

Introduction to Core Learning Outcomes Assessment

Linda Baughman, PhD

General Education Assessment Coordinator

Office of Academic Assessment

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OVERVIEW

- Assessment gives us useful data.
 - Assessment helps students get jobs.
 - Assessment helps faculty support new incentives and important current project.
- Context for Core Learning Assessment: SACSCOC, SCHEV, VCCCS
- Assessment overview.
- 2019-2020 Assessing Professional Readiness and Scientific Literacy



Skills and Knowledges Employers Find Important:

Effective oral communication	90 %
Ethical judgment and decision-making	87 %
Work effectively with others in teams	87 %
Apply knowledge in a real world setting	87 %
Work independently (time management)	85 %
Self-Motivation (proactive ideas/solutions)	85 %
Critical thinking and analytical reasoning skills	84 %
Effective written communication	78 %
Problem solve w/people from diff. backgrounds	73 %
Ability to work with numbers and statistics	55 %

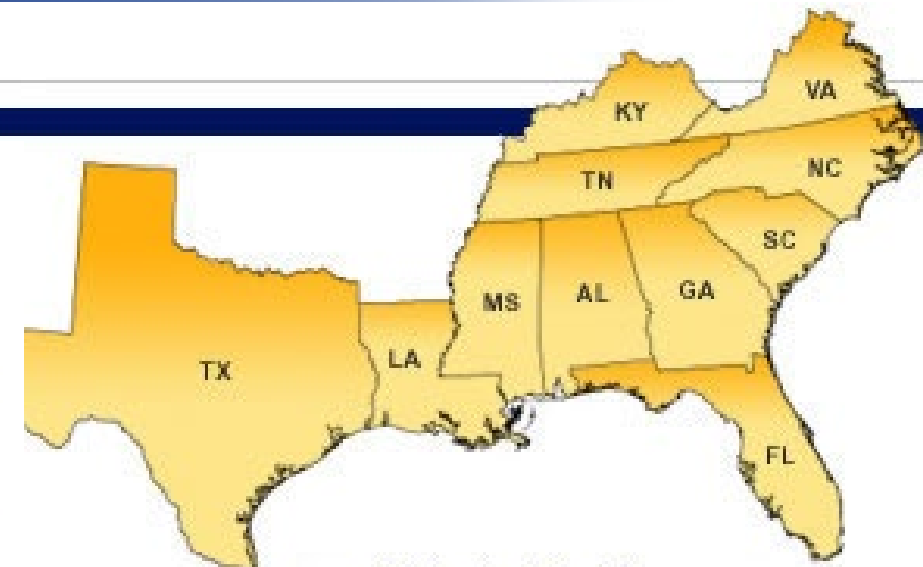
“Fulfilling the American Dream: Liberal Education and the Future of Work.” Hart Research Associates for the AAC&U. 2018.

Assessment and Reaffirmation— SACSCOC

- SACSCOC is **NOT** the reason we assess.
- SACSCOC impacts our assessment timetable.
- SCHEV
- VCCCS



Southern Association of Colleges and Schools
Commission on Colleges



Extraterritorial

We Assess Six Core Learning Outcomes:

SCHEV Core Competencies:

