

# GENERAL EDUCATION LEARNING GOALS

## 4. QUANTITATIVE AND SCIENTIFIC REASONING

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- 4.1. Describe and delineate the components of the scientific method
- 4.2. Apply scientific and mathematical methods to solving problems
- 4.3. Collect, graph, and summarize data and make relevant observations and statements of results and formulate questions
- 4.4. Evaluate evidence and determine if conclusions based upon data are valid and reliable
- 4.5. Distinguish sound scientific works from non-scientific works

# ASSESSMENT METHODS

- Various assignments were used to assess learning goals 4.1-4.5 throughout the Fall 2024 semester.
- These assignments were administered to students well after introducing their included subject material to students.
- Each biology instructor used the same exact assessment assignments for each stated learning goal.
- We compared the total number of student successes to the total number of student attempts and then presented our results as a percentage for each assessment assignment.
- Students were considered “successful” on an assessment assignment if they scored 80% or above on that assignment.

## 4.1. DESCRIBE AND DELINEATE THE COMPONENTS OF THE SCIENTIFIC METHOD

		Percentage Scoring 80% or above
Attempts	82	90.24% (82.4 % Fall 2022)
Successes	74	

## 4.2. APPLY SCIENTIFIC AND MATHEMATICAL METHODS TO SOLVING PROBLEMS

		Percentage Scoring 80% or above
Attempts	80	88.75% (90.5% Fall 2022)
Successes	71	

## 4.3. COLLECT, GRAPH, AND SUMMARIZE DATA AND MAKE RELEVANT OBSERVATIONS AND STATEMENTS OF RESULTS AND FORMULATE QUESTIONS

- Collecting and Graphing data

		<b>Percentage Scoring 80% or above</b>
Attempts	80	86.3% (87.8% Fall 2022)
Successes	69	

- Interpreting graphs

		<b>Percentage Scoring 80% or above</b>
Attempts	80	91.25% (83.8% Fall 2022)
Successes	73	

## 4.4. EVALUATE EVIDENCE AND DETERMINE IF CONCLUSIONS BASED UPON DATA ARE VALID AND RELIABLE

		Percentage Scoring 80% or above
Attempts	80	92.5% (87.3% Fall 2022)
Successes	74	

## 4.5. DISTINGUISH SOUND SCIENTIFIC WORKS FROM NON-SCIENTIFIC WORKS

		Percentage Scoring 80% or above
Attempts	80	85.0% (81.6% Fall 2022)
Successes	68	

# SUMMARY

- **90.24 %** of students could describe and delineate the components of the scientific method (4.1)
- **88.75 %** of students could apply scientific and mathematical methods to solve problems (4.2)
- **86.3 %** of students could collect, graph, and summarize data and **91.25%** of students could make relevant observations and statements of results and formulate questions (4.3)
- **92.5%** of students could evaluate evidence and determine if conclusions based upon data are valid and reliable (4.4)
- **85.0%** of students could distinguish sound scientific works from non-scientific works (4.5)
- All 5 learning outcomes were achieved with at least 80% proficiency by 80% or more of the general biology students enrolled in General Biology sections for the Fall 2024 semester.