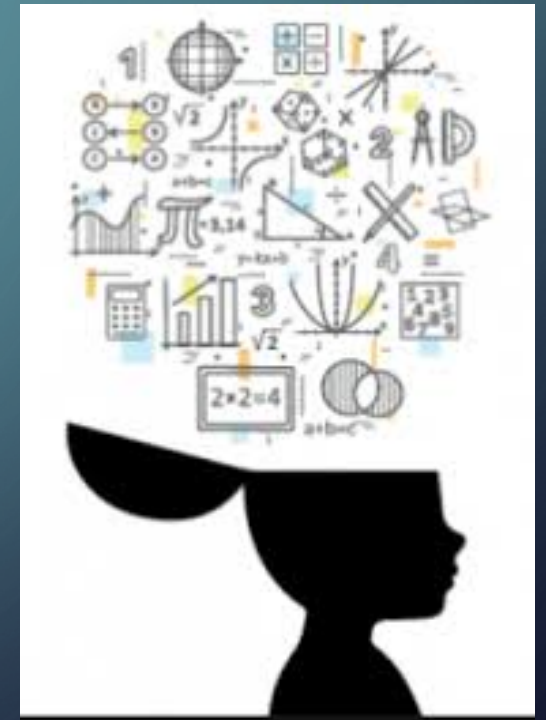


ASSESSING QUANTITATIVE REASONING ACROSS THE CURRICULUM

OCTOBER 15, 2018

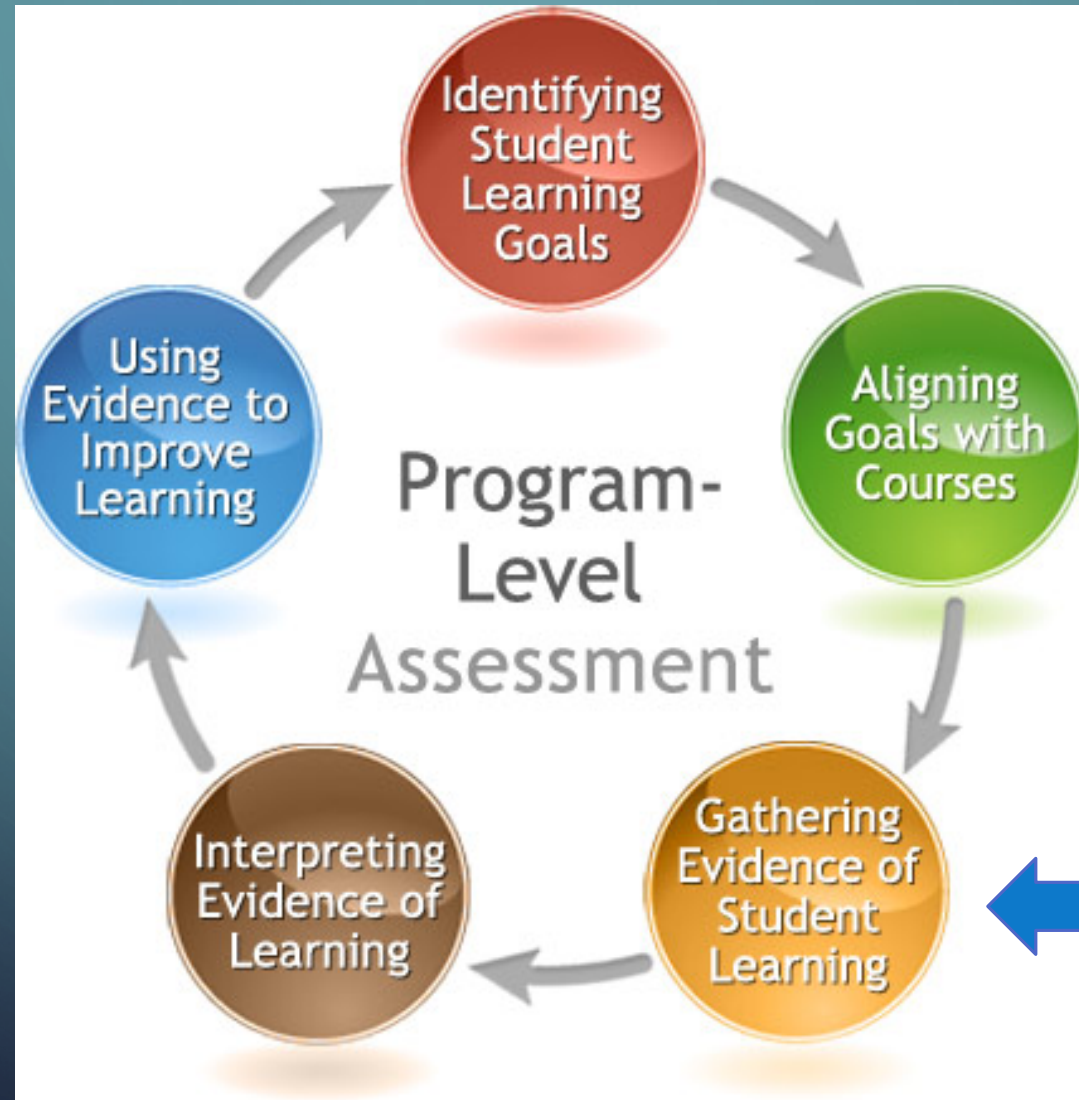
DR. JESSICA DENNIS, INTERIM DIRECTOR OF ASSESSMENT



WORKSHOP OUTCOMES

- As a result of this workshop you will be able to:
 - Describe the features of quantitative reasoning
 - Adopt a rubric and select assignments for the assessment of these skills
 - Develop a plan for data collection

THE ASSESSMENT CYCLE



Today!

DEFINING AND ASSESSING QUANTITATIVE REASONING



The background is a dark teal gradient. In the corners, there are decorative white lines that resemble circuit traces or a network diagram, with small circles at the end of the lines.

WHY IS QUANTITATIVE REASONING A CORE
COMPETENCY FOR UNDERGRADUATE EDUCATION?

Informed citizens must be good consumers of quantitative information!



Fix the National Debt

The national debt continues to rise while our leaders struggle to pass a federal budget. Can you do better? Here's your chance to find out.

The national debt is higher than it has been since just after World War II. And it is rising towards unprecedented – and unsustainable – levels. [Learn more about our current path.](#)

High and rising debt will threaten economic growth and the standard of living for all Americans as investment dwindles and the country becomes less competitive. [See why rising debt is a major problem.](#)

SHORT-TERM GOAL

70%

10 YEARS

Stabilizing the debt at a reasonable level is the first step in improving our fiscal health. Steadying debt held by the public at 70% of the economy is a realistic level for the near term.

