Science Division
Chapter Zero
How is the Science Division aligned with the College's Goals?

To meet the challenge of articulating how the Science Division is aligned with the college's goals, division members met in discipline groups and as a whole. We listed activities representative of each core value and strategic direction, then, after further analysis and discussion, created the following.

Core Value 1: Learning

The Science Division has established learning outcomes that apply generally throughout the Division and specifically for each course, and demonstrates strong support for learning. Staff have created, maintained and expanded our learning environment by providing a variety of student opportunities, a wide breadth of curriculum choices and rigorous standards for which the division is recognized in the community and by other academic institutions. We also have a staff with diverse expertise and a new and remodeled facility with modern design and, in some instances, state of the art equipment. The following provides more details about the learning environment offered by the Science Division.

Student Opportunities

- Science Resource Center (SRC)
- Peer Tutors
- Stipends and scholarships

Curriculum Breadth

- Multiple sections of classes each term in a diversity of subjects
- nonmajors biology emphasis courses, general science courses, and the new Chemistry for Everyday Life course offer a very wide range of sciences for the nonmajor.
- Diversified instructional delivery
- Technologies that provide multiple media for different types of learners, interactive lab activities that give student experience in DOING science
- Collaborative projects that give students group work skills

Curriculum Standards

- Developed a strong foundation of appropriate required pre-requisites
- Rigorous use of math in many courses
- Generic outcomes for all science courses developed by the Division
- Activities that encourage and develop critical thinking abilities

Staff

- High level of professional interactions among Science staff
- Faculty mentoring system is in place
- Science Division Informational Guidelines Booklet
- Biology staff are developing generic course lab packets to be easily adopted by new faculty
- Staff attend professional conferences on a yearly basis and often give presentations.
- Involvement in committees, groups, and taskforces on campus is high and include the Strategic Learning Initiative leadership team and sub teams, Faculty Council, Faculty Professional Development, Degree Requirements Review Committee, and others

- Flexibility of course assignments and times allows for faculty to maximize their professional interests and endeavors
- Science Office maintains an open door policy for everyone

Facilities

- Recent addition to the Science Building and remodeled older classrooms have expanded and updated all our facilities, e.g., wet lab for aquatic organism study, computer labs
- Classrooms and the SRC provide students with computers and Internet connections
- New microscopes, and physics and chemistry data collection devices have elevated the abilities for students to explore
- The SRC has provided much-in-demand space for group and individual study and is a testing center for telecourse students
- LCC Herbarium is in partnership with the Oregon Flora Project and the Herbarium at Oregon State University
- There are two lab preparation areas, two computer labs, and a greenhouse

Core Values 2- Diversity

The Science Division is aligned with this core value in three major categories.

The Division attracts and makes welcome diverse faculty and students by:

- Hiring practices that include diversity components, value cultural competence, and advertising sources that specifically target people of color
- Involving faculty in the reading together event
- Welcoming students and staff of color

The Division helps students understand issues of privilege, power and differences by:

- Integrating themes of privilege, power and differences into course work
- Discussing issues of diversity, and power in science
- Offering BI 103G Global Ecology, a course that meets Ethnic/Gender/Cultural Diversity requirement for the AAOT
- Seeking examples and experiences from students from various backgrounds
- Providing multicultural examples in class

The Division maintains an accessible, inclusive, and respectful environment for students by:

- Using inclusive language and multicultural examples in class activities
- Providing non-English texts in Science Resource Center
- Actively participating in the Young Women in Science mentoring program
- Encouraging participation from all students
- Many instructors provide a statement on syllabi describing how we maintain a respectful environment
- Applying Student Conduct Code to class activities
- Working closely with Disability Services office
- Offering classes that meet at various times

Core Value 3 Innovation
The Science Division engages in many innovative activities. The following categories list existing and potential projects that enhance the effectiveness of our academic community:

Students
- On-line courses and Web-based curriculum materials
- Learning communities – BioBonds; Petal, Pen, Peck, and Paw; Ecotrails
- Service Learning projects for students – Environmental Science
- Varying class formats in time, place, and instructional mode
- Stakeholder-based decision making process
- Student-designed lab projects
- Ongoing exploration of evolving needs of students for new classes/programs, and development of new courses/programs in response, e.g., BioBonds, additional sections, online and telecourses, Green Chemistry curriculum
- Acquiring and implementing the use of new lab equipment
- Student clubs: Chemistry, Physics, Ecology
- Student poster projects
- Offering technical program Continuing Education Units (potential)
- Student-centered learning activities
- Making connections outside the campus for students, e.g., co-operative and internship education programs
- Creative field trips
- Wet Lab and aquaria for research-, problem-, and case-based learning projects
- Virtual models on the web for Anatomy and Physiology