Critical Thinking

Written Communication

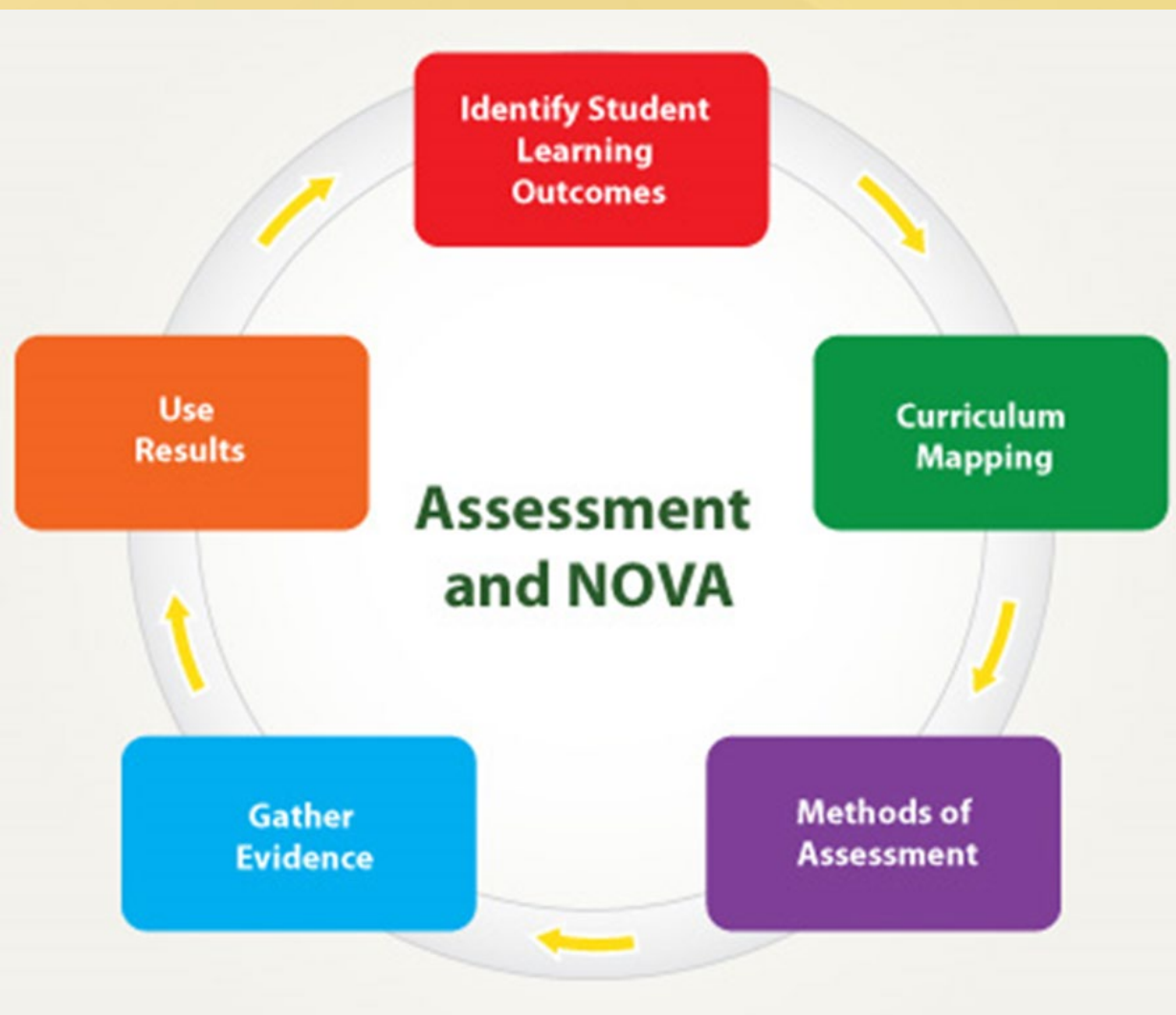
Quantitative Reasoning

Civic Engagement

VCCS :

Professional Readiness

Scientific Reasoning



TAKE ONE...



CLO Assessment Timeline

We are **here**

Core Learning Objectives Assessment Cycle						
CLO	BENCHMARK			EVALUATION		
	2017-18	2018-19	2019-20	2020-21	2012-22	2022-23
Civic Engagement		X			X	
Critical Thinking	X			X		
Professional Readiness			X			X
Quantitative Literacy	X			X		
Scientific Literacy			X			X
Written Communication		X			X	

Questions? Thoughts?



GENERAL EDUCATION ASSESSMENT

- Step One: Operationalize Your Core Learning Outcome
- Watch Words:
 - Specific
 - Measurable
 - Attainable
 - Results Oriented and
 - Time-bound information
 - (SMART)





Begin with the definition of PR or SR then operationalize it to meet the goals/standards for your program/discipline.

Virgin of the Rocks: A subversive message hidden by Da Vinci.

A palm tree in an Alpine scene prompts Kelly Grovier to follow a trail of clues that unlock a 15th-Century mystery – transforming Da Vinci masterpieces into ruminations on the Earth's geological evolution.

By Kelly Grovier (Credit: Louvre)



Begin with the definition of PR or SR then operationalize it to meet the goals/standards for your program/discipline.

Step One: operationalize the CLO, (be sure it is:)

Specific

Measurable,

Attainable,

Results Oriented and

Time-bound information.

Methods Used to Assess Core Learning Outcomes

Rubrics applied to examples of student work (Institutionally created or AAC&U VALUE rubrics)	91%
Culminating or capstone projects	78%
Student surveys and self-reports	64%
Locally developed common assignments in courses	62%
Locally developed examinations	46%
Standardized national tests of general skills , such as critical thinking	38%
Standardized national tests of general knowledge , such as science or humanities	33%

Questions? Thoughts?