LONG-TERM GOAL

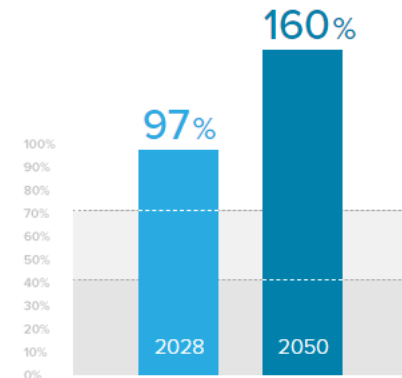
40%

by 2050

Getting debt back down to the historical average level of about 40% of the economy will give us the fiscal space to deal with emergencies and help promote economic growth.

Changing course will require halting the rise of the debt as a share of the economy in the medium term and reducing the debt toward historical levels in the longer term. [See more on the targets.](#)

Debt as Percentage of GDP



Stabilize the U.S. Debt at 70% of GDP by 2028

Fix the Debt in the short and long term. Make the hard budget choices to reduce U.S. debt to 70% of the economy by 2028 by identifying nearly \$8 trillion of deficit reduction and bring it down to 40% by 2050.

\$7,810 billion to go.

Your goal is to cut \$7810 billion from the Federal Budget to bring down the debt to 70% of GDP by 2028

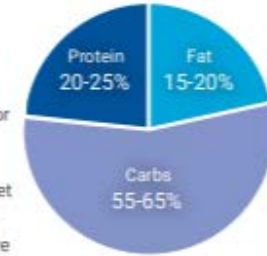
PERSONAL HEALTH DATA

FOOD

SUMMARY

What foods do I need to eat?




Your genotype suggests that you may have a better response to a weight-loss diet if daily calories come from the following proportions of fat, carbohydrates, and protein. You can monitor this with a diet log.



Based on your gender, age, height, current weight and current activity level, we recommend a diet of approximately **1,829 calories per day** to lose weight. This number was calculated estimating your total energy expenditure, or the number of calories your body needs each day. Since you are interested in losing weight, you will need to eat fewer calories than your total energy expenditure. We suggest a modest calorie reduction of 20 percent. We have calculated this reduction into our calorie recommendation for you, so if you eat around 1,829 calories per day, you can expect to lose weight. This is not a drastic calorie reduction, so you should not feel hungry or like you are denying yourself food if you eat this many calories.

The amount of exercise you get can change your energy requirements. Therefore, you may need to eat more calories than this if you are performing 45 minutes or more of moderate-to-high intensity cardio exercise on a daily basis.

Here are suggested macronutrient ranges to follow that may optimize the weight loss from your diet.

| | RECOMMENDATION | PERCENT | GRAMS | CALORIES |
|---|---|------------------|--------------------|----------------------|
|  | PROTEIN Choose a reduced-calorie diet that is between 20-25% protein. Get your protein from mostly plant food sources such as beans, legumes, nuts, seeds, whole grains and vegetables. | 20% to 25% | 91g to 114g | 366 to 457 |
|  | FAT Choose either a low- or moderate-fat, reduced-calorie diet. Get your fats mostly from plant foods, but avoid excess added oils. | 15% to 20% | 30g to 41g | 274 to 366 |
|  | CARBOHYDRATES You can lose weight on a reduced calorie diet that is either moderate or low in carbs. Choose complex carbs for more nutrients (veggies, beans, whole grains, etc.) and avoid simple or processed carbs (fries, chips, crackers, etc.). | 55% to 65% | 251g to 297g | 1,006 to 1,189 |

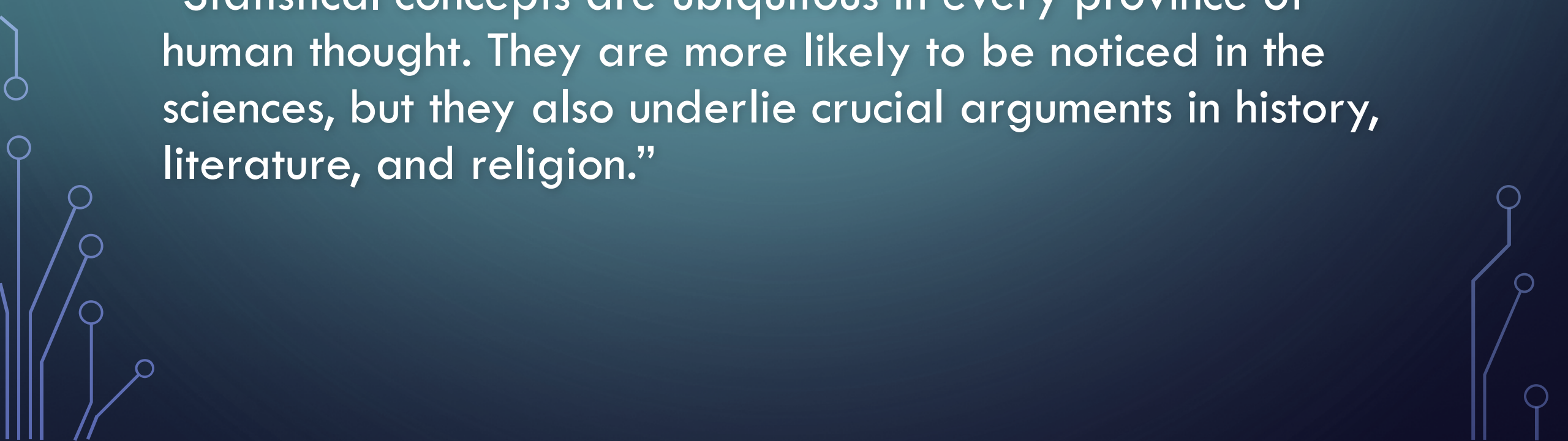
The total number of calories or grams of each macronutrient shown represent a recommended amount to consume each day.

