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Objectives definitions

1a. Read Critically: The process of simultaneously extracting and constructing meaning through interaction and involvement with written language.

1b. Analyze Arguments and Information: The ability to know when there is a need for information, to be able to identify, locate, evaluate, and effectively and responsibly use and share that information for the problem at hand. Analyzing arguments requires breaking complex topics or issues into parts to gain a better understanding of them.

1c. Engage in Constructive Ideation: The capacity to combine or synthesize existing ideas, images, or expertise in original ways and the experience of thinking, reacting, and working in an imaginative way characterized by a high degree of innovation, divergent thinking, and risk taking.

2a. Communicate Effectively in Writing: The development and expression of ideas in writing. It involves learning to work in many genres and styles. It can involve working with many different writing technologies, and mixing texts, data, and images. Written communication abilities develop through iterative experiences across the curriculum.

2b. Communicate Orally: A prepared, purposeful presentation designed to increase knowledge, to foster understanding, or to promote change in the listeners' attitudes, values, beliefs, or behaviors.

2c. Communicate through Creative Expression: Effectively applies artistic concepts and processes to clearly communicate meaning.

3a. Work Collaboratively and Independently: Behaviors under the control of individual team members (effort they put into team tasks, their manner of interacting with others on team, and the quantity and quality of contributions they make to team discussions.)

3b. Work Across a Variety of Cultural Contexts and a Spectrum of Differences: Students will become informed, open-minded, and responsible people who are attentive to diversity across the spectrum of differences, 2) seek to understand how their actions affect both local and global communities, and 3) address the world's most pressing and enduring issues collaboratively and equitably. This set of cognitive, affective, and behavioral skills and characteristics support effective and appropriate interaction in a variety of cultural contexts.

4. Critically Evaluate the Ethical Implications of What They Say and Do: Reasoning about right and wrong human conduct. It requires students to be able to assess their own ethical values and the social context of problems, recognize ethical issues in a variety of settings, think about how different ethical perspectives might be applied to ethical dilemmas and consider the ramifications of alternative actions. Students' ethical self-identity evolves as they practice ethical decision-making skills and learn how to describe and analyze positions on ethical issues.

5a. Reason Quantitatively: Also known as Numeracy or Quantitative Reasoning (QR) – is a "habit of mind," competency, and comfort in working with numerical data. Individuals with strong QR skills possess the ability to reason and solve quantitative problems from a wide array of authentic contexts and everyday life situations. They understand and can create sophisticated arguments supported by quantitative evidence and they can clearly communicate those arguments in a variety of formats (using words, tables, graphs, mathematical equations, etc., as appropriate).

5b. Reason Computationally: Computational reasoning is a problem solving methodology that can be automated and transferred and applied across subjects and is often implemented with a computer. Students employing computational reasoning use a set of concepts, such as abstraction, recursion, and iteration, to process and analyze data, and to create real and virtual artifacts.

5c. Reason Scientifically: Encompasses the reasoning and problem-solving skills involved in generating, testing and revising hypotheses or theories, and in the case of fully developed skills, reflecting on the process of knowledge acquisition and change that results from such inquiry activities. Science, as a cultural institution, represents a "hallmark intellectual achievement of the human species" and these achievements are driven by both individual reasoning and collaborative cognition.

UD Gen Ed Goal #1a: Read Critically

Adapted from: AAC&U Reading VALUE Rubric

Definition

Reading is "the process of simultaneously extracting and constructing meaning through interaction and involvement with written language" (Snow et al., 2002). (From www.rand.org/pubs/research_briefs/RB8024/index1.html)

Framing Language

To paraphrase Phaedrus, texts do not explain, nor answer questions about, themselves. They must be located, approached, decoded, comprehended, analyzed, interpreted, and discussed, especially complex academic texts used in college and university classrooms for purposes of learning. Historically, college professors have not considered the teaching of reading necessary other than as a "basic skill" in which students may require "remediation." They have assumed that students come with the ability to read and have placed responsibility for its absence on teachers in elementary and secondary schools.

This absence of reading instruction in higher education must, can, and will change, and this rubric marks a direction for this change. Why the change? Even the strongest, most experienced readers making the transition from high school to college have not learned what they need to know and do to make sense of texts in the context of professional and academic scholarship--to say nothing about readers who are either not as strong or as experienced. Also, readers mature and develop their repertoire of reading performances naturally during the undergraduate years and beyond as a consequence of meeting textual challenges. This rubric provides some initial steps toward finding ways to measure undergraduate students' progress along the continuum. Our intention in creating this rubric is to support and promote the teaching of undergraduates as readers to take on increasingly higher levels of concerns with texts and to read as one of "those who comprehend."

Readers, as they move beyond their undergraduate experiences, should be motivated to approach texts and respond to them with a reflective level of curiosity and the ability to apply aspects of the texts they approach to a variety of aspects in their lives. This rubric provides the framework for evaluating both students' developing relationship to texts and their relative success with the range of texts their coursework introduces them to. It is likely that users of this rubric will detect that the cell boundaries are permeable, and the criteria of the rubric are, to a degree, interrelated.

Glossary

- Analysis: The process of recognizing and using features of a text to build a more advanced understanding of the meaning of a text. (Might include evaluation of genre, language, tone, stated purpose, explicit or implicit logic (including flaws of reasoning), and historical context as they contribute to the meaning of a text.)
- Comprehension: The extent to which a reader "gets" the text, both literally and figuratively. Accomplished and sophisticated readers will have moved from being able to "get" the meaning that the language of the text provides to being able to "get" the implications of the text, the questions it raises, and the counterarguments one might suggest in response to it. A helpful and accessible discussion of 'comprehension' is found in Chapter 2 of the RAND report, Reading for Understanding: www.rand.org/pubs/monograph_reports/MR1465/MR1465.ch2.pdf.
- Epistemological lens: The knowledge framework a reader develops in a specific discipline as s/ he moves through an academic major (e.g., essays, textbook chapters, literary works, journal articles, lab reports, grant proposals, lectures, blogs, webpages, or literature reviews, for example). The depth and breadth of this knowledge provides the foundation for independent and self-regulated responses to the range of texts in any discipline or field that students will encounter.
- Genre: A particular kind of "text" defined by a set of disciplinary conventions or agreements learned through participation in academic discourse. Genre governs what texts can be about, how they are structured, what to expect from them, what can be done with them, how to use them
- Interpretation: Determining or construing the meaning of a text or part of a text in a particular way based on textual and contextual information.
- Interpretive Strategies: Purposeful approaches from different perspectives, which include, for example, asking clarifying questions, building knowledge of the context in which a text was written, visualizing and considering counterfactuals (asking questions that challenge the assumptions or claims of the text, e.g., What might our country be like if the Civil War had not happened? How would Hamlet be different if Hamlet had simply killed the King?).
- Multiple Perspectives: Consideration of how text-based meanings might differ depending on point of view.
- Parts: Titles, headings, meaning of vocabulary from context, structure of the text, important ideas and relationships among those ideas.
- Relationship to text: The set of expectations and intentions a reader brings to a particular text or set of texts.
- Searches intentionally for relationships: An active and highly-aware quality of thinking closely related to inquiry and research.
- Takes texts apart: Discerns the level of importance or abstraction of textual elements and sees big and small pieces as parts of the whole meaning (compare to Analysis above).
- Metacognition: This is not a word that appears explicitly anywhere in the rubric, but it is implicit in a number of the descriptors, and is certainly a term that we find frequently in discussions of successful and rich learning. Metacognition, (a term typically attributed to the cognitive psychologist J.H. Flavell) applied to reading refers to the awareness, deliberateness, and reflexivity defining the activities and strategies that readers must control in order to work their ways effectively through different sorts of texts, from lab reports to sonnets, from math texts to historical narratives, or from grant applications to graphic novels, for example. Metacognition refers here as well to an accomplished reader's ability to consider the ethos reflected in any such text; to know that one is present and should be considered in any use of, or response to a text.