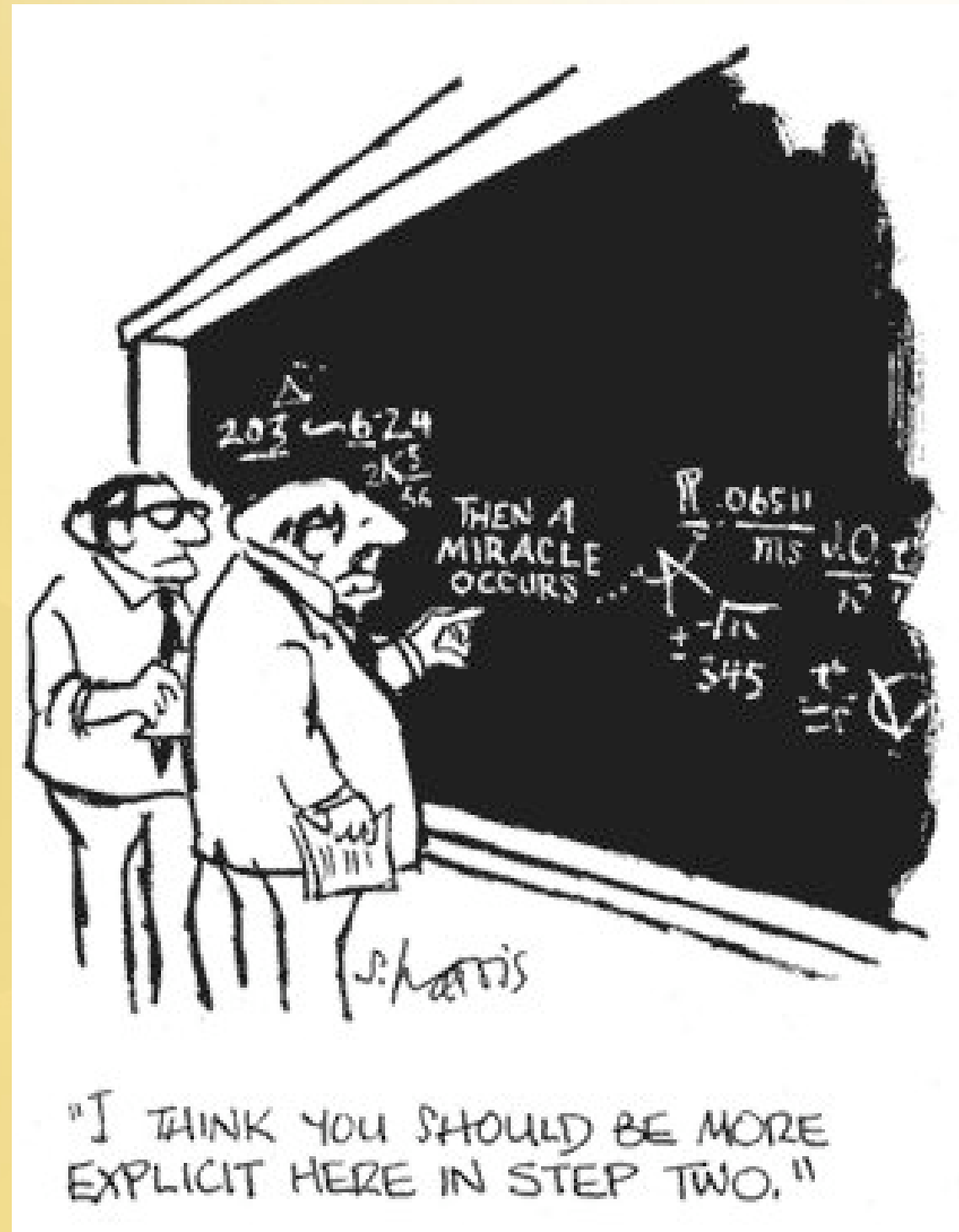
(Part Two)



Scientific Literacy*

Scientific Literacy is the ability to apply scientific method and related concepts and principles to make informed decisions and engage with issues related to the natural, physical, and social world.

Degree graduates will recognize and know how to use the scientific method, and to evaluate empirical information.



*VCCS definition

Operationalize the CLO Your Way

Operationalize your expected outcomes.

Scientific Literacy the ability to apply scientific method and related concepts and principles to make informed decisions and engage with issues related to the natural, physical, and social world.

Becomes: Students will research the recent Icelandic improvements on geothermal energy. They will discuss the global importance of this scientific find.