It's tough to keep track of this simply by reading food labels. That's because most foods contain a combination of the macronutrients. A food item usually contains either protein and fat (such as meat), carbohydrates and fat (such as oil-saute'd vegetables or French fries), or protein, carbohydrates and fat (beans, nuts and seeds, a chicken salad or a hamburger with a bun). It's not easy to know how much of any one macronutrient you are getting or if you are achieving your macronutrient goals simply



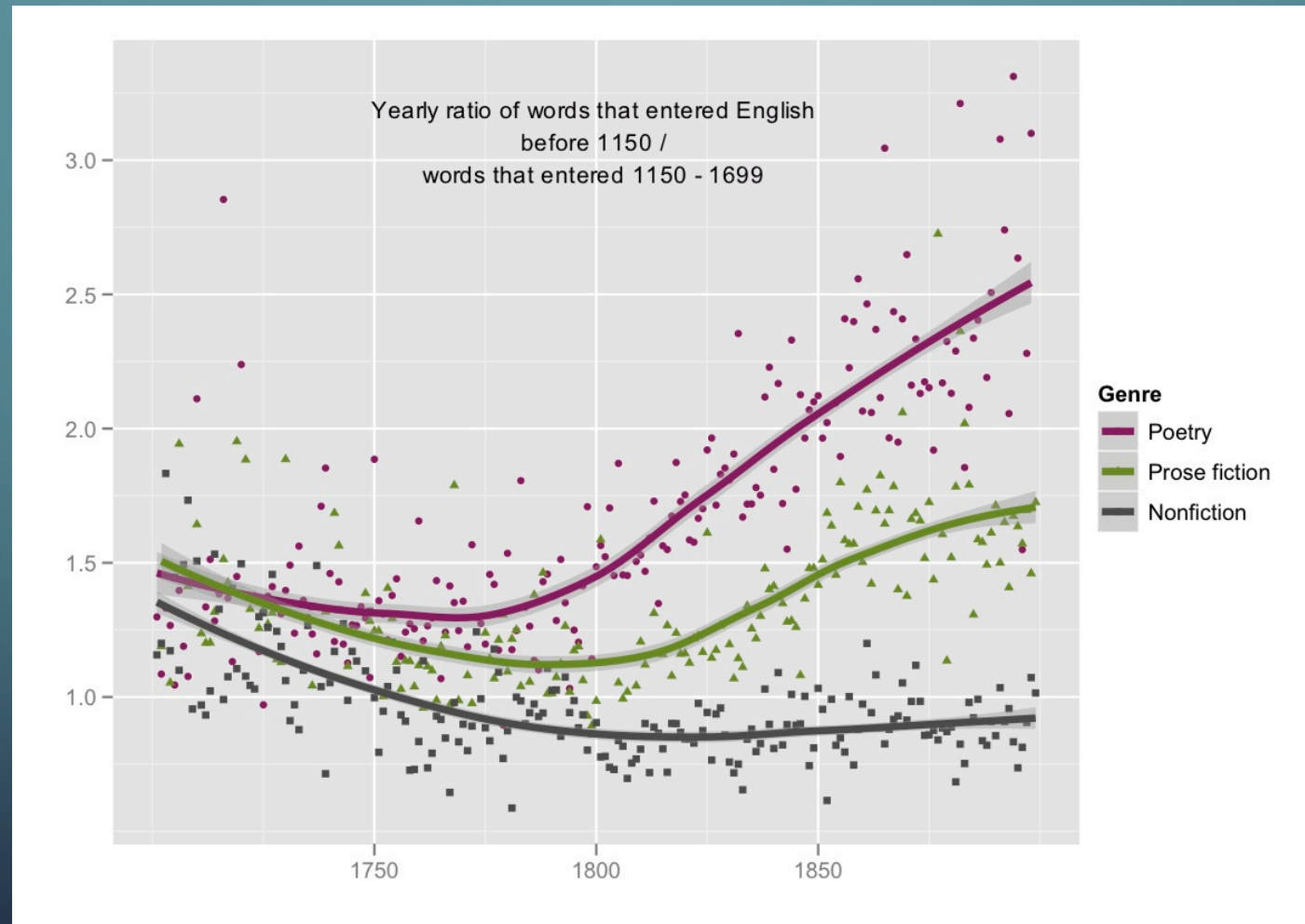
Stephen Stigler (1999) *Statistics on the Table: The History of Statistical Concepts and Methods* :

“Statistical concepts are ubiquitous in every province of human thought. They are more likely to be noticed in the sciences, but they also underlie crucial arguments in history, literature, and religion.”



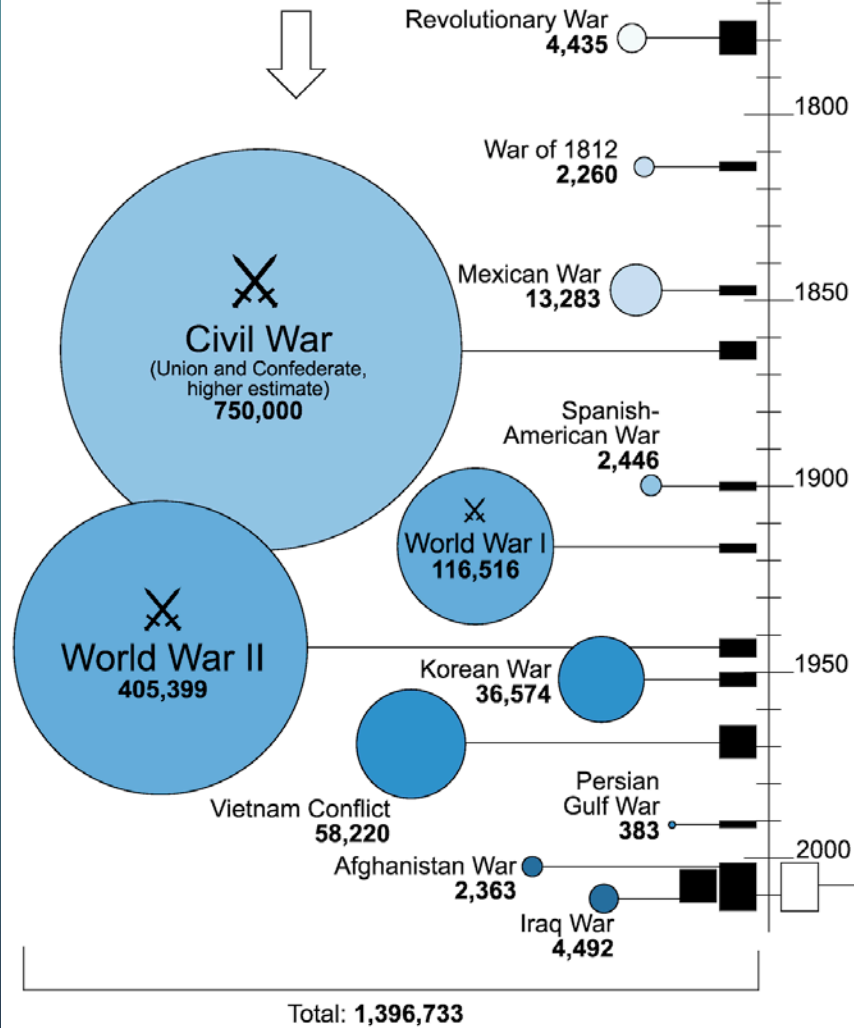
Digital Humanities:

An emerging field that applies computational tools and methods to traditional humanities



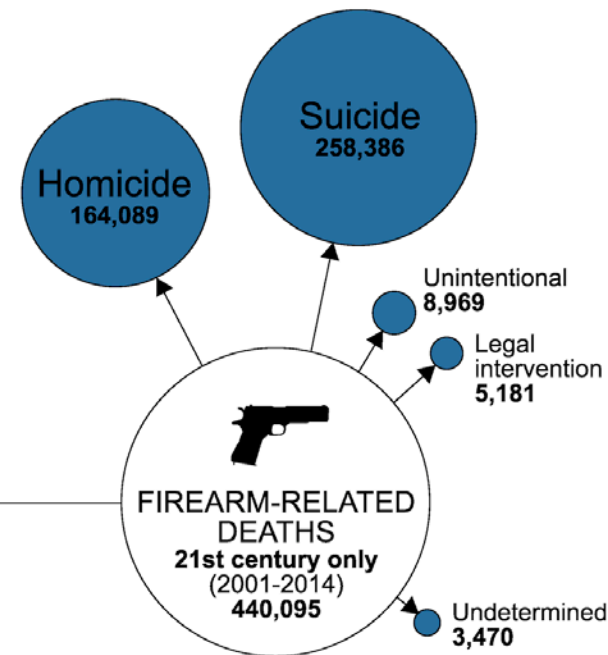
Underwood and Sellers (2012). Emergence of literary diction. *Digital Humanities*, vol. 1

DEATHS FROM WARFARE 1775-2014



CC-BY-SA martingrandjean.ch

More Americans have died from guns since the beginning of the 21st century than in Korean War and Vietnam Conflict



USING QUANTITATIVE REASONING IN EVERYDAY LIFE

- Calculating mortgages and understanding interest rates
- Evaluating colleges
- Sports records
- Recipe conversions/calorie counting
- Comparing prices and deciding how to get the best deal

https://learning.blogs.nytimes.com/2012/09/26/n-ways-to-apply-algebra-with-the-new-york-times/?_r=0

WASC SENIOR COLLEGE AND UNIVERSITY COMMISSION (WSCUC)

- In the *2013 Handbook of Accreditation*, Criteria for Review 2.2a states:
 - Baccalaureate programs engage students in an integrated course of study of sufficient breadth and depth to prepare them for work, citizenship, and life-long learning. These programs ensure the development of core competencies including, but not limited to, **written and oral communication, quantitative reasoning, information literacy, and critical thinking.**
- Institutions are free to define each core competency in a way that makes sense for the institution, its mission, its values, and the needs of its student body.

INSTITUTIONAL LEARNING OUTCOMES AT CAL STATE LA

- **Knowledge: Mastery of content and processes of inquiry**

- CSULA graduates have a strong knowledge base in their academic major and can use powerful processes of inquiry in a range of disciplines. They engage contemporary and enduring questions with an understanding of the complexities of human cultures and the physical and natural world and are ready to put their knowledge into action to address contemporary issues.

- **Proficiency: Intellectual skills**

- CSULA graduates are equipped to actively participate in democratic society. They are **critical thinkers** who make use of **quantitative and qualitative reasoning**. They have the ability to **find, use, evaluate and process information** in order to engage in complex decision-making. They read critically, **speak and write** clearly and thoughtfully and communicate effectively.

- **Place and Community: Urban and global mission**

- CSULA graduates are engaged individuals who have contributed to the multi-lingual and multiethnic communities that constitute Los Angeles and the world of the future. They are aware of how their actions impact society and the environment, and they strive to make socially responsible decisions. They are community builders sensitive to the needs of diverse individuals and groups and committed to renewing the communities in which they live.

- **Transformation: Integrative learning**

- CSULA graduates integrate academic learning with life. They engage in community, professional, creative, research and scholarly projects that lead to changes in their sense of self and understanding of their worlds. Graduates integrate their knowledge, skills and experience to address complex and contemporary issues and act ethically as leaders for the 21st century.

ACTIVITY #1: WHAT IS QUANTITATIVE REASONING?

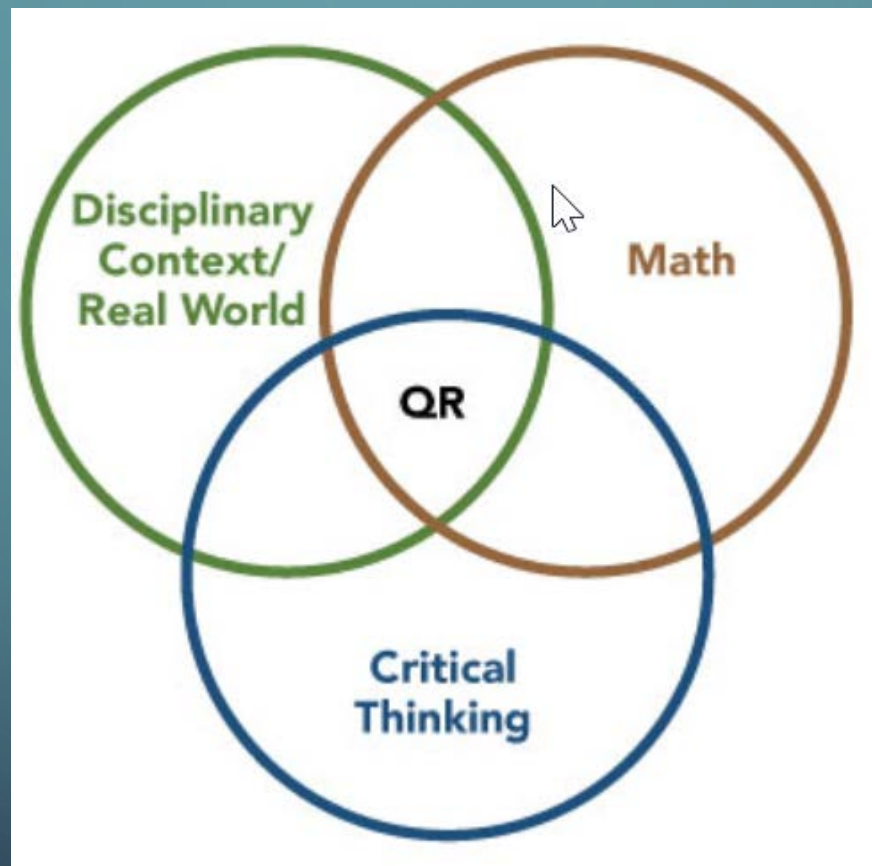


- In what situations are quantitative skills used in your discipline?
- What are the characteristics of those in your discipline who demonstrates quantitative literacy?
 - List at least 5 traits or dispositions

WHAT IS QUANTITATIVE REASONING?

