the arrows point in the direction of energy flow. The results are reviewed by the instructor and class. • Biology 202 exams are entirely take home. Students are presented with critical thinking questions and then using literature, the internet and group discussions arrive at feasible and accurate answers. <p>Quantitative analysis is integrated into most science and math courses and engages students in learning and applying math in a variety of quantitative learning outcomes. These courses develop quantitative facility as a primary objective and methods of assessment must address quantitative ideas. For example:</p> <ul style="list-style-type: none"> • Math courses include word problems that require students to sort information

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provided and analyze the data given. Students then derive the corresponding math, perform calculations and apply solution techniques, and analyze the final results.

- Applied math is a basic tool of the science curriculum and quantitative analysis is a central outcome that is assessed in almost every course. Students in the AS transfer programs who cannot successfully apply required quantitative analyses cannot advance to the next level. In one biology lab, students compute the size of field of view at various magnifications and the size of an organism that they view.
- Earth and Environmental Sciences faculty received an NSF grant for their Quantitative Environmental Learning Project (<http://seattlecentral.edu/qelp/>). In one exercise developed for this project, students are asked to evaluate data on waste and population in one of nine states. From these data students are asked to do a number of calculations and to draw conclusions about the meaning of their results. Faculty found that student engagement improves with the application of real data sets in developing the understanding of science and math concepts.
- Biology 202 - students are asked to evaluate data on animal physiology and development. From these data students are asked to do a number of calculations and to draw conclusions about the meaning of their results. All results are recorded on a laboratory notebook.
- Each physics course has explicit quantitative outcomes that support the physical concepts in the course. More specifically Physics 101 explicitly outlines the use of linear and quadratic equations to understand kinematics, the use of trigonometry to analyze projectile motion, 2-D applications to Newton's Laws and Conservation of Momentum and solving systems of equations in both kinematics and dynamics.

Written composition is practiced and assessed in both ENG 101 (Freshman Composition) and ENG 102 (Research Writing) [Note: AS Degree students are required to take ENG 101 but may take a communications course in place of ENG 102]. English faculty established criteria for evaluating student writing in ENG 101. These criteria address language proficiency including: having a thesis; using specific details, facts, or examples to support thesis; demonstrate critical thinking; produce coherent prose (transitions); choose appropriate organizational pattern; make writing choices based on audience and purpose; write clear, grammatically and mechanically correct prose; develop style and voice; integrate sources and avoid plagiarism. Rubrics have been developed to support the evaluation process.

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	<p>Additionally, writing assignments are given in a variety of other discipline-specific and interdisciplinary courses required for distribution credits. While the criteria for evaluation are generally focused on the communication of ideas, some faculty also give feedback on composition. For example:</p> <ul style="list-style-type: none">• ENV 150 (Environmental Issues and Problems) includes weekly reflective essays on environmental issues and students are evaluated on communication of their ideas in both their writing and in classroom discussions.• Most science labs require written lab reports and many also require one or more longer formal reports, including CHE 101, CHE 140, 150 and 160. These reports require critical thinking and applied math as well as a demonstration of students' understanding of chemistry concepts.• Biology 202 – groups of students write a research paper using information literacy and primary literature. Each student is responsible to write one section of the paper. Papers are written in professional scientific style. There is instructor feedback on the rough draft in preparation for the final version.• The physics department requires students to write reports for many labs that describe the student created procedure, the resulting data and analysis. Drafts of these labs are required and graded in preparation for the final version.
<p>Have college-level mastery of information literacy and be technologically literate.</p>	<p>Information literacy is embedded in a variety of courses. Required courses for all AS degree students include ENG 101 which includes information literacy through writing assignments that are supported by information. AS-I students are also required to take ENG 102 (Research Papers), AS-II students have a choice of ENG 102 or CMN 205) Librarians support science and math faculty to help students find and use information appropriately and to define appropriate evaluation criteria. In a variety of science and math courses, students are asked to investigate scientific literature and report their findings. Some examples of this practice include:</p> <ul style="list-style-type: none">• BIO 120: (Marine Biology) students do a search for articles about a particular organism and prepare annotated bibliographies. Last spring students compared results from Google and Academic database searches to see what types of articles came up. Ultimately they needed 3 reliable sources including one primary research article. Students gave a presentation about their organism and their

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research experience.

- In physics 103 and 203 students choose a rotational phenomenon to study – Frisbees, Tippe Tops, spinning books, pool, bowling, gyroscopic motion, rattlebacks, bicycle stability, swinging (on swings), martial arts, etc. The explanations while fairly complicated are within reach of most students in third quarter physics. The students do a library search and have to re-interpret explanatory articles in terms of the physics language that they know. Students present to the class with the objective of teaching them how the rotational phenomena work. The information literacy project has helped the students considerably to perform well on this project.
- Biology 202, some ANP 213 sections –students perform journal commentaries on primary literature and write a research summary of a topic of interest that relates to material from the class.

