

Secondary Science Endorsements Requirement Area Options

Each of the nine secondary science endorsements is competency based, meaning that it includes multiple pathways for an educator to provide evidence that they have met requirements. The endorsements allow educators to demonstrate competency by taking university courses OR by taking a Praxis Exam. Some endorsements also include other options for demonstrating competency, such as a USBE course, College Major and/or Minor, or a stack of microcredentials.

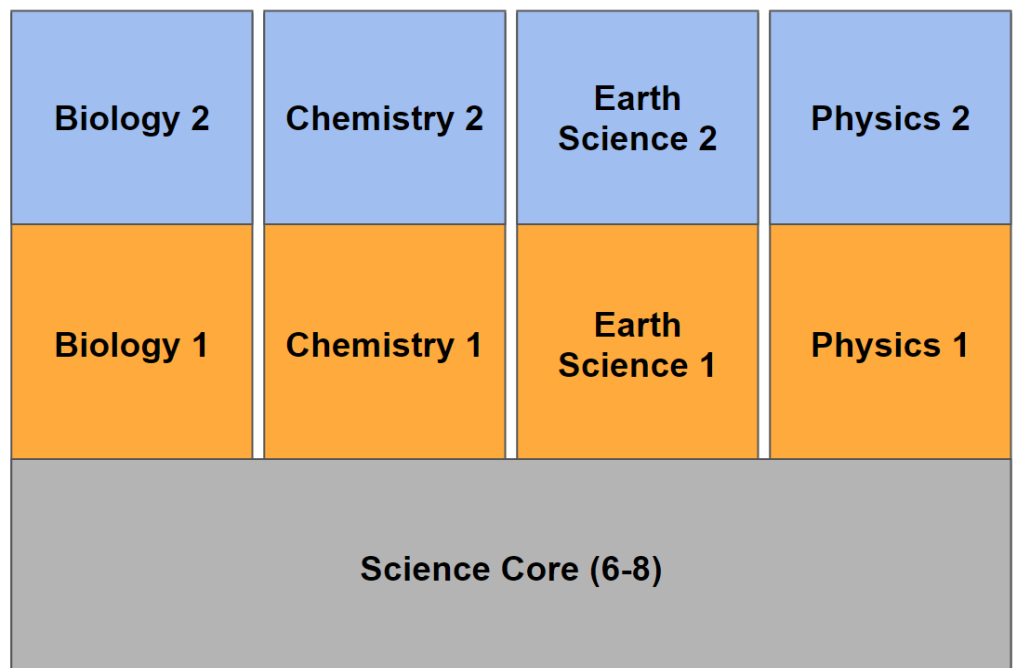
This document contains summaries of the options available for the requirement areas for each Secondary Science Endorsement in a one page table format. Each of the tables demonstrate how each requirement area for the associated endorsement can be met. Each row must be met by at least one of the column options - cells that are grayed out are not available options. For descriptions of approved options that meet the endorsement requirements and the competencies associated with each requirement area see the associated specifications document found on the [USBE Science Webpage](#).

The secondary science endorsement format is a tiered system where educators will need to have met or meet requirements of the lower tiers in order to earn the higher tiers. In the secondary science endorsement format, science educators will need to earn the Science Core tier as a base requirement for all level-1 high school content areas. Additionally, educators will need to earn or meet requirements of the level-1 content area endorsement in order to qualify for the associated level-2 endorsement in that content area. The Science Core endorsement will qualify educators to teach middle school (grades 6-8) integrated science courses. Level-1 content area endorsements (Biology 1, Chemistry 1, Earth Science 1, and Physics 1) will qualify educators to teach core SEEd courses in the content area as well as some additional science elective courses, where applicable. Level-2 content area endorsements (Biology 2, Chemistry 2, Earth Science 2, and Physics 2) will qualify educators to teach advanced level (AP, CE, and IB) science courses in the content area and some additional science elective courses, where applicable.

