

Endorsement Program Approval for Biology

Please complete this form to request State Board of Education approval for the endorsement program indicated.. Please note that a program is a comprehensive set of learning opportunities developed to help the candidate to demonstrate the competencies specified in chapter 180-82A WAC.

Majors/degrees are not automatically equivalent to endorsement programs.

To complete the form place your cursor on any of the gray text fields in the two right hand columns. You can also move from one text area to another by using the tab or arrow keys. Please return the completed form to your OSPI liaison.

College/University Central Washington University

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Competency	Strategies that will be used to assess candidate capacity/ performance related to the competencies
1.0 Common Core: Life Science Concepts and Principles	
The biology teacher knows and understands scientific concepts and principles that are needed to advance student learning as defined by state and national standards developed by the science education community including major unifying themes. Content includes the big ideas of science and the mathematics underlying them and refers to:	
<u>Mathematics</u> – Applications of mathematics in life science research, including:	
K1.1.1 Algebra.	Problem-solving activities, lab notebook, exams
K1.1.2 Probability and statistics.	Exams, research meetings, written report, lab notebook, problem-solving activities
<u>Knowing</u> – Science is a way of asking and answering questions about the physical universe.	
K1.2.1 Scientific method.	Laboratory notebooks/reports, program portfolio
K1.2.2 Other ways of knowing	Program portfolio, exams
<u>Ecosystems</u> – Ecosystems, interdependent communities of living things, recycle matter while energy flows through them.	
K1.3.1 The interdependence of life: populations, communities, and ecosystems.	Lab notebooks, field notebooks, research papers, presentations, program portfolio
K1.3.2 Threats to the global ecosystem and	Lab notebooks, field notebooks, research papers,

environment.	presentations, program portfolio
<u>Strategies of Life</u> – Living things use many strategies to deal with the problems of acquiring and using matter and energy.	
K1.4.1 The organization of living things.	Exams, lab notebooks, MFAT, program portfolio
K1.4.2 Classifying living things.	Exams, lab notebooks, MFAT, program portfolio
K1.4.3 Strategies of fungi.	Exams, lab notebooks, MFAT, program portfolio
K1.4.4 Strategies of plants.	Exams, lab notebooks, MFAT, program portfolio
K1.4.5 Strategies of animals.	Exams, lab notebooks, MFAT, program portfolio
<u>Molecules of Life</u> – A cell's major parts are constructed from a few simple molecular building blocks.	
K1.5.1 Characteristics of organic molecules	Exams, lab notebooks, MFAT, program portfolio
K1.5.2 Amino acids and the structure of proteins	Exams, lab notebooks, MFAT, program portfolio
K1.5.3 Carbohydrates	Exams, lab notebooks, MFAT, program portfolio
K1.5.4 Lipids	Exams, lab notebooks, MFAT, program portfolio
K1.5.5 Vitamins and minerals	Exams, lab notebooks, MFAT, program portfolio
<u>The Living Cell</u> – Life is based on chemistry, and chemistry takes place in cells.	
K1.6.1 The nature and variety of cells.	Exams, lab notebooks, MFAT, program portfolio
K1.6.2 How a cell works.	Exams, lab notebooks, MFAT, program portfolio
K1.6.3 Metabolism and energy transfer: photosynthesis, glycolysis, respiration.	Exams, lab notebooks, MFAT, program portfolio
K1.6.4 Cell division: mitosis and meiosis.	Exams, lab notebooks, MFAT, program portfolio
<u>Genetics</u> – All living things use the same genetic code to guide the chemical reactions in every cell.	
K1.7.1 Classical genetics: qualitative and quantitative.	Exams, lab notebooks, MFAT, program portfolio, problem-solving activities
K1.7.2 Nucleotides, DNA and RNA.	Exams, lab notebooks, MFAT, program portfolio
K1.7.3 The genetic code.	Exams, lab notebooks, MFAT, program portfolio, problem-solving activities
K1.7.4 Genetic engineering, gene therapy.	Exams, lab notebooks, MFAT, program portfolio
<u>Evolution</u> – All life of Earth evolved from single-celled organisms by the process of natural selection.	
K1.8.1 Basis of biological diversity.	Exams, lab notebooks, MFAT, program portfolio
K1.8.2 The diversity of life on earth.	Exams, lab notebooks, MFAT, program portfolio
K1.8.3 Genetic variation within a species.	Exams, lab notebooks, MFAT, program portfolio
K1.8.4 Evidence of evolution.	Exams, lab notebooks, MFAT, program portfolio
K1.8.5 Adaptation and natural selection.	Exams, lab notebooks, MFAT, program portfolio
K1.8.6 Changes in diversity over time.	Exams, lab notebooks, MFAT, program portfolio
The biology teacher is able to:	
S1.1 Can conduct limited but original research in biology demonstrating the ability to design and conduct open-ended investigations and report results.	Laboratory reports, oral presentations, mentor discussion, program portfolio
S1.2 Classify organisms into distinct groups according to structural, cellular, biochemical, and genetic characteristics.	Laboratory exercises, reports, instructor observation, mentor discussion, program portfolio
S1.3 Explain that specific genes regulate the	Laboratory exercises, reports, instructor

