Section 1 – Program Mission and Educational Objectives

Program Mission:

The Bachelor of Science program in Biology-Health Sciences (BHS) prepares undergraduate students for professional and graduate schools in the medical sciences (medicine, dentistry, pharmacy, veterinary sciences, physical therapy, physician assistant, etc.).

Mission Alignment:

The BHS program has the following Educational Objectives:

- Provide an integrated foundation of knowledge in biological disciplines that includes morphological, cellular, molecular, physiological, developmental, and evolutionary principles.
- Train students to utilize the scientific method and develop skills in analysis, evaluation, and critical thinking, as well as communication, team building, and professionalism.
- Prepare students for entrance into graduate schools and professional health schools, including preparation for national admissions examinations such as the Graduate Record Examination (GRE), Medical College Admission Test (MCAT), Dental School Admissions Test (DAT), and similar examinations, or qualify them for entry level positions in biology and health-related occupations.

Section 2 – Program Student Learning Outcomes

Upon completion of the program, students will have demonstrated the following abilities:

- PSLO 1 - Demonstrate scientific knowledge and understanding.
  - Demonstrate foundational knowledge in the natural sciences (e.g., terminology, organization, classifications, appropriate use of units, methodologies, and fundamental principles).
  - Apply scientific principles to biological and medical examples/contexts.
- PSLO 2 - Be proficient in scientific reasoning and critical thinking.
  - Analyze data to determine its relationship to principles and evaluate the data for errors.
  - Analyze and evaluate content in biology.
- PSLO 3 - Be able to effectively find and use resources from literature.

- PSLO 4 - Demonstrate effective oral, written and visual communication.
- PSLO 5 - Demonstrate mathematical knowledge and skills in the biological sciences.

In the last year, BHS faculty briefly discussed whether PSLOs 3 and 4 are a focus of our program and if it should still be included, but no decisions or changes were made. BHS faculty discussed creating an external advisory board that could help guide our decisions to ensure we are properly preparing students.

Section 3 – Curriculum Map

PSLOs are aligned with Institutional Student Learning Outcomes (ISLOs).

ISLO 1 – Communication
ISLO 2 – Inquiry & Analysis
ISLO 3 – Ethical Reasoning
ISLO 4 – Quantitative Literacy
ISLO 5 - Teamwork
ISLO 6 – Diverse Perspectives

PSLOs and ISLOs are assessed at three levels and each PSLO/ISLO addressed by each course is listed at the appropriate level.
- Foundational (F) – introduction to the concept
- Practice (P) – performance within programmatic coursework that builds on foundational knowledge
- Capstone (C) – synthesis of knowledge from multiple areas in coursework in application of professional level practice

University	ISLO 1,3,6	ISLO 2,5	ISLO 3,6	ISLO 1,5	ISLO 2,4
Program	PSLO 1	PSLO 2	PSLO 3	PSLO 4	PSLO 5
FRESHMAN YEAR					
BIO 109 - Intro to Medical Sciences Credit Hours: 2			F	F	
BIO 211 - Principles of Biology Credit Hours: 4	F	F			
BIO 212 - Principles of Biology Credit Hours: 4	F	F			
BIO 213 - Principles of Biology Credit Hours: 4	F	F			
SOPHOMORE YEAR					
BIO 209 - Current Research Tpc Med Sci I Credit Hours: 1		F	F	F	
BIO 345 - Medical Microbiology Credit Hours: 5	P	P			
CHE 221 - General Chemistry I Credit Hours: 5	F	F			F
CHE 222 - General Chemistry II Credit Hours: 5	F	F			F
CHE 223 - General Chemistry III Credit Hours: 5	F	F			F

JUNIOR YEAR					
BIO 331 - Human Anatomy/Physiology I Credit Hours: 5	P	P			
BIO 332 - Human Anatomy/Physiology II Credit Hours: 5	P	P			
BIO 333 - Human Anatomy/Physiology III Credit Hours: 5	P	P			
CHE 331 - Organic Chemistry I Credit Hours: 4	P	P			P
CHE 332 - Organic Chemistry II Credit Hours: 4	P	P			P
CHE 333 - Organic Chemistry III Credit Hours: 4	P	P	P	P	P
PHY 221 - General Physics w/Calculus Credit Hours: 4 d	F	P			P
PHY 222 - General Physics w/Calculus Credit Hours: 4 d	F	P			P
PHY 223 - General Physics w/Calculus Credit Hours: 4 d	F	P			P
SENIOR YEAR					
BIO 346 - Pathophysiology I Credit Hours: 3	C	C			
BIO 409 - Crnt Rsch Tpcs in Med Sci II Credit Hours: 2		C	C	C	
CHE 450 - Biochemistry I Credit Hours: 4	C	C			C
CHE 451 - Biochemistry II Credit Hours: 4	C	C			C
Health Biology Electives (lower-division):					
BIO 200 - Medical Terminology Credit Hours: 2	F	F			
BIO 205 - Nutrition Credit Hours: 3	F	F	P	P	
BIO 216 - Intro to Veterinary Medicine Credit Hours: 4	F	F			
BIO 226 - Intro to Wildlife Rehab Credit Hours: 3	F	F			
Health Biology Electives (upper-division):					
BIO 326 - Parasitology Credit Hours: 4	P	P			
BIO 341 - Medical Genetics Credit Hours: 3	P	P	P	P	
BIO 342 - Cell Biology Credit Hours: 4	P	P			
BIO 347 - Pathophysiology II Credit Hours: 3	P	P			
BIO 352 - Developmental Biology Credit Hours: 4	P	P			
BIO 357 - Intro to Neuroscience Credit Hours: 3	P	P	P	P	
BIO 426 - Evolutionary Biology Credit Hours: 3	P	P			
BIO 435 - Exercise Physiology Credit Hours: 3	P	P			
BIO 436 - Immunology Credit Hours: 4	P	P			
BIO 461 - Human Cadaver Dissection Credit Hours: 1	C	C			
BIO 462 - Human Cadaver Dissection Credit Hours: 1	C	C			
BIO 495 - Research Project in Biology Credit Hours: Varies (1-4)		C	C	C	C
CHE 360 - Clinical Pharmacology/Hlth Prf Credit Hours: 3	P	P			
CHE 452 - Biochemistry III Credit Hours: 4	C	C			C
CHE 495 - Research Project in Chemistry Credit Hours: Varies (1-4)		C	C	C	C
STAT 414 - Stat Methods in Epidemiology Credit Hours: 4	P	P			

Section 4 – Assessment Cycle

The assessment cycle was revised in AY21-22 to better align PSLO assessment with ISLO assessment. Each PSLO and ISLO is assessed every three years. This content should remain relatively static from year to year.