(you operationalize SL...not us)

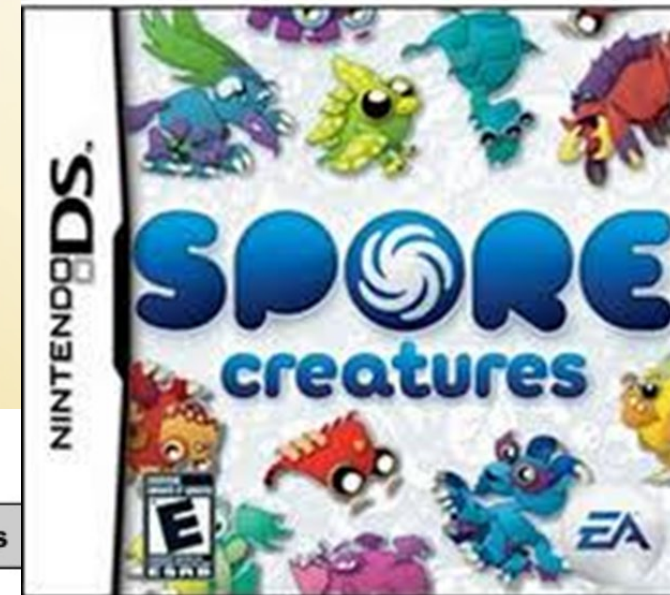


TAKE ONE...



	1 pt	2 pts	3 pts
Demonstrates an understanding of core scientific concepts and appropriate terminology.	Uses core concepts and appropriate terminology: Never or rarely Many errors Ambiguous explanations and / or improper usage	Uses core concepts and appropriate terminology: Sometimes Some errors Incomplete explanations or usage	Uses core concepts and appropriate terminology: Consistently / Always Few or no errors Clear and complete explanations and usage
Demonstrates the ability to evaluate, analyze and interpret data.	Evaluates, analyzes and interprets: Never or rarely Many errors in analysis Unable to evaluate data and / or results Many errors in interpretation	Evaluates, analyzes and interpret: Sometimes Some errors in analysis Incomplete evaluation of data and / or results Some errors in interpretation	Evaluates, analyzes and interprets: Consistently / always Few or no errors Clearly and complete evaluation of data/ results Almost error free interpretation
Demonstrates the ability to apply acquired knowledge to scientific aspects of personal and global issues.	Applies acquired knowledge: Never or rarely Never or rarely identifies scientific aspects of issue Never or rarely recognizes ethical implications	Applies acquired knowledge: Sometimes Sometimes identifies scientific aspects of issue Sometimes recognizes ethical implications	Applies acquired knowledge: Consistently / always Identifies scientific aspects of issue Recognizes ethical implications

Rubric = Key Learning Objectives



Rubric for teaching sessions with scientific discovery games

CATEGORY	Proficient	Partially Proficient	Unsatisfactory	Points
	4 points	2 points	0 points	
Knowledge of the key aspects of the simulation/game	Identified between 5-3 significant aspects in each of the categories of the game (significant events, key characters, division of labor, resources needed, problems to be solved).	Identified less than 3 significant aspects in each of the categories of the game.	Could not identify any significant aspects of the game.	/4
Ability to understand and communicate the rules of the game	Understood the majority of the rules and knows where to find the rules in question.	Understood a few rules and does not know where to find the rules in question.	Did not understand the rules of the game nor where to find the rules of the game.	/4
Ability to locate and select relevant information from a variety of sources to solve game problems	Located and selected relevant information from a few sources that will help solve game problems.	Located a limited amount of information. Some were not relevant to the game/subject.	Unable to locate relevant information.	/4
Use of creative thinking strategies in the game-making or problem solving challenge	Used several original ideas and strategies to solve the game challenge.	Rarely used original ideas to solve the game challenges.	Did not use any original ideas to solve the game challenges.	/4
Group/partner teamwork	Assisted group/partner in the activity's objective.	Finished individual task, but did not assist group/partner during the activity.	Contributed little to the group effort during the activity.	/4
TOTAL POINTS				/20

Science GRC Rubric

SCIENCE			
Crosscutting Concepts			
<p>Crosscutting concepts bridge disciplinary boundaries and unite core ideas throughout the fields of science and engineering. These concepts deepen students' understanding of the disciplinary core ideas, and develop a coherent and scientifically based view of the world. These concepts include:</p> <ul style="list-style-type: none"> • Patterns, • Cause and Effect, • Scale, Proportion, and Quantity, • Systems and System Models, • Energy and Matter, • Structure and Function, and • Stability and Change. 			
Advanced Understanding 4	Meets the Standard 3	Approaching 2	Does Not Meet 1
<p>The student is able to:</p> <ul style="list-style-type: none"> • Evaluate phenomenon through the appropriate concept in order to make reasonable and defensible predictions. • Apply concepts to create justifiable explanations or analogies to situations not directly taught in the classroom. 	<p>The student is able to:</p> <ul style="list-style-type: none"> • Analyze phenomenon through the appropriate concept in order to make reasonable and defensible predictions or to draw inferences that show an understanding of the connections the concept has to the subject matter. 	<p>The student is able to:</p> <ul style="list-style-type: none"> • Summarize or demonstrate an understanding of the concept. • Explain the concept showing an understanding of some of the connections to the subject matter currently being taught. 	<p>The student is able to:</p> <ul style="list-style-type: none"> • Identify, list, or define the characteristics of the concept.