College Wide
- Web site development provides a window into the college and the division
- Eldon Schafer nature trail and student-designed brochure describing the trail and plants
- Strategic Learning Initiative projects
- Participating in the Reading Together project
- Sustainable landscape project
- Learning communities
- External program resources
- Grant writing - NSF, FIPSE, Perkins

Shared Governance
- Stakeholder decision making process
- Faculty council
- Science Advisory Committee exemplifies representative governance

Faculty and Staff
- Encourage professional development for all staff
- Strong advocacy through college-wide committee participation
- Support for curriculum development
- Collaboration with counseling staff on articulation agreements
- Development of faculty technology room
- Grant writing

- Development of Green Chemistry curriculum

Core Value 4 Collaboration and Partnership

The Science Division establishes and maintains relationships that expand our effectiveness and learning opportunities for students and the community. The Division is guided by a charter and administrative procedures manual that specify the collaborative nature of governance in the division. The following list highlights our current collaborative projects that most enhance our academic community:

Outside partnerships

- Northwest Biology faculty organization
- Oregon Science Education Council
- College Now Program
- Northwest Energy Education Institute (NEEI) regional training model
- Partnerships with community Allied Health facilities
- Collaboration with high schools on preparatory college classes
- Obtain equipment from community sources
- Mt. Pisgah arboretum
- Field trips to community industrial sites
- Collaborate with Northwest Christian College in curriculum development
- Mentor Florence campus A & P and chemistry program
- Articulation with Oregon University System science departments
- Women in Science Program (middle-school mentoring)
- Service learning opportunities
- Co-operative Education experiences
- Resource and Facility Sharing
- The Energy Management discipline is partnered with and is supported by the Eugene Water and Electric Board and the Bonneville Power Administration
- Native Plant Society / Mycological Society Meetings and events

Across Campus Learning

- Established Learning Community courses; new communities are also under development.
- Collaboration with American Indian Language Program

Clubs

- Green Chemistry Club (affiliated with the American Chemical Society)
- Ecology Club
- Physics Club

Meetings and Committees

- Faculty council
- Science Advisory council
- Technology Advisory team
- Discipline meetings
- Science Advisory Committee

Core values 5 *Integrity

Faculty in the Science Division are active and effective advocates for several areas of interest. This advocacy frequently results in the creation of classroom activities and student projects, new campus initiatives, and review and modification of Science Division practice.

Resources

- Information Technology is an integral and critically examined part of curricula
- Energy use reminders
- Building and equipment safety, security
- Sustainability Committee
- Energy conservation team
- Chemical hygiene officer
- Discuss resources and conservation in biology, geology, chemistry, and environmental science classes

Public Trust

- Advocate for wetlands and energy efficiency demonstration building
- Represents college and division in public meetings, boards, etc.
- Argue for greater transparency in college processes and budgets
- Native landscape project
- Include concepts of sustainability in curricula
- Recycling in faculty /staff offices, public spaces, and classrooms
- Green chemistry
- Advocate for preservation of the Marston forest and nature trails
- Improving the image of chemistry as a major and the availability of organic chemistry over the next several years

Student/staff/faculty integrity

- Friendly, knowledgeable office staff helping students add classes
- Inclusive division meetings
- Syllabus explaining policies is distributed to students on the first day of classes
- Classroom policies (i.e., grading standards that hold students to the Student Code of Conduct)
- Accessible/ approachable instructors
- Encourage questions and equal participation from all students in class
- Include examples of women, nonwestern contribution
- Good meeting plan followed during division and SAC meetings
- Charter holds the division and its members to a high performance standard

Core value 6 * Accessibility

The Science Division has identified and implemented four areas involved in achieving accessibility: increasing the number of places and times for offering courses; accommodating a wide range of abilities; broadening student experiences within and beyond the classroom; and removing some financial burdens. Listed below each area heading are specific examples.

Increasing the number of places and times for offering courses

- Night and weekend classes
- Telecourses
- Online classes
- Web CT online course delivery system
- Community learning centers
- Outreach centers
- "Hybrid" distance education (courses with on-line and on-campus components)
- Use of Science Resource Center for limited content delivery and/or make-up work
- Additional sections added after classes have filled

Accommodating a wide range of abilities

- Floor layout accessible to persons of differing physical abilities
- Multi-cultural class discussions
- Collaboration with Rites of Passage
- Diversity focus
- Independent study
- Non-discriminatory classroom environments
- Alternative assignments for students who cannot participate in activities/field trips, etc.
- Work closely with disability services office to meet needs of students.