Level-2 Content Areas contain the advanced content specific requirements in each science discipline. **Qualifies educators to teach Advanced (AP, CE, & IB) and some additional science elective courses in the content area**

Level-1 Content Areas contain the general content specific requirements in each science discipline. **Qualifies educators to teach core SEEd courses in the content area and some additional science elective courses**

Science Core (6-8) contains the base requirements for all secondary science endorsements. **Qualifies educators to teach Middle School Science courses in grades 6-8.**



Science Core Endorsement Requirement Areas

The following table demonstrates how each requirement area for the Science Core Endorsement could be met. **Each row must be met by at least one of the column options** - cells that are grayed out are not available options. For more information, please see the [Secondary Science Core Endorsement Application](#) and the [Secondary Science Core Endorsement Specs](#).

Requirement Area (Aligned Area Competency hyperlink to more details below)	University Course <i>Evidence:</i> If this option is used the application must include a transcript for each course below	Praxis Exam or NES Test (or equivalent) <i>Evidence:</i> If this option is used the application must include the PDF copy of the Exam's score report	Microcredential Stack <i>Evidence:</i> If this option is used the application must include the PDF copy of the MIDAS Transcript for each stack listed below	Certificate or Approved Course <i>Evidence:</i> If this option is used the application must include a MIDAS Transcript or paper copy of the Safety Certification below
Earth Science Content Knowledge	General Earth Science, Astronomy, Geology, or Meteorology	Middle School Science Content Knowledge Praxis (0442/5442) Score of 152 or higher Middle Grades General Science National Evaluation Series Test (205) Score of 152 or higher		
Life Science Content Knowledge	General Biology			
Chemistry Content Knowledge	General Chemistry			
Physics Content Knowledge	General Physics			
Three-Dimensional Science & Engineering Pedagogical Knowledge	3 Dimensional Science and Engineering		Three-Dimensional Science and Engineering Microcredential Pathway	Approved USBE or District Course
Science Education Teaching & Dispositions Knowledge	Teaching Methods in Science		Science Teaching Methods Microcredential Pathway	
Science Classroom Lab Safety Knowledge	Classroom Lab Safety (Generally covered in a Teaching Methods in Science Course)			Flinn Safety Certificate OR Approved Safety Course

Biology 1 Endorsement Requirement Areas

The following table demonstrates how each requirement area for the Biology 1 Endorsement could be met. **Each row must be met by at least one of the column options** - cells that are grayed out are not available options. For more information, please see the [Secondary Science Endorsement Application - Biology Pathway](#) and the [Secondary Biology 1 Endorsement Specs](#).

Requirement Area(s) (Aligned Area Competency hyperlink to more details below)	University Course <i>Evidence:</i> If this option is used the application must include a transcript for each course below	College Major or Minor <i>Evidence:</i> If this option is used the application must include a transcript with the Major or Minor is posted	Praxis Exam or NES Test (or equivalent) <i>Evidence:</i> If this option is used the application must include the PDF copy of the Exam's score report	Prerequisite Endorsement Requirements <i>Evidence:</i> Prerequisite Endorsement must be posted in CACTUS or an Additional Application for prerequisite endorsement must included with this application
Science Core Endorsement				Science Core Endorsement
Biological Molecules Content Knowledge	Molecular Biology	College Major or Minor in Biology, Biology Education, or a Biology Variation (e.g., Microbiology, Ecology, Wildlife Biology, Physiology, Genetics, Evolutionary Biology)	Biology Content Knowledge Praxis (0236/5236) Score of 149 or higher Or Biology National Evaluation Series Test (316) Score of 220 or higher	
Organisms Content Knowledge	General Biology II or Zoology or Botany			
Ecosystems Content Knowledge	Ecology			
Heredity Content Knowledge	Genetics			
Biological Evolution Content Knowledge	Evolutionary Biology			

Biology 2 Endorsement Requirement Areas

The following table demonstrates how each requirement area for the Biology 2 Endorsement could be met. **Each row must be met by at least one of the column options** - cells that are grayed out are not available options. For more information, please see the [Secondary Science Endorsement Application - Biology Pathway](#) and the [Secondary Biology 2 Endorsement Specs](#).