- **WASC frames quantitative reasoning as:**
 - The ability to apply mathematical concepts to the interpretation and analysis of quantitative information in order to solve a wide range of problems, from those arising in pure and applied research to everyday issues and questions.
 - It may include such dimensions as ability to apply math skills, judge reasonableness, communicate quantitative information, and recognize the limits of mathematical or statistical methods.

QUANTITATIVE REASONING CONCEPTUALIZED



Elrod, S. (2014). Quantitative Reasoning: The Next "Across the Curriculum" Movement. *Peer Review*, vol. 16.

NATIONAL NUMERACY NETWORK



- A comfort, competency, and "habit of mind" in working with numerical data that is as important in today's highly quantitative society as reading and writing were in previous generations.
- A ability that emphasizes the higher-order reasoning and critical thinking skills needed to understand and to create sophisticated arguments supported by quantitative data.
- <http://serc.carleton.edu/nnn/index.html>

AAC&U VALUE RUBRIC FOR QUANTITATIVE LITERACY

| Dimension | Criteria for Capstone Proficiency |
|--|---|
| <p>Interpretation Ability to explain information presented in mathematical forms (e.g., equations, graphs, diagrams, tables, words).</p> | <p>Provides accurate explanations of information presented in mathematical forms. Makes appropriate inferences based on that information. <i>For example, accurately explain the trend data shown in a graph and make reasonable predictions regarding what the data suggest about future events.</i></p> |
| <p>Representation Ability to convert relevant information into various mathematical forms (e.g., equations, graphs, diagrams, tables, words).</p> | <p>Skillfully converts relevant information into an insightful mathematical portrayal in a way that contributes to a further or deeper understanding.</p> |
| <p>Calculation</p> | <p>Calculations attempted are essentially all successful and sufficiently comprehensive to solve the problem. Calculations are also presented elegantly (clearly, concisely)</p> |
| <p>Application / Analysis Ability to make judgments and draw appropriate conclusions based on the quantitative analysis of data, while recognizing the limits of this analysis.</p> | <p>Uses the quantitative analysis of data as the basis for deep and thoughtful judgments, drawing insightful, carefully qualified conclusions from this work.</p> |
| <p>Assumptions Ability to make and evaluate important assumptions in estimation, modeling, and data analysis.</p> | <p>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.</p> |
| <p>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).</p> | <p>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.</p> |

CAL STATE LA'S GE BLOCK B4 LEARNING OUTCOMES

- *Outcome 1:* Use mathematical concepts and quantitative reasoning to solve problems, both in a pure mathematical context and in real-world contexts.
- *Outcome 2:* Interpret information presented in a mathematical form (e.g. equations, graphs, diagrams, tables, words) and convert relevant information into a mathematical form.
- *Outcome 3:* Draw appropriate conclusions based on the quantitative analysis of data, recognizing any underlying assumptions or limits of this analysis.
- *Outcome 4:* Use deductive reasoning in a pure mathematical context to draw conclusions and provide an irrefutable logical justification for them.
- *Outcome 5:* Formulate and communicate a position on a real-world question and use appropriate quantitative information in support of that position, and evaluate the soundness of such an argument.

AAC&U VALUE RUBRIC FOR INQUIRY AND ANALYSIS

| Dimension | Criteria for Capstone Proficiency |
|---|---|
| Topic selection | Identifies a creative, focused, and manageable topic that addresses potentially significant yet previously less explored aspects of the topic. |
| Existing knowledge, research, and/or views | Synthesizes in depth information from relevant sources representing various points of view/approaches. |
| Design process | All elements of the methodology or theoretical framework are skillfully developed. Appropriate methodology or theoretical frameworks may be synthesized from across disciplines or from relevant sub-disciplines. |
| Analysis | Organizes and synthesizes evidence to reveal insightful patterns, differences, or similarities related to focus. |
| Conclusions | States a conclusion that is a logical extrapolation from the inquiry findings. |
| Limitations and implications | Insightfully discusses in detail relevant and supported limitations and implications |

QUIRK RUBRIC

For additional information on Carleton's Quirk initiative, see <http://serc.carleton.edu/quirk>.

| | 1 | 2 | 3 | 4 |
|-----------------------------|--|--|---|--|
| Central Relevance | <p>Use of numerical evidence is so poor that either it is impossible to evaluate the argument with the information presented or the argument is clearly fallacious. Perhaps key aspects of data collection methods are missing or critical aspects of data source credibility are left unexplored. The argument may exhibit glaring misinterpretation (for instance, deep confusion of correlation and causation). Numbers may be presented, but are not woven into the argument.</p> | <p>The use of numerical evidence is sufficient to allow the reader to follow the argument. But there may be times when information is missing or misused. Perhaps the use of numerical evidence itself is uneven. Or the data are presented effectively, but a lack of discussion of source credibility or methods makes a full evaluation of the argument impossible. Misinterpretations such as the confusion of correlation and causation may appear, but not in a way that fundamentally undermines the entire argument.</p> | <p>The use of numerical evidence is good throughout the argument. Only occasionally (and never in a manner that substantially undermines the credibility of the argument) does the paper fail to explore source credibility or explain methods when needed. While there may be small, nuanced errors in the interpretation, the use of numerical evidence is generally sound.</p> | <p>The use of numerical evidence is consistently of the highest quality. When appropriate, source credibility is fully explored and methods are completely explained. Interpretation of the numerical evidence is complete, considering all available information. There are no errors such as confusion of correlation and causation.</p> |
| Peripheral Relevance | <p>Fails to use any explicit numerical evidence to provide context. The paper is weaker as a result. This paper shows no attempt to employ peripheral QR.</p> | <p>Uses numerical evidence to provide context in some places, but not in others. The missing context weakens the overall paper. Or the paper may consistently provide data to frame the argument, but fail to put that data in context by citing other numbers for comparison.</p> | <p>The paper consistently provides numerical evidence to contextualize the argument when appropriate. Moreover, numbers are presented with comparisons (when needed) to give them meaning. However, there may be times when a better number could have been chosen or more could have been done with a given figure.</p> | <p>Throughout the paper, numerical evidence is used to frame the argument in an insightful and effective way. When needed, comparisons are provided to put numbers in context.</p> |