Disciplinary Core Ideas

This criterion describes the set of knowledge students will learn in order to prepare them with sufficient core knowledge so that they can later acquire additional information on their own. Specifically, a core idea should:

- Have broad importance across multiple sciences or engineering disciplines or be a key organizing principle of a single discipline,
- Provide a key tool for understanding or investigating more complex ideas and solving problems,
- Relate to the interests and life experiences of students or be connected to societal or personal concerns that require scientific or technological knowledge,
- Be teachable and learnable over multiple grades at increasing levels of depth and sophistication. That is, the idea can be made accessible to younger students but is broad enough to sustain continued investigation over years.

Advanced Understanding 4	Meets the Standard 3	Approaching 2	Does Not Meet 1
<p>The student is able to:</p> <ul style="list-style-type: none"> • Make connections between different core ideas to create or evaluate solutions to real world problems, or uses the connections between core ideas to justify a new hypothesis. • Apply a wide range of vocabulary fluently, accurately, and appropriately. • Use detailed relevant facts to show understanding through accurate and precise descriptions, explanations and examples. The depth of content knowledge is consistent with the next grade band standards* 	<p>The student is able to:</p> <ul style="list-style-type: none"> • Use core ideas to accurately explain natural phenomenon, and can make reasonable predictions about future events based upon this knowledge. • Use appropriate content vocabulary accurately. • Use relevant facts to show understanding through accurate descriptions, explanations and examples. 	<p>The student is able to:</p> <ul style="list-style-type: none"> • Summarize core ideas, and apply that knowledge to accurately explain observed phenomenon. • Use some content vocabulary accurately and appropriately. • Use mostly relevant facts and usually shows understanding through descriptions, explanations and examples though they may be basic or superficial. 	<p>The student is able to:</p> <ul style="list-style-type: none"> • Recognize and describe the core ideas.

Communication in the Discipline

Students need to be able to read and write in the context of science to be career and college ready. They must have the writing skills in order to articulate and defend claims, and to describe observed phenomenon and experiences. Students must also have the reading skills and vocabulary knowledge necessary to read and comprehend a variety of text because the majority of workforce and college reading will be complex informational text.

Advanced Understanding 4	Meets the Standard 3	Approaching 2	Does Not Meet 1
<p>The student is able to:</p> <ul style="list-style-type: none"> Communicate in a way that is clear and coherent, and in which the development, organization and style are appropriate to the task, purpose and audience. Present arguments on disciplinary content that are logical, focused and supported with sufficient and relevant data. Interpretation of the data makes insightful connections to other content concepts or disciplines, or draws relevant conclusions to real world applications or problems. 	<p>The student is able to:</p> <ul style="list-style-type: none"> Communicate in a way that is clear and coherent, and in which the development, organization and style are appropriate to task, purpose and audience. Present arguments on disciplinary content that are logical, focused and supported with sufficient and relevant evidence. Provide step by step procedures that are precise and detailed enough so that others can replicate them and (possibly) produce the same results. 	<p>The student is able to:</p> <ul style="list-style-type: none"> Communicate in a way that is clear and coherent, but the organization and style may not be appropriate to the task, purpose or audience. Present arguments on disciplinary content which are logical and focused, but lack evidence that supports the argument. Provide step by step procedures that lack detail needed for others to replicate. 	<p>The student is able to:</p> <ul style="list-style-type: none"> Communicate with some clarity but concepts may be inaccurate or inappropriate as related to the task, purpose or audience. Present arguments on disciplinary content, which are unfocused or unsupported with evidence. Communicate some procedures but lack details needed for others to replicate.

Questions? Thoughts?



Professional Readiness*

Professional Readiness is the ability to work well with others and display situationally and culturally appropriate demeanor and behavior.

Degree graduates will demonstrate skills important for successful transition into the ***workplace and pursuit of further education.***



PR Operationalize as...

- Oral communication: open effective, and professional communication.
- Workplace demeanor: appropriate workplace and classroom demeanor.
- Teamwork: work effectively with others towards a common goal.
- Creative Problem Solving: solve challenge or problem in
- Ethical Reasoning: considering the best interests of others and the community.
- Leadership: discern describe their personal leadership styles.
- Cultural Awareness: recognize personal experiences and biases may affect ability to lead/work with others.



And that's just a start...

PR can be...