Requirement Area(s) (Aligned Area Competency hyperlink to more details below)	University Course <i>Evidence:</i> If this option is used the application must include a transcript for each course below	College Major <i>Evidence:</i> If this option is used the application must include a transcript with the Major is posted	Teaching Experience and Relevant Professional Learning <i>Evidence:</i> If this option is used the application must include a certificate of completion for the relevant PL workshop and two years of teaching must occur after the PL workshop.	Prerequisite Endorsement Requirements <i>Evidence:</i> Prerequisite Endorsement must be posted in CACTUS or an Additional Application for prerequisite endorsement must included with this application
Science Core Endorsement				Science Core Endorsement
Secondary Biology 1 Endorsement				Biology 1 Endorsement
Advanced Data Analysis Content Knowledge	General or Applied Statistics	College Major in Biology, Biology Education, or a Biology Variation (e.g., Microbiology, Ecology, Physiology, Genetics, Evolutionary Biology)	Teach AP Biology for 3 Years and Attend an AP Biology Summer Institute or Teach IB Biology for 3 years and attend an IB DP Biology Workshop	
Advanced Life Science Content Knowledge	Choose any two of the following Options (at least one must include an extra 1.0 Credit lab experience): <ul style="list-style-type: none"> ● Cell Biology Or Microbiology ● Anatomy and/or Physiology ● Biotechnology ● Wildlife Biology OR an advanced course focused on Zoology/Botany 			

Chemistry 1 Endorsement Requirement Areas

The following table demonstrates how each requirement area for the Chemistry 1 Endorsement could be met. **Each row must be met by at least one of the column options** - cells that are grayed out are not available options. For more information, please see the [Secondary Science Endorsement Application - Chemistry Pathway](#) and the [Secondary Chemistry 1 Endorsement Specs](#).

Requirement Area(s) (Aligned Area Competency hyperlink to more details below)	University Course <i>Evidence:</i> If this option is used the application must include a transcript for each course below	College Major or Minor <i>Evidence:</i> If this option is used the application must include a transcript with the Major or Minor is posted	Praxis Exam or NES Test (or equivalent) <i>Evidence:</i> If this option is used the application must include the PDF copy of the Exam's score report	Prerequisite Endorsement Requirements <i>Evidence:</i> Prerequisite Endorsement must be posted in CACTUS or an Additional Application for prerequisite endorsement must included with this application
Science Core Endorsement				Science Core Endorsement
Atoms, Bonds, & Reactions Content Knowledge	Principles of Chemistry 1	College Major or Minor in Chemistry, Chemistry Education, Physical Science Education, or a Chemistry Variation (e.g., Biochemistry, Geochemistry, Physical Chemistry)	Chemistry Content Knowledge Praxis (0246/5246) Score of 140 or higher Or Chemistry National Evaluation Series Test (321) Score of 220 or higher	
Equilibrium, Thermodynamics, & Electrochemistry Content Knowledge	Principles of Chemistry 2			
Chemistry Laboratory Content Knowledge	Chemistry Lab			
Integration with Life & Earth Science Content Knowledge	Choose one of the following 3 credit course options: <ul style="list-style-type: none"> • Biochemistry or Organic chemistry • Geochemistry • Physical Chemistry 			

Chemistry 2 Endorsement Requirement Areas

The following table demonstrates how each requirement area for the Chemistry 2 Endorsement could be met. **Each row must be met by at least one of the column options** - cells that are grayed out are not available options. For more information, please see the [Secondary Science Endorsement Application - Chemistry Pathway](#) and the [Secondary Chemistry 2 Endorsement Specs](#).