Broadening student experiences within and beyond the classroom

- Learning communities
- Modular courses
- Independent research opportunities
- Science Resource Center tutoring
- Student access to network resources
- Continuous mentoring for new full time faculty and support staff
- Collaboration with Rites of Passage
- Cooperative Work Experience (CWE)

Remove some financial burdens

- Work study
- Learn and earn
- Connecting students with internships
- Texts for borrowing/use in SRC and library
- Science scholarships
- Order books from UK
- Offering tuition-based classes can help to decrease time-to-completion of degree by increasing opportunities to take high-demand courses.

Strategic Direction 1, Achieve Financial Stability

The Science Division contributes to Strategic Direction 1 through increased efficiencies (e.g., energy conservation, increasing number of course offerings that afford financial gain and that reduce enrollment bottlenecks for students, and by upgrading computers with inexpensive parts to extend useful life), by seeking outside funding, and by seeking to streamline our budgeting processes.

Strategic Direction 2, Building Organizational Infrastructure

The Science Division contributes to Strategic Direction 2 through its efforts to empower staff to redesign their work, bring non-contracted faculty more fully into the division community, and to hire more contracted faculty and support staff. It seeks to mainstream innovation by increasing the use of technology in the classroom and by increasing student learning opportunities through on-line and other distance education classes. Its governance structure and decision making processes, as described in the division charter and operations manual, reinforce existing strengths and provide a solid foundation for continued infrastructure growth.

Strategic Directions 3, Enhance College Climate

The Science Division support Strategic Direction 3 by improving and increasing student opportunities and retention through student clubs (e.g., Ecology, Green Chemistry, and Physics Clubs), engaging in program assessment projects that better student preparation through pre-requisite courses (e.g., Biobonds pre-requisite for Anatomy and Physiology Program), offering multiple sections of courses throughout the year, strengthening ties and articulation agreements with UO and OSU for majors, encouraging and supporting peer tutoring and study groups, and by participating in learning communities among divisions. The division actively builds stronger relationships among and between divisions by being enthusiastic and cheerful, maintaining open door policies, by modeling collaborative decision-making, and through social functions.

Strategic Direction 4, Implement Business, Workforce, Extended Learning

The following are ideas for Strategic Direction 4. To increase profitability of BWEL, the college could: provide a meeting place for public seminars, partner with community organizations such as the Native Plant Society, Cascade Mycological Society, and the Mount Pisgah Arboretum. BWEL could be a site to support home school efforts (especially computers). It could develop certification programs and offer CEU credits through professional associations, and could explore contract training opportunities in summer academies. Growth of BWEL could follow the example set by the Northwest Energy Efficiency Institute.

SCIENCE DIVISION
Chapter One
Who are we?

UNIT MISSION / VISION

The mission of the Science Division is to assist individuals to achieve their science education needs and goals.

DIVISION DESCRIPTION

Students take science courses numbered 100-199 to satisfy science requirements for direct transfer and AAOT, AAS, AS, and AGS degrees, and for general interest. Courses numbered 200 and above are generally taken by science majors. Science courses are filled by approximately 6000 students per year (1005.7 FTE in 2002-2003). The Division also serves as a co-op education job site.

TRANSFER COURSES

Anatomy and Physiology

These courses are pre-requisite to, and are supportive of Family and Health Careers degree programs and certificates. Students take A&P courses to meet degree requirements for Emergency Medical Technician, Practical Nursing, Associate Degree Nursing, Dental Hygiene, and Respiratory Care.

Biology

This discipline has developed a number of "emphasis" courses for nonmajors. These are designed around core concepts in biology so that a student may learn about, for example, molecular and cellular biology in a marine, botanical, or zoological context. Opportunities for biology majors include a 200-level course sequence that includes both zoology or botany.

Chemistry

All courses numbered 100-199 in this discipline are taken by students to meet requirements of either LCC or other health occupation degree-granting institutions. Chemistry plays a central role for science majors, as it is required by all programs of study. Science majors take general and organic chemistry.

Engineering

Through agreement with the University of Oregon, the Engineering program for this geographical area was established at LCC. The program at LCC is a joint effort of the Math and Science divisions and includes courses with the physics and engineering labels taught by math and physics faculty.

Earth and Environmental Sciences

Courses in this discipline include majors and nonmajors geology, and a very popular three-term sequence in environmental science for nonmajors.

Physics

Physics has six subdivisions: calculus-based General Physics for physics, engineering, and mathematically advanced science majors primarily; algebra-based General Physics for other science majors; conceptual introduction to physics primarily for non-science majors and for exploration of physics by students, some of whom then become physics and engineering majors; astronomy; engineering; and technical introduction to physics for professional-technical programs, which may also be used for transfer credit.