UD Gen Ed Goal #1a: Read Critically Rubric

	Capstone 4	**Milestones** 3	 2	**Benchmark** 1
Comprehension	Recognizes possible implications of the text for contexts, perspectives, or issues beyond the assigned task within the classroom or beyond the author's explicit message (e.g., might recognize broader issues at play, or might pose challenges to the author's message and presentation).			Apprehends vocabulary appropriately to paraphrase or summarize the information the text communicates.
Genres	Uses ability to identify texts within and across genres, monitoring and adjusting reading strategies and expectations based on generic nuances of particular texts.			Applies tacit genre knowledge to a variety of classroom reading assignments in productive, if unreflective, ways.
Relationship to Text *Making meanings with texts in their contexts*	Evaluates texts for scholarly significance and relevance within and across the various disciplines, evaluating them according to their contributions and consequences.			Approaches texts in the context of assignments with the intention and expectation of finding right answers and learning facts and concepts to display for credit.
Analysis *Interacting with texts in parts and as wholes*	Evaluates strategies for relating ideas, text structure, or other textual features in order to build knowledge or insight within and across texts and disciplines.			Identifies aspects of a text (e.g., content, structure, or relations among ideas) as needed to respond to questions posed in assigned tasks.
Interpretation *Making sense with texts as blueprints for meaning*	Provides evidence not only that s/he can read by using an appropriate epistemological lens but that s/he can also engage in reading as part of a continuing dialogue within and beyond a discipline or a community of readers.			Can identify purpose(s) for reading, relying on an external authority such as an instructor for clarification of the task.
Reader's Voice *Participating in academic discourse about texts*	Discusses texts with an independent intellectual and ethical disposition so as to further or maintain disciplinary conversations.			Comments about texts in ways that preserve the author's meanings and link them to the assignment.

UD Gen Ed Goal #1b: Analyze Arguments and Information

Adapted from AAC&U Critical Thinking VALUE Rubric, Inquiry & Analysis VALUE Rubric, and Information Literacy VALUE Rubric

Definition

The ability to know when there is a need for information, to be able to identify, locate, evaluate, and effectively and responsibly use and share that information for the problem at hand. - Adopted from the National Forum on Information Literacy. Analyzing arguments is a critical thinking skill and a habit of mind characterized by the comprehensive exploration of issues, ideas, artifacts, and events before accepting or formulating an opinion or conclusion. This process of inquiry is systematic and requires students to explore issues, objects or works through the collection and analysis of evidence that results in informed conclusions or judgments. Analysis is the process of breaking complex topics or issues into parts to gain a better understanding of them.

Framing Language

This rubric is designed to be transdisciplinary, reflecting the recognition that success in all disciplines requires habits of inquiry and analysis that share common attributes. Further, research suggests that successful critical thinkers from all disciplines increasingly need to be able to apply those habits in various and changing situations encountered in all walks of life.

This rubric is designed for use with many different types of assignments and the suggestions here are not an exhaustive list of possibilities. Critical thinking can be demonstrated in assignments that require students to complete analyses of text, data, or issues. Assignments that cut across presentation mode might be especially useful in some fields. If insight into the process components of critical thinking (e.g., how information sources were evaluated regardless of whether they were included in the product) is important, assignments focused on student reflection might be especially illuminating. The rubric language assumes that the inquiry and analysis process carried out by the student is appropriate for the discipline required. For example, if analysis using statistical methods is appropriate for the discipline then a student would be expected to use an appropriate statistical methodology for that analysis. If a student does not use a discipline-appropriate process for any criterion, that work should receive a performance rating of "1" or "0" for that criterion.

In addition, this rubric addresses the **products** of analysis and inquiry, not the **processes** themselves. The complexity of inquiry and analysis tasks is determined in part by how much information or guidance is provided to a student and how much the student constructs. The more the student constructs, the more complex the inquiry process. For this reason, while the rubric can be used if the assignments or purposes for work are unknown, it will work most effectively when those are known. Finally, faculty are encouraged to adapt the essence and language of each rubric criterion to the disciplinary or interdisciplinary context to which it is applied.

Glossary

- Limitations: Critique of the process or evidence.
- Implications: How inquiry results apply to a larger context or the real world.

UD Gen Ed Goal #1b: Analyze Arguments and Information Rubric

	Capstone 4	**Milestones** 3	 2	**Benchmark** 1
Determine the Extent of Information Needed	Effectively defines the scope of the research question or thesis. Effectively determines key concepts. Types of information (sources) selected directly relate to concepts or answer research question.			Has difficulty defining the scope of the research question or thesis. Has difficulty determining key concepts. Types of information (sources) selected do not relate to concepts or answer research question.
Access the Needed Information	Accesses information using effective, well-designed search strategies and most appropriate information sources.			Accesses information randomly, retrieves information that lacks relevance and quality.
Evidence *Selecting and using 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. Viewpoints of experts are questioned thoroughly.			Information is taken from source(s) without any interpretation/evaluation. Viewpoints of experts are taken as fact, without question.
Evaluate Information and its Sources Critically*	Chooses a variety of information sources appropriate to the scope and discipline of the research question. Selects sources after considering the importance (to the researched topic) of the multiple criteria used (such as relevance to the research question, currency, authority, audience, and bias or point of view).			Chooses a few information sources. Selects sources using limited criteria (such as relevance to the research question).
Analysis	Thoroughly (systematically and methodically) analyzes own and others' assumptions and carefully evaluates the relevance of contexts when presenting a position.			Shows an emerging awareness of present assumptions (sometimes labels assertions as assumptions). Begins to identify some contexts when presenting a position.
Limitations and Implications	Insightfully discusses in detail relevant and supported limitations and implications taking into account the complexities of an issue. Limits of position are acknowledged. Others' points of view are synthesized within position (perspective, thesis/hypothesis).			Presents limitations and implications, but they are possibly irrelevant and unsupported.

UD Gen Ed Goal #1c: Engage in Constructive Ideation

Adapted from AAC&U Creative Thinking VALUE Rubric

Definition

Creative thinking is both the capacity to combine or synthesize existing ideas, images, or expertise in original ways and the experience of thinking, reacting, and working in an imaginative way characterized by a high degree of innovation, divergent thinking, and risk taking.

Framing Language

Creative thinking, as it is fostered within higher education, must be distinguished from less focused types of creativity such as, for example, the creativity exhibited by a small child's drawing, which stems not from an understanding of connections, but from an ignorance of boundaries. Creative thinking in higher education can only be expressed productively within a particular domain. The student must have a strong foundation in the strategies and skills of the domain in order to make connections and synthesize. While demonstrating solid knowledge of the domain's parameters, the creative thinker, at the highest levels of performance, pushes beyond those boundaries in new, unique, or atypical recombinations, uncovering or critically perceiving new syntheses and using or recognizing creative risk-taking to achieve a solution.

The Creative Thinking VALUE Rubric is intended to help faculty assess creative thinking in a broad range of transdisciplinary or interdisciplinary work samples or collections of work. The rubric is made up of a set of attributes that are common to creative thinking across disciplines. Examples of work samples or collections of work that could be assessed for creative thinking may include research papers, lab reports, musical compositions, a mathematical equation that solves a problem, a prototype design, a reflective piece about the final product of an assignment, or other academic works. The work samples or collections of work may be completed by an individual student or a group of students.

Glossary

- Exemplar: A model or pattern to be copied or imitated (quoted from http://dictionary.reference.com/browse/exemplar).
- Domain: Field of study or activity and a sphere of knowledge and influence.

UD Gen Ed Goal #1c: Engage in Constructive Ideation Rubric

	Capstone	**Milestones**		**Benchmark**
	4	3	2	1
Acquiring Competencies *This step refers to acquiring strategies and skills within a particular domain.*	Reflect: Evaluates creative process and product using domain-appropriate criteria.			Model: Successfully reproduces an appropriate exemplar.
Taking Risks *May include personal risk (fear of embarrassment or rejection) or risk of failure in successfully completing assignment, i.e. going beyond original parameters of assignment, introducing new materials and forms, tackling controversial topics, advocating unpopular ideas or solutions.*	Actively seeks out and follows through on untested and potentially risky directions or approaches to the assignment in the final product.			Stays strictly within the guidelines of the assignment.
Solving Problems	Not only develops a logical, consistent plan to solve problem, but recognizes consequences of solution and can articulate reason for choosing solution.			Only a single approach is considered and is used to solve the problem.
Embracing Contradictions	Integrates alternate, divergent, or contradictory perspectives or ideas fully.			Acknowledges (mentions in passing) alternate, divergent, or contradictory perspectives or ideas.
Innovative Thinking *Novelty or uniqueness (of idea, claim, question, form, etc.)*	Extends a novel or unique idea, question, format, or product to create new knowledge or knowledge that crosses boundaries.			Reformulates a collection of available ideas.
Connecting, Synthesizing, Transforming	Transforms ideas or solutions into entirely new forms.			Recognizes existing connections among ideas or solutions.