ISLO	PSLO	Act 2022-2023	Collect 2023-2024	Plan 2024-2025
ISLO 1 **Communication**	**PSLO 4** **Communication**			C BIO 409 - Crnt Rsch Tpcs in Med Sci II
ISLO 3 **Ethics**	**PSLO 3** **Lit resources**			F BIO 109 - Intro to Medical Sciences
ISLO 5 **Teamwork**	**PSLO 2** **Critical thinking**			P PHY 221- Gen Physics w/Calculus
ISLO 6 **Diverse Perspectives**	**PSLO 3, 4** **Lit resources, Communication**	F BIO 109 - Intro to Medical Sciences P BIO 209 - Crnt Rsch Tpcs in Med Sci I C BIO 409 - Crnt Rsch Tpcs in Med Sci II		
ISLO 2 **Inquiry and Analysis**	**PSLO 1, 2** **Science knowledge, Critical thinking**		F BIO 212 Principles of Biology P PHY223 – Gen Physics w/ Calculus C CHE 451 - Biochemistry II	
ISLO 4 **Quantitative Literacy**	**PSLO 5** **Math knowledge**		F CHE 221 – Gen Chemistry P PHY 221 – Gen Physics w/ Calculus C CHE 450 Lab – Biochemistry I	

Section 5 – Assessment Data Collection Processes

In 2023-24 data was collected on two of six ISLOs and two of five PSLOs:

- **ISLO 2 – Inquiry and Analysis**
- **ISLO 4 – Quantitative Literacy**
- **PSLO 1 - Demonstrate scientific knowledge and understanding.**
  - Demonstrate foundational knowledge in the natural sciences (e.g., terminology, organization, classifications, appropriate use of units, methodologies, and fundamental principles).

- o **Apply scientific principles to biological and medical examples/contexts.**
- • **PSLO 5 - Demonstrate mathematical knowledge and skills in the biological sciences.**

Performance Target:
The overall standard of success established by BHS faculty members for this year was that 80% of students would achieve a 50 (2/4) on the standard rubric for foundational courses, 75 (3/4) for practicing courses, and 100 (4/4) for capstone courses. Depending on the assignment and how it was graded, this could vary.

Activity:
Assignments for ISLO 2 and PSLO 1, 2 – BIO 212, PHY 223, CHE 451:
Foundational
No data collected

Practicing
3 unit quizzes consisting of 10 conceptual multiple choice questions and 4 short quantitative problem solving questions. Students are allowed access to an equation sheet, the book, and notes, and are allowed to retake the quiz as many times as they choose with only the highest score counting.

Question 12	5 pts

Quick Start: A car accelerates from 0 to 20.4 m/s in 7.35 s. The mass of the car is 1070 kg.

What is the average power used in accelerating the car?

Report your result in watts (W).

Capstone
A 4-week laboratory write-up covering protease digestion.

Assignments for ISLO 4 and PSLO 5 – CHE 221, PHY 221, CHE 450:
Foundational
A 25-point quiz covering moles, molarity, other concentrations, dilutions, solubility, and balancing reactions.

Quiz 2

CHE221

General Chemistry 1

Fall 2023

Name_____

Score_____ /25

Please answer the questions to the best of your ability. **Circle your final answer** for all calculations and show your work for partial credit. Good luck!

$N_A = 6.022 \times 10^{23}$ $M_1V_1 = M_2V_2$

1.   (5)What is the concentration (in molarity) of NaCl when an entire box of salt (2.2 kg) is dissolved in a jug of water to make 0.020 kL of solution?

2.   (4)Indicate whether each of the following compounds are soluble or insoluble (circle one) in water:

K_2CO_3	Soluble	or	Insoluble
$Al(C_2H_3O_2)_3$	Soluble	or	Insoluble
Fe_2S_3	Soluble	or	Insoluble
$CoCl_2$	Soluble	or	Insoluble
$Mg_3(PO_4)_2$	Soluble	or	Insoluble

3.   (4)What is the mass percent of lithium in lithium nitride?

4.   (4)How many mL of 8.50 M KNO_3 solution do I need to create 635 mL of 0.100 M KNO_3?

5.   (4)Balance the following reaction using the lowest whole number coefficients:

___SiO_2 + ___CaC_2 → ___Si + ___CaO + ___CO_2

6.   (4)How many molecules of caffeine ($C_8H_{10}N_4O_2$) are present in a cup of coffee containing 0.0007 moles of caffeine?

Practicing
Experiment notes and lab memo on Intensity.

Capstone

A 10-point quiz covering dilutions and growth rate.

CHE 450 Lab Quiz 1A, Oct 2023
(10 points possible)

Write your name in the upper right-hand corner, and fold the paper over it.
Show your work for all calculations. Include correct units with your answers, where applicable.

1   (3 pts) You have a 0.25M solution of ATP. What volumes of this and of distilled water would you use
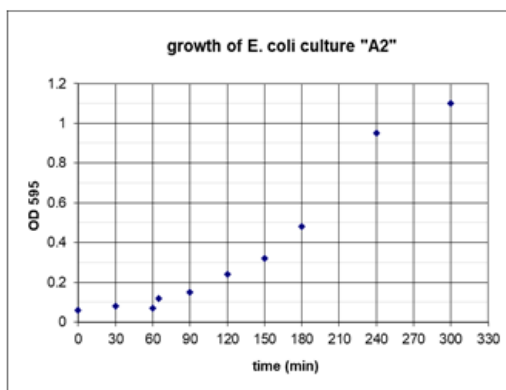   to make 1.0ml of a 5.0mM solution of ATP?

     What is the dilution factor for this?

2   (4 pts) Use your diluted solution from q.1 to make 100µl of a 0.10mM solution of ATP.

     What is the dilution factor for this step?

     What is your *overall* dilution
     factor, from start to finish?

3   (3 pts) For this graph, draw an
     appropriate trend-line. AND
     estimate the doubling time of
     the culture. [Show your work.]

growth of E. coli culture "A2"

OD 595 vs time (min) — data points rising from ~0.05 at 0 min to ~1.1 at 300 min.

Reliability:

The instructor of record for each course was responsible for assessing the artifacts for the class. At the end of the term, each instructor recorded their data in a Qualtrics form to record the data at the time of collection until the Course Learning Outcomes worksheets became available. Three different level courses taught by three different faculty members within the BHS program were involved in assessment to fairly distribute the workload associated with assessment, to provide a representative sample of instruction, and to include multiple people's input and.