CERTIFICATE/ DEGREE PROGRAMS

Energy Management
Purpose: To prepare students for careers in the Energy Management field, and optionally, as Renewable Energy Systems Installers.

Learning Outcomes
The graduate will:

- evaluate the energy use patterns for residential and commercial buildings and recommend energy efficiency and alternative energy solutions for high-energy consuming buildings.
- understand the interaction between energy consuming building systems and make recommendations based on that understanding.
- construct energy evaluation technical reports and make presentations for potential project implementation.

The graduate of the Renewable Energy Technician Option also will:

- appropriately size and recommend renewable energy system types for particular situations.
- understand and put into practice the installation protocol for Photovoltaic and Solar Domestic Hot Water Systems.

HISTORY / SIGNIFICANT PROGRAM EVENTS
Steve John and Rhoda Love are contributing to this section.

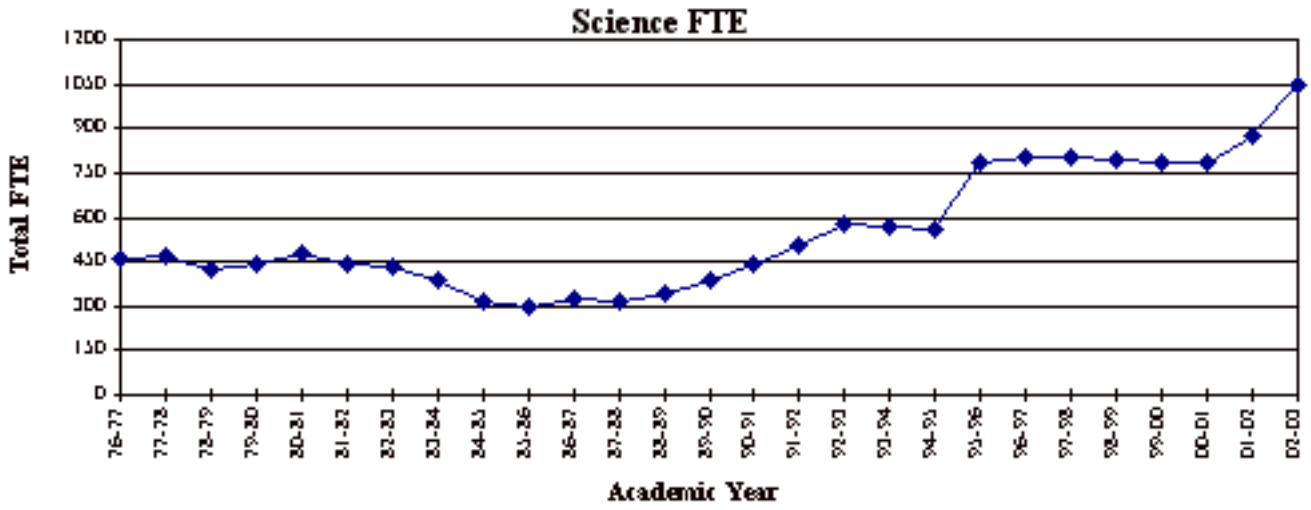
Outline
the early days, science at the college before it was LCC
the first "new" building with no dividers between the ceilings in classrooms
the number of faculty
faculty offices and the chicken wire
development of the SAC, Charter, and SAP
the retrenchment scare of the '80s and how department members met that challenge
field trips to the San Juans, Baja California, California, Oregon coast, and Cascade Mountain Range
growth of the department into a division
the bond and the new building
the funding crisis of 2001-2003 and its impact on the Division
physical structure – labs, herbarium, wertlab, nature trail, Siltcoos, Florence campus, Mount Pisgah

Science FTE Report (Dept. 9)