Technology literacy is developed in many courses through the requirement for students to produce documents in electronic formats. Over the course of their tenure at the college, transfer students have a number of opportunities to practice different software applications appropriate to the courses they elect and this practice includes file management, email communication, attaching files, and saving files to a drive on the network server. Students are encouraged to use presentation software and to post projects on the web in a number of courses. While these skills are not assessed directly in many cases, students who have difficulties with technology are referred to computer lab skills workshops.

- The Science and Math building has dedicated computer labs and the lab staff is available to help students solve technological problems as they arise.
- AS Degree Option 2 students are required to take 5 credits in Computer Science.
- Faculty report that the use of computers in math courses makes the math more accessible to students. There are many good programs used for specific courses, including programs on the web. Math faculty want lower as well as higher level math students to have access to these technologies. Even Math 084 is becoming “paperless.” Math learning programs allow students to get immediate feedback so they can keep working until they get the right solution. These programs also develop students’ comfort and facility with technology.
- Physics courses employ a number of specialized software programs, including

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	<p>Physlets (Java applets that explain physics), Mathematica, Mathcad, Matlab, and Maple. Students use word processing programs to write up reports and spreadsheets to model data – embedding graphs and data within their reports to illustrate their findings.</p> <ul style="list-style-type: none"> • Anatomy and Physiology classes use A.D.A.M. Interactive Anatomy (AIA) as an interactive learning tool that dramatically enhances the study of human anatomy and related topics.
<p>Demonstrate effective oral and written communication, teamwork and collaboration in scientific, mathematical and other settings.</p>	<p>A number of coordinated studies programs, such as “Rivers of Identity” (Fall 2007) integrate science and math concepts in the context of other disciplines. These programs focus on group projects, teamwork and presentations. Many other courses in science and math develop teamwork and communication. Examples include:</p> <ul style="list-style-type: none"> • Statistics courses emphasize interpersonal communication by requiring students to explain numbers and math to others. Classroom discussions include examples of statistics from NPR and examine the statistical issues relating to those numbers. • There is an emphasis on group work and group projects in all levels of math. • Earth Sciences labs are built around a collaborative learning model • Chemistry lab reports require students to make a claim and defend it • The Biology faculty have been commended by the Curriculum Review Committee for their emphasis on collaborative work and critical thinking. Most biology labs involve group work and many involve group reports. • Nearly all physics labs are done in teams and several capstone projects in both physics and engineering courses require team oral presentations. The department works explicitly with the students to identify the essential elements of an excellent presentation. Students are graded using a rubric created specifically for scientific presentations.
<p>Have the ability to design and conduct experiments, as well as to analyze and interpret data.</p>	<p>Opportunities to design and conduct experiments, and to analyze and interpret data are integrated into many science assignments, especially in the 200 level courses. Examples of these opportunities for practice and feedback on this outcome include:</p>

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	<ul style="list-style-type: none"> • CHE 150 students conduct their own scientific investigations and give presentations on their results. • Physics student are often required to design their own experiments once they understand the equipment. For example in PHY 102 & 202 lab students are asked to design simple DC circuits that exemplify basic principles of circuits. They then set up these circuits and then by taking measurements demonstrate a variety of principles • Botany 112 – students design, implement, analyze and then report on individual research projects. Requires students to create feasible experiments, record data properly and understand their results. • Research/Work Experiences for Transfer Ready SCCC Students: Year one of funding for this project builds upon a pilot project currently under way at SCCC to support transfer to baccalaureate institutions or the workforce. This part of the program allows students with sophomore standing to take a methods course in research that leads them to form their own research questions. Based upon their interests and academic experience these students are matched with research mentors during the school year to engage in scientific research in academic or industry labs.
<p>Understand methods of inquiry specific to traditional and contemporary areas of knowledge in mathematics and the natural and physical sciences.</p>	<p>AS Degree transfer students elect courses in disciplines they intend to pursue after transfer. They have the opportunity to explore methods of inquiry and mathematical tools they will need to pursue those goals</p> <ul style="list-style-type: none"> • CHE 236 students are preparing for majors in pre med, dentistry, pharmacy, bioengineering, chemistry and related fields. These students score above the national average in the American Chemical Society standardized test. • BIO 201 builds the knowledge base needed for the subsequent courses in the series and prepares students who plan to major in pre-med, dentistry, cellular biology, microbiology and other related areas. The faculty developed a new supporting lab manual which is closely coordinated with the course content and this has led to greater student satisfaction and success. • In EGR 230 (Engineering Dynamics) students investigate more advanced problems in small groups. The projects involve research, experimentation, analysis and presentation (example: why should a trebuchet be mounted on rails?).