Section 6 – Assessment Data

Program Enrollment:

Fall 2019	Fall 2020	Fall 2021	Fall 2022	Fall 2023
164	169	148	129	

Enrollment within the BHS program was relatively stable for a number of years. Unsurprisingly, we saw a dip in enrollment during and after the height of the COVID 19 pandemic. Our department started experimenting with different techniques to increase recruitment as discussed in closing the loop. Enrollment numbers were not able to be accessed prior to the due date for this report.

1st Year Retention Rates

2018-19	2019-20	2020-21	2021-22	2022-23
81%	75%	62%	76%	90%

Our 1st year retention rate generally is at or above the Oregon Tech target of 75%, though it did fall at the beginning of the pandemic. The retention rate then bounced back above the university-wide goal, speaking to the great efforts that our department has devoted in training our program students and connecting them to Oregon Tech as well as to our local community. Enrollment and retention continue to be a priority for the BHS program.

ISLO and PSLO data:

Level	Course	Assessment Methods	Performance Target	Results	Goals met?	Equity gaps?
ISLO 4 Quantitative Literacy **PSLO 5 Mathematical knowledge**						
Foundational	CHE 221 Gen Chem I	**Quiz** on concentration, balancing reactions	80% of students scoring 75% on the quiz KF campus	86% of students	Yes	
Practicing	PHY 221 Gen Physics w/ Calculus I	**3 quizzes** on different units.	80% of students scoring 70% on all the quizzes KF campus	67% of students achieved 70% on all the quizzes	No	
Capstone	CHE 450 Biochemistry I	**Quiz** on dilution and growth rate	80% of students scoring 70% on the quiz KF campus	60% of students achieved 70% on the quiz	No	
ISLO 2 Inquiry and Analysis **PSLO 1 Scientific Knowledge** **PSLO 2 Critical Thinking**						
Foundational	BIO 212	Data was not collected – need to capture				

	Principles of Biology	foundational level next time we assess				
Practicing	PHY 223 Gen Physics w/ Calculus III	**Experiment notes and lab memo** from lab on Intensity	80% of students achieve 75% (3/4 on standard rubric) KF campus	82% of students achieved 75% (3/4 on standard rubric)	Yes	
Capstone	CHE 451 Biochemistry II	**Multiweek laboratory write-up** on protease digestions	80% of students achieve 75% (3/4 on standard rubric) KF campus	60% of students achieved 75% (3/4 on standard rubric)	No	
BBHS Graduation Rate		University Dashboard	6-year rate >50%	48%	No	Yes?
BBHS Retention		University Dashboard	1-year rate >75%	90%	Yes	Yes?
DFWI		University Dashboard	All program <12%	9%	Yes	Yes?

Interpretation of results:

Faculty comments and strategies to improve learning outcomes:

ISLO 4/PSLO 5

Foundational

The assignment used to assess the foundational learning outcomes was completed by students about halfway through the term. This provides them with sufficient time to receive instruction on the quantitative literacy I expect them to have for this course. Quantitative literacy is an imperative skill in General Chemistry, and I make it a focus to set a foundation/baseline that all students in the course should have, because what they come in with is incredibly varied from student to student. It would be beneficial in the future of our program to better equip the students with basic algebraic, number logic, and graphical analysis skills coming into General Chemistry - and going forward. The more they have it, the better it will be for them as we continue to encourage, facilitate, teach, and assess quantitative literacy into the latter years of the students' educational path through our program.

Practicing

Encouraged to "double dip" with institutional assessment, I used the university rubric for ESLO "Quantitative Literacy" to assess students at the "Practicing" or "Mid" level. I used unit quizzes for the assessment. These quizzes consist of 10 conceptual multiple choice questions and 4 short quantitative problem solving questions. There is some scaffolding and prompting. Students know the general concepts being covered on the quiz and have

access to an equation sheet. (The quizzes are open book and open note, so students have access to virtually unlimited resources.) To solve the problems, students must "Calculate", "Interpret", "Construct Representations", and "Apply in Context" at the practicing level. The quiz does not evaluate the "Communicate" aspect of the Quantitative Literacy rubric. The standard for success was defined as achieving at least 70 percent on all three unit quizzes. As stated, quizzes are open book and open note. Furthermore, students are allowed to retake the quiz as many times as they choose, and only the highest score is recorded. A 70 percent requires students to correctly solve at least 2/4 of the quantitative problems. Under these conditions, 8/12 BHS students scored 70 percent or better on all three quizzes. 2/12 students were marginal. If the standard were 75 percent rather than 70 percent, only 6/12 students would have met the objective. In my opinion, this represents a serious deficiency in math skills among BHS students at this level (junior year) of their program. Rather, there is a dichotomy. 6/12 students earned near perfect scores, and do not struggle with math. 6/12 students failed or barely passed this test of math skills. The math skills required are not advanced: arithmetic, algebra, and trigonometry. (No calculus is required on exams. This is only applied and assessed in take-home problem sets.) The challenge is in "using" math. Even with prompting and unlimited resources, many students struggle to interpret word problems, construct a simple mathematical model of a scenario, link equations together, and correctly carry out numerical calculations with a calculator. In my opinion, the only remedy is practice. These skills should be emphasized across the program, not just in math and physics courses. Many BHS students see these courses as irrelevant obstacles to their degree. However, an inability to apply introductory college level mathematics is a serious deficiency for any graduate with a B.S. degree. It will hinder students who take the GRE, MCAT, or similar exams with a quantitative component. It does not bode well for data analysis in research, or understanding statistical data in research and professional literature either. Added emphasis on numerical calculations (spreadsheets and calculators) and quantitative problem solving before, alongside, and after physics could improve performance in this PSLO. I introduce a problem solving heuristic in class, emphasize it throughout the introductory physics sequence, and provide students multiple opportunities each week to practice and develop these skills. However, when these skills are only required and emphasized in physics, students can get by relying on resources like Chegg and Peer Consulting, without ever acquiring these skills for themselves. (Just to emphasize, 4/12 students could not or chose not to earn a 70 percent on an exam with unlimited attempts and unlimited access to external resources.) Quizzes were administered through Canvas from a question bank. Sample questions are attached to this survey. The full set of questions and exams can be accessed through Canvas: https://oit.instructure.com/courses/20670 PHY221_01: General Physics w/Calculus Rubric: https://www.oit.edu/sites/default/files/document/2016-17-eslo-5-quantitative-literacy-rubric.pdf

Capstone
60% of the students achieved the standard, a 7/10 score on a lab quiz doing some math and interpreting a graph. The students know how to add, multiply etc, but they don't all

grasp which numbers to plug into a formula, or which formula to use. Most of these students did fine on similar questions in a lab worksheet that was part of their report, but on which they could get help from others. More practice for students in applying simple math in varied contexts in multiple courses would be helpful, particularly including some situations (quizzes) where they have to do that work themselves.