UD Gen Ed Goal #2a: Communicate Effectively in Writing

Adapted from AAC&U Written Communication VALUE Rubric

Definition

Written communication is the development and expression of ideas in writing. Written communication involves learning to work in many genres and styles. It can involve working with many different writing technologies, and mixing texts, data, and images. Written communication abilities develop through iterative experiences across the curriculum.

Framing Language

This writing rubric is designed for use in a wide variety of educational institutions. The most clear finding to emerge from decades of research on writing assessment is that the best writing assessments are locally determined and sensitive to local context and mission. Users of this rubric should, in the end, consider making adaptations and additions that clearly link the language of the rubric to individual campus contexts.

This rubric focuses assessment on how specific written work samples or collections of work respond to specific contexts. The central question guiding the rubric is "How well does writing respond to the needs of audience(s) for the work?" In focusing on this question the rubric does not attend to other aspects of writing that are equally important: issues of writing process, writing strategies, writers' fluency with different modes of textual production or publication, or writer's growing engagement with writing and disciplinarity through the process of writing.

E valuators using this rubric must have information about the assignments or purposes for writing guiding writers' work. Also recommended is including reflective work samples of collections of work that address such questions as: What decisions did the writer make about audience, purpose, and genre as s/ he compiled the work in the portfolio? How are those choices evident in the writing -- in the content, organization and structure, reasoning, evidence, mechanical and surface conventions, and citational systems used in the writing? This will enable evaluators to have a clear sense of how writers understand the assignments and take it into consideration as they evaluate

The first section of this rubric addresses the context and purpose for writing. A work sample or collections of work can convey the context and purpose for the writing tasks it showcases by including the writing assignments associated with work samples. But writers may also convey the context and purpose for their writing within the texts. It is important for faculty and institutions to include directions for students about how they should represent their writing contexts and purposes.

Faculty interested in the research on writing assessment that has guided our work here can consult the National Council of Teachers of English/ Council of Writing Program Administrators' White Paper on Writing Assessment (2008; www.wpacouncil.org/whitepaper) and the Conference on College Composition and Communication's Writing Assessment: A Position Statement (2008; www.ncte.org/cccc/resources/positions/writingassessment)

Glossary

- Content Development: The ways in which the text explores and represents its topic in relation to its audience and purpose.
- Context of and purpose for writing: The context of writing is the situation surrounding a text: Who is reading it? Who is writing it? Under what circumstances will the text be shared or circulated? What social or political factors might affect how the text is composed or interpreted? The purpose for writing is the writer's intended effect on an audience. Writers might want to persuade or inform; they might want to report or summarize information; they might want to work through complexity or confusion; they might want to argue with other writers, or connect with other writers; they might want to convey urgency or amuse; they might write for themselves or for an assignment or to remember.
- Disciplinary conventions: Formal and informal rules that constitute what is seen generally as appropriate within different academic fields, e.g. introductory strategies, use of passive voice or first person point of view, expectations for thesis or hypothesis, expectations for kinds of evidence and support that are appropriate to the task at hand, use of primary and secondary sources to provide evidence and support arguments and to document critical perspectives on the topic. Writers will incorporate sources according to disciplinary and genre conventions, according to the writer's purpose for the text. Through increasingly sophisticated use of sources, writers develop an ability to differentiate between their own ideas and the ideas of others, credit and build upon work already accomplished in the field or issue they are addressing, and provide meaningful examples to readers.
- Evidence: Source material that is used to extend, in purposeful ways, writers' ideas in a text.
- Genre conventions: Formal and informal rules for particular kinds of texts and/ or media that guide formatting, organization, and stylistic choices, e.g. lab reports, academic papers, poetry, webpages, or personal essays.
- Sources: Texts (written, oral, behavioral, visual, or other) that writers draw on as they work for a variety of purposes -- to extend, argue with, develop, define, or shape their ideas, for example.

UD Gen Ed Goal #2a: Communicate Effectively in Writing Rubric

	Capstone 4	**Milestones** 3	 2	**Benchmark** 1
Context of and Purpose for Writing *Includes considerations of audience, purpose, and the circumstances surrounding the writing task(s).*	Demonstrates a thorough understanding of context, audience, and purpose that is responsive to the assigned task(s) and focuses all elements of the work.			Demonstrates minimal attention to context, audience, purpose, and to the assigned tasks(s) (e.g., expectation of instructor or self as audience).
Content Development	Uses appropriate, relevant, and compelling content to illustrate mastery of the subject, conveying the writer's understanding, and shaping the whole work.			Uses appropriate and relevant content to develop simple ideas in some parts of the work.
Genre and Disciplinary Conventions *Formal and informal rules inherent in the expectations for writing in particular forms and/or academic fields (please see glossary).*	Demonstrates detailed attention to and successful execution of a wide range of conventions particular to a specific discipline and/or writing task (s) including organization, content, presentation, formatting, and stylistic choices			Attempts to use a consistent system for basic organization and presentation.
Sources and Evidence	Demonstrates skillful use of high- quality, credible, relevant sources to develop ideas that are appropriate for the discipline and genre of the writing			Demonstrates an attempt to use sources to support ideas in the writing.
Control of Syntax and Mechanics	Uses graceful language that skillfully communicates meaning to readers with clarity and fluency, and is virtually error- free.			Uses language that sometimes impedes meaning because of errors in usage.

UD Gen Ed Goal #2b: Communicate Orally

Adapted from AAC&U Oral Communication VALUE Rubric

Definition

Oral communication is a prepared, purposeful presentation designed to increase knowledge, to foster understanding, or to promote change in the listeners' attitudes, values, beliefs, or behaviors.

Framing Language

Oral communication takes many forms. This rubric is specifically designed to evaluate oral presentations of a single speaker at a time and is best applied to live or video-recorded presentations. For panel presentations or group presentations, it is recommended that each speaker be evaluated separately. This rubric best applies to presentations of sufficient length such that a central message is conveyed, supported by one or more forms of supporting materials and includes a purposeful organization. An oral answer to a single question not designed to be structured into a presentation does not readily apply to this rubric.

Glossary

- Central message: The main point/ thesis/ "bottom line"/ "take-away" of a presentation. A clear central message is easy to identify; a compelling central message is also vivid and memorable.
- Delivery techniques: Posture, gestures, eye contact, and use of the voice. Delivery techniques enhance the effectiveness of the presentation when the speaker stands and moves with authority, looks more often at the audience than at his/ her speaking materials/ notes, uses the voice expressively, and uses few vocal fillers ("um," "uh," "like," "you know," etc.).
- Language: Vocabulary, terminology, and sentence structure. Language that supports the effectiveness of a presentation is appropriate to the topic and audience, grammatical, clear, and free from bias. Language that enhances the effectiveness of a presentation is also vivid, imaginative, and expressive.
- Organization: The grouping and sequencing of ideas and supporting material in a presentation. An organizational pattern that supports the effectiveness of a presentation typically includes an introduction, one or more identifiable sections in the body of the speech, and a conclusion. An organizational pattern that enhances the effectiveness of the presentation reflects a purposeful choice among possible alternatives, such as a chronological pattern, a problem-solution pattern, an analysis-of-parts pattern, etc., that makes the content of the presentation easier to follow and more likely to accomplish its purpose.
- Supporting material: Explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities, and other kinds of information or analysis that supports the principal ideas of the presentation. Supporting material is generally credible when it is relevant and derived from reliable and appropriate sources. Supporting material is highly credible when it is also vivid and varied across the types listed above (e.g., a mix of examples, statistics, and references to authorities). Supporting material may also serve the purpose of establishing the speaker's credibility. For example, in presenting a creative work such as a dramatic reading of Shakespeare, supporting evidence may not advance the ideas of Shakespeare, but rather serve to establish the speaker as a credible Shakespearean actor.

