General Education Procedure	Procedure Number	2.2P
	Effective Date	May 2, 2014

1.0 PURPOSE

In accordance with Board of Trustees Policy 2.2., General Education the purpose of this procedure is to outline the parameters in which the President ensures expectations for the general education provided within the degree and certificate programs offered by LCCC is clearly articulated.

2.0 REVISION HISTORY

Adopted on: 5/2/14
Revised on: 4/27/17

3.0 PERSONS AFFECTED

Persons affected by this procedure are the Laramie County Community College Board of Trustees, Laramie County Community College President, and the Laramie County Community College Faculty, Staff and Students.

4.0 DEFINITIONS

A. *Competency* – The mechanism by which student learning is assessed. A competency is a specific, measurable statement of what a student knows or is able to do upon completion of a course or program of study.

B. *Institutional Competencies* – The overarching abilities that students develop throughout their educational experience at LCCC and are able to demonstrate as graduates.

C. *General Education* – A purposeful program of students educational activities that builds a mature understanding and appreciation of diverse cultures and the human condition, the mastering of multiple modes of inquiry, the ability to effectively analyze and communicate information, and the recognition of the importance of creativity fundamental to lifelong intellectual growth.

5.0 LCCC GENERAL EDUCATION/INSTITUTIONAL COMPETENCIES (See Appendix A)

At LCCC, the mechanism by which student learning outcomes are assessed is the competency. A competency is a specific, measurable statement of what students know or are able to do upon completion of a course or program of study. LCCC's general education curriculum program is derived from the College's general education/institutional competencies (herein after "institutional competencies"). Institutional competencies are the overarching skills that students develop throughout their educational experience at LCCC and are able to demonstrate upon graduation.

All graduates of LCCC's certificate and associate degree programs will have completed a robust curriculum that builds the competencies and abilities necessary for students to engage successfully as citizens in a globalized, competitive, and socially interconnected world, regardless of their chosen

career field. Therefore, LCCC has established a blueprint for academic success based on the following four general education outcomes that are incorporated throughout the curriculum.

A. Reasoning
   1) Quantitative reasoning – Students' ability to represent and interpret mathematical information and apply it to a task
   2) Scientific reasoning – Students' ability to observe, hypothesize, test, analyze, interpret and reflect on scientific phenomena
   3) Problem solving – Students' ability to analyze a task, apply tools, execute a plan, and reflect on its effectiveness
   4) Information literacy – Students' ability to access, evaluate, and synthesize appropriate resources for a project, and to use resources ethically

B. Effective Communication
   1) Written communication – Students' ability to effectively communicate in writing
   2) Verbal communication – Students' ability to effectively communicate verbally when giving presentations

C. Collaboration
   1) Students' ability to foster teamwork, consider needs of partners, and work toward a specific goal as part of a team

D. Human Culture
   1) Cultural Awareness – Students' ability to distinguish the complexity of cultural elements important to members of a culture
   2) Aesthetic analysis – Students' ability to analyze objective and subjective characteristics of art, music, performance art, literature, architecture, mass media, humanities and other forms of artistic expression

6.0 WYOMING STATUTORY REQUIREMENTS

Wyoming state law (W.S. 21-9-102) requires students in associate degree programs to successfully complete a course in the United States and/or Wyoming Constitutions prior to graduating. Coursework to fulfill this requirement is integrated into the general education of LCCC Associate of Arts, Associate of Science, and Associate of Applied Science degree programs. It is not required in Certificate of Completion programs.

7.0 GENERAL EDUCATION IN ASSOCIATE OF APPLIED SCIENCE AND CERTIFICATE OF COMPLETION PROGRAMS

In accordance with Board of Trustees Policy 2.1 Degrees and Certificates, LCCC offers Associate of Applied Science (AAS) and Certificate of Completion programs designed for occupational entry/advancement. These programs include a basic general education core aligned with the institutional competencies expected of all LCCC graduates. More specifically, this general education coursework requires credit completion in the following areas:

Basic General Education Requirements[1]		Institutional Competencies
Credits	**Course(s)**	
Seminar		
3	COLS 1000 Introduction to College Success: First-Year Seminar	Information Literacy Problem Solving Collaboration
Communication		
3	At least three credits of coursework in which students meet the Written Communication competencies	Effective Communication: Written Information Literacy
3	At least three credits of course work in which students meet the Verbal Communication competencies	Effective Communication: Verbal Collaboration
Quantitative Reasoning		
3	At least three credits of course work in which students meet the Quantitative Reasoning competencies	Quantitative Reasoning
WY Statutory Requirement[2]		
3	At least three credits from a course that satisfies the statutory requirement (POLS 1000; HIST 1211; HIST 1221; HIST 1251; ECON 1200; choice based on program requirements)	N/A (Required by State Law)
15 TOTAL CREDITS		

8.0 GENERAL EDUCATION IN ASSOCIATE OF ARTS/SCIENCE PROGRAMS

In accordance with Board of Trustees Policy 2.1 Degrees and Certificates, LCCC offers two degrees intended for transfer to a baccalaureate program at a four-year institution. These are the Associate of Arts (AA) and Associate of Science (AS) degree. These programs are built on a foundation of general education designed to develop the institutional and general education competencies expected of all LCCC graduates. This general education core typically comprises the first year of AA/AS degree programs and its coursework requires credit completion in the following areas:

General Education Core Requirements		Institutional Competencies
Credits	Course(s)	
Seminar		
3	COLS 1000 Introduction to College Success: First-Year Seminar	Information Literacy Problem Solving Collaboration

1 Certificate of Completion Programs must satisfy all of the institutional competencies identified in the LCCC Basic General Education Core either through the incorporation of specific courses approved as meeting those competencies or by integration of learning within applied coursework that satisfies the outcomes.

2 Not required for Certificate of Completion Programs.

Communication		
3	At least three credits of course work in which students meet the Written Communication competencies	Effective Communication: Written Information Literacy
3	At least three credits of course work in which students meet the Verbal Communication competencies	Effective Communication: Verbal Collaboration
WY Statutory Requirement		
3	At least three credits from a course that meets the statutory requirement (POLS 1000; HIST 1211; HIST 1221; HIST 1251; ECON 1200; choice based on program requirements)	N/A (Required by State Law)
Quantitative Reasoning		
3	At least three credits of course work in which students meet the Quantitative Reasoning competencies	Quantitative Reasoning
Science, Technology, Engineering, Mathematics (STEM)		
3-4	At least three credits from a course that includes a laboratory component and satisfies the Scientific Reasoning competencies	Scientific Reasoning
3	At least three credits of course work in which students meet two of the three competencies listed—Quantitative Reasoning, Scientific Reasoning, Problem Solving	Quantitative Reasoning Scientific Reasoning Problem Solving
Human Culture		
3	At least three credits from a course that satisfies the Cultural Awareness competencies	Cultural Awareness
3	At least three credits course work in which students meet the Aesthetic Analysis competencies.	Aesthetic Analysis
27-28 TOTAL CREDITS		

9.0 DESIGNATING COURSES SATISFYING INSTITUTIONAL COMPETENCIES

Under the direction of the Vice President of Academic Affairs, the Academic Standards Committee implements and maintains a process for approving new coursework and reviewing existing coursework to be designated as satisfying the institutional competencies. The Vice President shall be responsible for publishing a current list of all courses that satisfy an institutional competency, designating the competency/competencies with which each course is aligned.

DESIGNATING COMPLETION OF THE EXPANDED LCCC GENERAL EDUCATION CORE

For students seeking to transfer after completion of an Associate of Arts or Associate of Science degree, the completion of the LCCC general education core is a significant milestone towards the achievement of a baccalaureate degree. Completion represents an educational foundation intended to align with the general education requirements of partnering four-year institutions. Therefore, LCCC formally recognizes the completion of the General Education core with a transcript notation of General Education Core Complete upon completion of the requirements outlined in this procedure.

REQUIRED APPROVALS	NAME/SIGNATURE	DATE
Originator(s) Name(s)	José Fierro, Academic Affairs Vice President	2/25/14
Ratified by College Council	Co-chair Kari Brown-Herbst	5/2/14
Approved by President (Signature)		5/2/14

LCCC Competency-Based General Education Curriculum

The mission of Laramie County Community College is to transform our students' lives through the power of inspired learning.