Year	Summer FTE	Fall FTE	Winter FTE	Spring FTE	Total FTE
1973-74	61.3	132.2	139.7	135.2	468.3
1974-75	67.4	141.4	148.1	141.4	498.3
1975-76	56.7	151.2	146.3	147.1	501.2
1976-77	53.0	138.8	138.6	132.0	462.5
1977-78	61.3	141.1	134.0	129.8	466.1
1978-79	56.3	124.7	122.9	118.6	422.4
1979-80	72.4	122.6	123.3	120.2	438.4
1980-81	65.1	142.8	133.6	133.6	475.1
1981-82	49.1	128.4	131.4	135.2	444.1
1982-83	37.4	138.6	121.4	132.2	429.5
1983-84	38.1	124.2	116.7	112.6	391.5
1984-85	39.0	98.9	85.3	97.1	320.2
1985-86	31.3	83.3	92.3	88.2	295.1
1986-87	30.9	100.9	102.9	90.7	325.3
1987-88	32.3	98.0	96.3	88.3	314.9
1988-89	30.3	108.9	107.8	95.2	342.2
1989-90	34.9	129.6	120.5	104.3	389.3
1990-91	29.6	134.8	143.1	134.6	442.1
1991-92	34.4	157.6	154.1	163.4	509.5
1992-93	67.6	172.6	171.4	162.9	574.5
1993-94	56.0	182.3	168.3	162.5	569.1
1994-95	53.0	171.8	162.0	170.6	557.4
1995-96	62.6	256.9	239.6	228.6	787.7
1996-97	74.0	244.4	242.6	239.1	800.1
1997-98	72.2	254.3	246.3	228.6	801.4
1998-99 *	77.5	262.3	236.2	219.4	795.4
1999-00	74.6	250.6	234.3	224.6	784.2
2000-01	66.5	256.0	240.2	223.0	785.7
2001-02	82.5	272.6	266.1	252.4	873.7
2002-03	109.1	311.6	313.2	310.7	1,044.6

Note: Oregon community colleges adopted a new FTE formula in 1995-96. The formula uses 510 clock hours as the basis for calculating FTE.

* An adjustment was made to the method used to calculate FTE for most credit classes for Winter and Spring terms 1999.



Source: Student Enrollment Characteristics Reports (1987-88); Reimbursement Reports IRZ2204 (1988-89 to present).

ORGANIZATIONAL STRUCTURE

Faculty in each discipline and support staff are represented by one of their members on the Science Advisory Committee (SAC), a body that meets weekly through the fall, winter, and spring terms. Terms of service are one academic year and rotate among all members of the Division. The SAC is the primary policy and decision-making body in the Division. Other than administrative and supervisory decisions specifically reserved for the Division Chair, Division meetings are the highest decision-making body of the Division.

The Division presently has 17 contracted faculty, 24 part time faculty (with a range of 24-35), 6 full time support staff, and 5 part time support staff.

FACULTY

Baker, Gail, MS 1977 Biology. San Diego State University
Ebbage, Roger, MS 1979 Industrial Arts. San Jose State University
Gaudia, Shelley, MS 1981 Biology and Chemistry. DePauw University
Gilbert, Dennis, PhD 1974 Physics. University of Oregon
Hall, Jerry, PhD 1974 Zoology. Michigan State University
Kiser, Stacey, MS 1994 Biology. University of Oregon
Morrison-Graham, Katie, PhD 1981 Neuroscience. University of California at Los Angeles
Mort, Gary, BS 1987 PhD (ABD) Chemistry. University of California, Davis
Newell, Carrie, MS 1991 Biology. Northern Arizona University
Nichols, Brian, MS1989 Exercise and Movement. University of Oregon
Pooth, Bert, PhD 2003 Biology. University of Miami
Russin, Joe, MS 1980 Biology. Utah State University
Sokolowski, Jamie, MS 1975 Physics. Washington State University
Swank, Stan, PhD 1996 Education; MS 1990 Biology. University of Oregon
Taylor, Brooke, MS 1999 Chemistry. University of Oregon
Thompson, John, MS 1993 Chemistry. University of Colorado
Ulerick, Sarah, PhD 1981 Science Education. University of Texas; BA, Geology. Harvard University

NONCONTRACTED FACULTY

Baxter, Mary
Behm, Harriet
Blackwell, David
Boleyn, Pat
Boyer, Lynda
Bungum, Peter
Coville, Mary
Fern, Jackie
French, Pat
Freyre, Marie
Gubrud, Allan
Hart, Reid
Hatten, Mike
Hewitt, Pam
Holmgren, Elly
Kelley, Bruce
Klausmeier, Will
Knelly, Leah
Lacy, Kit
Manclark, Bruce
McClellan, Vincent
Miles, Greg
Mitchell, Cliff
Mitchell, Mike
Nelson, Julie
Nurre, Stuart
Oswald, Bob
Owen, Claudia
Philips, Roger
Rajabzadeh, Ahmad
Rice, Andrea
Rice, Harry
Ross, Rich
Smith, Londa
White, Bob
Wilkins, Brad
Young-Cheney, Joan
Zeppa, Scott

SUPPORT STAFF

Green, Autumn,
Rowlett, Connie
Dumbleton, Barbara
Manford, Randy
Glass, Beverly (Star)
Schiappa, David
Newton, Joseph

DIVISION CHAIR

Hammon, Kyle, MS 1987 Biology. University of Oregon; PhD (ABD) Arizona State University

Science Division
Chapter Two
Program Outcomes (Curriculum)

What does your program intend to do? What does the learner acquire after completing your program? How does you program contribute to enhancing the core abilities (as defined in the catalogue) of the learner?