UD Gen Ed Goal #2b: Communicate Orally Rubric

	Capstone 4	Milestones 3	 2	Benchmark 1
Organization	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is clearly and consistently observable and is skillful and makes the content of the presentation cohesive.			Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is not observable within the presentation.
Language	Language choices are imaginative, memorable, and compelling, and enhance the effectiveness of the presentation. Language in presentation is appropriate to audience.			Language choices are unclear and minimally support the effectiveness of the presentation. Language in presentation is not appropriate to audience.
Delivery	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation compelling, and speaker appears polished and confident.			Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) detract from the understandability of the presentation, and speaker appears uncomfortable.
Supporting Material	A variety of types of supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make appropriate reference to information or analysis that significantly supports the presentation or establishes the presenter's credibility/authority on the topic.			Insufficient supporting materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make reference to information or analysis that minimally supports the presentation or establishes the presenter's credibility/ authority on the topic.
Central Message	Central message is compelling (precisely stated, appropriately repeated, memorable, and strongly supported.)			Central message can be deduced, but is not explicitly stated in the presentation.

UD Gen Ed Goal #2c: Communicate through Creative Expression

Adapted from Bismarck State College Rubric for the Assessment of Communication

Definition

Constructive ideation is both the capacity to combine or synthesize existing ideas, images, or expertise in original ways and the experience of thinking, reacting, and working in an imaginative way characterized by a high degree of innovation, divergent thinking, and risk taking.

UD Gen Ed Goal #2c: Communicate through Creative Expression Rubric

	Capstone 4	**Milestones** 3	 2	**Benchmark** 1
Acquiring Competencies *This step refers to acquiring strategies and skills within a particular domain.*	Reflect: Evaluates creative process and product using domain-appropriate criteria.			Model: Successfully reproduces an appropriate exemplar.
Taking Risks *May include personal risk (fear of embarrassment or rejection) or risk of failure in successfully completing assignment, i.e. going beyond original parameters of assignment, introducing new materials and forms, tackling controversial topics, advocating unpopular ideas or solutions.*	Actively seeks out and follows through on untested and potentially risky directions or approaches to the assignment in the final product.			Stays strictly within the guidelines of the assignment.
Solving Problems	Not only develops a logical, consistent plan to solve problem, but recognizes consequences of solution and can articulate reason for choosing solution.			Only a single approach is considered and is used to solve the problem.
Embracing Contradictions	Integrates alternate, divergent, or contradictory perspectives or ideas fully.			Acknowledges (mentions in passing) alternate, divergent, or contradictory perspectives or ideas.
Innovative Thinking *Novelty or uniqueness (of idea, claim, question, form, etc.)*	Extends a novel or unique idea, question, format, or product to create new knowledge or knowledge that crosses boundaries.			Reformulates a collection of available ideas.
Connecting, Synthesizing, Transforming	Transforms ideas or solutions into entirely new forms.			Recognizes existing connections among ideas or solutions.

UD Gen Ed Goal #3a: Work Collaboratively and Independently

Adapted from AAC&U Teamwork VALUE Rubric

Definition

Teamwork is behaviors under the control of individual team members (effort they put into team tasks, their manner of interacting with others on team, and the quantity and quality of contributions they make to team discussions.)

Framing Language

Students participate on many different teams, in many different settings. For example, a given student may work on separate teams to complete a lab assignment, give an oral presentation, or complete a community service project. Furthermore, the people the student works with are likely to be different in each of these different teams. As a result, it is assumed that a work sample or collection of work that demonstrates a student's teamwork skills could include a diverse range of inputs. This rubric is designed to function across all of these different settings.

Two characteristics define the ways in which this rubric is to be used. First, the rubric is meant to assess the teamwork of an individual student, not the team as a whole. Therefore, it is possible for a student to receive high ratings, even if the team as a whole is rather flawed. Similarly, a student could receive low ratings, even if the team as a whole works fairly well. Second, this rubric is designed to measure the quality of a **process**, rather than the quality of an **end product**. As a result, work samples or collections of work will need to include some evidence of the individual's interactions within the team. The final product of the team's work (e.g., a written lab report) is insufficient, as it does not provide insight into the functioning of the team.

It is recommended that work samples or collections of work for this outcome come from one (or more) of the following three sources: (1) students' own reflections about their contribution to a team's functioning; (2) evaluation or feedback from fellow team members about students' contribution to the team's functioning; or (3) the evaluation of an outside observer regarding students' contributions to a team's functioning. These three sources differ considerably in the resource demands they place on an institution. It is recommended that institutions using this rubric consider carefully the resources they are able to allocate to the assessment of teamwork and choose a means of compiling work samples or collections of work that best suits their priorities, needs, and abilities.

UD Gen Ed Goal #3a: Work Collaboratively and Independently Rubric

	Capstone 4	**Milestones** 3	 2	**Benchmark** 1
Contributes to Team Meetings	Helps the team move forward by articulating the merits of alternative ideas or proposals.			Shares ideas but does not advance the work of the group.
Facilitates the Contributions of Team Members	Engages team members in ways that facilitate their contributions to meetings by both constructively building upon or synthesizing the contributions of others as well as noticing when someone is not participating and inviting them to engage.			Engages team members by taking turns and listening to others without interrupting.
Individual Contributions Outside of Team Meetings	Completes all assigned tasks by deadline; work accomplished is thorough, comprehensive, and advances the project. Proactively helps other team members complete their assigned tasks to a similar level of excellence.			Completes all assigned tasks by deadline.
Fosters Constructive Team Climate	Supports a constructive team climate by doing all of the following: Treats team members respectfully by being polite and constructive in communication. Uses positive vocal or written tone, facial expressions, and/or body language to convey a positive attitude about the team and its work. Motivates teammates by expressing confidence about the importance of the task and the team's ability to accomplish it. Provides assistance and/or encouragement to team members.			Supports a constructive team climate by doing any one of the following: Treats team members respectfully by being polite and constructive in communication. Uses positive vocal or written tone, facial expressions, and/or body language to convey a positive attitude about the team and its work. Motivates teammates by expressing confidence about the importance of the task and the team's ability to accomplish it. Provides assistance and/or encouragement to team members.
Responds to Conflict	Addresses destructive conflict directly and constructively, helping to manage/resolve it in a way that strengthens overall team cohesiveness and future effectiveness.			Passively accepts alternate viewpoints/ideas/opinions.

UD Gen Ed Goal #3b: Working Across a Variety of Cultural Contexts and a Spectrum of Differences

Adapted from AAC&U Global Learning VALUE Rubric combined with Intercultural Knowledge and Competence VALUE Rubric

Definition

Global learning is a critical analysis of and an engagement with complex, interdependent global systems and legacies (such as natural, physical, social, cultural, economic, and political) and their implications for people's lives and the earth's sustainability. Through global learning, students should 1) become informed, open-minded, and responsible people who are attentive to diversity across the spectrum of differences, 2) seek to understand how their actions affect both local and global communities, and 3) address the world's most pressing and enduring issues collaboratively and equitably. Intercultural Knowledge and Competence is "a set of cognitive, affective, and behavioral skills and characteristics that support effective and appropriate interaction in a variety of cultural contexts." (Bennett, J. M. 2008. Transformative training: Designing programs for culture learning. In *Contemporary leadership and intercultural competence: Understanding and utilizing cultural diversity to build successful organizations*, ed. A. Moodian, 95-110. Thousand Oaks, CA: Sage.)

Framing Language

Effective and transformative global learning offers students meaningful opportunities to analyze and explore complex global challenges, collaborate respectfully with diverse others, apply learning to take responsible action in contemporary global contexts, and evaluate the goals, methods, and consequences of that action. Global learning should enhance students' sense of identity, community, ethics, and perspective- taking. Global learning is based on the principle that the world is a collection of interdependent yet inequitable systems and that higher education has a vital role in expanding knowledge of human and natural systems, privilege and stratification, and sustainability and development to foster individuals' ability to advance equity and justice at home and abroad. The call to integrate intercultural knowledge and competence into the heart of education is an imperative born of seeing ourselves as members of a world community, knowing that we share the future with others. Beyond mere exposure to culturally different others, the campus community requires the capacity to: meaningfully engage those others, place social justice in historical and political context, and put culture at the core of transformative learning. The intercultural knowledge and competence rubric suggests a systematic way to measure our capacity to identify our own cultural patterns, compare and contrast them with others, and adapt empathically and flexibly to unfamiliar ways of being

We encourage users of the Global Learning Rubric to also consult three other closely related VALUE Rubrics: Civic Engagement, Intercultural Knowledge and Competence, and Ethical Reasoning.