Laramie County Community College (LCCC) prepares students to lead both practical and meaningful lives. We do this through well-designed academic programs aligned with professions and occupations, as well as through a purposeful focus on competency-based general education. All graduates of LCCC's certificate and associate degree programs will have completed a robust curriculum that builds the competencies and abilities necessary for students to engage successfully as citizens in a globalized, competitive, and socially interconnected world, regardless of their chosen vocation.

LCCC INSTITUTIONAL COMPETENCIES

LCCC general education curriculum is based on the following Institutional Competencies:

1. REASONING

A. Problem Solving

LCCC graduates will analyze a task, apply tools, execute a plan, and reflect on its effectiveness.

1) Task Analysis – Students analyze the parameters of a task including identification of the problem, setting goals, establishing a process, and recognizing limitations to solving the problem.
2) Application – Students apply cognitive and concrete instruments to accomplish tasks.
3) Execution – Students follow a process, redirect as necessary, and work systematically toward the goal.
4) Reflection – Students evaluate success, failures, and implications for future tasks.

B. Information Literacy

LCCC graduates will access, evaluate, and synthesize appropriate resources for a project, and use resources ethically.

1) Access – Students access information of suitable type and scope using appropriate tools.
2) Evaluation – Students evaluate sources for credibility (e.g., bias, reliability, validity) and relevance to topic.
3) Synthesis – Students combine their own understanding with information from sources, accurately reflecting the author's intent, to address the topic.
4) Ethical Use – Students use resources ethically (e.g., avoiding plagiarism, avoiding copyright infringement) and cite sources appropriately.

C. Quantitative Reasoning

LCCC graduates will represent and interpret mathematical information and apply it to a task.

1) Representation – Students demonstrate mastery of mathematical information in a variety of modes (e.g., symbolically, visually, numerically, and verbally).
2) Application – Students apply appropriate mathematical methods (e.g., numerical, analytical, graphical, and statistical) to solve a problem.
3) Interpretation – Students draw inferences through interpretation of mathematical models (e.g., formulas, graphs, tables, and diagrams).
4) Analysis – Students analyze answers for validity of mathematical processes and results.

D. Scientific Reasoning

LCCC graduates will observe, hypothesize, test, analyze, interpret and reflect on scientific phenomena.

1) Observation – Students observe and describe a phenomenon and form questions about their observations.
2) Hypothesis – Students hypothesize a reason and identify the variables for the phenomenon.
3) Experimentation – Students design and conduct an experiment to test a hypothesis and control for variables.
4) Analysis – Students analyze data obtained during experimentation.
5) Interpretation – Students interpret results to confirm or reject a hypothesis.
6) Reflection – Students reflect on an experiment to determine its implications and limitations.

2. EFFECTIVE COMMUNICATION

A. Written Communication

LCCC graduates will effectively communicate in writing.

1) Purpose – Students maintain intended purpose for a specific situation.
2) Audience – Students adapt language and style (e.g., creative, technical, scientific, etc.) for intended participants.
3) Content Development – Students state main idea(s) supported by evidence.
4) Organization – Students connect ideas in a unified manner using transitions.
5) Mechanics – Students employ correct grammar, punctuation, spelling, sentence structure, and syntax.
6) Format – Students meet assignment guidelines (e.g., formatting/citation requirements, submission guidelines, etc.).

B. Verbal Communication

LCCC graduates will effectively communicate verbally when giving presentations.

1) Purpose - Students maintain intended purpose for specific situation.
2) Audience – Students adapt presentation for intended participants (including topic relevance, language choice, and audience engagement techniques).
3) Content Development - Students develop main idea(s) supported by appropriate evidence.
4) Organization - Students connect ideas in a unified manner using transitions.
5) Delivery – Students enhance effectiveness of message, both verbally and nonverbally (e.g. eye contact, vocal variety, gestures, etc.)
6) Format – Students meet assignment guidelines (e.g., formatting/citation requirements, submission guidelines, etc.).

3. COLLABORATION

LCCC graduates will foster teamwork, consider needs of stakeholders, and work toward a specific goal as part of a team.