OTHER INFORMATION ON THE QUIRK RATING SHEET

- Problematic characteristics of the QR present in the paper:

___ Uses ambiguous words rather than numbers.

___ Fails to provide numbers that would contextualize the argument.

___ Fails to describe own or others' data collection methods.

___ Doesn't evaluate source or methods credibility and limitations.

___ Inadequate scholarship on the origins of quantitative information cited.

___ Makes an unsupported claim about the causal meaning of findings.

___ Presents numbers without comparisons that might give them meaning.

___ Presents numbers but doesn't weave them into a coherent argument.

For additional information on Carleton's Quirk initiative, see <http://serc.carleton.edu/quirk>.

QUANTITATIVE LITERACY PORTFOLIO RUBRIC

| | Exceeds Expectations | Meets Expectations | Below Expectations | Well Below Expectations |
|---|---|---|---|---|
| Interpretation <i>Ability to explain information presented to the student in the form of equations, graphs, diagrams, tables, words, etc.</i> | Provides accurate explanations of information presented in mathematical forms. Makes appropriate inferences based on that information. | Provides accurate explanations of information presented in mathematical forms. | Provides somewhat accurate explanations of information presented in mathematical forms, but occasionally makes minor errors related to computations or units. | Attempts to explain information presented in mathematical forms, but draws incorrect conclusions about what the information means. |
| Manipulation <i>Ability of the student to convert relevant information from one form—such as equations, graphs, diagrams, tables, words—to another.</i> | Skillfully converts relevant information into an insightful mathematical portrayal in a way that contributes to a further or deeper understanding. | Competently converts relevant information into an appropriate and desired mathematical portrayal. | Completes conversion of information but resulting mathematical portrayal is only partially appropriate or accurate. | Completes conversion of information but resulting mathematical portrayal is inappropriate or inaccurate. |
| Communication <i>Ability of the student to express 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)</i> | 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. | Uses quantitative information in connection with the argument or purpose of the work, though data may be presented in a less than completely effective format or some parts of the explication may be uneven. | Uses quantitative information, but does not effectively connect it to the argument or purpose of the work. | Presents an argument for which quantitative evidence is pertinent, but does not provide adequate explicit numerical support. (May use quasi-quantitative words such as “many,” “few,” “increasing,” “small,” and the like in place of actual quantities.) |

Hubert, D. A., & Lewis, K. (2014). A framework for general education assessment: Assessing information literacy and quantitative literacy with ePortfolios. *International Journal of ePortfolio*, 4, 61-71.

SELECTING OR DESIGNING ASSIGNMENTS FOR ASSESSMENT



STANDARDIZED ASSESSMENTS

- National Assessment of Adult Literacy
 - <http://nces.ed.gov/naal/>
- Assessment Resource Tools for Improving Statistical Thinking (ARTIST) and Comprehensive Assessment of Outcomes in a first year Statistical Course test (CAOS) tests:
 - <https://apps3.cehd.umn.edu/artist/index.html>
- California Critical Thinking Skills Test with Numeracy
 - <http://www.insightassessment.com/>
- Other examples of assessment instruments:
 - https://serc.carleton.edu/NICHE/ex_qr_assessment.html

QR WRITING ASSIGNMENTS: TYPE 1



- Require students to use evidence from a provided source with multiple charts and tables or from sources they choose themselves.
 - Intro. to Latino/Latina Studies assignment that asks students to find "stories" within a census table summarizing educational attainment by race and gender.
 - An economics assignment asking to analyze the employment effects of the minimum wage using a theoretical model of supply and demand and data from the Statistical Abstract of the United States.

QR WRITING ASSIGNMENTS: TYPE 2

- Require students to collect their own data to analyze.
 - Natural science lab reports.
 - Sociology assignment requiring students to keep and then analyze a time diary.
 - A first-year seminar that asks students to tally and explore prevalence of social behaviors at a local city festival would also fit this type.



WHAT IS A SIGNATURE ASSIGNMENT?

- Embedded in a course
- Used for course grade and program assessment
- Aligned with Program Learning Outcomes
- Collaboratively designed by faculty
- Meaningful and integrative
- Why?
 - Allows a program to assess learning across course sections or instructors
 - Creates consistency
 - Useful for assessing course sections with different modalities/pedagogies

SOME FOUNDATIONAL QUANTITATIVE REASONING QUESTIONS

- What do the numbers show?
 - Is there numerical evidence to support a claim?
 - How can seeking and analyzing numbers illuminate important phenomena?
 - How plausible is a possibility in light of data?
- How representative is that?
 - Are there meaningful subgroups?
 - What's the central tendency? What are the odds? What is the base rate?
- Compared to what?
 - What's the unit of measurement?
 - What is the implicit or explicit frame of reference?
- Is the outcome statistically significant or likely to be due to chance?
- What's the effect size?
 - How large is the difference?
- Are the results those of a single study or of a literature?
- What's the research design (correlational or experimental)?
- How was the variable operationalized?
- Who's in the measurement sample?
- Controlling for what?



ASSIGNMENTS TO INVITE QUANTITATIVE REASONING

Example 1: Cultural Analysis of Film

- Students choose one of the cultural topics they analyzed in class after viewing three current French films (e.g., education, art,, immigration, socio-economic status, communication, spatial boundaries, and social networks).
- Students must first define the very precisely circumscribed phenomenon they will study as they research its statistical significance on a cultural level.
- By integrating socio-economic data analysis and the study of the movie, students evaluate the worth of the fiction as a faithful or distorted mirror of its society.

https://serc.carleton.edu/quirk/quantitative_writing/examples/33554.html

ASSIGNMENTS TO INVITE QUANTITATIVE REASONING

Example 2: Teaching Economics Students to Assess the State of the Economy

- Students are asked to collect and analyze data on a few macro economic aggregates to give them a first taste of empirical work.
- Students must create data tables and charts using a spreadsheet, and draw conclusions based on three variables which may be telling somewhat different stories. Critical decisions include which measures of GDP Growth, inflation, and unemployment to choose, and how to weight them in reaching a conclusion about the overall state of the economy.

https://serc.carleton.edu/quirk/quantitative_writing/examples/31123.html

ACTIVITY #2: QUANTITATIVE WRITING EXAMPLES

- View some examples of QR writing assignments from a closely related discipline to your own:

https://serc.carleton.edu/quirk/quantitative_writing/examples.html

- What kind of writing assignment could be used for assessment of quantitative reasoning among majors in your program?
- In which course(s) could this assignment be given?