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<p>Understand the interdisciplinary and multicultural nature of knowledge.</p>	<p>A number of courses in the Science and Math Division address interdisciplinary dimensions. Over the last few years there have been a number of Coordinated Studies Programs which integrate learning from a variety of disciplinary perspectives, including:</p> <ul style="list-style-type: none"> • <i>6 Billion People and Counting</i>: integrates math and environmental geology to explore environmental issues. Students can satisfy both quantitative reasoning and integrated studies requirements with this course. • <i>Mapping the Eye – the Power of an Illusion</i>: explores the relationship between seeing and perceiving. Students consider issues of race, class, gender and religion through both humanities and social sciences perspectives. • <i>The Nature of Being: Plagues, Pestilence, and Power</i>: combines perspectives from biology and history and science fiction and also allows students to satisfy composition credits through essays, research papers and annotated bibliographies. • AS Degree distribution requirements include courses in a minimum of four disciplines in the humanities and social sciences. <p>Other science and math courses integrate multiple disciplinary perspectives. Examples include:</p> <ul style="list-style-type: none"> • Math courses often apply mathematical concepts and strategies through word problems in different disciplinary contexts, such as medicine, transportation, and architecture. • There is a strong connection between the chemistry and biotechnology curricula. All Biology courses build from the basic knowledge acquired in the math and chemistry courses, allowing more application of previous knowledge. • Engineering is by nature a very inter-disciplinary subject, requiring application of principles in physics, chemistry, mathematics and computer science
<p>Demonstrate academic honesty and ethical behavior.</p>	<p>Academic honesty is addressed in math and science courses through assignment and course policy requirements. Examples include:</p> <ul style="list-style-type: none"> • Math group work is encouraged for homework but students are required to submit their own answers to the problems. Students who do not follow the policy are penalized through loss of credit and in extreme cases, failure in a course.

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	<ul style="list-style-type: none"> • An online homework platform for math addresses cheating by giving different problem sets to each student • Courses that include information literacy outcomes require citations to give credit for ideas and information derived from outside sources. • Students are typically required to hand in sequential drafts of work leading up to the finished version consequently allowing the instructor to see the development of the work that is done by specific students. • Students are sometimes required to give their own personal reactions to a reading that makes it less likely that their analysis can be pulled from an external sources.
<p>Be able to appreciate and apply their knowledge of science in the outside world.</p>	<ul style="list-style-type: none"> • Statistics classes ask students to bring in numbers they hear on NPR reports which are then evaluated through class discussions about the statistical concepts and issues involved. • ENV 150 (Environmental Issues) classes do service learning projects with environmental organizations or environment related projects for other organizations. Winter 2008 one student worked with homeless people who were moving into housing, to promote the idea of recycling. At the end of the quarter students present their project in a public poster. • Physics demonstration and experiments are derived everyday phenomena to focus on basic concepts. Electronic data acquisition enables study through simple experiments (such as jumping off a chair) and measuring impact forces, accelerations etc. For example: <ul style="list-style-type: none"> (i) Use a video camera and special video software (Videopoint) to study kinematics), students design their own projectile experiment. (ii) Measure acceleration and normal force in an elevator, using a portable data acquisition setup. (iii) Use a soda can and foam insulation to study polarization, build a DC motor with wire, a battery, paper clips, and a bar magnet. • Engineering has introduced projects that get students involved and engaged: In Engineering Statics, for example, students have to build a bridge made of balsa wood. The project involves design, modeling, construction, testing, and failure analysis.

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- Engineering students participate in intercollegiate competitions and extracurricular engineering activities such as the human powered paper vehicle engineering competitions (HPPV) where small teams design and build their own paper vehicle, then raced it against other teams from other colleges in the state; and Rocket team, which involves design, construction and testing of rockets.

EXTERNAL EVIDENCE? *Alumni, employer or Technical Advisory Committee feedback?*

Science and Math faculty retreats have been a successful forum for reviewing program level curriculum issues.

Science and Math Outcomes Assessment group (SAMOA) was formed in 2007 with faculty representing each of the disciplines to explore strategies for addressing outcomes assessment at the degree level.

Collaborations with workforce education, service learning, industry and four-year programs lead to curriculum revisions.

Program reviews: Science & Math disciplines are reviewed in a 3 year cycle. The review process addresses program changes, course documents, learning outcomes and assessment practices. The committee also reviews new and revised course proposals to ensure learning outcomes are in alignment with degree and other requirements. Reviews are held by discipline groups (Earth & Environmental Sciences, Mathematics, Life Sciences, Physical Sciences, Chemistry, and Computer Science and Engineering). Faculty members have the opportunity to report out on program changes, new courses, trends, and other curriculum and resource issues and then to address concerns introduced by the Curriculum Review Report. [See: CRC Reports]

FINDINGS: *What have you learned from your outcomes assessment activities?*

Faculty in SAM practice outcomes assessment at the course level and address skills needed to advance from one course to another within their own disciplines. However, in the past there has been little exploration of how each of these disciplines fit into the context of the AS degrees or interact with each other.