1) Contribution – Students work productively, meet deadlines, and incorporate feedback as needed in cooperation with team members.
2) Fostering Teamwork – Students actively listen and acknowledge group members' perspectives and respectfully articulate their own perspectives as they relate to the goal.
3) Community Perspective – Students make decisions by considering needs of identified partners.
4) Conflict Management – Students effectively resolve differences of opinion to maintain team productivity.

4. HUMAN CULTURE

A. Cultural Awareness

LCCC graduates will distinguish the complexity of cultural elements important to members of a culture.

1) Knowledge – Students recognize the complexity of elements important to members of other cultures in relation to its history, politics, and economy as well as values, beliefs, practices and communication styles.
2) Self-Awareness & Perceptions – Students articulate how cultural values influence behavior and attitudes in the self.
3) Adaptability – Students adapt to situations where cultural differences affect interactions.
4) Interaction – Students interact with others respectfully.

B. Aesthetic Analysis

LCCC graduates will analyze objective and subjective characteristics of art, music, performance art, literature, architecture, mass media, humanities and other forms of artistic expression.

1) Classification – Students identify characteristics of art forms that place them into a genre or period.
2) Context – Students recognize the influences of culture on art forms.
3) Subjective Reflection – Students articulate reasons for personal interpretations of art forms.

GENERAL EDUCATION CORE ASSESSMENT PLAN

LCCC will apply a rigorous approach to assessing student achievement of the LCCC Institutional Competencies. Common course assessments are being implemented across the curriculum and will be connected to Institutional Competencies for which the rubrics have been developed. These rubrics have been placed in the learning management system for use by instructors to collect institutional data.

Appendix A

LCCC Basic and General Education Core Curricula

GENERAL EDUCATION IN ASSOCIATE OF APPLIED SCIENCE AND CERTIFICATE OF COMPLETION PROGRAMS
LCCC offers Associate of Applied Science (AAS) and Certificate of Completion programs designed for occupational entry/advancement. These programs include a basic general education core aligned with the institutional competencies expected of all LCCC graduates. More specifically, this general education coursework requires credit completion in the following areas:

Basic General Education Requirements[3]		**Institutional Competencies**
Credits	**Course(s)**	
Seminar		
3	COLS 1000 Introduction to College Success: First-Year Seminar	Information Literacy Problem Solving Collaboration
Communication		
3	At least three credits of coursework in which students meet the Written Communication competencies	Effective Communication: Written Information Literacy
3	At least three credits of course work in which students meet the Verbal Communication competencies	Effective Communication: Verbal Collaboration
Quantitative Reasoning		
3	At least three credits of course work in which students meet the Quantitative Reasoning competencies	Quantitative Reasoning
WY Statutory Requirement[4]		
3	At least three credits from a course that satisfies the statutory requirement (POLS 1000; HIST 1211; HIST 1221; HIST 1251; ECON 1200; choice based on program requirements)	N/A (Required by State Law)

3 Certificate of Completion Programs must satisfy all of the institutional competencies identified in the LCCC Basic General Education Core either through the incorporation of specific courses approved as meeting those competencies or by integration of learning within applied coursework that satisfies the outcomes.

4 Not required for Certificate of Completion Programs.

15 TOTAL CREDITS

GENERAL EDUCATION IN ASSOCIATE OF ARTS/SCIENCE PROGRAMS

LCCC offers two degrees intended for transfer to a baccalaureate program at a four-year institution. These are the Associate of Arts (AA) and Associate of Science (AS) degree. These programs are built on a foundation of general education designed to develop the institutional and general education competencies expected of all LCCC graduates. This general education core typically comprises the first year of AA/AS degree programs and its coursework requires credit completion in the following areas:

General Education Core Requirements		**Institutional Competencies**
Credits	Course(s)	
Seminar		
3	COLS 1000 Introduction to College Success: First-Year Seminar	Information Literacy Problem Solving Collaboration
Communication		
3	At least three credits of course work in which students meet the Written Communication competencies	Effective Communication: Written Information Literacy
3	At least three credits of course work in which students meet the Verbal Communication competencies	Effective Communication: Verbal Collaboration
WY Statutory Requirement		
3	At least three credits from a course that meets the statutory requirement (POLS 1000; HIST 1211; HIST 1221; HIST 1251; ECON 1200; choice based on program requirements)	N/A (Required by State Law)
Quantitative Reasoning		
3	At least three credits of course work in which students meet the Quantitative Reasoning competencies	Quantitative Reasoning
Science, Technology, Engineering, Mathematics (STEM)		
3-4	At least three credits from a course that includes a laboratory component and satisfies the Scientific Reasoning competencies	Scientific Reasoning