Glossary

- Global Self-Awareness: in the context of global learning, the continuum through which students develop a mature, integrated identity with a systemic understanding of the interrelationships among the self, local and global communities, and the natural and physical world.
- Perspective Taking: the ability to engage and learn from perspectives and experiences different from one's own and to understand how one's place in the world both informs and limits one's knowledge. The goal is to develop the capacity to understand the interrelationships between multiple perspectives, such as personal, social, cultural, disciplinary, environmental, local, and global.
- Cultural Diversity: the ability to recognize the origins and influences of one's own cultural heritage along with its limitations in providing all that one needs to know in the world. This includes the curiosity to learn respectfully about the cultural diversity of other people and on an individual level to traverse cultural boundaries to bridge differences and collaboratively reach common goals. On a systems level, the important skill of comparatively analyzing how cultures can be marked and assigned a place within power structures that determine hierarchies, inequalities, and opportunities and which can vary over time and place. This can include, but is not limited to, understanding race, ethnicity, gender, nationhood, religion, and class.
- Personal and Social Responsibility: the ability to recognize one's responsibilities to society--locally, nationally, and globally--and to develop a perspective on ethical and power relations both across the globe and within individual societies. This requires developing competence in ethical and moral reasoning and action.
- Working across a variety of cultural contexts requires a critical analysis of and an engagement with the knowledge and values shared by a group. If students obtain this competency they should 1) become informed, open-minded, and responsible people who are attentive to diversity across the spectrum of differences, 2) seek to understand how their actions affect both local and global communities, and 3) address the world's most pressing and enduring issues collaboratively and equitably.

UD Gen Ed Goal #3b: Working Across a Variety of Cultural Contexts and a Spectrum of Differences Rubric

	Capstone 4	**Milestones** 3	 2	**Benchmark** 1
Self-Awareness	Effectively addresses significant issues in the natural and human world based on articulating one's identity in a global context. Articulates insights into own cultural rules and biases (e.g. seeking complexity; aware of how her/his experiences have shaped these rules, and how to recognize and respond to cultural biases, resulting in a shift in self-description.)			Identifies some connections between an individual's personal decision-making and certain local and global issues.
Perspective Taking	Evaluates and applies diverse perspectives to complex subjects within natural and human systems in the face of multiple and even conflicting positions (i.e. cultural, disciplinary, and ethical.)			Identifies multiple perspectives while maintaining a value preference for own positioning (such as cultural, disciplinary, and ethical).
Cultural Diversity	Adapts and applies a deep understanding of multiple worldviews, experiences, and power structures while initiating meaningful interaction with other cultures to address significant global problems.			Describes the experiences of others historically or in contemporary contexts primarily through one cultural perspective, demonstrating some openness to varied cultures and worldviews.
Personal and Social Responsibility demonstrating empathy	Takes informed and responsible action to address ethical, social, and environmental challenges in global systems and evaluates the local and broader consequences of individual and collective interventions. Interprets intercultural experience from the perspectives of own and more than one worldview and demonstrates ability to act in a supportive manner that recognizes the feelings of another cultural group.			Identifies basic ethical dimensions of some local or national decisions that have global impact.
Attitudes *Curiosity and Openness*	Asks complex questions about other cultures, seeks out and articulates answers to these questions that reflect multiple cultural perspectives. Initiates and develops interactions with culturally different others. Suspends judgment in valuing her/his interactions with culturally different others.			May states minimal interest in learning more about other cultures but somewhat receptive to interacting with culturally different others. Has difficulty suspending any judgment in her/his interactions with culturally different others, but is unaware of own judgment.
Production	Persuasively demonstrates accomplished skill level in the effective application of a variety of techniques. Effectively applies artistic concepts and processes to clearly communicate meaning.			Demonstrates minimal skill in the application of techniques. Unable to apply artistic concepts and processes.
Perception	Effectively analyzes the artistic work and its overall impact in elaborate detail, referring to the aesthetics and design principles that contribute to the ideas communicated. Effectively describes personal preferences for an artistic work/style, providing extensive rationale based on elements of visual art and personal experiences.			Unable to describe the artistic work or its emotional impact; lacks references to aesthetics or design principles. Unable to clearly state personal preferences for an artistic work/style; reference to the elements of visual art or personal experiences are inappropriate or lacking.
Application	Effectively explains in detail how the arts are a part of everyday life and society. Effectively explains how the skills learned can be used in vocational, cultural, or recreational opportunities.			Minimally ability to explain how the arts are a part of everyday life or society. Little to no connections to applications in vocational, cultural, or recreational opportunities.
Central Message	Central message is compelling (precisely stated, appropriately repeated, memorable, and strongly supported.)			Central message can be deduced, but is not explicitly identifiable in the work representation.

UD Gen Ed Goal #4: Critically Evaluate the Ethical Implications of What They Say and Do

Adapted from AAC&U Ethical Reasoning VALUE Rubric

Definition

Ethical Reasoning is reasoning about right and wrong human conduct. It requires students to be able to assess their own ethical values and the social context of problems, recognize ethical issues in a variety of settings, think about how different ethical perspectives might be applied to ethical dilemmas and consider the ramifications of alternative actions. Students' ethical self-identity evolves as they practice ethical decision-making skills and learn how to describe and analyze positions on ethical issues.

Framing Language

This rubric is intended to help faculty evaluate work samples and collections of work that demonstrate student learning about ethics. Although the goal of a liberal education should be to help students turn what they've learned in the classroom into action, pragmatically it would be difficult, if not impossible, to judge whether or not students would act ethically when faced with real ethical situations. What can be evaluated using a rubric is whether students have the intellectual tools to make ethical choices.

The rubric focuses on five elements: Ethical Self Awareness, Ethical Issue Recognition, Understanding Different Ethical Perspectives/ Concepts, Application of Ethical Principles, and Evaluation of Different Ethical Perspectives/ Concepts. Students' Ethical Self Identity evolves as they practice ethical decision-making skills and learn how to describe and analyze positions on ethical issues. Presumably, they will choose ethical actions when faced with ethical issues.

Glossary

- Core Beliefs: Those fundamental principles that consciously or unconsciously influence one's ethical conduct and ethical thinking. Even when unacknowledged, core beliefs shape one's responses. Core beliefs can reflect one's environment, religion, culture or training. A person may or may not choose to act on their core beliefs.
- Ethical Perspectives/ concepts: The different theoretical means through which ethical issues are analyzed, such as ethical theories (e.g., utilitarian, natural law, virtue) or ethical concepts (e.g., rights, justice, duty).
- Complex, multi-layered (gray) context: The sub-parts or situational conditions of a scenario that bring two or more ethical dilemmas (issues) into the mix/ problem/ context/ for student's identification.
- Cross-relationships among the issues: Obvious or subtle connections between/ among the sub-parts or situational conditions of the issues present in a scenario (e.g., relationship of production of corn as part of climate change issue).

UD Gen Ed Goal #4: Critically Evaluate the Ethical Implications of What They Say and Do Rubric

	Capstone 4	**Milestones** 3	 2	**Benchmark** 1
Ethical Self-Awareness	Student discusses in detail/analyzes both core beliefs and the origins of the core beliefs and discussion has greater depth and clarity.			Student states either their core beliefs or articulates the origins of the core beliefs but not both.
Understanding Different Ethical Perspectives/Concepts	Student names the theory or theories, can present the gist of said theory or theories, and accurately explains the details of the theory or theories used.			Student only names the major theory she/he uses.
Ethical Issue Recognition	Student can recognize ethical issues when presented in a complex, multilayered (gray) context AND can recognize cross- relationships among the issues.			Student can recognize basic and obvious ethical issues but fails to grasp complexity or interrelationships.
Application of Ethical Perspectives/Concepts	Student can independently apply ethical perspectives/ concepts to an ethical question, accurately, and is able to consider full implications of the application.			Student can apply ethical perspectives/concepts to an ethical question with support (using examples, in a class, in a group, or a fixed-choice setting) but is unable to apply ethical perspectives/concepts independently (to a new example.).
Evaluation of Different Ethical Perspectives/Concepts	Student states a position and can state the objections to, assumptions and implications of and can reasonably defend against the objections to, assumptions and implications of different ethical perspectives/concepts, and the student's defense is adequate and effective.			Student states a position but cannot state the objections to and assumptions and limitations of the different perspectives/concepts.

