Physical Science (PS)
Signature Assignment and Reflection Guide

Table of Contents

Considerations When Using This Guide

- This is a guide. Faculty should attempt to have their signature assignments and student reflections address as many of the learning outcomes identified here as make sense within the context of each course. The General Education Committee will be using these overall expectations when examining courses up for 5-year review, and a course that addresses few of these outcomes may raise concerns among committee members. From an assessment point of view, the General Education program and its students benefit when General Educated designated courses address the program's outcomes.
- This guide is derived from the faculty-developed map for signature assignments and reflection in this General Education designation. The rubrics in this document will be used to assess random samples of graduating student ePortfolios. Therefore, the General Education Committee encourages faculty to incorporate these rubrics into their grading process and make students aware of the standards by which signature assignments will be judged.
- Within the boundaries of this guide, faculty develop their own mix of assignments and reflection prompts that best fits their course. Note that a key decision for faculty to make is whether having students archive one or two or even three signature assignments in their ePortfolio is the best way to meet the assessment expectations for the PS designation.
- When designing courses and aligning learning outcomes with classroom activities and assignments, remember to balance two key features: Your course should be an engaging and memorable experience for students and it should contribute to assessment of the General Education program by focusing our attention to the pages of student ePortfolios most likely to have evidence for specific learning outcomes.

Salt Lake Community College

Effective Communication

Signature assignments **must** ask students to address **at least one** of the following:
- Critically read and analyze primary and secondary sources.
- Critically watch/observe and analyze visual material.
- Develop appropriate, relevant, and compelling content in their work.

Critically Reading and Analyzing Sources Rubric

	4	3	2	1
Students critically read and analyze primary and secondary sources.	Work reflects understanding and use of primary and/or secondary sources, with no misinterpretation or omission of information.	Work reflects understanding and use of primary and/or secondary sources, with occasional misinterpretation or omission of information.	Work reflects understanding and use of primary and/or secondary sources, with considerable misinterpretation or omission of information.	Work does not reflect understanding and use of primary and/or secondary sources.

Critically Watch/Observe and Analyze Visual Material Rubric

	4	3	2	1
Students critically watch/observe and analyze visual material.	Work reflects that the student has thoroughly observed and effectively analyzed source material, a process, or an event as part of the assignment.	Work reflects that the student has accurately observed and analyzed source material, a process, or an event as part of the assignment.	Work reflects that the student has attempted to observe and analyze source material, a process, or an event as part of the assignment.	Work reflects no attempt to observe and use source material, a process, or an event as part of the assignment.

Content Development Rubric

	4	3	2	1
Students develop appropriate, relevant, and compelling content in their work.	Work correctly employs all or nearly all the major concepts, persons, or events needed to give a complete treatment of the topic.	Work correctly employs most of the major concepts, persons, or events needed to give a complete treatment of the topic, or employs them, but with some errors in their application to the topic.	Work omits some major concepts, persons or events needed to give a complete treatment of the topic, and/or makes significant errors in their application to the topic.	Work rarely or never uses major concepts, persons, or events, and/or makes significant errors in their application to the topic.

Quantitative Literacy

Signature assignments **should**, if it makes sense to the context of the assignment, ask students to effectively use quantitative information in connection with the argument or purpose of their work.

Use of Quantitative Information Rubric (From the AAC&U Quantitative Literacy VALUE Rubric)

	4	3	2	1
Students use quantitative evidence in support of the argument or purpose of the work.	Work uses quantitative information in connection with the argument or purpose of the work, presents it in an effective format, and explicates it with consistently high quality.	Work uses quantitative information in connection with the argument or purpose of the work, though data may be presented in a less than completely effective format or some parts of the explication may be uneven.	Work uses quantitative information, but does not effectively connect it to the argument or purpose of the work.	Work presents an argument for which quantitative evidence is pertinent, but does not provide adequate explicit numerical support. (May use quasi-quantitative words such as "many," "few," "increasing," "small," and the like in place of actual quantities.)

Critical Thinking

Signature assignments **should** ask students to do at least **one** of the following:
- Employ evidentiary sources with enough interpretation/evaluation to develop a comprehensive analysis, argument, or synthesis.
- Demonstrate scientific reasoning processes to draw conclusions.
- Demonstrate the application of specialized methods and tools of scientific inquiry by actively and directly collecting, analyzing, and interpreting data, presenting findings, and/or using information to answer questions.
- Understand the role science plays in historical and contemporary issues.

Evidence Rubric (from the AAC&U Critical Thinking VALUE Rubric)

	4	3	2	1
Students select and use information to investigate a point of view or conclusion	Information is taken from source(s) with enough interpretation/evaluation to develop a comprehensive analysis or synthesis.	Information is taken from source(s) with enough interpretation/evaluation to develop a coherent analysis or synthesis.	Information is taken from source(s) with some interpretation/evaluation, but not enough to develop a coherent analysis or synthesis.	Information is taken from source(s) without any interpretation/evaluation.

Scientific Reasoning Rubric (from the WICHE Passport Learning Outcomes)

	4	3	2	1
Students demonstrate scientific reasoning processes to draw conclusions.	Conclusions are clearly based on careful observation, marshalling of data or information, and/or the use of qualitative or quantitative analysis.	Conclusions are based on observation, marshalling of data or information, and/or the use of qualitative or quantitative analysis.	Conclusions are minimally based on observation, data or information, and/or the use of qualitative or quantitative analysis.	Conclusions not supported by observation, data or information, or analysis.