ISLO 2/PSLO 1/PSLO 2

<u>Foundational</u>
N/A

<u>Practicing</u>
Encouraged to "double dip" with institutional assessment, I used the university rubric for ESLO "Inquiry & Analysis" to assess students at the "Proficiency" or "Mid" level. https://www.oit.edu/sites/default/files/document/2016-17-inquiry-amp-analysis-rubric.pdf I assessed students notes taken during an experiment and the one-page lab memo they write after each lab, which includes summary and reflection. The lab provides the problem under study, so I was not able to assess the "Identify" aspect of the rubric. To meet expectations for this assessment, students had to demonstrate proficiency in 3 of the 4 remaining categories: Investigate, Support, Evaluate, Conclude. Of 11 BHS students enrolled in the course, 9 met this standard. One student skipped the lab. The other student who did not meet the standard due to laziness rather than lack of ability. In discussions with the student, it is clear that he could have met the standard had he applied himself. While 9/11 students met the standard, only one student received proficiency in all 4 categories. The other 8 did not show proficiency in either the evaluate or conclude categories, indicate a lack of proficiency in critical thinking and scientific reasoning. Students were able to follow instructions for data analysis, for example, fitting linear, semilog, and log-log plots. However, most students were not able to interpret their lines of best fit (units of fitting parameters, connection between slope and exponent in semilog and log-log plots). Furthermore, no students drew the connection between the data analysis and complementary theoretical material from class (inverse square law for intensity). However, as the purpose of labs was to introduce and demonstrate these relationships, I did not make this connection part of the evaluation criteria. I think that improving performance on this objective requires a focus on *experimental design* and *interpretation of data* across the BHS curriculum. Students can follow instructions for the most part. However, assessments of critical thinking and scientific reasoning reveal that students often do not know *what* they are doing or *why*. More instruction and practice in experimental design --- and critical analysis of experimental design --- could help. Likewise, more practice drawing and supporting conclusions from data, subject to critical (but supportive) review could help with scientific reasoning. BHS students are generally good at following instructions in lab and take thorough notes in lab notebooks after minimal instruction at the start of the term. They can follow algorithms for experimental protocol and data analysis. They need more practice in critical thinking and scientific reasoning. Assignments and samples of student work are attached. The first

sample of student work demonstrates proficiency in all four categories. The second sample shows a lack of proficiency, largely due to lack of effort. The third sample shows proficiency overall, but a lack of proficiency in the Evaluate category, as the student was unable to interpret the results of their analysis. (The third student does demonstrate critical thinking in describing a way to improve the experimental design, however.)

Capstone
60% (not 80%) of the class achieved the 75% benchmark. The most common weakness was in the evaluate and conclude parts of the rubric, where some students often showed developing but insufficient mastery, either as "Organizes evidence, but the organization is not effective in revealing important patterns, differences, or similarities." or "States a general conclusion beyond the scope of the inquiry, the support for which is inadequate, or information was chosen to fit the conclusion." strategies to improve: more practice in this course and in earlier chemistry courses; practice where an assignment is returned with instructor feedback/discussion for improvement, then re-submitted.

Equity Gaps:
In the future, it might be nice to try to look at each course, but this was not possible this year. Without complete access to and explanation of how some of the data is put together, it is hard to tell whether equity gaps exist for sure, but some of the data suggests that there could be equity gaps within graduation rates, retention, and DFWI.

Graduation Rate
For each of the following, it is possible the group described is so much smaller that the smaller graduation number is just a fact that we have fewer students that are a part of that group rather than a statistically significant difference in graduation rate. For 6-year graduations, there have been 0 African American students who have graduated from our program (compared to 24 total), 0 first generation students (compared to 22 non-first generation), and 4 PELL Awarded students (compared to 20 non-PELL Awarded students).

When considering first generation students, there appear to be fewer first-generation students enrolled in the BHS program and perhaps there have been even fewer historically. That being said, the other data shows that first generation students received grades for about half as many classes as non-first generation students in the last year across all biology courses and we had about half as many first-year first-generation students as first-year non-first-generation students in the BHS program. This would suggest we should be seeing likely half as many first-generation students graduating in 6 years compared to non-first generation students, for approximately 10 graduates rather than 0 graduates.

The situation is similar for PELL Awarded students. PELL Awarded students received grades in about 1/5 as many classes as non-PELL Awarded students, but first-year

numbers indicate the BHS program started out with about 1/2 as many PELL Awarded students as non-PELL Awarded students. Without knowing more about the specific numbers of students it is hard to say whether there is an equity gap or not, but it is something that our department should continue to monitor.

Retention

When looking at first year retention, there were two potential concerns, that again, it is hard to say for sure whether there is an equity concern or not. The first is that we started the year with about 2.5 times as many female as male students. Through the 4th term, there were the same number of male students, and all 4 of the students not retained were female. The second is that of the 4 students not retained, 3 were PELL Awarded students and 1 was non-PELL Awarded. This would be further evidence with the Graduation Rate data that would suggest there is an equity gap in our program for PELL Awarded students.

DFWI

Addressing the DFWI data was a little confusing because in many cases, the percentage provided did not match the value that would be calculated from the DFWI number divided by the total number. But if we go off the percentages shown, Hispanic (13.0%), American Indian (13.1%), African American (16.9%), PELL Awarded (14.2%), first generation (13.7%), and freshman (20%) students all have DFWI rates that are about 1.5-2.2 times higher than the average rate (8.9%). The DFWI rate drops to 7.6% for sophomores from the extremely high percentage freshman year. This might suggest that these groups of students that are getting higher DFWI rates, are getting a lot of these scores in their freshman year, causing students to drop out, lowering first year retention rates and overall graduation rates.

History of Results:

Under the leadership of a new program director and new department chair, BHS faculty have discussed how to better align our current PSLOs with current requirement of professional schools. The assessment process has also changed significantly over this time with the introduction of Course Learning Outcome worksheets for reporting assessment data and more clearly defined performance targets. We do not have much historical data at this point and look forward to filling in this table over time. The last time Quantitative Literacy was evaluated was in the 20-21 Assessment Report. The data collected during that year was a faculty survey and so does not correlate with the way this data was collected this time making comparison between the years difficult.

Evaluation of Past Actions:

Without historical data to compare, it is unclear whether past actions have lead to any changes in outcomes.