functions performed by structures within the cells of multicellular organisms.	observation, mentor discussion, program portfolio
S1.4 Describe how genetic information (DNA) in the cell is controlled at the molecular level, and provides genetic continuity between generations.	Laboratory exercises, reports, instructor observation, mentor discussion, program portfolio
S1.5 Compare and contrast the specialized structural and functional systems that regulate growth and development, and maintain health.	Laboratory exercises, reports, instructor observation, mentor discussion, program portfolio
S1.6 Explain that fossils and radioactive elements can be used to correlate and determine the sequence of geologic events.	Laboratory exercises, reports, instructor observation, mentor discussion, program portfolio
S1.7 Investigate and examine the scientific evidence used to develop theories for evolution, speciation, adaptation, and biological diversity.	Laboratory exercises, reports, instructor observation, mentor discussion, program portfolio
S1.8 Explain how organisms can sustain life by obtaining, transporting, transforming, and releasing matter and energy.	Laboratory exercises, reports, instructor observation, mentor discussion, program portfolio
S1.8 Compare and contrast the complex factors (biotic and abiotic) that affect living organisms, interactions in biomes, ecosystems, communities, and populations.	Laboratory exercises, reports, instructor observation, mentor discussion, program portfolio
S1.10 Analyze the effects of natural events and human activities on the earth's capacity to sustain biological diversity.	Laboratory exercises, reports, instructor observation, mentor discussion, program portfolio
2.0 Common Core: Nature of Science and Technology in the Life Sciences	
The biology teacher knows and understands:	
K2.1 The nature of scientific inquiry in the context of life sciences including intellectual honesty, limitations of science and technology, dealing with inconsistencies, evaluating methods of investigation, and evolution of scientific ideas.	Program portfolio
K2.2 That science and technology are human endeavors, interrelated to each other, to society, and to the workplace in the context of the life sciences (e.g. all peoples contribute to science and technology, science and technology are interrelated, many careers and occupations use science, mathematics, and technology).	Mentor discussion, oral presentation, program portfolio
K2.3 The unifying themes common to all science, including systems, order and organization; evidence, models and organizations; constancy, changes and measurement; evolution and equilibrium; and form and function.	Exams, lab notebooks, MFAT, program portfolio
The biology teacher is able to:	
S2.1 Use processes and conventions of science as a professional activity.	Oral presentation, lab reports, program portfolio
S2.2 Use standards defining acceptable	Oral presentation, lab reports, program portfolio

