

# Scientific Literacy Competency

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ASSESSMENT BRIEF UPDATE

2015 TO 2018

# How is Scientific Literacy Defined?

**The General Education Program Governance & Policies document**

**specifies**

**G2**

**course competencies.**

Upon successful completion of a student's G2 sequence they will be able to:

## **Outcomes for Scientific Reasoning.**

- a) Identify strategies for logical problem solving
- b) Recognize that scientific explanations offer falsifiable predictions
- c) Identify evidence that supports scientific claims
- d) Recognize that the nature of scientific discovery and knowledge is fluid
- e) Understand that fact, theory, and law are not a hierarchy

# How is Mathematical Reasoning Assessed?

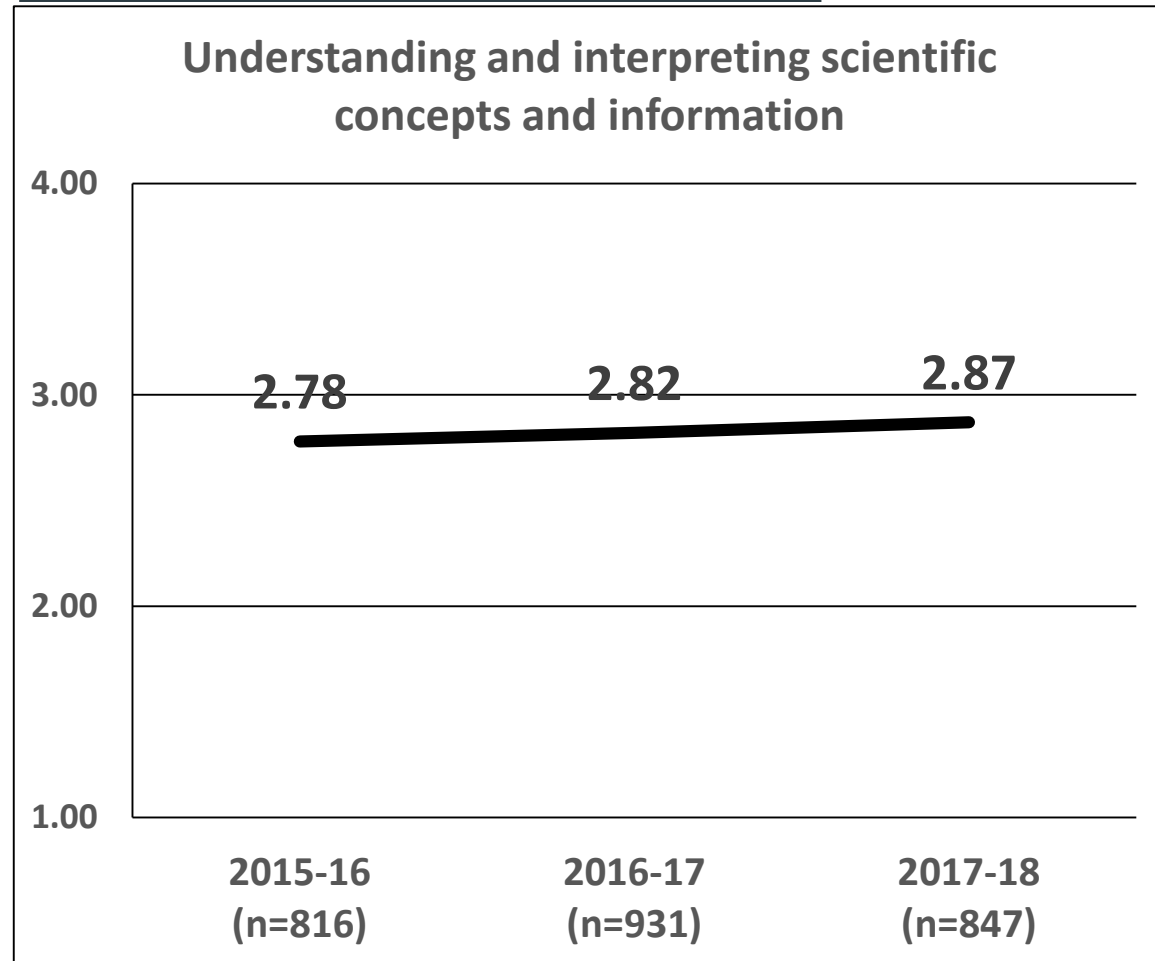
In the general education program, Mathematical Reasoning is assessed by both direct and indirect evidence.