Section 7 – Data-driven Action Plans:

Based on last year's collected data and the student exit survey, our students are falling short of our goals for them in terms of Quantitative Literacy and Inquiry and Analysis. More work will need to be done throughout this year during BHS and Natural Science department meetings to more clearly define the goals for improvement based on agreement of the department/program. The following proposed plan is not necessarily the final plan that will be agreed upon by faculty going forward, but it is a starting point for the conversation to take place this year.

The BHS program has already been discussing whether we should be changing our math requirements to eliminate Calculus as a required course. This discussion will be ongoing.

Action Driver	Action Taken	Accountable Person	Resources Needed	Outcome Measure
3/5 goals for student achievement not met related to QL and I&A Particularly noteworthy data points: -foundational/ practicing level expectations were met, but then practicing/capstone levels were not met suggesting a plateau (or possibly even regression) in skill throughout the program -more than half of graduating seniors said they were only somewhat prepared or	Consider changes to the required math curriculum Consider changes to biological courses to bring math and critical thinking into every course Create assignments throughout the curriculum that address all parts of the standard rubric because some points are infrequently addressed	Nate Bickford Travis Lund	Dedicated time during department and program meetings to discuss the results, brainstorm solutions, create and implement a plan Potentially need help from other departments like math to create new courses or extra help spaces for students	26-27 Program Assessment comparison to this year's data

inadequately prepared with mathematical knowledge and skill				

Another component that the program/department must consider in the coming year is how we will be evaluating the new Biology – Research Sciences major that is officially available this year for some students to potentially graduate with that degree this year. We also began the Biomedical Sciences Master's degree program this year. We have four students currently in the program (two full masters students and two 3+2 students who are in their 4th year that is being double counted). We need to develop a plan to assess this program separately from our undergraduate program.

Section 8 – Closing the Loop: Reflection on previous work

In last year's action plan, the primary goals surrounded growing enrollment, increasing retention, and improving how our program does assessment.

Grow Enrollment
Last year's goal (that will be ongoing) is to grow enrollment. As we noted, some efforts would have more immediate impacts and others would take years for the changes to materialize. The ongoing efforts include:
- Meeting with Tech Ambassadors annually to tell them more about the BHS program so they have specifics to tell prospective students and their parents about BHS
- Faculty meeting with prospective students when they come on visits. A schedule is set up so that Admissions knows which faculty to contact depending on the day.
- Faculty visiting high schools and middle schools in the area
- Coordinating visits from local schools to campus
- Posting about the work in the department on social media

Efforts that have been paused or are now infrequently implemented:
- Providing an option for students to text a faculty member with questions

Increase Retention
BHS has improved its first year retention rate to 90% (up from 76% last year). We attribute this improvement in retention to our collective effort in creating a supportive system within our department and university. There are several methods we have tried to improve retention.
- We implemented a new peer tutoring program located in the hallway in Dow and now in its second year, we are continuing to modify the system. Due to budget constraints, we had to reduce the number of hours we have students available in the hallway.

- The department chair sends out reminder emails periodically to remind faculty to use Inspire's Early Warning System.
- There has been a push to develop the department's culture. The end-of-year party was a success again last year even though it ended up being a pretty hot day. The Nobel Prize symposium expanded this year from only have 3 science talks to having a second week that included the 3 humanities talks. The Halloween celebration expanded this year so that Natural Science and MIT coordinated on the same theme. The attempt at starting up a journal club last year fizzled due to low participation, but will likely be tried again now that the master's program has started. The department did not receive shirts/jackets.
- The department has been rapidly expanding the amount of research being done and the number of students involved in the research.

Streamline Assessment
The 3-year rotation of assessment was expanded so that all ISLOs/PSLOs would be assessed at the foundational, practicing, and capstone levels. We did not get all 6 different assessments completed this year, but it was an improvement that did allow us to make much closer comparisons at least within the same year rather than every 3 years. We did inform faculty earlier in the year who would be evaluating which ISLOs/PSLOs, but with trying to roll out a slightly new system there were still some hiccups. Travis Lund created a Qualtrics form to collect the assessment data whenever the faculty collect the data rather than needing to wait until Course Learning Outcomes worksheet becomes available. This system was maybe not as seamless as we hoped for those who ultimately needed to submit the data, but it was very valuable for the evaluator in accessing the data once we were able to figure out how to grant access to the Qualtrics results. Our program still needs to work on how to better close the loop and discuss assessment results with the whole group and make group decisions about next best steps.

New BHS track
BHS faculty were tasked with developing new potential track ideas as both retention and recruitment method. A pre-veterinarian track was considered, but the final decision was Biology-Research Sciences. Final approvals for this were completed so that students could potentially graduate with that degree during this academic year.

Website update
The website was updated last year with some new text to highlight key points about the department. Some parts have some minor errors or formatting issues that still need to be addressed. Additionally, the University Research Committee tasked the Natural Science department with adding a Research page on our website, which will hopefully get accomplished this year.

New BMS program

The new Master's in Biomedical Sciences program received all final approvals last year to begin accepting new students this year. The program received its first four students this year.

<u>New hires</u>
We had goals for new faculty hires. We were unsuccessful in hiring a visiting instructor for physics to assist while sabbaticals are occurring last year, but we were able to hire one for this year. We did not receive approval for hiring a fire ecologist or lab manager last year so were not able to list jobs for those positions.

BBHS

(2023-24) Student Exit Survey
June 25th 2024, 12:55 pm PDT

Q BBHS 1 - Program Student Learning Outcomes for Biology-Health Sciences B.S. Please indicate how well the Biology-Health Sciences program prepared you in the following areas.