While there is anecdotal evidence from past students about curriculum issues, there has been no systematic follow-up. More systematic input from current students through course evaluations is taken into consideration regularly. Faculty would be interested in a formal survey of former students. They are also interested in whatever data are available from the State Higher Ed. database on students transferring from SCCC to UW. They are particularly interested in the percent of students who complete an AS vs. those who transfer before completing the AS Degree and if there is a difference in the success rate for those two groups.

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Those involved in the curriculum mapping process (Fall 2007 and Winter 2008) are enthusiastic about the conversations this process leads to. SAMOA is exploring degree level learning outcomes and using the Program Outcome Guides to check discipline specific curriculum outcomes against the Degree level outcomes.

Math faculty found that there are problems with the math placement test used by the college. The concern is that the tests may not be reliable and they don't match the math courses but it is a daunting task to revise placement testing because tests are used district wide. Math instructors are exploring the possibility of administering a diagnostic test in each class at the beginning of the quarter and allowing space in classes to move students around at the beginning of the quarter. The mathematics program website helps students prepare for the placement tests.

Math and chemistry instructors find that students who complete the MAT 124 and MAT 125 courses first are better prepared for entry to the BIO 201, 202, 203 or PHY 201, 202, 203 series.

Students completing the Chemistry series (CHE 231, 235, 236) score above the national average in the standardized American Chemical Society test. Many of these students go on to transfer to UW and apply to and are accepted for the very competitive undergraduate research experience (REU).

Chemistry instructors are well connected in industry and in higher ed. and have received grants from both local and federal sources. These connections have direct bearing on their ability to keep the curriculum relevant and to improve the transferability of their courses to UW and other 4 year programs.

2005: faculty investigated the environmental science course offerings at other local community college and reviewed enrollment in courses offered at SCCC and observed that there is increased demand in the environmental sciences at SCCC and a demand for more introductory lab science courses in oceanography, meteorology and environmental science. The study concluded that there is a need for additional faculty in these areas.

ACTIONS TAKEN: *What program changes have you made in the last three years? -- WHAT WAS THE IMPETUS FOR CHANGE?*

Fall 2006: The new Science and Math (SAM) building opened. A higher level of lab staffing was introduced enabling open labs and allowing students to do their lab assignments on a flexible schedule to accommodate their time constraints. Biology, Physics, chemistry, computer science, and mathematics have supervised open labs and computer labs. Engineering also has an open shop BUT students must go through a safety training, must be supervised and working on specific engineering projects sanctioned by the department

Fall 2007: The Science and Math Outcomes Assessment Group (SAMOA) formed. This group, with members representing all science and math disciplines, has participated in curriculum mapping for the two AS degree options. They have also provided leadership for the faculty in their areas. A day-long retreat to discuss outcomes and create curriculum maps at the discipline level was held for SAM faculty on Friday, February 1st, 2008. This event was

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successful in developing wider participation among faculty who engaged in conversations about the relationship between their disciplines and the transfer degrees. Faculty discussed different models for advising students, including the possibility of faculty advisors who could help students tailor their curriculum choices to improve their transfer preparation.

2007-2008: Implemented SCCC Undergraduate Research Experiences (SURE), a pilot undergraduate research project. The Science and Math Division is currently running a pilot methods course, combining funds from NSF ONSIGHT project, Washington NASA Space Grant Consortium and the SCCC Foundation to help pay stipends & supplies for students and their research mentors. The planning group will bring in a consultant from the Council for Undergraduate Research in Washington, D.C. to work with the team and plan for a sustainable program at SCCC. Wendy Rockhill (biology faculty) and Rebecca Hartzler (acting dean) are applying for federal funding from two sources: a FY09 Appropriations Request and funding through the National Science Foundation to expand the program next year.

Biology:

- 2005-2008: Three biology faculty are involved in the Curriculum for the Bioregion Initiative which "aims to better prepare college and university students, to live in a world where the complex issues of environmental quality, environmental justice, and sustainability are important, if not paramount. This new curriculum reform initiative of the Washington Center, based on the idea of bioregional learning and engagement, underscores a connected inter-institutional effort" (<http://www.evergreen.edu/washcenter/project.asp?pid=62>). As a result of this project, one of the instructors is initiating curriculum changes in spring 2008.
- Fall 2006: introduced new course HEA 225 (Global Health) which addresses the AA/AS science requirement for basic science literacy and for pre-health care students including Nursing, Respiratory Therapy, Surgical Technicians, and Dental Hygiene and integrates multi-cultural tolerance & understanding. The course investigates determinants of health, measuring health in communities and nations, Infectious Diseases & Immunity, AIDS, TB, Malaria, Food, Nutrition and Health.
- Created a new BIO 201 Lab manual drawing from several current literary sources and incorporating lab activities which past students found most useful and interesting.
- Biology open lab hours were extended so that students can come to the lab individually or in groups to study lab materials. Advanced biology students were hired as teaching assistants to help in the lab during these study times.
- Student Leadership funds enabled the purchase of additional anatomy models held in the college library so students have access to them during extended hours.