Measures	2015-16	2016-17	2017-18	2018-19
<b>TOSLS MU</b>				
<b>Lower Division Courses (GenEd PreTest/PostTest or Major PreTest)</b>	not collected	414 PreTest 265 PostTest BIOL 100, ESCI 120, PHYS 117 (Spring 2017)	864 PreTest 581 PostTest BIOL 100, ESCI 102/104/120, PHYS 104/117 UNIV 103 (Math/CSCI) (Fall 2017)	258 PreTest CHEM 111 UNIV 103 (Math/CSCI) (Fall 2018)
<b>Upper Division Courses (PreTest Only in Major-based courses)</b>	not collected	not collected	not collected	36 PreTest CHEM 487, ESCI 441 (Fall 2018)
<b>National Survey of Student Engagement</b>	not collected	307 First-Years 396 Seniors	not collected	Being collected
<b>Senior Exit Survey</b>	815 seniors	931 seniors	848 seniors	Being collected
<b>Alumni Job Placement Survey (~1 yr out)</b>	750 alumni	622 alumni	686 alumni	To be collected fall 2019
<b>Internship Field Supervisor Feedback</b>	not applicable	not applicable	not applicable	not applicable

# Comparison of Senior & Alumni *Perceptions* of Scientific Literacy

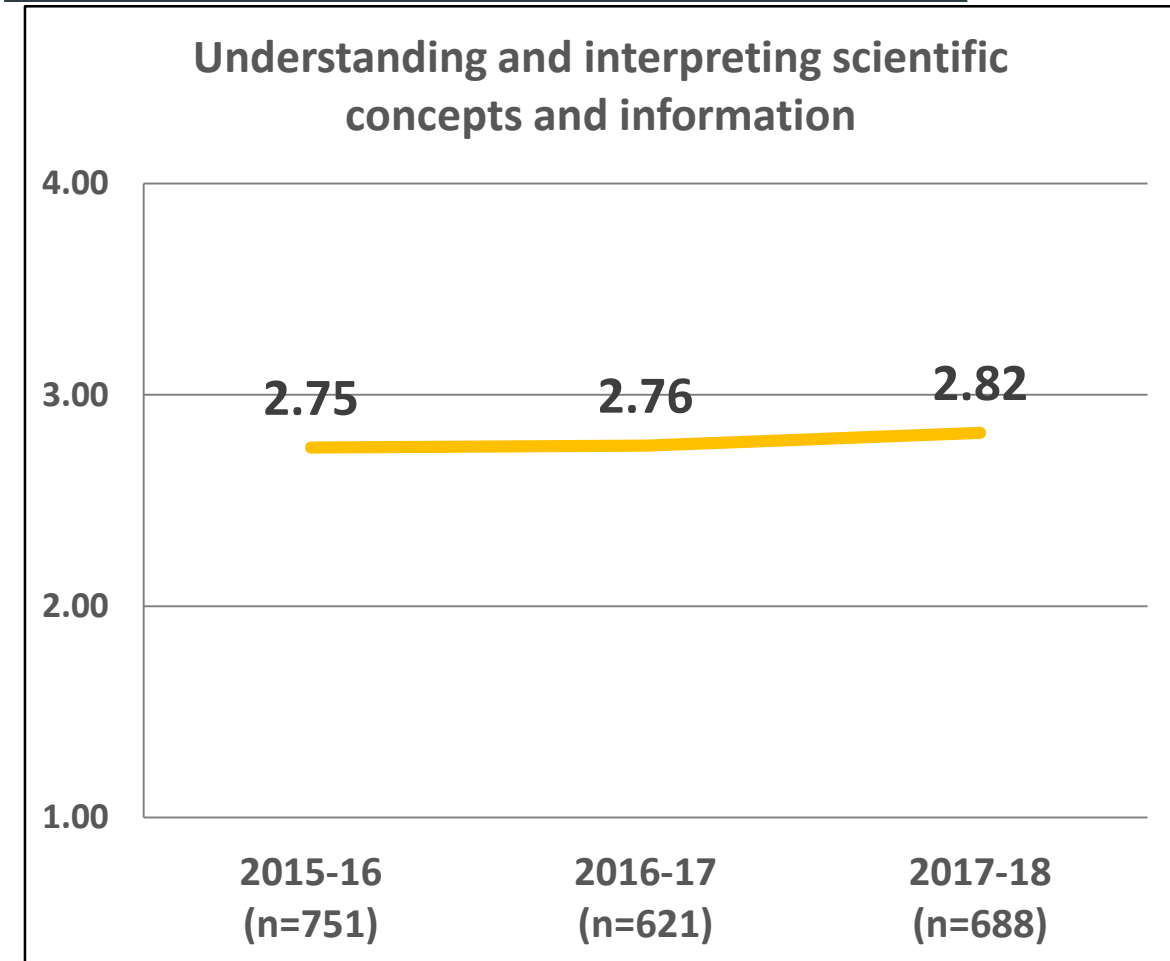
[Experience contributed to your knowledge, skills, and personal development where 1=Very little, 2=Some, 3=Quite a bit, 4=Very much]

## SENIORS AT GRADUATION



[Senior perceptions per Senior Exit Survey administered last two weeks before commencement.]