- Program Level:

There are six academic disciplines within the Division: Anatomy and Physiology, Biology, Chemistry, Earth and Environmental Sciences, Engineering, and Physics. In addition, the Division has the Energy Management Program. Each discipline is complementary to and supports all the others; chemistry majors must take physics, biology majors must take chemistry, nonmajors are required to take some math/science/computer science courses with different prefixes, etc. Collectively, the disciplines are considered the science "program," and for that reason we have a general list of outcomes common to all courses. Additionally, disciplines have their own unique academic practice and history, so each may have its own set of outcomes listed below under course outcomes. Students achieve the Core Ability Outcomes as they move through each course.

Courses meeting the Science (/Math/Computer) Science requirements shall:

1] Be a minimum of three credits.
2] Be regularly numbered offerings. (not temporary or independent study)
3] Have the main focus be the systematic study of a branch of science, math or computer science.

In addition, courses that qualify for the Science/Math/Computer Science requirement shall meet the following criteria:

1] Build upon and apply a systematized body of knowledge or principles through observation and experimentation.

2] Build a foundation to connect skills and knowledge to other disciplinary learning, thus meeting the needs of other programs and degree requirements.

3] Develop ability to symbolically express relationships between figures, forms, and / or quantities.

4] Communicate precisely, technically, quantitatively, and symbolically within a structured system.

5] Use multiple approaches to develop critical analytical thinking that includes synthesis, evaluation, and creative insight.

6] Require inductive and deductive reasoning.

7] Foster life long learning.

8] Incorporate individual growth in technical thinking along with student involvement in their own learning process.

The following include clustering and revised wording of discipline specific outcomes. Numbers in parentheses show the original items that were clustered to obtain the generalized outcome statements.

1) Understand the difference between scientific patterns of thought and other patterns of thought as ways to understand the world; be able to recognize a question or problem as being scientific in nature, and confront and correct invalid intuitions about the way things work.
(B4, C2, G4, PH4)

2) Understand the principles underlying a classification system (eg organisms, earth materials, chemicals) and be able to describe distinguishing features of major categories within the system.
(B7, G10)

3) Understand hierarchical levels of structural organization of matter, and recognize the macroscopic consequences of microscopic properties and behaviors.
(B8, C3)

4) Demonstrate an understanding of natural processes that govern the interactions between organisms and environment, and have an increased awareness & appreciation of the interconnected character of nature.
(B9, B2, B11, G1)

5) Be able to relate scientific knowledge to current issues in order to make informed decisions.
(B1, B5, B11, C4, C5)

6) Understand and be able to demonstrate the application of the scientific method (inquiry) to solve a specific scientific problem: make observations and gather data in a laboratory or field environment; develop and test hypotheses about natural phenomena; have basic understanding of and experience with modern laboratory skills and up to date safety knowledge; make reasonable inferences based on observations or experimental results.
(B3, C1, C7, C8, G5, PH 3)

7) Ability to describe natural phenomena, and interpret and express scientific information, in symbolic format (e.g. equations, graphs, tables, mathematical notation, maps).
(PH2, PH6, PH7)

8) Be able to use appropriate software and hardware tools to model and/or assess a scientific problem; and to manipulate numbers and estimate answers to calculations involving scientific information.
(C6, ENGR1, PH5)

9) Work collaboratively in groups.
(ENGR2)

10) Communicate scientific ideas effectively, and explain the development of theories resulting from scientific endeavors using appropriate terminology, clear and unambiguous language, and correctly formulated concepts regarding natural phenomena.
(ENGR3, G2, G3, G7)

Learning College Guidelines. According to the learning college principles, science students should be able to answer the following questions about their science course.

1. Do you feel you have made a substantive change in your understanding of [course topic inserted here: ie genetics, marine biology….] since week one of this course?
   Can you communicate about science more effectively?
   Can you ask scientific questions and plan how to investigate it?
   Can you explain how science is a collaborative endeavor and give examples of scientific discoveries that show collaboration with in the scientific community.
2. Has your instructor facilitated your learning?
   Have you been engaged as a partner with the instructor in your learning?
   Have you taken primary responsibility in your learning?
   Has your learning been documented?
   Do you feel your assignments show your improved understanding?

3. Do you feel you have had a variety of options in your learning?
   Reading articles and written reports
   Laboratory investigations
   Short weekly quizzes & Exams (both of these containing multiple choice, short answers and longer answers)
   Group activities/ Collaborative Learning activities

- Course Level:

Anatomy & Physiology / Microbiology
Students will be able to:

Communicate using appropriate clinically oriented anatomical and physiological terminology.