Computer Science:

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- Faculty attend the annual *Working Connections IT Faculty Development Institute* every year. This is a place where industry and educator come together to match the IT educational needs to industry requirements.
- Faculty ensure that SCCC computer science courses are equivalent to UW courses through regular investigation of UW courses and requirements and implement curriculum changes to incorporate new programming languages as they are introduced.
- All courses are now supported by a full website with resources to support the curriculum.

Math:

- Introduced Math for Elementary School Teachers curriculum (Math 170, 171, 172) supporting the Associate of Arts in Education and has served students pursuing the Bachelors in Education degree at City University.
- Created the Business Mathematics curriculum: Math 116 and 117 are designed to prepare students intending to pursue bachelor's degrees in Business Administration. These courses are based on what the local universities want--real world projects that are team based and require students to present their ideas to groups.
- Capstone courses have also increased in recent years. Math 102, College Algebra, bridges the gap between Intermediate Algebra and Pre-Calculus functions that enables students to strengthen skills for success in advanced mathematics. Math 103 (Geometry and Visualization) and Math 107 (Math for Liberal Arts) serve students who aim for majors in the arts and humanities.
- The Calculus series has also seen topical changes intended to comport with the equivalent curriculum at the University of Washington—a commendable effort on the part of the faculty to serve the needs of transfer students in science and engineering.
- The Differential Equations, Vector Calculus, and Linear Algebra courses have also evolved to incorporate newer pedagogy including group work and technology.
- UW implemented changes in the sequence for topics in the Calculus and Differential Equations series. As a result all math programs in the state had to adjust their curriculum to ensure transferability. SCCC Math faculty addressed the issue by adding a supplemental course to the second course in the series to introduce the UW topics sequence. Students are advised to take this supplemental course for full credit if they plan to transfer to UW.

Physics:

- 2005: Faculty introduced a textbook developed in connection with the Physics Education Group (PEG) at the UW. This group does research on physics pedagogy. Based on their research they developed teaching

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materials and published their findings. The Knight textbook and workbook uses findings from research on how physics is taught and uses online homework (mastering physics) that allows for immediate feedback on homework assignments and therefore a more interactive approach.

- *2007 Introduced new online course: PHY 107 Introduction to Physics. Instructor uses Physics by Inquiry written by McDermott who is instrumental at PEG and employs a hands-on, lab-based approach that includes student self-assessment to get students engaged.*

Environmental Science:

- As a result of the 2005 investigation into the environmental science course offerings, a new position was created and a full-time permanent faculty position was filled in Fall 2007 by Dr. Katie Gagnon, Environmental Science/Oceanography Instructor.
- Faculty received an NSF grant for their Quantitative Environmental Learning Project (<http://seattlecentral.edu/qelp/>). Based on this work they have developed a companion textbook, Quantitative Reasoning & the Environment, published by Prentice Hall (2007) (<http://enviromath.com/>).

ACTIONS PLANNED: *What program changes or new assessment activities are you planning for next year?*

2008-2009: SAMOA will continue faculty conversations about AS degree learning outcomes and the way science and math curricula prepare students for transfer into science, math and health majors at four-year institutions.

2008-2009: Expand undergraduate research project (SURE) to include more students. The scope of the project will be determined by success of pending grant applications. This project may include exploring the idea of capstone projects for transfer students, linked in some way to existing course framework.