3	At least three credits of course work in which students meet two of the three competencies listed—Quantitative Reasoning, Scientific Reasoning, Problem Solving	Quantitative Reasoning Scientific Reasoning Problem Solving
Human Culture		
3	At least three credits from a course that satisfies the Cultural Awareness competencies	Cultural Awareness
3	At least three credits course work in which students meet the Aesthetic Analysis competencies.	Aesthetic Analysis
27-28 TOTAL CREDITS		

Appendix B
LCCC Institutional and General Education Core Competencies Rubrics

Collaboration

Students' ability to foster teamwork, consider needs of partners, and work toward a specific goal as part of a team

Criteria	Proficient (able or skilled)	Developing (progressing)	Insufficient (incomplete or unsatisfactory evidence)
contribution works productively, meets deadlines, and incorporates feedback as needed in cooperation with team members	student positively impacts team productivity to meet deadlines and incorporates feedback effectively and efficiently	student meets deadlines and contributes to project and attempts to incorporate feedback	student does not meet deadlines, does not contribute to project and/or does not incorporate feedback
fostering teamwork actively listens and acknowledges group members' perspectives and respectfully articulates own perspectives as they relate to the goal	student actively listens to and acknowledges group members' perspectives and respectfully articulates own perspectives as they relate to the goal	student actively listens to group members' perspectives and articulates own perspectives as they relate to the goal	student does not actively listen and acknowledge group members and/or is unable to express perspectives with respect as they relate to the goal
community perspective makes decisions by considering needs of identified partners	student identifies and analyzes needs of partners and draws direct links from aspects of the project to identified needs	students' actions are linked to needs of identified partners	students actions are not linked to needs of identified partners
conflict management effectively resolves differences of opinion to maintain team productivity	student effectively promotes conflict resolution to maintain team productivity	student recognizes conflicts and makes efforts to resolve conflicts to maintain team productivity	student does not seek to resolve conflicts to maintain team productivity

Cultural Awareness

Students' ability to distinguish the complexity of cultural elements important to members of a culture

Criteria	Proficient (able or skilled)	Developing (progressing)	Insufficient (incomplete or unsatisfactory evidence)
knowledge recognizes the complexity of elements important to members of other cultures in relation to its history, politics, and economy as well as values, beliefs and practices and communication styles	student recognizes interconnectedness of elements that influence culture	student recognizes elements that influence culture	student does not recognize elements that influence culture
self-awareness & perceptions articulates how cultural values influence behavior and attitudes in the self	student articulates how cultural values affect his or her behaviors	student recognizes how cultural values influence his or her behaviors	student does not recognize how cultural values influence his or her behaviors
adaptability adapts to situations where cultural differences affect interactions	student adapts to situations where cultural differences affect interactions	student recognizes situations where cultural differences affect interactions	student does not recognize situations where cultural differences affect interactions
interaction interacts with others respectfully	student empathetically adjusts communication and behavior to others' cues	student is inconsistent in empathetically adjusting communication and behavior to others' cues	student does not empathetically adjust communication and behavior to others' cues