Apply an understanding of cell structure and function to the multiple body systems.

Utilize microscopy in evaluating tissue structure and function.

Discuss the homeostatic mechanisms, relevant anatomy, and physiological function of different body systems, and provide examples of the interdependence of these systems.

Evaluate clinical data pertaining to common laboratory testing methodologies (i.e. CBCs, Urinalysis, PFTs)

Identify the names of assigned bones/bone markings and names/actions of assigned muscles.

Communicate an understanding of genetics and their relationship to heredity.

Microbiology Course Outcomes:

Students will be able to:

Discuss the cell biology and pathogenic properties of different classes of microbial organisms and infectious agents that affect human health.

Demonstrate knowledge of infection control and the principles and practices of sterilization, disinfections, and antisepsis.

Describe infectious disease processes, body defenses, and clinical characteristics of representative diseases affecting different body systems.

Apply common laboratory techniques for culturing and observing microbes.

Biology

B6 Explain the evolutionary processes that shape the unity and diversity of organisms on Earth and contribute to characteristics and adaptations.

B10 Understand the processes of energy transfer in biological systems.

Chemistry

Students who complete a chemistry course will …

Understand and be able to demonstrate the application of the scientific method to a chemical problem.

Have the ability to recognize a question or problem as being chemical in nature.

Understand and be able to demonstrate how microscopic properties and behaviors have macroscopic consequences.

Be able to apply contemporary chemical knowledge to issues of human health.

Be able to apply current chemical knowledge to issues of environmental health and sustainability.

Be able to use appropriate software and hardware tools to model and/or assess a chemical problem.

Have experience with and a basic understanding of modern laboratory skills.

Have up to date laboratory and chemical safety knowledge.

Earth and Environmental Sciences

G8 Be able to demonstrate the use of Earth/environmental-science tools such as maps, graphs, aerial photos, mathematical relationships, Geographic Information Systems (GIS) and/or spreadsheets.

G9 Explain the application of Earth/environmental-science concepts such as plate motions, stratigraphic principles, radiometric dating, stellar lifecycles, parallax, Big Bang, planetary models, organic evolution, island biogeography, energy budgets, and thermodynamics

G10 Describe and study natural materials such as minerals, rocks, fossils, soils, waters, atmosphere, and/or living things.

G11 Explain the dynamic nature of Earth and its environments, as in plate interactions, the hydrosphere, landform development, stellar and planetary evolution, adaptation, extinction, development of major groups of organisms, population dynamics, weather, climate, changing climate, and/or biogeochemical cycles.

G12 Describe major systems of nature, such as, plate tectonics, mountain belts, volcanic and seismic zones, depositional environments, stellar and galactic systems, ecosystems, and/or biomes.

G13 Describe the character of natural systems/hazards/resources/environmental issues in the Northwest.

Engineering

ENGR 1 Ability to estimate orders of magnitude expected in calculations.

ENGR 4 Ability to assess a physical situation to determine the appropriate laws and or equations to describe and/or analyze it.

Physics

PH 1 Discuss and formulate concepts regarding physical phenomena.

PH 5 Ability to make practical calculations utilizing Scientific Laws and theories.

Chapter 4: Analysis of Expected Performance versus Actual Performance

The following is the product of an extensive Strengths, Weaknesses, Opportunities, and Threats analysis.

Goals	Action Steps	Comments	Who / When
GOAL #1			
Provide a safe working and learning environment	1) Be familiar with applicable safety laws 2)Comply with safety regulations and laws 3) Coordinate safety and emergency issues with college safety committee and science safety committee when appropriate 4) Coordinate training as needed 5) Create a bona fide, permanent safety committee for Building 16		-Kyle -Joseph -current SSC
GOAL #2	**Action Steps**	**Comments**	**Who / When**
Ensure that LCC has an appropriate Chemical Hygiene Officer (CHO)	1) Bring issues concerning the science chair being the college designated CHO to the college Safety Committee & appropriate decision makers 2) Investigate other colleges' CHO 3) Develop a recommendation for preferred outcome concerning CHO position to appropriate decision makers 4) Establish timeline		-Gary -Barb -Kyle

GOAL #3	Action Steps	Comments	Who / When
Provide a voice for the Science Division in college business	1) Have representatives from science on committees that impact the division 2) Secure appropriate timelines for response to work orders to maintain a safe, functional work and learning environment 3) Hire a non-interim Division chair who will advocate strongly for division needs 4) Move Division meeting to a time not in conflict with other college-wide groups	eg LASR	-Kyle -Stacey
GOAL #4	**Action Steps**	**Comments**	**Who / When**
Mitigate support staff workload increases	1) Hire 0.5 or greater FTE support staff, especially in life science area 2) Make tech support people full time and a regularly budgeted position 3) Assess impact of tuition-based classes on support staff 4) Where possible, distribute tasks among faculty and staff 5) Increase proportion of full-time faculty 6) Review support staff roles and assignments to make them more effective	Track extra workload	- Dennis - Joseph - Kyle