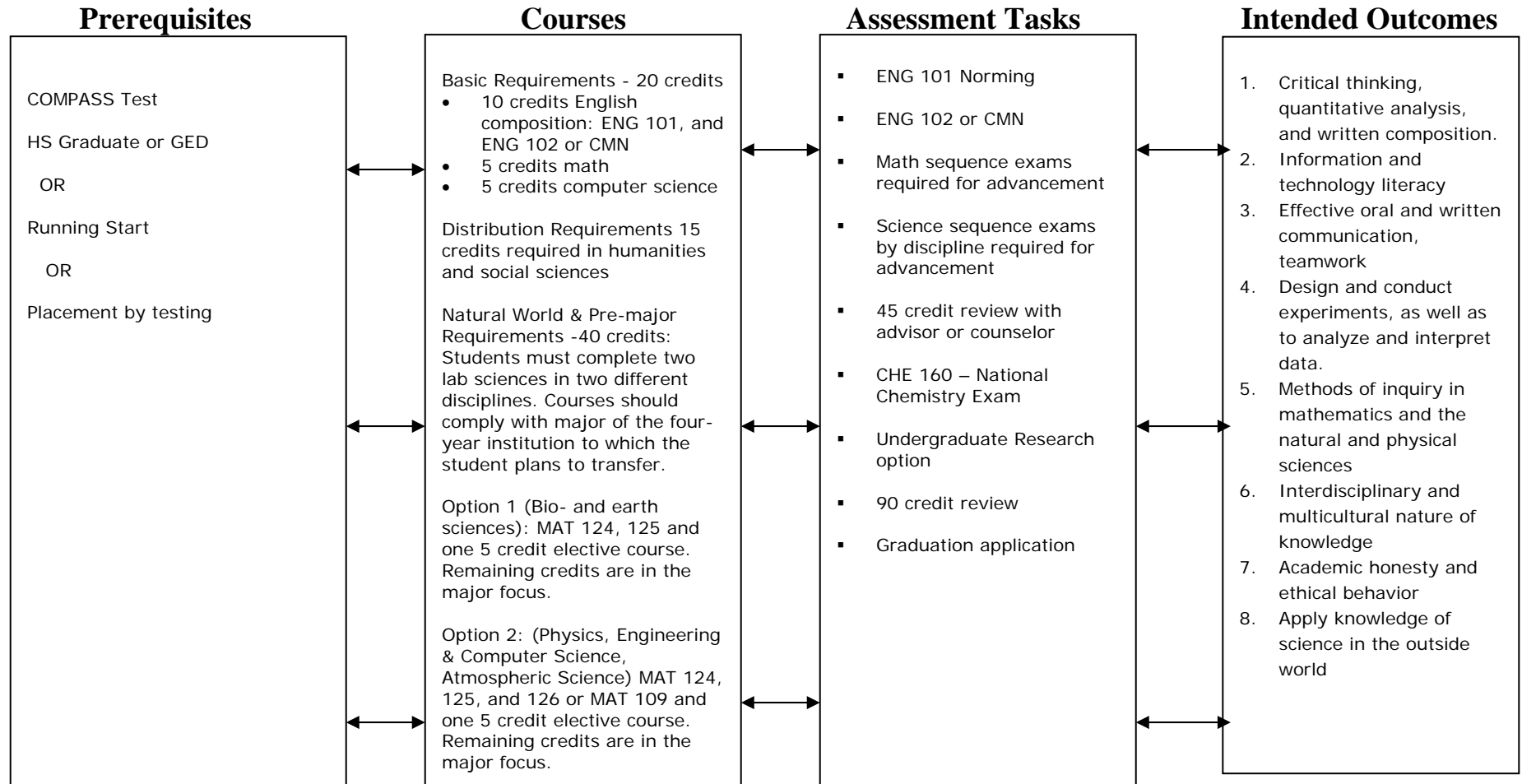
2008-2009: Washington State Bioregions Initiative will contribute to the interdisciplinary learning outcome through curriculum revisions initiated by this project. The curriculum development project of one biology instructor will be complete by June 2008. The finished product will include outcomes, assessment tools, and activities. Other disciplines in both science and humanities will have the opportunity to develop curricula for their areas through this project.

Program Name:

Associate of Science (A.S.) Degree

Revised 3 December 2007

Theme(s): Critical thinking; quantitative analysis; diversity of ideas and people; real-life applications; life-long learning
Program Role: Prepare students to transfer to four-year science, math and health sciences programs or for employment as lab technicians.