1. Scientific knowledge and skills in scientific reasoning.
2. Apply scientific principles to biology-based problems.
3. Effectively find and use resources from the literature.
4. Demonstrate effective oral, written, and visual communication.
5. Demonstrate mathematical knowledge and skills in the biological sciences...
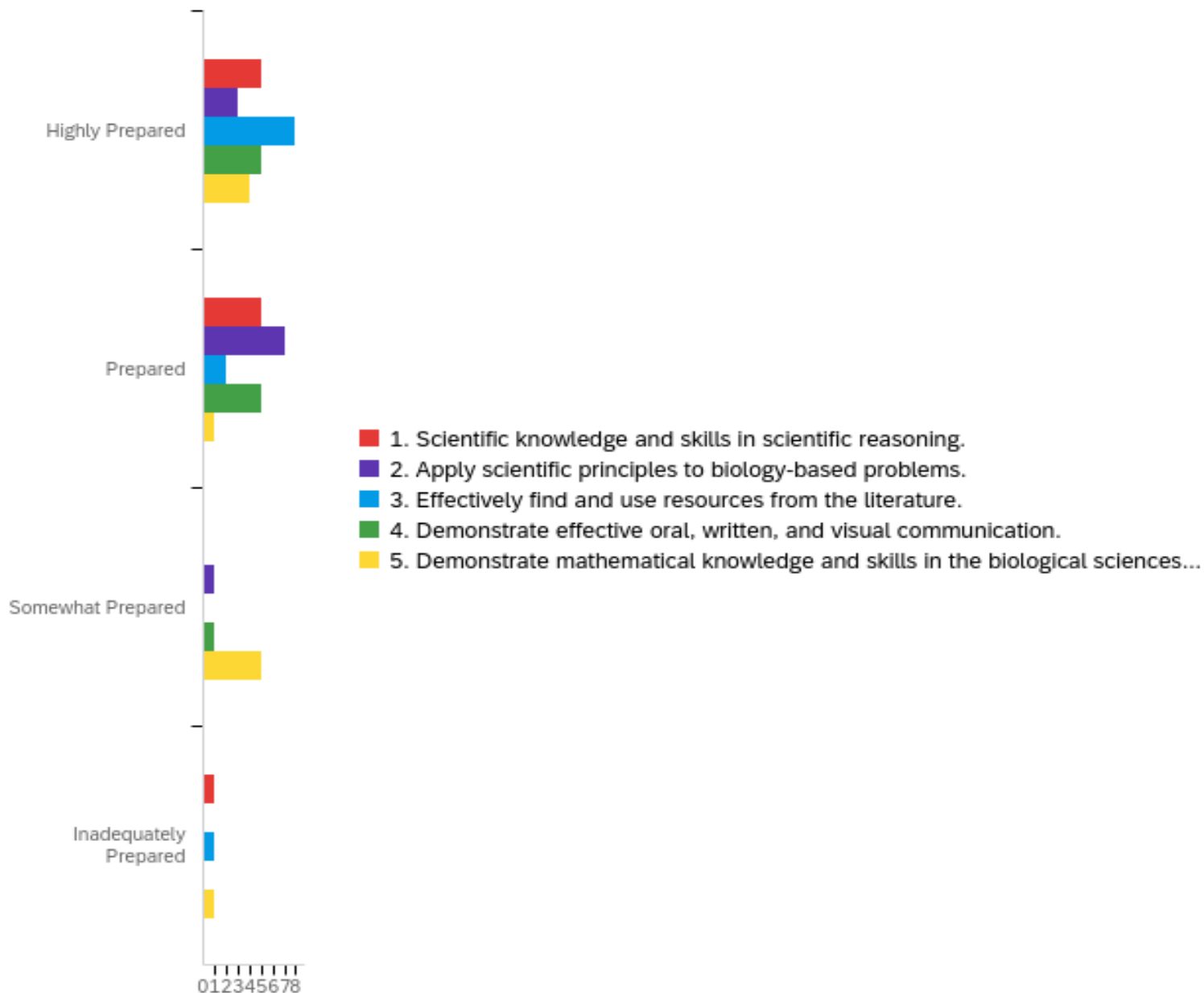
#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	1. Scientific knowledge and skills in scientific reasoning.	1.00	4.00	1.73	0.86	0.74	11
2	2. Apply scientific principles to biology-based problems.	1.00	3.00	1.82	0.57	0.33	11
3	3. Effectively find and use resources from the literature.	1.00	4.00	1.45	0.89	0.79	11
4	4. Demonstrate effective oral, written, and visual communication.	1.00	3.00	1.64	0.64	0.41	11
5	5. Demonstrate mathematical knowledge and skills in the biological sciences.	1.00	4.00	2.27	1.05	1.11	11

#	Question	Highly Prepared		Prepared		Somewhat Prepared		Inadequately Prepared		Total
1	1. Scientific knowledge and skills in scientific reasoning.	45.45%	5	45.45%	5	0.00%	0	9.09%	1	11
2	2. Apply scientific principles to biology-based problems.	27.27%	3	63.64%	7	9.09%	1	0.00%	0	11
3	3. Effectively find and use resources from the literature.	72.73%	8	18.18%	2	0.00%	0	9.09%	1	11
4	4. Demonstrate effective oral, written, and visual communication.	45.45%	5	45.45%	5	9.09%	1	0.00%	0	11
5	5. Demonstrate mathematical knowledge and skills in the biological sciences.	36.36%	4	9.09%	1	45.45%	5	9.09%	1	11