UD Gen Ed Goal #5a: Reason Quantitatively

Adapted from AAC&U Quantitative Literacy VALUE Rubric

Definition

Quantitative Literacy (QL) – also known as Numeracy or Quantitative Reasoning (QR) – is a "habit of mind," competency, and comfort in working with numerical data. Individuals with strong QL skills possess the ability to reason and solve quantitative problems from a wide array of authentic contexts and everyday life situations. They understand and can create sophisticated arguments supported by quantitative evidence and they can clearly communicate those arguments in a variety of formats (using words, tables, graphs, mathematical equations, etc., as appropriate).

Quantitative Literacy Across the Disciplines

Current trends in general education reform demonstrate that faculty are recognizing the steadily growing importance of Quantitative Literacy (QL) in an increasingly quantitative and data-dense world. AAC&U's recent survey showed that concerns about QL skills are shared by employers, who recognize that many of today's students will need a wide range of high level quantitative skills to complete their work responsibilities.

Virtually all of today's students, regardless of career choice, will need basic QL skills such as the ability to draw information from charts, graphs, and geometric figures, and the ability to accurately complete straightforward estimations and calculations.

Preliminary efforts to find student work products which demonstrate QL skills proved a challenge in this rubric creation process. It's possible to find pages of mathematical problems, but what those problem sets don't demonstrate is whether the student was able to think about and understand the meaning of her work. It's possible to find research papers that include quantitative information, but those papers often don't provide evidence that allows the evaluator to see how much of the thinking was done by the original source (often carefully cited in the paper) and how much was done by the student herself, or whether conclusions drawn from analysis of the source material are even accurate.

Given widespread agreement about the importance of QL, it becomes incumbent on faculty to develop new kinds of assignments which give students substantive, contextualized experience in using such skills as analyzing quantitative information, representing quantitative information in appropriate forms, completing calculations to answer meaningful questions, making judgments based on quantitative data and communicating the results of that work for various purposes and audiences. As students gain experience with those skills, faculty must develop assignments that require students to create work products which reveal their thought processes and demonstrate the range of their QL skills.

This rubric provides for faculty a definition for QL and a rubric describing four levels of QL achievement which might be observed in work products within work samples or collections of work. Members of AAC&U's rubric development team for QL hope that these materials will aid in the assessment of QL – but, equally important, we hope that they will help institutions and individuals in the effort to more thoroughly embed QL across the curriculum of colleges and universities.

Framing Language

This rubric has been designed for the evaluation of work that addresses quantitative literacy (QL) in a substantive way. QL is not just computation, not just the citing of someone else's data. QL is a habit of mind, a way of thinking about the world that relies on data and on the mathematical analysis of data to make connections and draw conclusions. Teaching QL requires us to design assignments that address authentic, data-based problems. Such assignments may call for the traditional written paper, but we can imagine other alternatives: a video of a PowerPoint presentation, perhaps, or a well-designed series of web pages. In any case, a successful demonstration of QL will place the mathematical work in the context of a full and robust discussion of the underlying issues addressed by the assignment.

Finally, QL skills can be applied to a wide array of problems of varying difficulty, confounding the use of this rubric. For example, the same student might demonstrate high levels of QL achievement when working on a simplistic problem and low levels of QL achievement when working on a very complex problem. Thus, to accurately assess a students' QL achievement it may be necessary to measure QL achievement within the context of problem complexity, much as is done in diving competitions where two scores are given, one for the difficulty of the dive, and the other for the skill in accomplishing the dive. In this context, that would mean giving one score for the complexity of the problem and another score for the QL achievement in solving the problem.

UD Gen Ed Goal #5a: Reason Quantitatively Rubric

	Capstone 4	**Milestones** 3	 2	**Benchmark** 1
Interpretation *Ability to explain information presented in mathematical forms (e.g., equations, graphs, diagrams, tables, words)*	Provides accurate explanations of information presented in mathematical forms. Makes appropriate inferences based on that information. *For example, accurately explains the trend data shown in a graph and makes reasonable predictions regarding what the data suggest about future events.*			Attempts to explain information presented in mathematical forms, but draws incorrect conclusions about what the information means. *For example, attempts to explain the trend data shown in a graph, but will frequently misinterpret the nature of that trend, perhaps by confusing positive and negative trends.*
Representation *Ability to convert relevant information into various mathematical forms (e.g., equations, graphs, diagrams, tables, words)*	Skillfully converts relevant information into an insightful mathematical portrayal in a way that contributes to a further or deeper understanding.			Completes conversion of information but resulting mathematical portrayal is inappropriate or inaccurate.
Calculation	Calculations attempted are essentially all successful and sufficiently comprehensive to solve the problem. Calculations are also presented elegantly (clearly, concisely, etc.)			Calculations are attempted but are both unsuccessful and are not comprehensive.
Application / Analysis *Ability to make judgments and draw appropriate conclusions based on the quantitative analysis of data, while recognizing the limits of this analysis*	Uses the quantitative analysis of data as the basis for deep and thoughtful judgments, drawing insightful, carefully qualified conclusions from this work.			Uses the quantitative analysis of data as the basis for tentative, basic judgments, although is hesitant or uncertain about drawing conclusions from this work.
Assumptions *Ability to make and evaluate important assumptions in estimation, modeling, and data analysis*	Explicitly describes assumptions and provides compelling rationale for why each assumption is appropriate. Shows awareness that confidence in final conclusions is limited by the accuracy of the assumptions.			Attempts to describe assumptions.
Communication *Expressing quantitative evidence in support of the argument or purpose of the work (in terms of what evidence is used and how it is formatted, presented, and contextualized)*	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.			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.)

UD Gen Ed Goal #5b: Reason Computationally

Created by University of Delaware Computer & Information Science faculty

Definition

Computational reasoning2 is a problem solving methodology that can be automated and transferred and applied across subjects and is often implemented with a computer. Students employing computational reasoning use a set of concepts, such as abstraction, recursion, and iteration, to process and analyze data, and to create real and virtual artifacts. (Adapted from Barr & Stephenson, 2011. http://csta.acm.org/Curriculum/sub/CurrFiles/BarrStephensonInroadsArticle.pdf)

Framing Language

Although much of the recent and current interest in computational reasoning originates with computer scientists, it is critical to remember that computational thinking is regularly employed by scholars and students as its components are embedded in and intrinsic to many different disciplines.

UD Gen Ed Goal #5b: Reason Computationally Rubric

	Capstone	**Milestones**		**Benchmark**
	4	3	2	1
Problem Decomposition *Break down tasks into smaller, manageable parts*	Identifies a large-scale problem. Breaks the problem into smaller manageable parts. Identifies variables to the problem and omits extraneous variables. Determines which variables are **controllable** and which are determined by outside factors.			Identifies a large-scale problem but fails to break the problem into parts that are manageable. Identifies limited variables to the problem and may include extraneous variables. Fails to identify which of the variables are controllable or determined by outside factors.
Abstraction *Reduce complexity to define main idea*	Identifies characteristics of a problem to reduce to its essential characteristics. Finds similarities and disregards unimportant differences in processes or objects. Reduces a data set to a simplified representation (model).			Creates models that include unnecessary characteristics and maybe missing essential characteristics. Fails to find similarities and often focuses on unimportant differences in processes or object. Fails to create a simplified representation (model) of a dataset.
Algorithms *Series of ordered steps taken to solve a problem or achieve some goal*	Develops a sequence of steps or instructions to accomplish a task or solve a problem. Refines an algorithm based on testing under different scenarios (inputs) for correctness and efficiency.			Fails to devise a logical sequence of ordered steps or instructions to solve the problem/task. May have omitted the testing to refine the correctness and efficiency of an algorithm.
Automation *Enable computers or machines to perform repetitive or tedious tasks*	Identifies opportunities for and benefits of automation; Uses automated tools to perform mundane tasks. Can articulate the pros and cons of automation in society. Creates an artifact that involves automation (e.g., a program, machine, model of a machine)			Fails to identify when a task can benefit from automation. Identifies mundane tasks, but is not able to use tools for their automation. Fails to express clearly the pros and cons that automation brings to society. Working artifact may have incorrect automation.
Simulation *Representation or model of a process. Also involves running experiments using models*	Creates a simulation of a process using software, animation, people, objects, spreadsheet or other appropriate medium.			Fails to create a simulated version of a process or uses inappropriate tools.