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DEVELOPING YOUR PLAN OF ACTION

WHERE ARE THESE OUTCOMES TAUGHT IN YOUR CURRICULUM?

| | 1500 | 2000 | 3020 | 3040 | 3080 | 3100 | 3220 | 3230 | 4110 | 4120 | 4250 | 4650 |
|------|------|------|------|------|------|------|------|------|------|------|------|------|
| PLO1 | I | | D | | D | D | | | D | D | M | M |
| PLO2 | | I | D | | | | | | D | | | M |
| QR | | I | | | D | | | D | | | | M |
| PLO4 | I | D | | D | D | D | D | D | | D | M | M |
| PLO5 | | I | | D | D | | | | | | | M |
| PLO6 | | I | | D | | | | | | | | |
| PLO7 | I | | D | | | D | | | M | | | M |

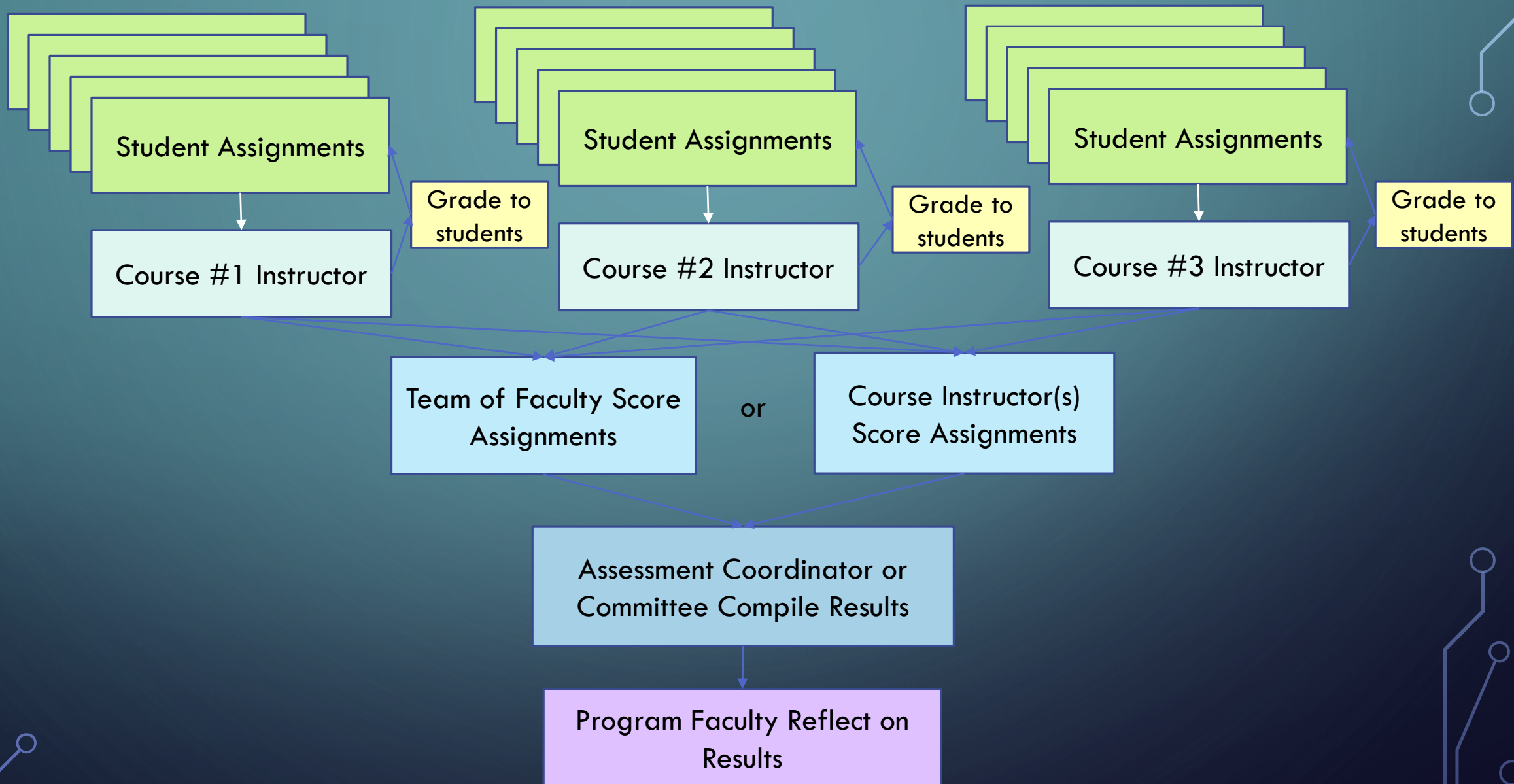
I = Introduced; D = Developed/Reinforced; M = Mastered

CHOOSE COURSES TO CONDUCT ASSESSMENTS

| | 1500 | 2000 | 3020 | 3040 | 3080 | 3100 | 3220 | 3230 | 4110 | 4120 | 4250 | 4650 |
|------|------|------|------|------|------|------|------|------|------|------|------|------|
| PLO1 | I | | D | | D | D | | | D | D | M | M |
| PLO2 | | I | D | | | | | | D | | | M |
| QR | | I | | | D | | | D | | | | M |
| PLO4 | I | D | | D | D | D | D | D | | D | M | M |
| PLO5 | | I | | D | D | | | | | | | M |
| PLO6 | | I | | D | | | | | | | | |
| PLO7 | I | | D | | | D | | | M | | | M |

I = Introduced; D = Developed/Reinforced; M = Mastered

GATHER AND EVALUATE



CHOOSING AND MODIFYING RUBRICS TO MEET YOUR NEEDS

- **Decide on minimum criteria for proficiency.**
- **VALUE rubrics use this terminology:**
 - **Capstone**- culminating level of achievement expected for baccalaureate degree
 - **Milestones**- progressively more sophisticated performance
 - *Not* intended for 1 = freshmen, 2 = sophomore, or 4 = A, 3 = B, etc.