Effective Communication: Verbal Communication

Students' ability to effectively communicate orally when giving presentations

Criteria	Proficient (able or skilled)	Developing (progressing)	Insufficient (incomplete or unsatisfactory evidence)
purpose maintains intended purpose for specific situation	student maintains intended purpose for specific situation	student inconsistently maintains intended purpose for specific situation	student does not maintain intended purpose for specific situation
audience adapts presentation for intended participants (including topic relevance, language choice, and audience engagement techniques)	student adapts presentation for audience	student inconsistently adapts presentation for audience	student does not adapt presentation for audience
content development develops main idea(s) and supports with appropriate evidence	student develops main idea(s) and supports with appropriate evidence	student inadequately develops main idea(s) and/or inadequately supports ideas with appropriate evidence	student does not develop idea(s) and does not support with appropriate evidence
organization organizes ideas in a unified manner using transitions	student organizes ideas in a unified manner using transitions	student inconsistently organizes ideas using some transitions	student inadequately organizes ideas using few or no transitions
delivery enhances effectiveness of message, both verbally and nonverbally (e.g., eye contact, vocal variety, gestures, etc.)	student enhances message with effective verbal and nonverbal delivery	student inadequately enhances message with effective verbal and nonverbal delivery	student does not enhance message with effective verbal and nonverbal delivery
format meets assignment guidelines (e.g., formatting/citation requirements, delivery guidelines, etc.)	student applies appropriate format with few errors	student applies appropriate format with numerous errors	student does not apply appropriate format

Effective Communication: Written Communication

Students' ability to effectively communicate in writing

Criteria	Proficient (able or skilled)	Developing (progressing)	Insufficient (incomplete or unsatisfactory evidence)
purpose maintains intended purpose for specific situation	student maintains purpose clearly and consistently	student attempts to maintain purpose but is inconsistent	student does not maintain purpose or purpose cannot be determined
audience adapts language and style (e.g., creative, technical, scientific, etc.) for intended participants	student clearly adapts language and style for intended participants	student adapts language and/or style for intended participants	student does not adapt language and style for intended participants
content development states main idea supported by evidence	student states main idea clearly and supports it with relevant, accurate evidence	student states main idea but supporting evidence is inadequate	student inadequately states main idea; supporting evidence is missing and/or poorly connected to the main idea
organization connects ideas in a unified manner using transitions	student connects ideas in a unified manner using transitions	student attempts to connect ideas in a unified manner using transitions	student does not connect ideas in a unified manner using transitions
mechanics employs correct grammar, punctuation, spelling, sentence structure, and syntax	student has few errors, but they do not interfere with comprehension	student has numerous errors, but they do not interfere with comprehension	student has numerous errors that interfere with comprehension
format meets assignment guidelines (e.g., formatting/citation requirements, submission guidelines, etc.)	student applies appropriate format with few errors	student applies appropriate format with numerous errors	student does not apply appropriate format

Aesthetic Analysis

Students' ability to analyze objective and subjective characteristics of art, music, performance art, literature, architecture, mass media, humanities and other forms of artistic expression

Criteria	Proficient (able or skilled)	Developing (progressing)	Insufficient (incomplete or unsatisfactory evidence)
classification identifies characteristics of art forms that place them into a genre or period	student correctly differentiates art forms that classifies them as part of a genre and/or period	student identifies characteristics of art forms that classifies them as part of a genre and/or period	student does not identify art forms as part of a genre and/or period
context recognizes the influences of culture on art forms	student correctly differentiates influences of culture on art forms	student recognizes the influences of culture on art forms	student does not recognize the influences of culture on art forms
subjective reflection articulates reasons for personal interpretations of art forms	student thoroughly explains reasons for personal opinions about art forms	student formulates personal opinions about art forms	student does not formulate personal opinions about art forms

Reasoning: Information Literacy

Students' ability to access, evaluate, and synthesize appropriate resources for a project, and to use resources ethically

Criteria	Proficient (able or skilled)	Developing (progressing)	Insufficient (incomplete or unsatisfactory evidence)
access accesses information of suitable type and scope using appropriate tools	student accesses information of suitable type and scope using appropriate tools	student accesses information of questionable type and/or limited scope using some appropriate tools	student does not access information of suitable type and scope and does not use appropriate tools
evaluation evaluates sources for credibility (e.g., bias, reliability, validity) and relevance to topic	student comprehensively evaluates sources for credibility and relevance and includes only appropriate sources	student inconsistently evaluates sources for credibility and relevance and includes inappropriate sources	student does not evaluate sources for credibility and relevance and does not include appropriate sources
synthesis combines own understanding with information from sources, accurately reflecting the author's intent, to address the topic	student synthesizes information to address the topic	student synthesizes information inconsistently and/or does not fully address the topic	student does not synthesize information to address the topic
ethical use uses resources ethically (e.g., avoiding plagiarism, avoiding copyright infringement) and cites sources appropriately	student uses resources ethically and correctly cites sources	student inconsistently uses resources ethically and inconsistently cites sources	student does not use resources ethically and/or does not cite sources