- Working in groups
- Leading a discussion
- Editing, outlining
- Highlighting the unwritten curriculum
- Drawing a map of something
- Time management
- Respecting differences/different 'others'
- Helping someone understand what they need to do to complete their project
- Learning to fail
- Using social media
- Media literacy
- Skepticism
- Manage customers, patients, superiors, equals in a professional/educational setting



Working in Groups

Evaluate a group learning assignment:

- Evaluations of collaborative work must be timely, transparent and systematic
- A contract that outlines roles, communication protocols, timelines and quality standards, of all students provides structure.**Must ensure “free-loading” is difficult.
- Evaluations may be made from the prospective of the team, the faculty member, and/or a third party.

Project Report Card:

- Product
- Process
- Progress



Assessing Change...

Portfolio Assessment: a collection of work that a learner has collected, selected, organized, reflected upon, and presented to show understanding and growth overtime. (Multiple soft skill assessments over the course of a class: group lab work, for ex.)

Badges: award badges based on specific soft skill use in the classroom.



TAKE ONE...



Oral Communication

Name: _____ Score: _____

Oral Presentation Rubric

	4—Excellent	3—Good	2—Fair	1—Needs Improvement
Delivery	<ul style="list-style-type: none"> • Holds attention of entire audience with the use of direct eye contact, seldom looking at notes • Speaks with fluctuation in volume and inflection to maintain audience interest and emphasize key points 	<ul style="list-style-type: none"> • Consistent use of direct eye contact with audience, but still returns to notes • Speaks with satisfactory variation of volume and inflection 	<ul style="list-style-type: none"> • Displays minimal eye contact with audience, while reading mostly from the notes • Speaks in uneven volume with little or no inflection 	<ul style="list-style-type: none"> • Holds no eye contact with audience, as entire report is read from notes • Speaks in low volume and/or monotonous tone, which causes audience to disengage
Content/ Organization	<ul style="list-style-type: none"> • Demonstrates full knowledge by answering all class questions with explanations and elaboration • Provides clear purpose and subject; pertinent examples, facts, and/or statistics; supports conclusions/ideas with evidence 	<ul style="list-style-type: none"> • Is at ease with expected answers to all questions, without elaboration • Has somewhat clear purpose and subject; some examples, facts, and/or statistics that support the subject; includes some data or evidence that supports conclusions 	<ul style="list-style-type: none"> • Is uncomfortable with information and is able to answer only rudimentary questions • Attempts to define purpose and subject; provides weak examples, facts, and/or statistics, which do not adequately support the subject; includes very thin data or evidence 	<ul style="list-style-type: none"> • Does not have grasp of information and cannot answer questions about subject • Does not clearly define subject and purpose; provides weak or no support of subject; gives insufficient support for ideas or conclusions
Enthusiasm/ Audience Awareness	<ul style="list-style-type: none"> • Demonstrates strong enthusiasm about topic during entire presentation • Significantly increases audience understanding and knowledge of topic; convinces an audience to recognize the validity and importance of the subject 	<ul style="list-style-type: none"> • Shows some enthusiastic feelings about topic • Raises audience understanding and awareness of most points 	<ul style="list-style-type: none"> • Shows little or mixed feelings about the topic being presented • Raises audience understanding and knowledge of some points 	<ul style="list-style-type: none"> • Shows no interest in topic presented • Fails to increase audience understanding of knowledge of topic
Comments				