Q BBHS 2 - What attracted you to Oregon Tech? Please check all that apply.
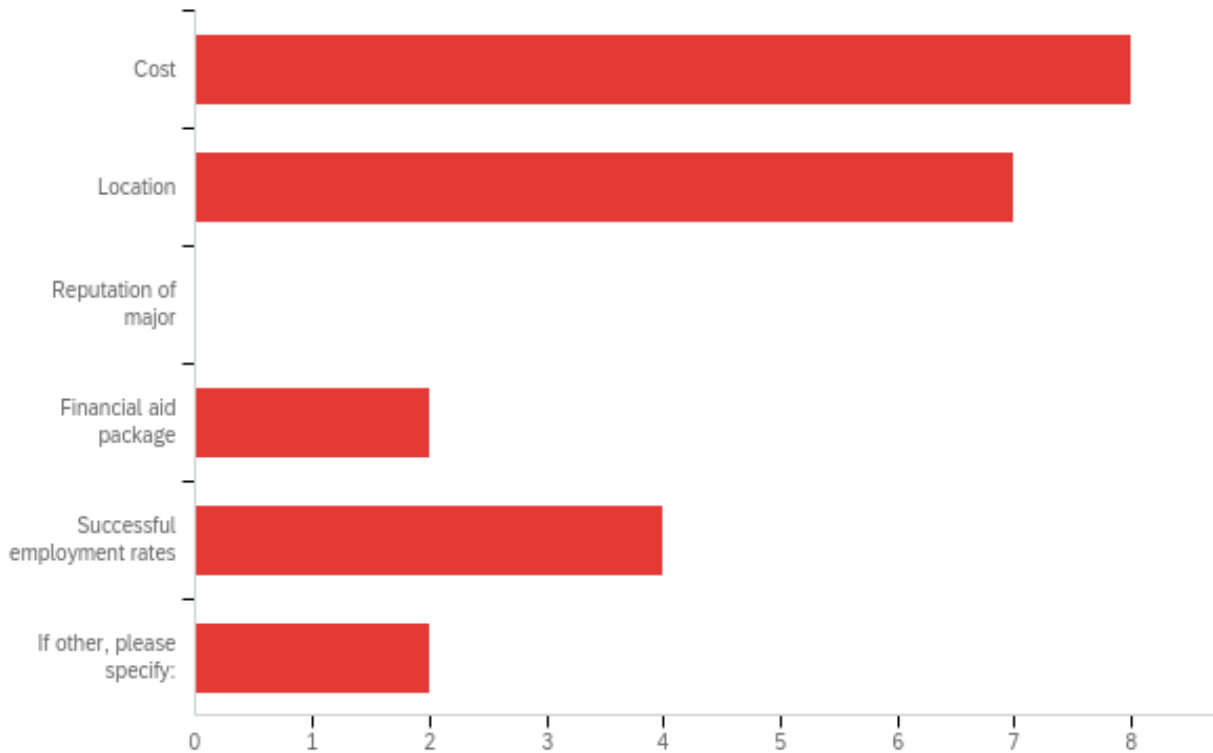
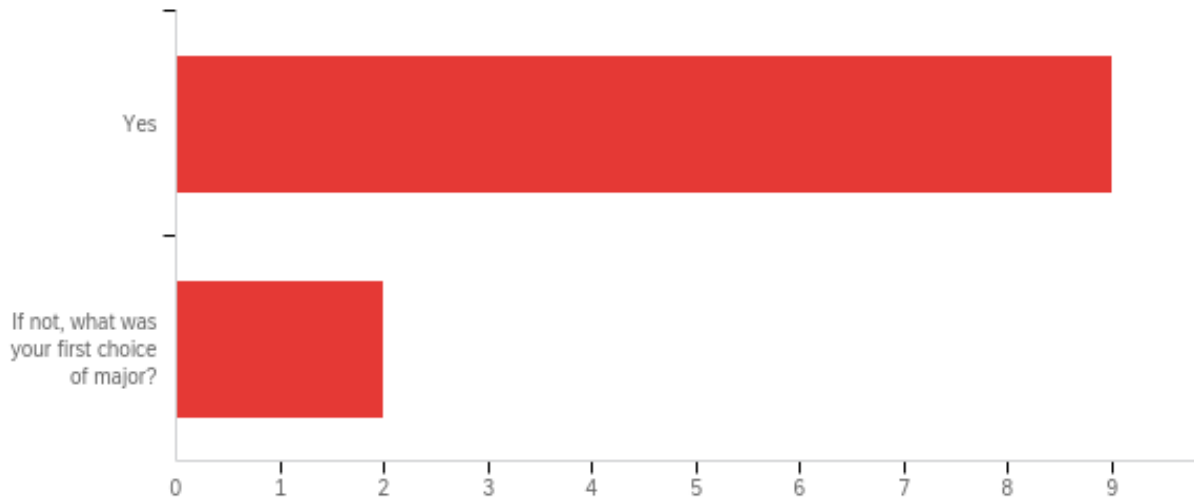| #	Answer	%	Count
1	Cost	34.78%	8
2	Location	30.43%	7
3	Reputation of major	0.00%	0
4	Financial aid package	8.70%	2
5	Successful employment rates	17.39%	4
6	If other, please specify:	8.70%	2
	Total	100%	23

Q BBHS 2_6_TEXT - If other, please specify:

If other, please specify: - Text
Participation in college-level athletics
I had family here that wouldn't charge me rent

Q BBHS 3 - Was Biology-Health Sciences your first choice of major?

#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	Was Biology-Health Sciences your first choice of major? - Selected Choice	1.00	2.00	1.18	0.39	0.15	11

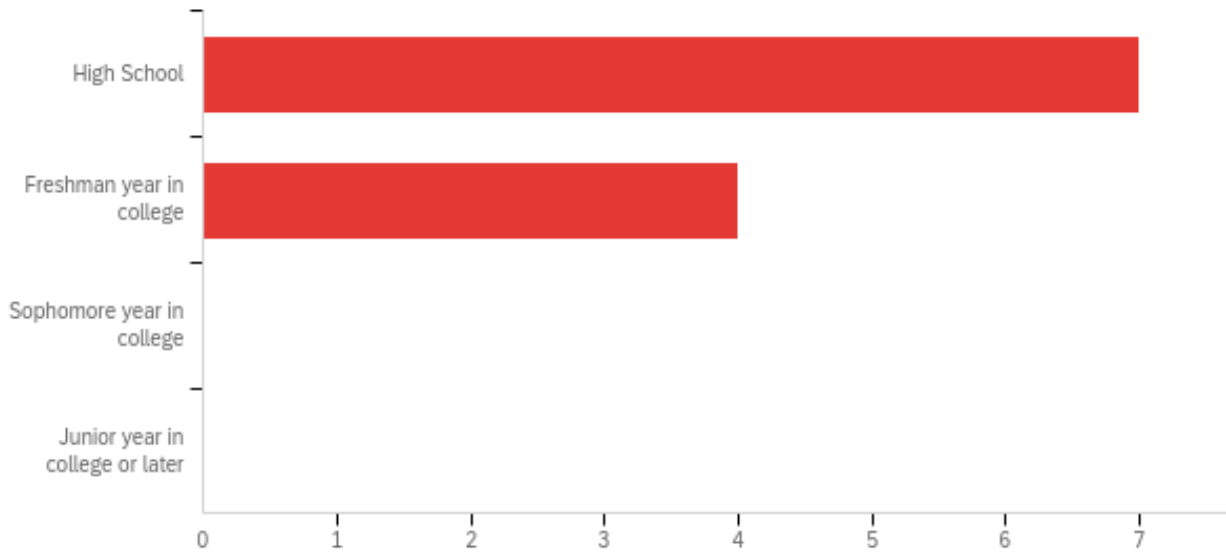| #	Answer	%	Count
1	Yes	81.82%	9
2	If not, what was your first choice of major?	18.18%	2
	Total	100%	11

Q BBHS 3_2_TEXT - If not, what was your first choice of major?

If not, what was your first choice of major? - Text

Applied Psychology

Nursing

Q BBHS 4 - At what stage in your studies did you choose your major?