evidence and scientific explanation.	
S2.3 Explain the nature of scientific inquiry including intellectual honesty, limitations of science and technology, dealing with inconsistencies, evaluating methods of investigation, and evolution of scientific ideas.	Discussion, instructor observation, program portfolio
S2.4 Explain that science and technology are human endeavors, interrelated to each other, to society, and to the workplace (e.g. all peoples contribute to science and technology, science and technology are interrelated, many careers and occupations use science, mathematics, and technology).	Discussion, instructor observation, program portfolio
3.0 Common Core: Inquiry - Skills and Processes of Science and Technology in Life Sciences	
The biology teacher knows and understands:	
K3.1 Abilities necessary to do scientific inquiry.	Portfolio, classroom activities, program portfolio
K3.2 Application of science knowledge and skills to solve problems or meet challenges.	Portfolio, classroom activities, program portfolio
The biology teacher is able to demonstrate abilities necessary to do scientific inquiry in the following areas: questioning, designing and conducting investigations, explanation, modeling (including mathematical modeling) and communication in biological investigations to include:	
S3.1 Questioning and formulating solvable problems.	Mentor discussion, program portfolio
S3.2 Reflecting on and constructing, knowledge from data.	Mentor discussion, lab report, program portfolio
S3.3 Collaborating and exchanging information while seeking solutions.	Mentor discussion, lab report, program portfolio
S3.4 Developing concepts and relationships from empirical experience.	Mentor discussion, lab report, program portfolio
S3.5 Apply science knowledge and skills to solve problems or meet challenges: identifying problems, designing or testing solutions, evaluating potential solutions in biological challenges at local, national or global level.	Mentor discussion, program portfolio
4.0 Common Core: Context of Life Science	
Biology teachers know the relationship between life science and the daily lives and interests of students and to a larger framework of human endeavor and understanding. The context of science refers to:	
K4.1 Knowing how science and technology interact with society.	Methods portfolio, program portfolio
K4.2 Knowing how values are used in scientific, technological, personal, social and cultural contexts.	Methods portfolio, program portfolio

K4.3 Knowing the relevance and importance of life science to the personal lives of students.	Methods portfolio, program portfolio
Biology teachers relate life science to the daily lives and interests of students and to a larger framework of human endeavor and understanding. The context of science refers to:	
S4.1 Enabling students to recognize relationships between science and technology and society.	Washington Performance-based Pedagogy Assessment (PBPA), classroom observation
S4.2 Enabling students to recognize the use of values in scientific, technological, personal, social, and cultural contexts.	PBPA, classroom observation
S4.3 Being able to demonstrate the relevance and importance of science to the personal lives of students.	PBPA, classroom observation
5.0 Common Core: Skills of Teaching	
Biology teachers know the equipment, materials, and preparation required in the biology laboratory, including.	
K5.1 Designing, conducting and evaluating laboratory activities, using techniques, equipment and facilities that meet current technological standards.	Exams, laboratory notebooks, classroom observation, biotech portfolio
K5.2 Design of experiments	Exams, laboratory notebooks, classroom observation, biotech portfolio
K5.3 Data analysis and presentation	Exams, laboratory notebooks, classroom observation, biotech portfolio
K5.4 Preparation of laboratory reports	Lab reports
K5.5 Operation of equipment	Exams, laboratory notebooks, classroom observation, biotech portfolio
K5.6 Preparation of materials	Exams, laboratory notebooks, classroom observation, biotech portfolio
K5.7 Lab safety (including storage and disposal of hazardous waste)	Observation, methods portfolio, program portfolio
Incorporating instructional materials, biology teachers are able to create a community of diverse student learners who can construct meaning from life science experiences and possess a disposition for further inquiry and learning. Skills of Teaching refers to:	
S5.1 Being able to use life science teaching actions, strategies and methodologies.	Observation, PBPA, methods portfolio, program portfolio
S5.2 Being able to establish Interactions with students, including questioning techniques, that promote learning and achievement.	Observation, PBPA, methods portfolio, program portfolio
S5.3 Being able to effectively organize classroom, laboratory, and field experiences in different student groupings	Observation, PBPA, methods portfolio, program portfolio
S5.4 Monitor students' understanding of content through a variety of assessment strategies, provide feedback to students to assist learning, adjust instruction and	Observation, PBPA, methods portfolio, program portfolio