Scientific Inquiry Rubric (from the WICHE Passport Learning Outcomes)

	4	3	2	1
Students apply the tools of scientific inquiry	Work deftly uses specialized methods and tools of scientific inquiry by actively and directly collecting, analyzing, and interpreting data, presenting findings, and/or using information to answer questions.	Work uses specialized methods and tools of scientific inquiry by actively and directly collecting, analyzing, and interpreting data, presenting findings, and/or using information to answer questions.	Work attempts to use specialized methods and tools of scientific inquiry by actively and directly collecting, analyzing, and interpreting data, presenting findings, and/or using information to answer questions.	Work does not use specialized methods and tools of scientific inquiry by actively and directly collecting, analyzing, and interpreting data, presenting findings, and/or using information to answer questions.

Role of Science Rubric

	4	3	2	1
Students understand the role science plays in historical and contemporary issues.	Work strongly demonstrates that the student understands the role science plays in historical and/or contemporary issues.	Work demonstrates that the student understands the role science plays in historical and/or contemporary issues.	Work demonstrates some understanding of the role science plays in historical and/or contemporary issues.	Work unsuccessfully attempts to show the role science plays in historical and/or contemporary issues.

Information Literacy

Signature assignments **should** ask students to demonstrate as many of the following as make sense in the context of the course:
- Use sources that are appropriate/credible/authoritative for the project.
- Create work with a clear purpose.
- Cite sources and use a consistent format.
- Draw syntheses based upon sources (conclusions, analysis, judgement, evaluation, etc.).

Information Literacy Rubric for AI Courses (Developed from the ACRL Framework for Information Literacy for Higher Education)

	4	3	2	1
Student will use sources that are appropriate/credible/authoritative for the project	Work includes a variety of sources identifiable as appropriate/credible/ authoritative.	Work includes mostly appropriate/credible/ authoritative sources.	Work includes minimally appropriate/credible/ authoritative sources.	Work does not include sources.
Student will state the intended audience/purpose of their research	Audience/purpose is identified in an academic/ professional manner.	Audience/purpose is clearly identified.	Audience/purpose is minimally identified.	No audience/purpose.
Student will cite sources and use a consistent format	Citations are perfect and format is professionally done.	Citations are mostly done correctly, or format has few minor mistakes.	Citations are incorrectly done, or format has major errors.	No citations provided.
Student will draw syntheses based upon sources (conclusions, analysis, judgement, evaluation, etc.)	Synthesis is excellent and point toward new areas of research.	Synthesis is reasonable in relation to sources.	Synthesis is provided, but is not logical or related to sources.	Synthesis is not provided.

Civic Literacy

Signature assignments **should** ask students to do **one** of the following if it makes sense in the context of the course:
- Think critically about—and weigh evidence surrounding—issues important to local or national communities.
- Think critically about—and weigh evidence surrounding—issues in global or international context.

Civic Literacy Rubric—Evidence Domestic

	4	3	2	1
Students think critically about—and weigh evidence surrounding—issues important to local or national communities.	Work contains ample evidence pertaining to the issue, and the evidence is masterfully used to describe the issue or support a position.	Work contains sufficient evidence pertaining to the issue, and the evidence is well used to describe the issue or support a position.	Work has little evidence, or the evidence is not well suited to describe the issue or support a position.	Work does not contain evidence pertaining to the issue or supporting a position.

Civic Literacy Rubric—Evidence Global International

	4	3	2	1
Students think critically about—and weigh evidence surrounding—issues in global or international context.	Work contains ample evidence pertaining to the issue, and the evidence is masterfully used to describe the issue or support a position.	Work contains sufficient evidence pertaining to the issue, and the evidence is well used to describe the issue or support a position.	Work has little evidence, or the evidence is not well suited to describe the issue or support a position.	Work does not contain evidence pertaining to the issue or supporting a position.

Reflection

The reflection in student ePortfolios **should** address **one** of the following:
- Disciplinary and/or content connections between one course and other courses or other academic knowledge
- Links between coursework and its broader applicability outside of school

An ideal way to meet this requirement is to provide students a choice of reflection prompts—each of which address one of the bulleted items above.

Reflection Rubric for Cross-disciplinary/Content Connections

	4	3	2	1
Students make disciplinary and/or content connections between one course and other courses or other academic knowledge.	Reflection makes engaging, detailed, and/or sophisticated connections between two or more General Education courses, the assignments therein, or between a General Education course and another body of academic knowledge.	Reflection makes connections between two or more General Education courses, the assignments therein, or between a General Education course and another body of academic knowledge.	Reflection attempts to make connections to other courses or assignments, but they are not compelling, lack detail, and/or are unsophisticated.	Reflection is simplistic and/or contains no detail.

Reflection Rubric for Broader Applicability

	4	3	2	1
Students make links between coursework and its broader applicability outside of school.	Reflection makes engaging, detailed, and/or sophisticated links between coursework and its broader applicability outside of school.	Reflection makes connections between coursework and its broader applicability outside of school.	Reflection attempts to make links the world outside of school, but they are not compelling, lack detail, and/or are unsophisticated.	Reflection is simplistic and/or contains no detail.

Creative Expression

Signature assignments in PS courses do not need to address creative expression.

Computer Literacy

Signature assignments in PS courses do not need to address computer literacy.

Work w/Others Professionally/Constructively

Signature assignments in PS courses do not need to address working with others professionally and constructively. This learning outcome will not be addressed in the annual ePortfolio assessment of the General Education program. Instead, we will be working individually with faculty who have collaborative group assignments in their courses to embed grading rubrics for those assignments that indicate students can:

- Contribute to team meetings/activities
- Contribute to group projects outside of team meetings
- Foster constructive team climate