GRADING RUBRIC - Soft Skills

COLLABORATION	<p>4 Exceeds expectations</p> <p>3 Meets expectations</p> <p>2 Emerging expectations</p> <p>1 Below expectations</p>	<p>Acts as a leader or exemplary team member Consistently provides thoughtful ideas in teams Consistently values and encourages all members of teams</p> <p>A strong team member Provides thoughtful ideas in teams Values and encourages all team members</p> <p>Participates minimally and requires some prompting as a team member Sometimes provides thoughtful ideas in teams Sometimes values and encourages all team members</p> <p>Rarely participates in team activities Rarely provides thoughtful ideas in teams Rarely values and encourages team members</p>
RESPECT	<p>4 Exceeds expectations</p> <p>3 Meets expectations</p> <p>2 Emerging expectations</p> <p>1 Below Expectations</p>	<p>Seeks and accepts the opinions and input of others Consistently demonstrates both respectful and helpful behavior</p> <p>Listens and accepts the opinions of others Demonstrates both respectful and helpful behavior</p> <p>Shows growth in accepting others Improvement noticed in demonstrating respectful and helpful behaviors</p> <p>Usually ignores the opinions and input of others Needs improvement in demonstrating respectful and helpful behavior</p>
INITIATIVE	<p>4 Exceeds Expectations</p> <p>3 Meets Expectations</p> <p>2 Emerging Expectations</p> <p>1 Below Expectations</p>	<p>Initiates curiosity and interest in learning Independently engages in learning activities Consistently perseveres and problem solves Demonstrates resourcefulness and seeks assistance as necessary</p> <p>Demonstrates curiosity and interest in learning Engages in learning activities Demonstrates perseverance Demonstrates resourcefulness and seeks assistance as necessary</p> <p>Occasionally demonstrates curiosity and interest in learning Sometimes engages in learning activities Occasionally perseveres Shows growth in resourcefulness and sometimes seeks assistance</p> <p>Seldom demonstrates curiosity in learning activities Rarely engages in learning activities Lacks perseverance Rarely uses alternate resources to assist with learning</p>
WORK HABITS	<p>4 Exceeds Expectations</p> <p>3 Meets Expectations</p> <p>2 Emerging Expectations</p> <p>1 Below Expectations</p>	<p>Always punctual and prepared Consistently displays a positive attitude Always on task • Always strives to reach full potential Spends extra time to ensure tasks are well done</p> <p>Punctual and prepared for class • Displays a positive attitude Stays on task • Strives to meet potential Completes tasks and meets deadlines</p> <p>Occasionally punctual and prepared Shows improvement in displaying a positive attitude Sometimes stays on task • Beginning to strive to meet potential Inconsistent with task completion</p> <p>Seldom punctual and prepared Rarely displays a positive attitude Needs to remain focused on task Does not strive to meet potential Needs to complete tasks and meet deadlines</p>

Have students write a comic about their experiences at NOVA

Comic Life Grading Rubric		Student		
Category	4	3	2	1
Content	You have included all required content in a meaningful and interesting way.	All of the required content is included in your comic strip.	Some of the required content is missing or shows poor planning.	You have not included the required content in your comic or have left out critical information.
Length	Length is not an issue, you tell what you needed to without adding extra things to fill space.	You meet the length requirements without leaving things out or adding extras	You did not meet the length requirements or added things just to meet the requirement	You did not meet length requirements and added extra things to try to
Clarity and Neatness	Your comic is easy to read and all elements are clearly written, labeled, or drawn. Your comic does not look too colorful or cluttered.	Your comic is easy to read and most elements are clearly written, labeled, or drawn. Overall placement of pictures and writing is good.	Your comic is hard to read with small fonts and may have poor color choices. Better placement of writing and pictures can improve your comic.	Your comic is hard to read and I cannot tell what goes where. There seems to be no logical design to your comic.
Spelling & Grammar	There are few if any errors in spelling and grammar.	There are a few errors that may take away from the quality of your work, but most errors are minor.	You could have taken more time to edit your work to correct errors.	There are several errors that take away from the quality of your work.
Creativity & Design	You have turned in your design sheet with your final comic strip and have taken time to be creative and think critically about how to best arrange pictures and texts in your comic strip.	You have turned in your design sheet with your final comic strip. Overall work shows that you made an attempt to be creative and interesting.	You did not turn in your design sheet with your final comic strip. Overall creativity and critical thinking about placing your writing and pictures in a meaningful way can be improved.	You did not turn in your design sheet. Your comic strip does not show that you have taken time to be creative and to think critically about where to place pictures and writing.
Information	You provided all of the information and other interesting facts to help readers know who you are.	You provided all of the information asked of you and told who you were.	You left out information that may have helped the reader know who you are.	You left out important information that lets the reader know who you are.
Totals				
Grade	_____ out of 24			

Last Questions and Thoughts?



HELP!!!

**For *Support:*
Contact**

Dr. Linda Baughman
General Education Assessment
Coordinator
LBaughman@nvcc.edu

Nicole Martello
Learning Outcomes Assessment
Coordinator
NMartello@nvcc.edu

Sharon Karkehabadi
Assoc. Vice-President, Academic Assessment
SKarkenhabad@nvcc.edu

**For *Emergencies:*
Contact**



Resources: Broad Issues

SACSCOC Resource Manual for the Principles of Accreditation

<http://www.sacscoc.org/pdf/2018%20POA%20Resource%20Manual.pdf>

The Quality and Integrity of Undergraduate Degrees

<http://www.sacscoc.org/pdf/081705/Quality%20and%20Integrity%20of%20Undergraduate%20Degrees.pdf>

NOVA's General Education Goals

<https://www.nvcc.edu/curcatalog/general/goals.html>

Benchmarking General Education Programs (EAB)

<http://www.shawnee.edu/academics/GEP-essential-learning-outcomes/media/Benchmarking-General-Education-Programs.pdf>

Resources: Broad Issues

Values Rubrics Case Studies (AAC&U)

<http://www.aacu.org/value/casestudies>

Questions for Assessing Higher-Order Cognitive Skills: It's Not Just Bloom's.