Requirement Area(s) (Aligned Area Competency hyperlink to more details below)	University Course <i>Evidence:</i> If this option is used the application must include a transcript for each course below	College Major <i>Evidence:</i> If this option is used the application must include a transcript with the Major is posted	Teaching Experience and Relevant Professional Learning <i>Evidence:</i> If this option is used the application must include a certificate of completion for the relevant PL workshop and two years of teaching must occur after the PL workshop.	Prerequisite Endorsement Requirements <i>Evidence:</i> Prerequisite Endorsement must be posted in CACTUS or an Additional Application for prerequisite endorsement must included with this application
Science Core Endorsement				Science Core Endorsement
Secondary Chemistry 1 Endorsement				Chemistry 1 Endorsement
Advanced Quantitative Chemistry Lab Content Knowledge	Analytical Chemistry (with Required Lab)	College Major in Chemistry, Chemistry Education, or a Chemistry Variation (e.g., Biochemistry, Geochemistry, Physical Chemistry)	Teach AP Chemistry for 3 Years and Attend an AP Chemistry Summer Institute or Teach IB Chemistry for 3 years and attend an IB DP Chemistry Workshop	
Advanced Chemistry Content Knowledge	Choose two Advanced/Applied Chemistry course options: (In addition to the Advanced/Applied Course used to earn the Secondary Chem I Endorsement) <ul style="list-style-type: none"> • Biochemistry I and/or II • Geochemistry I and/or II • Organic Chemistry I and/or II • Physical Chemistry I and/or II 			

Earth Science 1 Endorsement Requirement Areas

The following table demonstrates how each requirement area for the Earth Science 1 Endorsement could be met. **Each row must be met by at least one of the column options** - cells that are grayed out are not available options. For more information, please see the [Secondary Science Endorsement Application - Earth Science Pathway](#) and the [Secondary Earth Science 1 Endorsement Specs](#)

Requirement Area(s) (Aligned Area Competency hyperlink to more details below)	University Course <i>Evidence:</i> If this option is used the application must include a transcript for each course below	College Major or Minor <i>Evidence:</i> If this option is used the application must include a transcript with the Major or Minor is posted	Praxis Exam or NES Test (or equivalent) <i>Evidence:</i> If this option is used the application must include the PDF copy of the Exam's score report	Prerequisite Endorsement Requirements <i>Evidence:</i> Prerequisite Endorsement must be posted in CACTUS or an Additional Application for prerequisite endorsement must included with this application
Science Core Endorsement				Science Core Endorsement
Earth's Place in the Universe Content Knowledge	Astronomy	College Major or Minor in Earth Science, Earth Science Education, Physical Science Education, or an Earth Science Variation (e.g., Environmental Science, Geology, Meteorology, Astronomy)	Earth Science Content Knowledge Praxis (0572/5572) Score of 153 or higher Or Earth and Space Science National Evaluation Series Test (322) Score of 220 or higher	
Geologic Systems & Processes Content Knowledge	Geology			
Weather & Climate Content Knowledge	Meteorology			
Biogeology Content Knowledge	Ecology			
Earth & Human Activity Content Knowledge	Environmental Science			

Earth Science 2 Endorsement Requirement Areas

The following table demonstrates how each requirement area for the Earth Science 2 Endorsement could be met. **Each row must be met by at least one of the column options** - cells that are grayed out are not available options. For more information, please see the [Secondary Science Endorsement Application - Earth Science Pathway](#) and the [Secondary Earth Science 2 Endorsement Options](#).

Requirement Area(s) (Aligned Area Competency hyperlink to more details below)	University Course <i>Evidence:</i> If this option is used the application must include a transcript for each course below	College Major <i>Evidence:</i> If this option is used the application must include a transcript with the Major is posted	Teaching Experience and Relevant Professional Learning <i>Evidence:</i> If this option is used the application must include a certificate of completion for the relevant PL workshop and two years of teaching must occur after the PL workshop.	Prerequisite Endorsement Requirements <i>Evidence:</i> Prerequisite Endorsement must be posted in CACTUS or an Additional Application for prerequisite endorsement must included with this application
Science Core Endorsement				Science Core Endorsement
Earth Science 1 Endorsement				Earth Science 1 Endorsement
Advanced Data Analysis Content Knowledge	General or Applied Statistics	College Major in Earth Science, Earth Science Education, or an Earth Science Variation (e.g., Environmental Science, Geology, Meteorology, Astronomy)	Teach AP Environmental Science for 3 Years and Attend an AP Environmental Science Summer Institute or Teach IB Environmental Systems and Societies for 3 years and attend an IB DP Environmental Systems and Societies Workshop	
Advanced Earth Science Content Knowledge	Choose two Advanced/Applied Earth Science course options: (In addition to the Advanced/Applied Course used to earn the Secondary Earth I Endorsement) <ul style="list-style-type: none"> • Atmospheric Science • Environmental Management • Geologic/Natural Hazards • Historical or Physical Geology or Intro to GIS • Soil Science 			