encourage students to learn to work together to solve problems.	
S5.5 Being able to use advanced technology to extend and enhance learning.	Observation, PBPA, methods portfolio, program portfolio
S5.6 Design, conduct and evaluate laboratory activities, using techniques, equipment and facilities that meet current technological standards including computer applications to science teaching and hands-on laboratory experiences, equipment, and laboratory notebook.	Observation, PBPA, biotech portfolio
S5.7 Being able to use prior conceptions and student interests to promote new learning.	Observation, PBPA, methods portfolio
6.0 Common Core: Curriculum	
Biology teachers know the biology curriculum.	
K6.1 Understand the application of student learning goals to design lessons (i.e., read with comprehension, write with skill, and communicate effectively and responsibly in a variety of ways and settings, know and apply the core concepts).	Methods portfolio, program portfolio
K6.2 Know a coherent, focused biology curriculum that is consistent with state standards (Essential Academic Learning Requirements) for life science education and appropriate for addressing the needs, abilities and interests of students.	Methods portfolio, program portfolio
Biology teachers develop and apply a coherent, focused life science curriculum that is consistent with state and national standards for life science education and appropriate for addressing the needs, abilities and interests of students. Curriculum refers to:	
S6.1 Select, analyze and modify materials to meet the instructional needs and levels of diverse learners.	Observation, PBPA, methods portfolio, program portfolio
S6.2 Being able to develop and apply an extended framework of goals, plans, materials, and resources for instruction.	Observation, PBPA, methods portfolio, program portfolio
S6.3 Being able to develop the instructional context, both in and out of school, within which pedagogy is embedded.	Observation, PBPA, methods portfolio, program portfolio
S6.4 Plan instruction based upon:	Observation, PBPA, methods portfolio, program portfolio
<ul style="list-style-type: none"> • Knowledge of subject matter, 	
<ul style="list-style-type: none"> • Promotion of higher order thinking 	
<ul style="list-style-type: none"> • Needs of local students and the community, 	
<ul style="list-style-type: none"> • Washington Essential Academic Learning Requirements (EALRs) 	
<ul style="list-style-type: none"> • Application in the workplace and career opportunities of life science, 	

<ul style="list-style-type: none"> Application of life science to society, economics and in peoples daily lives 	
S6.5 Plan instruction to include use of student learning goals in the context of the life sciences (i.e. read with comprehension, write with skill, and communicate effectively and responsibly in a variety of ways and settings, know and apply the core concepts).	Observation, PBPA, methods portfolio, program portfolio
7.0 Common Core: Social Context	
Biology teachers know the relation between science and the community and know the human and institutional resources in the community. The social context of science teaching refers to:	
K7.1 Knowing examples of social and community support networks within which occur life science teaching and learning.	Methods portfolio, program portfolio
K7.2 Knowing the relationship of science teaching and learning to the needs and values of various communities.	Methods portfolio, program portfolio
Biology teachers can relate science to the community and to use human and institutional resources in the community to advance the education of their students in life science. The social context of science teaching refers to:	
S7.1 Being able to develop the social and community support network within which science teaching and learning occur.	PBPA, methods portfolio
S7.2 Being able to relate science teaching and learning to the needs and values of the community.	PBPA, methods portfolio
S7.3 Being able to involve people and institutions from the community in the teaching of science.	PBPA, methods portfolio
8.0 Common Core: Assessment	
Biology teachers know a variety of contemporary assessment strategies to evaluate the intellectual, social, and personal development of the learner in all aspects of earth science. Assessment refers to:	
K8.1 Knowing the measurement and evaluation of student learning in a variety of dimensions.	Observation, PBPA, methods portfolio, program portfolio
Biology teachers are able to use a variety of contemporary assessment strategies to evaluate the intellectual, social, and personal development of the learner in all aspects of science. Assessment refers to:	
S8.1 Identifying outcomes to be measured.	Observation, PBPA, methods portfolio, program portfolio
S8.2 Being able to align goals, instruction and outcomes.	Observation, PBPA, methods portfolio, program portfolio
S8.3 Being able to measure and evaluate	Observation, PBPA, methods portfolio, program