[2] Throughout the literature this concept is referred to as "computational thinking." UD's GenEd objectives use the phrase "computational reasoning" so the term is parallel with other similar GenEd objectives (quantitative reasoning and scientific reasoning).

UD Gen Ed Goal #5c: Reason Scientifically

Adapted from AAC&U Problem Solving VALUE Rubric

Definition

Problem solving is the process of designing, evaluating and implementing a strategy to answer an open-ended question or achieve a desired goal.

Framing Language

Problem-solving covers a wide range of activities that may vary significantly across disciplines. Activities that encompass problem-solving by students may involve problems that range from well-defined to ambiguous in a simulated or laboratory context, or in real-world settings. This rubric distills the common elements of most problem-solving contexts and is designed to function across all disciplines. It is broad-based enough to allow for individual differences among learners, yet is concise and descriptive in its scope to determine how well students have maximized their respective abilities to practice thinking through problems in order to reach solutions.

This rubric is designed to measure the quality of a **process**, rather than the quality of an **end-product**. As a result, work samples or collections of work will need to include some evidence of the individual's thinking about a problem-solving task (e.g., reflections on the process from problem to proposed solution; steps in a problem-based learning assignment; record of think-aloud protocol while solving a problem). The final product of an assignment that required problem resolution is insufficient without insight into the student's problem-solving process. Because the focus is on institutional level assessment, scoring team projects, such as those developed in capstone courses may be appropriate as well.

Glossary

- Contextual Factors: Constraints (such as limits on cost), resources, attitudes (such as biases) and desired additional knowledge which affect how the problem can be best solved in the real world or simulated setting.
- Critique: Involves analysis and synthesis of a full range of perspectives.
- Feasible: Workable, in consideration of time-frame, functionality, available resources, necessary buy-in, and limits of the assignment or task.
- "Off the shelf" solution: A simplistic option that is familiar from everyday experience but not tailored to the problem at hand (e.g. holding a bake sale to "save" an underfunded public library).
- Solution: An appropriate response to a challenge or a problem.
- Strategy: A plan of action or an approach designed to arrive at a solution. (If the problem is a river that needs to be crossed, there could be a construction-oriented, cooperative (build a bridge with your community) approach and a personally oriented, physical (swim across alone) approach. An approach that partially applies would be a personal, physical approach for someone who doesn't know how to swim.
- Support: Specific rationale, evidence, etc. for solution or selection of solution.

UD Gen Ed Goal #5c: Reason Scientifically Rubric

	Capstone 4	**Milestones** 3	 2	**Benchmark** 1
Define Problem	Demonstrates the ability to construct a clear and insightful problem statement with evidence of all relevant contextual factors.			Demonstrates a limited ability in identifying a problem statement or related contextual factors.
Identify Strategies	Identifies multiple approaches for solving the problem that apply within a specific context.			Identifies one or more approaches for solving the problem that do not apply within a specific context.
Propose Solutions/Hypotheses	Proposes one or more solutions/hypotheses that indicates a deep comprehension of the problem. Solution/hypotheses are sensitive to contextual factors as well as all of the following: ethical, logical, and cultural dimensions of the problem.			Proposes a solution/hypothesis that is difficult to evaluate because it is vague or only indirectly addresses the problem statement.
Evaluate Potential Solutions	E valuation of solutions is deep and elegant (for example, contains thorough and insightful explanation) and includes, deeply and thoroughly, all of the following: considers history of problem, reviews logic/reasoning, examines feasibility of solution, and weighs impacts of solution.			E valuation of solutions is superficial (for example, contains cursory, surface level explanation) and includes the following: considers history of problem, reviews logic/reasoning, examines feasibility of solution, and weighs impacts of solution.
Implement Solution	Implements the solution in a manner that addresses thoroughly and deeply multiple contextual factors of the problem.			Implements the solution in a manner that does not directly address the problem statement.
Evaluate Outcomes	Reviews results relative to the problem defined with thorough, specific considerations of need for further work.			Reviews results superficially in terms of the problem defined with no consideration of need for further work

Faculty Senate General Education Resolutions

November 2014 Resolution

WHEREAS, the University of Delaware exists to cultivate learning, develop knowledge, and foster the free exchange of ideas, and
WHEREAS, a robust program of general education is an essential component of the cultivation of learning, the development of knowledge, and the fostering of a free exchange of ideas, and
WHEREAS, the overarching goal of general education at the University of Delaware is to set students along the path of possessing the characteristics of one who is both broadly and deeply educated, and
WHEREAS, in our April 2011 self-study prepared for the Middle States Commission on Higher Education, we noted that the current undergraduate general education goals, requirements, and assessment activities are under review with an eye toward streamlining the list of goals and taking action steps between now and 2015 to establish a coherent and integrative program of undergraduate education and university requirements, and
WHEREAS, this review has proceeded and culminated in the recommendations below, therefore, be it

RESOLVED, that the Faculty Senate adopts the following statement of purposes for the University of Delaware's general education program:
We seek to prepare students who are:

• Engaged citizens, involved in the world around them, and who understand the major challenges and debates of the day;
• Aware of their intellectual strengths and interests and of their ethical values and commitments;
• Capable of interpreting the arts and culture of contemporary and past societies; and
• Equipped with the essential skills necessary to thrive in a rapidly evolving world including the ability to be a lifelong learner, creator, and innovator.
and be it further

RESOLVED, that to meet these purposes, the Faculty Senate adopts for all students the five objectives of general education set forth as follows:
General education at the University of Delaware prepares students who are able to:

(1) Read critically, analyze arguments and information, and engage in constructive ideation.
(2) Communicate effectively in writing, orally, and through creative expression.
(3) Work collaboratively and independently within and across a variety of cultural contexts and a spectrum of differences.
(4) Critically evaluate the ethical implications of what they say and do.
(5) Reason quantitatively, computationally, and scientifically. and be it further

RESOLVED, that to implement these objectives, the General Education Committee of the Faculty Senate will by 1 April 2015 submit an implementation plan aligned with the UD General Education Objectives; and be it further
RESOLVED, that the General Education Committee will develop an assessment plan whereby the University of Delaware can track student progress toward meeting the UD General Education Objectives; and be it further
RESOLVED, that an open hearing will be held during the early part of the spring semester of 2015 to receive campus input regarding these plans.

November 2014 Addendum

Resolution on General Education
Addendum – Explanatory Paragraphs

Engaged citizens, involved in the world around them, and who understand the major challenges and debates of the day.
Higher education is not solely a private investment in one's future, but a public good that inculcates citizens with the knowledge, skills, and values necessary to participate effectively in political culture. An educated citizenry is essential to a functioning democracy, a responsive and accountable government, a vibrant marketplace of ideas, thriving communities, global awareness, and to the solution of urgent social problems. The general education program can foster students' capacity for civic engagement in at least three ways. First, the intellectual competence that is fostered by general education–critical thinking, ethical reasoning, historical and cross-cultural perspective, breadth of knowledge, multicultural awareness–enables students to evaluate policy options and make reasoned judgments about complex and diverse challenges such as inequality, climate change, education, health care, infrastructure, and international instability. Second, courses in the curriculum provide knowledge of fundamental concepts that inform active citizenship, including the structure and institutions of government and societies, political theory, economics, constitutionalism and the rule of law, and United States and world history, politics, and culture. Third, experiences beyond the classroom can familiarize students with pressing issues of the day, provide experience with participatory democracy, encourage public service, and create an awareness of the real-world impact of laws and public policies. These experiences may include service learning, field experience, volunteer work, participation in the governance and decision-making of student organizations, involvement with political campaigns and organizations, and attendance at public lectures on current events and controversies. Our graduates should leave the University of Delaware with the ability and desire to vote, serve on juries, engage in civic discourse and collective action, and participate meaningfully in the public life of their communities.

Aware of their intellectual strengths and interests and of their ethical values and commitments.
Students identify intellectual passions that they can pursue over the course of their lives. They see themselves as both formed by and contributing to the cultures of which they are part. They are able to articulate the reasons behind the positions they hold on key ethical questions and to explain the values and commitments that drive their work and thought. While self-awareness is a perpetual process, UD graduates must have acquired enough maturity, perspective, and insight to provide strong footing during post-academic pursuits. What they are passionate about, what they value, what they are good at, (and not so good at), and how they are unique are understandings that will serve to propel them forward. An awareness of how they have connected and can continue to connect their minds with their hearts and then with their hands are essential for a potential of life-long success and happiness. It helps them identify intellectual passions that they can pursue over the course of their lives, recognizing the values and commitments that drive their work and thought. While they will not have achieved their fullest potential upon graduation from UD, they should graduate with an understanding of their potential and with aspirations to fulfill this potential.