Physics 1 Endorsement Requirement Areas

The following table demonstrates how each requirement area for the Physics 1 Endorsement could be met. **Each row must be met by at least one of the column options** - cells that are grayed out are not available options. For more information, please see the [Secondary Science Endorsement Application - Physics Pathway](#) and the [Secondary Physics 1 Endorsement Specs](#).

Requirement Area(s) (Aligned Area Competency hyperlink to more details below)	University Course <i>Evidence:</i> If this option is used the application must include a transcript for each course below	College Major or Minor <i>Evidence:</i> If this option is used the application must include a transcript with the Major or Minor is posted	Praxis Exam or NES Test (or equivalent) <i>Evidence:</i> If this option is used the application must include the PDF copy of the Exam's score report	Prerequisite Endorsement Requirements <i>Evidence:</i> Prerequisite Endorsement must be posted in CACTUS or an Additional Application for prerequisite endorsement must included with this application
Science Core Endorsement				Science Core Endorsement
Kinematics, Dynamics, & Conservation Laws Content Knowledge	General Physics I	College Major or Minor in Physics, Physics Education, Physical Science Education, or a Physics Variation (e.g., Astrophysics, Theoretical Physics, Nuclear Physics)	Physics Content Knowledge Praxis (0266/5266) Score of 136 or higher Or Physics National Evaluation Series Test (323) Score of 220 or higher	
Fields & Electromagnetism Content Knowledge	General Physics II			
Physics Laboratory Content Knowledge	Physics Lab			
Waves and Their Applications in Technology	Choose one of the following 3 credit course options: <ul style="list-style-type: none"> • Modern Physics • Electricity and Magnetism • Waves, Acoustics, and Sound 			

Physics 2 Endorsement Requirement Areas

The following table demonstrates how each requirement area for the Physics 2 Endorsement could be met. **Each row must be met by at least one of the column options** - cells that are grayed out are not available options. For more information, please see the [Secondary Science Endorsement Application - Physics Pathway](#) and the [Secondary Physics 2 Endorsement Specs](#).

Requirement Area(s) (Aligned Area Competency hyperlink to more details below)	University Course <i>Evidence:</i> If this option is used the application must include a transcript for each course below	College Major <i>Evidence:</i> If this option is used the application must include a transcript with the Major is posted	Teaching Experience and Relevant Professional Learning <i>Evidence:</i> If this option is used the application must include a certificate of completion for the relevant PL workshop and two years of teaching must occur after the PL workshop.	Prerequisite Endorsement Requirements <i>Evidence:</i> Prerequisite Endorsement must be posted in CACTUS or an Additional Application for prerequisite endorsement must included with this application
Science Core Endorsement				Science Core Endorsement
Secondary Physics 1 Endorsement				Physics 1 Endorsement
Advanced Quantitative Physics Reasoning Content Knowledge	Calculus I	College Major in Physics, Physics Education, or a Physics Variation (e.g., Astrophysics, Theoretical Physics, Nuclear Physics)	Teach any AP Physics course for 3 Years and Attend any AP Physics Summer Institute or Teach IB Physics for 3 years and attend an IB DP Physics Workshop	
Advanced Physics Content Knowledge	Choose two Advanced/Applied Physics course options: (In addition to the Advanced/Applied Course used to earn the Secondary Phys 1 Endorsement) <ul style="list-style-type: none"> • Astronomy or Astrophysics • Electricity and Magnetism • Mechanical Engineering • Mechanics, Statics • Modern Physics • Thermodynamics • Waves, Acoustics, and Sound 			