<https://www.lifescied.org/doi/full/10.1187/cbe.12-03-0024>

“Relationship between Language and Concept Science Notebook Scores of English Language Learners and/or Economically Disadvantaged Students.” 2015. (A study on middle-school, but the results are instructive)

<https://web.a.ebscohost.com/ehost/pdfviewer/pdfviewer?vid=0&sid=d6d536e0-dff2-4a03-9783-9cce6cd40279%40sessionmgr4010>

Resources: What Employers Want

- Hart Research Associates. (2015). **Falling short? College learning and career success:** Selected findings from online surveys of employers and college students
<https://www.aacu.org/sites/default/files/files/LEAP/2015employerstudentsurvey.pdf>
- Hart Research Associates. (2018). **Fulfilling the American Dream: Liberal Education and the Future of Work.**
<https://www.aacu.org/sites/default/files/files/LEAP/2018EmployerResearchReport.pdf>
- **Degree Qualifications Profile:**
<https://www.luminafoundation.org/files/resources/dqp.pdf>

Resources: What Employers Want (Burning Glass)

- **Burning Glass Reports-Slide One** (Burning Glass Technologies is an analytics software company that has cracked the genetic code of an ever-changing labor market. Powered by the world's largest and most sophisticated database of labor market data and talent, we deliver real-time data and breakthrough planning tools that inform careers, define academic programs, and shape workforces).
- Liberal Arts students can improve employability:
- <http://burning-glass.com/wp-content/uploads/BGTReportLiberalArts.pdf>
- Rebuilding Middle Skills:
- [http://burning-glass.com/wp-content/uploads/BRIDGE THE GAP REBUILDING AMERICAS MIDDLE SKILL S.pdf](http://burning-glass.com/wp-content/uploads/BRIDGE_THE_GAP_REBUILDING_AMERICAS_MIDDLE_SKILL_S.pdf)
- <http://burning-glass.com/research/quant-crunch-data-science-job-market/>,
- <http://burning-glass.com/research/digital-skills-gap/>

Resources: What Employers Want (Burning Glass)

- **Burning Glass Reports-Slide Two** (Burning Glass Technologies is an analytics software company that has cracked the genetic code of an ever-changing labor market. Powered by the world's largest and most sophisticated database of labor market data and talent, we deliver real-time data and breakthrough planning tools that inform careers, define academic programs, and shape workforces).
- Demand for Data Science Skills is Disrupting the Job Market:
- <http://burning-glass.com/research/quant-crunch-data-science-job-market/>
- Research on Digital Skills, Digital Literacy and the Future of Work:
- <http://burning-glass.com/research/digital-skills-gap/>

Resources: Scientific Literacy

New Scientific Literacies for an Interdependent World.

<https://www.aacu.org/publications-research/periodicals/new-scientific-literacies-interdependent-world>

“Colleges Reinvent Classes to Keep More Students in Science.” *NYT*, 2014.

<https://www.nytimes.com/2014/12/27/us/college-science-classes-failure-rates-soar-go-back-to-drawing-board.html>

[Science Direct](#) looks like a solid science assessment resource.

Assessing student writing and science: popular science writing.

<https://www.sciencedirect.com/science/article/pii/S1075293516300873>

Resources: Professional Readiness

“Best Practices in Soft Skills Assessment.” Hanover Research (Washington D.C.) 2014. <https://www.gssaweb.org/wp-content/uploads/2015/04/Best-Practices-in-Soft-Skills-Assessment-1.pdf>

“Soft Skills Grading Rubric,” uccs.edu
<https://www.uccs.edu/Documents/pltw/Soft-Skills-Rubric.pdf>

[@Catlin Tucker](#) (A good resource, she writes a lot about education: “Teaching and Assessing Soft Skills,” <https://catlintucker.com/2017/09/teaching-assessing-soft-skills/>

“Favorite Web Tools,” <https://catlintucker.com/favorite-web-tools/>

“Rubric for Evaluating Student Presentations.” Kelly Hayden.
[Rubric for Evaluating Student Presentations.](#)

Resources: Professional Readiness

“Using Semantic Technologies for Formative Assessment in Scoring in Large Classes and MOOCs.” (2018)

<https://eric.ed.gov/?id=EJ1190185>

Improving Students’ Communication Skills in Physics class:

<https://iopscience.iop.org/article/10.1088/1742-6596/1028/1/012026/pdf>

“An Approach to Teaching Critical Thinking Across the Disciplines Using Performance Tasks with a Common Rubric.” 2017/

<https://www.sciencedirect.com/science/article/pii/S1871187116301596>