GOAL #5	Action Steps	Comments	Who / When
Enable all Science staff and students to optimize use of technology to support student learning (including but not limited to computer technology)	1) Provide appropriate technology training for all staff 2) Establish replacement/upgrade cycles for technology (functional, reliable, up-to-date) 3) Establish stable funding source for staff technology support (as opposed to student support funded by the tech fee.) 4) Hire permanent, full-time computer support specialist for the division to help guide the development of technology outcomes for courses 5) Take advantage of SLI opportunities related to technology	Tech fee may do this, but not systemic Tech fee will NOT do this, need to lobby administration Need to continue to lobby board/ administration for a permanent, FT position	- Joe - Shelley - Kyle - SAC?
GOAL #6	**Action Steps**	**Comments**	**Who / When**
Optimize use of all Division facilities and infrastructure to support student learning	1) Establish mission, description or function statements for certain facilities: e.g. wet lab, herbarium, greenhouse, weather station, school forest, Siltcoos Station, etc 2) Develop use plans for same 3) Educate Division staff about #1 & #2 4) Increase opportunities for student involvement and acknowledge students' accomplishments	eg in-service, handbooks	- Gail - Carrie - Bert - Joseph - Sarah - Robert

GOAL #7	**Action Steps**	**Comments**	**Who / When**
Operate the Science Division under the guidance of Charter	1) Certify division charter 2) Review division charter and SAP every other year 3) Revise as needed		- Kyle - SAC
GOAL #8	**Action Steps**	**Comments**	**Who / When**
Meet existing demand for classes	1) Examine enrollment data 2) Add classes strategically 3) Develop strategies for funding 4) Expand scheduling & formatting options 5) Hire fulltime faculty in other disciplines with problem FT-PT ratio 6) Secure sufficient facilities, esp labs	See Goal #6	- Brian - Kyle - Shelley

GOAL #9	Action Steps	Comments	Who / When
Expand learning opportunities	1) Identify potential students (those we don't currently serve) 2) Work with foundation and other donors to develop additional scholarship opportunities and provide other needed resources 3) Conduct program assessment within each discipline 4) Develop long term direction for programs, and coordination between programs 5) Identify formatting, scheduling, and instructional enhancements 6) Develop curriculum and infrastructure – facilities & staff 7) Review the new budget process to assure it will support future growth in desired areas 8 Take advantage of instructional support such as SLI, curriculum development	Use accreditation study as catalyst for program assessment. Consider level and breadth; lecture/lab coordination; expand & coordinate emphasis courses; clarify disciplinary and interdisciplinary frameworks to guide decision making in response to further budget cuts. eg continuing education, modularization, case-study teaching, on-line & TV resources, tutorials, coop ed, service learning, science/math articulation & reinforcement, autonomous or supplemental modeling courses, interdisciplinary learning Internal funding of release time & curriculum development (via judicious use of tuition-based courses). Encourage PT instructors to submit curriculum development proposals	- Bert - Gail - Jerry - Cliff - Kyle - Sarah - Stan - distance ed
GOAL #10	**Action Steps**	**Comments**	**Who / When**
Maintain a * *[safe and supportive]* environment for all Division personnel possible words to substitute: *collegial* *nurturing* *inclusive* *civil* *respectful*	1) Improve part-time faculty training and mentoring 2) Increase PT involvement in Division functions and activities 3) Meet at least once a year off-campus/potluck 4) Subject-based discussions each term 5) Cross-discipline learning community discussion once per term	Notebook on administrative structure Discipline-based consistency in mentoring Shared intellectual life	- Kyle - Dennis - Stacey - Larry - Joe - TK - Gail

GOAL #11	Action Steps	Comments	Who / When
Achieve and maintain optimal financial support	1) Actively pursue grant opportunities and secure funding from other sources 2) Develop a process that can help determine the financial and human resource costs (+ or -) of decisions and changes made in the division 3) Review class fees to ensure adequate program budgets 4) Identify and report on longer-term program funding needs and how money will be spent or saved for future purchases 5) Actively participate in college budgeting and finance decisions 6) Educate ourselves about collaborative financial decision making 7) Be proactive with the LCC Foundation and Grants office 8) Be proactive in meeting Science Division needs 9) Engage in addressing funding issues beyond the college		- Stacey - Kyle - John - Carrie - Joseph - Larry