Aware of and capable of interpreting the arts and culture of modern and past societies,
A well-rounded individual has the ability to appreciate the arts and culture of modern and past societies and the fact that arts and culture often are connected to the perennial issues that have characterized human experience and shaped contemporary culture and debates. Understanding how themes such as justice, conflict, and the nature of good and evil have been represented in philosophy, literature, drama, and the visual arts exposes students to different modes of intellectual inquiry and aesthetic expression, as well as scholarly approaches to critically analyzing those perspectives. Historical and cross-cultural inquiry emphasizes the contingent nature of present conditions, introduces customs and beliefs different from one's own, and provides alternatives for imagining how society should be organized. Students should understand that their identities, experiences, and values are rooted in cultural traditions, but that those traditions are not universal; sensitivity to and appreciation of cultural difference and change over time and place is essential to living in a global society.

Equipped with the essential skills necessary to thrive in a rapidly evolving world including the ability to be a lifelong learner, creator, and innovator.
While the knowledge students gain in their disciplines through courses required for their majors will prepare them specifically, general education at UD needs to prepare students broadly for a world in motion. They must have the capacity to be successful in communities that are remarkably both interconnected and dynamic. This constant variability requires leaders and citizens who can creatively and critically adapt with a conscience, understanding that their actions affect the lives of those around them. At the same rate that contemporary science and technology and the

political, economic, and cultural arenas change; so too must graduates be able to change. It is essential that UD graduates can acquire new skills and knowledge and be innovative while understanding the corresponding, often complex, ethical and social implications.

Objective #1: General education prepares students who are able to read critically, analyze arguments and information, and engage in constructive ideation.
Critical reading skills are essential for acquisition of knowledge and advancing understanding. Students need to contextualize written content and respond to it effectively, differentiating their own contemporary and culturally influenced values from those expressed by another. They must be able to analyze and critically evaluate information presented and the arguments that have been constructed. Arguments may pose challenges to the values and beliefs of the student, requiring the student to reflect on their own attitudes and presumptions about our civilization or about the natural world, or perhaps about their place as an individual. Following careful reflection and synthesis, students should be prepared to engage in constructive ideation, building new ideas and concepts, and contributing to the solution of previously unsolved problems.

Objective #2: General education prepares students who are able to communicate effectively in writing, orally, and through creative expression.
Effective written and oral communication skills are essential components of learning and critical thinking. They are necessary for personal growth, meaningful social interaction, and participation in civic debate and in the modern workplace. These skills allow individuals to foster comprehension of complex or competing ideas, organize and disseminate knowledge, and persuade others to reconsider their attitudes, beliefs, and behaviors. The development of written and oral communication skills equips graduates to communicate effectively to general and specialized audiences, employing multiple genres and different technologies, including text, voice, data, and images. A student with these skills will understand how to advance a credible argument using logical reasoning and the use of evidence; how to write and speak with clarity and grace; how to account for different audiences and contexts; and how to employ the standard conventions of writing. Similarly, it is essential that students recognize and are able to communicate in a variety of media that go beyond the written and spoken word. These include forms of artistic and emerging forms of expression enabled by technology.

Objective #3: General education prepares students who are able to work collaboratively and independently within and across a variety of cultural contexts and a spectrum of differences.
An understanding, appreciation, and assimilation of common and diverse perspectives facilitates social, cultural, technical, and economic progress. The general education program herein establishes a foundation for appreciating what each individual brings and what diversity brings to modern society. The definition of culture is intentionally broad and encompasses an international perspective derived from various peoples and cultures, a social and economic perspective that may be derived from individuals from different segments of a society, a discipline-based perspective obtained through experience or study, and others. The development of skills to work independently and collaboratively within a culture ensures that graduates have a well-established foundation of basic knowledge and awareness and can communicate and work with others of similar background. A student with these skills will build upon their own knowledge, perspective, and experiences to communicate and work effectively with those of similar background providing an important base for interactions with individuals from different backgrounds. The development of skills to work independently and collaboratively across cultures ensures that graduates will understand the limitations of a single perspective and the value of diverse perspectives and cultures in creative problem solving of major challenges and discussion in debates, and establishment of an engaged society. A student with these skills will learn from diverse perspectives, assimilate this knowledge, and synthesize new solutions and ways of thinking.

Objective#4: General education prepares students who are able to critically evaluate the ethical implications of what they say and do.
Students see themselves as members of communities. As such, they consider the potential effects of their words and actions upon other people. In their speech and writing, they strive for mutual understanding. In their work as professionals, they aim to serve a larger community. They are responsive to the views and needs of others, and they acknowledge the strengths of differing perspectives. They understand their own positions as partial and fallible. They seek not simply to provide technical solutions to clearly defined problems, but to situate their work in broader historical and social contexts, to question assumptions, and to pose and consider alternatives.

Objective #5: General education prepares students who are able to reason quantitatively, computationally, and scientifically.
The ever-increasing growth of scientific knowledge and the subsequent application of that knowledge has been a principle driver for change in modern society, impacting individuals and societies worldwide. The general education program proposed here prepares students to thrive in a rapidly changing scientifically and technologically driven world by equipping them to reason

using the principal tools of science and by introducing them to the central concepts of science that form the basis for modern reasoning about the physical and biological world. The development of quantitative reasoning skills equips graduates to understand and interpret quantitative information presented in multiple forms and given in multiple contexts. A student with these skills will understand data, the visual presentation of data, the statistical analysis of data, as well as essential concepts such as exponential growth and the law of large numbers. Computational thinking synthesizes these skills with the ability to analyze and logically organize data with modeling and simulations, the ability to think in abstractions, in terms of decomposition, evaluations, and generalizations. The development of scientific reasoning skills equips graduates to understand the evaluation of evidence in modern science. A student with these skills will understand the scientific method, inductive and deductive thinking, causal reasoning, and how to evaluate the evidence for and against a scientific hypothesis or theory.

May 2015 Resolution

WHEREAS, the faculty of the University of Delaware have affirmed the importance of a robust program of general education through their unanimous support of the November 3, 2014 "Resolution on General Education," and
WHEREAS, the Task Force on General Education has recommended a review of all degree programs to ensure all students attain competency in all five Objectives of General Education, and
WHEREAS, the new Objectives of General Education differ significantly from previous General Education Goals, be it therefore

RESOLVED, that the Faculty Senate directs the President of the Faculty Senate to proceed forthwith in charging the Faculty Senate Committee on General Education in partnership with the Faculty Senate Committee on Undergraduate Studies to oversee this review using the guidelines laid out in the attached document. and be it further
RESOLVED, that the Faculty Senate directs each department or program responsible for administering undergraduate majors to ensure that their degree programs, inclusive of major, college, and university requirements fully support student development in all Objectives of General Education by September 1, 2017, and be it further
RESOLVED, that an assessment mechanism for the General Education requirements be articulated.

May 2015 Attachment

Attached Document for Resolution on a Review of Degree Programs Guidelines for the Faculty Senate Committee on General Education

The Faculty Senate Committee on General Education is charged to assist departments and programs administering undergraduate majors in ensuring full opportunity for all students to attain competency in the Objectives of General Education. The committee is also responsible for conducting a review of all degree programs in this regard in partnership with the Faculty Senate Committee on Undergraduate Education. These committees are to be charged by the President of the Faculty Senate with all due haste upon adoption of this resolution. The committees are additionally charged to:

(1) Support and work with programs and departments to ensure that all degree programs provide support for all students in attaining competency in all the Objectives of General Education.
(2) Provide rubrics against which degree programs will be assessed, based on the AAC&U VALUE Rubrics, for each Objective of General Education or component of Objectives to all programs and departments by May 1, 2016.
(3) Provide clear guidelines for review of student learning in all degree programs, with regard to the Objectives of General Education, to all programs and departments by May 1, 2016.
(4) Provide clear examples and templates to all departments including curricular maps to aid in their internal reviews of how students are achieving the Objectives of General Education by May 1, 2016.
(5) Provide timely and detailed feedback and guidance on the review of student learning within each degree program.