student learning in a variety of dimensions.	portfolio
S8.4 Being able to use outcome data to guide and change instruction.	Observation, PBPA, methods portfolio, program portfolio
S8.5 Monitoring and assessing students' understanding of content through a variety of means	Observation, PBPA, methods portfolio, program portfolio
9.0 Common Core: Environment for Learning	
Biology teachers know safe and supportive learning environments reflecting high expectations for the success of all students. Learning environments refers to:	
K9.1 Knowing examples of changes that can make physical spaces more effective for learning life science.	Biotech portfolio, methods portfolio, program portfolio
K9.2 Knowing psychological and social environments of the student engaged in learning life science.	Methods portfolio, program portfolio
K9.3 Knowing safety in all areas related to science instruction.	Methods portfolio, program portfolio
Biology teachers manage the instructional environment including creating a climate that promotes fairness; establish and maintain mutual respect with and among students; communicating clear, challenging learning expectations to each student; establish and communicate challenging learning expectations to each student; establish and maintain consistent standards of classroom behavior; and make the physical environment safe and conducive to learning. Learning environments refers to:	
S9.1 Being able to design/manage physical spaces within which learning of science occurs.	Observation, PBPA, methods portfolio, biotech portfolio
S9.2 Creating a climate that promotes fairness	PBPA, methods portfolio
S9.3 Establishing and maintaining rapport with students	Observation, student teaching observation form
S9.4 Communicating challenging learning expectations to each student	Observation, PBPA, methods portfolio
S9.5 Establishing and maintaining consistent standards of classroom behavior	Observation, PBPA, methods portfolio
S9.6 Creating a safe environment conducive to learning	Observation, PBPA, methods portfolio
S9.7 Being able to demonstrate safe treatment and ethical use of living organisms	Observation, PBPA, methods portfolio
10.0 Common Core: Professional Practice	
Biology teachers have a knowledge base that prepares them for professional practice. Professional practice refers to:	
K10.1 Knowledge of life science and educational professional organizations.	Program portfolio
K10.2 Knowledge of standards of ethical	Program portfolio

behavior consistent with the best interests of students and the community.	
Biology teachers participate in the professional community, improving practice through their personal actions, education and development. Professional practice refers to:	
S10.1 Participating in the activities of the professional community to cultivate professional relationships	Observations, PBPA, program portfolio
S10.2 Being able to demonstrate ethical behavior consistent with the best interests of students and the community, as stated in Washington's Code of Professional Conduct, and local, state and federal laws and regulations.	Observations, PBPA, program portfolio
S10.3 Being able to reflect on professional practices and continuous efforts to ensure the highest quality of science instruction.	Observations, PBPA, program portfolio
S10.4 Being able to willingly work with students and new colleagues as they enter the profession.	Observations, PBPA, program portfolio
S10.5 Communicating and interacting effectively with parents/guardians, other agencies and the community at large to support learning by all students	Observations, PBPA, program portfolio
Describe evidences that candidates will provide to document candidates' positive impact on student learning in the respective endorsement area.	
Students to be endorsed in biology, upon completing student teaching, will have been assessed using the Performance-based Pedagogy Assessment (PBPA) tool. The PBPA requires pre-service teacher candidates to document evidence of positive impact on student learning through development and implementation of a unit plan in biology. The unit plan will address the diversity of students in the pre-service candidate's field placement and will include effective planning, instructional strategies, management of instruction, and assessment strategies. Further evidence of biology endorsement candidate impact on student learning will be assessed using an end-of-program portfolio that demonstrates candidate knowledge and skill in biology teaching.	
Describe the assessment system by which candidate performance, relative to the competencies, will be aggregated, analyzed, and used for program improvement.	
Portfolio assessment of instruction: Pre-service teacher candidate performance during the biology teaching program is evaluated using standards-aligned performance indicators (projects, tests/quizzes, presentations, etc.) and reflections within an end-of-program portfolio. Instructors assess individual candidate performance data relative to standards-aligned performance benchmarks and analyze aggregated data to inform overall biology teaching program performance. Targeted programmatic changes emerge from aggregated candidate performance outcomes relative to benchmarks. Entry to program and exit from program surveys provide general indicators of performance whereas a series of summative assessments (Biology Major Field Achievement Test, Praxis II test for Biology) provide additional context for portfolio evidence. The program portfolio provides diverse sources of evidence that are collectively used to evaluate individual candidate proficiency as well as inform program effectiveness.	