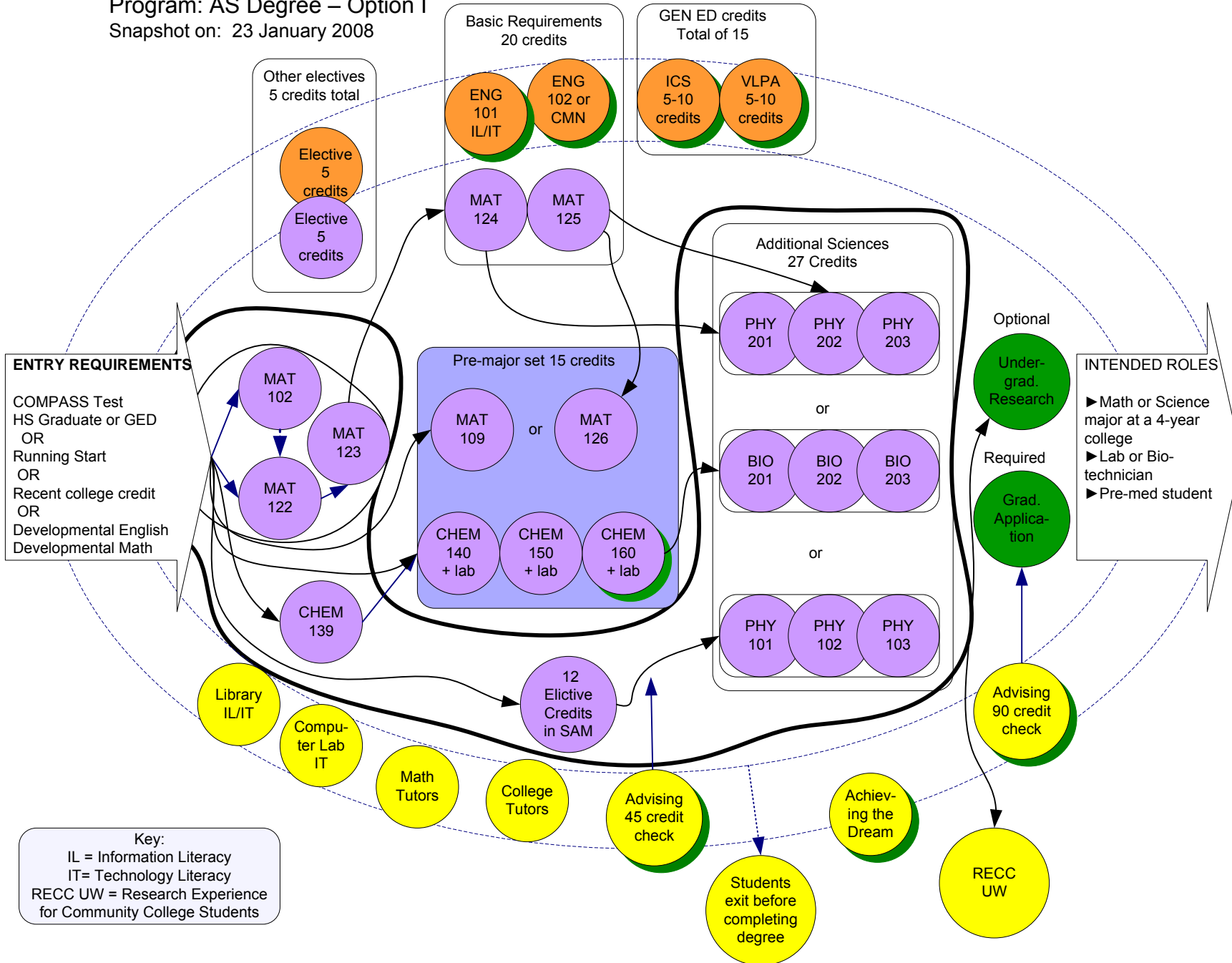
What must students understand to demonstrate the intended outcome?

What skills must students master to demonstrate the intended outcome?

What will students do in here to demonstrate evidence of the outcome?

What do students need to be able to DO “out there” that we’re responsible for “in here”??

Program: AS Degree – Option I
 Snapshot on: 23 January 2008



Intended Learning Outcomes:

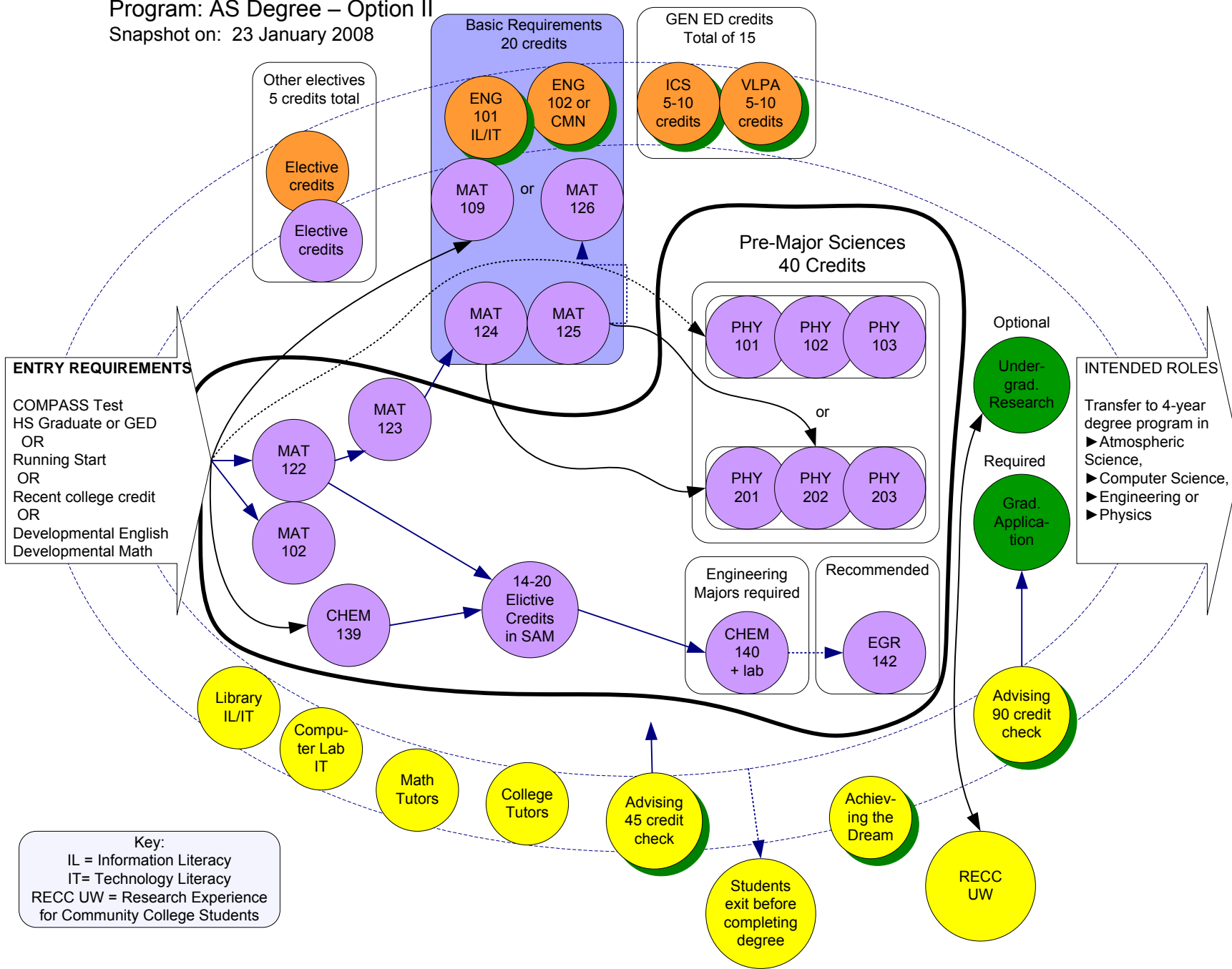
- ▶ College-level knowledge and skills in critical thinking, quantitative analysis, and written composition.
- ▶ College-level mastery of information literacy and be technologically literate.
- ▶ Effective oral and written communication, teamwork and collaboration in scientific, mathematical and other settings.
- ▶ Design and conduct experiments, as well as to analyze and interpret data.
- ▶ Practice methods of inquiry to mathematics and the natural and physical sciences.
- ▶ Understand the interdisciplinary and multicultural nature of knowledge.
- ▶ Demonstrate academic honesty and ethical behavior.
- ▶ Appreciate and apply knowledge of science in the outside world.