MODIFYING RUBRICS

- Rubrics must be modified for each project
- Add more specific criteria based on your program or assignment
- Add new dimensions to reflect issues important to your program

Figure 8. Modification of the VALUE rubric for civic engagement (tracked changes show relabeling of criteria, combination of two criteria, and additional changes to reflect campus context)

| | CAPSTONE 4 | MILESTONE 3 | MILESTONE 2 | BENCHMARK 1 |
|---------------------------------------|--|--|--|--|
| <u>Civic Literacy (Knowledge)</u> | <u>Connects and extends knowledge (facts, theories, etc.) of civic contexts, structures and systems within one's own academic study/field/discipline and beyond (multidisciplinary)</u> | <u>Analyzes knowledge (facts, theories, etc.) of civic contexts, structures and systems by making relevant connections to one's own academic study/field/discipline.</u> | <u>Begins to connect knowledge (facts, theories, etc.) of civic contexts, structures and systems to one's own academic study/field/discipline.</u> | <u>Begins to identify knowledge (facts, theories, etc.) of civic contexts, structures and systems.</u> |
| Analysis of Knowledge | Connects and extends knowledge (facts, theories, etc.) from one's own academic study/field/discipline to civic engagement and to one's own participation in civic life, politics, and government. | Analyzes knowledge (facts, theories, etc.) from one's own academic study/field/discipline by making relevant connections to civic engagement and to one's own participation in civic life, politics, and government. | Begins to connect knowledge (facts, theories, etc.) to civic engagement and to one's own participation in civic life, politics, and government. | Begins to identify knowledge (facts, theories, etc.) from one's own academic study/field/discipline that is relevant to civic engagement and to one's own participation in civic life, politics, and government. |
| <u>Civic Communication and Skills</u> | Tailors communication strategies, <u>participation and advocacy skills</u> and advocacy skills to effectively express, listen, and adapt to others to establish relationships to further civic action | Effectively communicates, <u>participates and advocates</u> in civic context, showing ability to do all of the following: express, listen, and adapt ideas and messages based on others' perspectives. | Communicates, <u>participates and advocates</u> in civic context, showing ability to do more than one of the following: express, listen, and adapt ideas and messages based on others' perspectives. | Communicates, <u>participates and advocates</u> in civic context, showing ability to do one of the following: express, listen, and adapt ideas and messages based on others' perspectives. |
| <u>Civic Responsibility (Values)</u> | <u>Demonstrates ability and commitment to collaboratively work across and within community contexts and structures to achieve a civic aim.</u> | <u>Demonstrates ability and commitment to work actively within community contexts and structures to achieve a civic aim.</u> | <u>Demonstrates experience identifying intentional ways to actively participate in civic contexts and structures.</u> | <u>Demonstrates a willingness for passive but not active participation in civic context and structures.</u> |

SCORING ASSIGNMENTS: RUBRIC CALIBRATION

- Hold a calibration session with all instructors or faculty scorers.
- Begin with a close reading of the rubric and identify areas of discussion.
- Faculty should come to an agreement on interpretation of language in rubric.
- Faculty are given an example of student work to score.
- Discuss scores row by row. Faculty provide rationale for their scores and try to reach consensus.
- Goal is to identify two scores around with the majority cluster.
- Repeat with more examples of student work (high, low, medium)

DOS AND DON'TS OF DATA COLLECTION AND ANALYSIS

DO

- Form a department assessment committee charged with regularly collecting and disseminating data
- Ask for faculty volunteers
- Give faculty early notice regarding assessment plans
- Collect CINs or other information so you can disaggregate results across populations
- Conduct a norming session for the use of the rubric
- Protect the confidentiality and anonymity of students and faculty by examining results at the group level
- Use results to inform changes

DON'T

- Wait until the last minute
- Pressure faculty to comply with assessment activities
- Use assessment results to call attention to, judge, or punish individual faculty or students
- Expect perfection
- Collect more data than you can use

USING RESULTS TO CREATE A CULTURE OF EVIDENCE

- Use results:
 - To examine skill development across the curriculum
 - To examine curriculum content coverage and areas for program modification
 - To improve instruction and introduce new pedagogies
 - Contact CETL for resources and support
 - To improve and refine your assessment process/methods



ACTIVITY #3: ASSESSMENT PLAN

- What assignment or activity will you use?
- How will you score student achievement?
- What classes would you target for sampling and when?
- Which faculty will be responsible for coordinating data collection?

Data analysis?

- How will you analyze the results? Will you disaggregate results in some way?
- How will results be shared, discussed, and used to make changes?

CAL STATE LA'S COORDINATED QR ASSESSMENT PROJECT 2018-2019

- Goal is to collect evidence of QR at the upper division level across programs.
- Participating programs will develop their own signature assignments or select assignments from courses.
- The university assessment team will develop a rubric with input from the Educational Effectiveness and Assessment Council.
- Programs will be invited to use the rubric and participate in norming sessions in the spring.
- Programs will score their own assignments and submit results by fall 2019.

ADVANTAGES TO PARTICIPATION IN THE QR ASSESSMENT PROJECT

- Contribute to an institutional effort to understand how quantitative reasoning is conceptualized across disciplines.
- Provide a common metric to discuss QR and promote the development of these skills across the curriculum from GE to upper division.
- Opportunity to participate in a norming session and learn how to coordinate the use of rubrics.

QUANTITATIVE REASONING RESOURCES

- Carleton Quantitative Inquiry, Reasoning, and Knowledge (QuIRK) initiative:
 - <https://apps.carleton.edu/quirk/design/resources/>
- Assessment Resource Tools for Improving Statistical Thinking (ARTIST):
 - <https://apps3.cehd.umn.edu/artist/index.html>
- Numeracy Infusion Course for Higher Education:
 - https://serc.carleton.edu/NICHE/ex_qr_assessment.html

OTHER RESOURCES AND CREDITS

- Cal State LA Assessment Resources website:
 - <http://www.calstatela.edu/apra/assessment-resources>
- “Quantitative Reasoning: The Final Frontier of Core Competencies” Presentation slides by Elrod, S. at the 2016 WASC Senior College and University Commission: 5 Core Competencies Workshop in Pomona, CA.
- Signature Assignment Resources:
 - “Using the VALUE Rubrics for Improvement of Learning and Authentic Assessment” by Rhodes & Finley (2013) Association of American Colleges and Universities
 - “Using Signature Assignments for Program-Level Assessment” Presentation Slides by University of Hawaii, Manoa
 - University of Texas signature assignments webpage:
 - <https://ugs.utexas.edu/sig/plan/samples/writing-model4>