Reasoning: Problem Solving

Students' ability to analyze a task, apply tools, execute a plan, and reflect on its effectiveness

Criteria	Proficient (able or skilled)	Developing (progressing)	Insufficient (incomplete or unsatisfactory evidence)
task analysis analyzes parameters of task: identifies the problem and sets goals, establishes a process, and recognizes limitations to solve the problem	student identifies the problem, analyzes the goal, steps to completion, and possible limitations of success	student attempts to identify the problem, analyze the goal, steps to completion, and possible limitations of success	student does not demonstrate problem identification, analysis of the goal, steps to completion, or possible limitations of success
application applies cognitive and concrete instruments to accomplish tasks	student uses appropriate tools to accomplish tasks	student attempts to use appropriate tools to accomplish tasks	student does not use appropriate tools to accomplish tasks
execution follows a process, redirect as necessary, and work systematically toward the goal	student methodically works toward goal; student evaluates steps and takes alternative actions as necessary	student attempts to work toward goal; student attempts to evaluate steps and take alternative actions as necessary	student does not work toward goal; student does not evaluate steps and take alternative actions as necessary
reflection evaluates successes, failures, and implications for future tasks	student evaluates the effectiveness of plan and considers implications for future tasks	student attempts to evaluate the effectiveness of plan and consider implications for future tasks	student does not evaluate the effectiveness of plan and consider implications for future tasks

Reasoning: Quantitative Reasoning

Students' ability to represent and interpret mathematical information and apply it to a task

Criteria	Proficient (able or skilled)	Developing (progressing)	Insufficient (incomplete or unsatisfactory evidence)
representation demonstrates mastery of mathematical information in a variety of modes (e.g., symbolically, visually, numerically, and verbally)	student demonstrates mastery of mathematical modes of representation	student inconsistently demonstrates mathematical modes of representation	student does not demonstrate mathematical modes of representation
application applies appropriate mathematical methods (e.g., numerical, analytical, graphical, and statistical) to solve a problem	student applies appropriate mathematical methods to solve problems	student inconsistently applies appropriate mathematical methods to solve problems	student does not apply appropriate mathematical methods to solve problems
interpretation draws inferences through interpretation of mathematical models (e.g., formulas, graphs, tables, and diagrams)	student draws inferences through interpretation of mathematical models	student inconsistently draws inferences through interpretation of mathematical models	student does not draw inferences through interpretation of mathematical models
analysis analyzes answers for validity of mathematical processes and results	student analyzes answers for validity of mathematical processes and results	student inconsistently analyzes answers for validity of mathematical processes and results	student does not analyze answers for validity of mathematical processes and results

Reasoning: Scientific Reasoning

Students' ability to observe, hypothesize, test, analyze, interpret and reflect on scientific phenomena

Criteria	Proficient (able or skilled)	Developing (progressing)	Insufficient (incomplete or unsatisfactory evidence)
observation observes and describes a phenomena and forms a question	student describes phenomena and forms a question	student, with guidance, describes phenomena and forms a question	student does not describe phenomena or form a question
hypothesis hypothesizes reasons and identifies the variables for the phenomena	student develops a hypothesis and identifies variables correctly	student, with guidance, develops a hypothesis and identifies variables	student does not develop a hypothesis or identify variables
experimentation designs and conducts an experiment to test the hypothesis and controls for variables	student designs and conducts an experiment including controls for key variables	student, with guidance, designs and conducts an experiment including controls for variables	student does not design and conduct an experiment and/or control for variables
analysis analyzes results	student analyzes results while accounting for key variables	student analyzes results	student does not analyze results
interpretation interprets results to confirm or reject the hypothesis	student interprets results to confirm or reject the hypothesis	student attempts to interpret results to confirm or reject the hypothesis	student does not interpret results to confirm or reject the hypothesis
reflection reflects on experiment to determine implications and limitations	student proposes modifications based on implications and limitations of the experiment	student recognizes implications and limitations of the experiment	student does not recognize implications or limitations of the experiment