INTENDED ROLES

- ▶ Math or Science major at a 4-year college
- ▶ Lab or Bio-technician
- ▶ Pre-med student

Key:
 IL = Information Literacy
 IT = Technology Literacy
 RECC UW = Research Experience for Community College Students

Program: AS Degree – Option II
 Snapshot on: 23 January 2008



Intended Learning Outcomes:

- College-level knowledge and skills in critical thinking, quantitative analysis, and written composition.
- College-level mastery of information literacy and be technologically literate.
- Effective oral and written communication, teamwork and collaboration in scientific, mathematical and other settings.
- Design and conduct experiments, as well as to analyze and interpret data.
- Practice methods of inquiry to mathematics and the natural and physical sciences.
- Understand the interdisciplinary and multicultural nature of knowledge.
- Demonstrate academic honesty and ethical behavior.
- Appreciate and apply knowledge of science in the outside world.

Program Assessment Inventory

Program: Associate of Science (A.S.) Degree

Assessment methods used to determine that students are prepared to succeed and that they have achieved the program learning outcomes when they complete degrees or certificates.

	<i>Early program</i>	<i>Mid program</i>	<i>End of program</i>
<i>Students are prepared to learn (prerequisites)</i>			
ASSET test scores			
COMPASS test scores	<i>required</i>		
SLEP test scores			
Other?			
<i>Students are assessed as they move through the program</i>			
Competencies assessment	<i>Developmental math and English, ENG 101, CHE 236 and selectively by discipline</i>		
Internship feedback			
Pre-Mid-Post assessment			
Service Learning experience feedback	<i>optional</i>		
Student course evaluations	<i>quarterly</i>		
Student focus groups			
Student grades	<i>quarterly</i>		
Student interviews			
Student self assessment			
Student surveys			<i>X</i>
<i>Students are assessed as they complete the program</i>			
Completion statistics			<i>by college</i>
Capstone projects			<i>not required</i>
Graduation statistics			<i>by college</i>
Portfolios			<i>not required</i>
Presentations			<i>not required</i>
<i>External assessment data is collected</i>			
Transfer rates			<i>by college</i>
Employer surveys			
Technical Advisory Committee			
License certification success rates			
Performance in 4 year programs			<i>by state</i>
Employment rates			
Salary statistics			
Survey of former students			<i>informal</i>
Other?			

Associate of Arts (A.S.) Degree

2006 Learning Outcomes

1. Have college-level knowledge and skills in critical thinking, quantitative analysis, and written composition.
2. Have college-level mastery of information literacy and be technologically literate.
3. Demonstrate effective oral and written communication, teamwork and collaboration in scientific, mathematical and other settings.
4. Have the ability to design and conduct experiments, as well as to analyze and interpret data.
5. Understand methods of inquiry specific to traditional and contemporary areas of knowledge in mathematics and the natural and physical sciences.
6. Understand the interdisciplinary and multicultural nature of knowledge.
7. Demonstrate academic honesty and ethical behavior.
8. Be able to appreciate and apply their knowledge of science in the outside world.