## ALUMNI 6 TO 10 MONTHS OUT



[Alumni perceptions per Alumni Job Placement Survey administered about six to ten months after commencement.]

# Student *Performance* on Scientific Literacy (MU TOSLS)

<b>Scientific Reasoning (Items from TOSLS-MU)</b>	Q#	<b>100 Level Non-Majors Pre-Test Mean (Spring 2017) (n=414)</b>	<b>100 Level Non-Majors Post-Test Mean (Spring 2017) (n=265)</b>	Q#	<b>100 Level Non-Majors Pre-Test Mean (Fall 2017) (n=864)</b>	<b>100 Level Non-Majors Post-Test Mean (Fall 2017) (n=581)</b>	Q#	<b>100 Level Majors Pre-Test Mean (Fall 2018) (n=258)</b>	<b>400 Level Majors Pre-Test Mean (Fall 2018) (n=36)</b>
<b>Valid Scientific Argument</b>	8	<b>55.5%</b>	<b>61.5%</b>						
	12	<b>57.0%</b>	<b>49.9%</b>	7	<b>59.9%</b>	<b>64.3%</b>	7	<b>64.4%</b>	<b>86.0%</b>
<b>Validity of Sources</b>	14	<b>40.7%</b>	<b>44.1%</b>	13	<b>45.3%</b>	<b>53.7%</b>	13	<b>53.7%</b>	<b>81.0%</b>
	19	<b>59.0%</b>	<b>68.7%</b>	18	<b>62.5%</b>	<b>68.3%</b>	18	<b>65.8%</b>	<b>89.3%</b>
<b>Use and Misuse of Scientific Info</b>	7	<b>76.6%</b>	<b>76.3%</b>	6	<b>78.6%</b>	<b>84.1%</b>	6	<b>81.8%</b>	<b>89.3%</b>
	9	<b>58.2%</b>	<b>57.7%</b>	8	<b>55.2%</b>	<b>62.6%</b>	8	<b>67.7%</b>	<b>89.0%</b>
<b>Research Design</b>	4	<b>42.9%</b>	<b>43.0%</b>	4	<b>44.5%</b>	<b>48.8%</b>	4	<b>48.4%</b>	<b>66.7%</b>

***MU instruments are located on your table.***

Assessment initiative led by General Education Coordinator, Dr. Lynn Marquez, in collaboration with SCTE faculty.

# Student *Performance* on Scientific Literacy (TOSLS)

<b>Nature of Science (NOS) (Items from TOSLS-MU)</b>	Q#	100 Level Non-Majors Pre-Test Mean (Spring 2017) (n=414)	100 Level Non-Majors Post-Test Mean (Spring 2017) (n=265)	Q#	100 Level Non-Majors Pre-Test Mean (Fall 2017) (n=864)	100 Level Non-Majors Post-Test Mean (Fall 2017) (n=581)	Q#	100 Level Majors Pre-Test Mean (Fall 2018) (n=258)	400 Level Majors Pre-Test Mean (Fall 2018) (n=36)
<b>NOS</b>	1	<b>33.0%</b>	<b>47.1%</b>	1	<b>36.8%</b>	<b>52.2%</b>	1	<b>44.3%</b>	<b>58.7%</b>
	3	<b>31.8%</b>	<b>27.9%</b>	3	<b>34.9%</b>	<b>42.3%</b>	3	<b>41.4%</b>	<b>41.7%</b>
	6	<b>48.8%</b>	<b>55.0%</b>	10	<b>33.9%</b>	<b>46.4%</b>	10	<b>45.4%</b>	<b>53.0%</b>
				20	<b>52.8%</b>	<b>60.4%</b>	20	<b>55.1%</b>	<b>61.3%</b>
<b>Falsification</b>	13	<b>45.1%</b>	<b>54.9%</b>	12	<b>42.7%</b>	<b>48.2%</b>	12	<b>42.6%</b>	<b>42.0%</b>
<b>Scientific Discovery</b>	5	<b>24.7%</b>	<b>16.4%</b>	5	<b>90.3%</b>	<b>90.6%</b>	5	<b>91.3%</b>	<b>97.3%</b>

***MU instruments are located on your table.***

Assessment initiative led by General Education Coordinator, Dr. Lynn Marquez, in collaboration with SCTE faculty.

# Discussion

## What do the results mean?

**In your small group, discuss the follow:**

### **1) What does the evidence demonstrate?**

- Does the assessment evidence presented demonstrate added value? How?
- Are students gaining skills as presented in these results?

### **2) Are you satisfied with results?**

- If so, what learning experiences contribute to the achievement of the competency?
- If not, how might we make improvements to the learning experiences?

### **3) Share highlights of your discussion with the larger group.**