#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	At what stage in your studies did you choose your major?	1.00	2.00	1.36	0.48	0.23	11

#	Answer	%	Count
1	High School	63.64%	7
2	Freshman year in college	36.36%	4
3	Sophomore year in college	0.00%	0
4	Junior year in college or later	0.00%	0
	Total	100%	11

Q BBHS 5 - Please provide feedback about the overall quality of the following aspects of the Biology-Health Sciences Program have been to you.
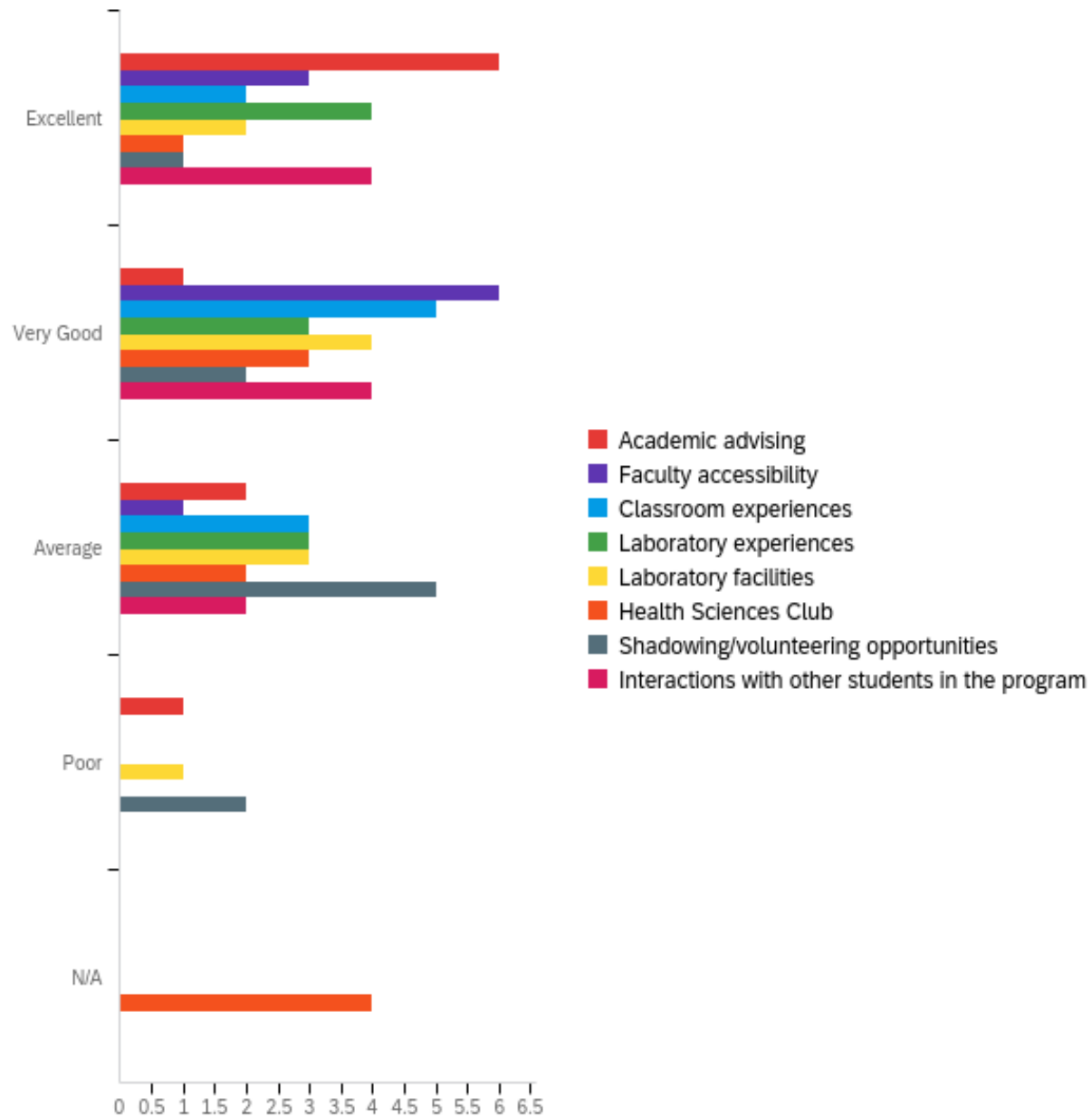
#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	Academic advising	1.00	4.00	1.80	1.08	1.16	10
2	Faculty accessibility	1.00	3.00	1.80	0.60	0.36	10
3	Classroom experiences	1.00	3.00	2.10	0.70	0.49	10
4	Laboratory experiences	1.00	3.00	1.90	0.83	0.69	10
5	Laboratory facilities	1.00	4.00	2.30	0.90	0.81	10

6	Health Sciences Club	1.00	41.00	17.70	19.03	362.21	10
7	Shadowing/volunteering opportunities	1.00	4.00	2.80	0.87	0.76	10
8	Interactions with other students in the program	1.00	3.00	1.80	0.75	0.56	10

#	Question	Excellent		Very Good		Average		Poor		N/A		Total
1	Academic advising	60.00%	6	10.00%	1	20.00%	2	10.00%	1	0.00%	0	10
2	Faculty accessibility	30.00%	3	60.00%	6	10.00%	1	0.00%	0	0.00%	0	10
3	Classroom experiences	20.00%	2	50.00%	5	30.00%	3	0.00%	0	0.00%	0	10
4	Laboratory experiences	40.00%	4	30.00%	3	30.00%	3	0.00%	0	0.00%	0	10
5	Laboratory facilities	20.00%	2	40.00%	4	30.00%	3	10.00%	1	0.00%	0	10
6	Health Sciences Club	10.00%	1	30.00%	3	20.00%	2	0.00%	0	40.00%	4	10
7	Shadowing/volunteering opportunities	10.00%	1	20.00%	2	50.00%	5	20.00%	2	0.00%	0	10
8	Interactions with other students in the program	40.00%	4	40.00%	4	20.00%	2	0.00%	0	0.00%	0	10

Q BBHS 6 - What are one or two specific things we could do to improve the Biology-Health Sciences major?

What are one or two specific things we could do to improve the Biology-Health Sciences major?

1) It may be helpful for lab classes to better align with lecture content that is being learned.   2) The natural science tutoring thing could definitely be improved.

Make the A&P course worth more credits. Allow 200 level microbiology.

The physics (200 level) courses were effective, but I wish that there was a course aimed to focus these concepts for the human body/medical field. I feel like a course on biomechanics would be very beneficial for the Biology-Health Sciences major.

The tutoring available for higher level courses, and maybe a different senior research project might be fun!

Pay professors more money Don't make all decisions off of diversity.

Helping students get into research and supporting the research. That way students don't go 2 years without being able to get the necessary supplies to conduct their research experiments

I think hiring teachers that actually respect the students would be a great start and I feel like most professors are but there are a few bad seeds who definitely make it hard to want to stay here. I also think allocating more resources to the professors would also increase moral as they even have a printing limit which seems ridiculous.
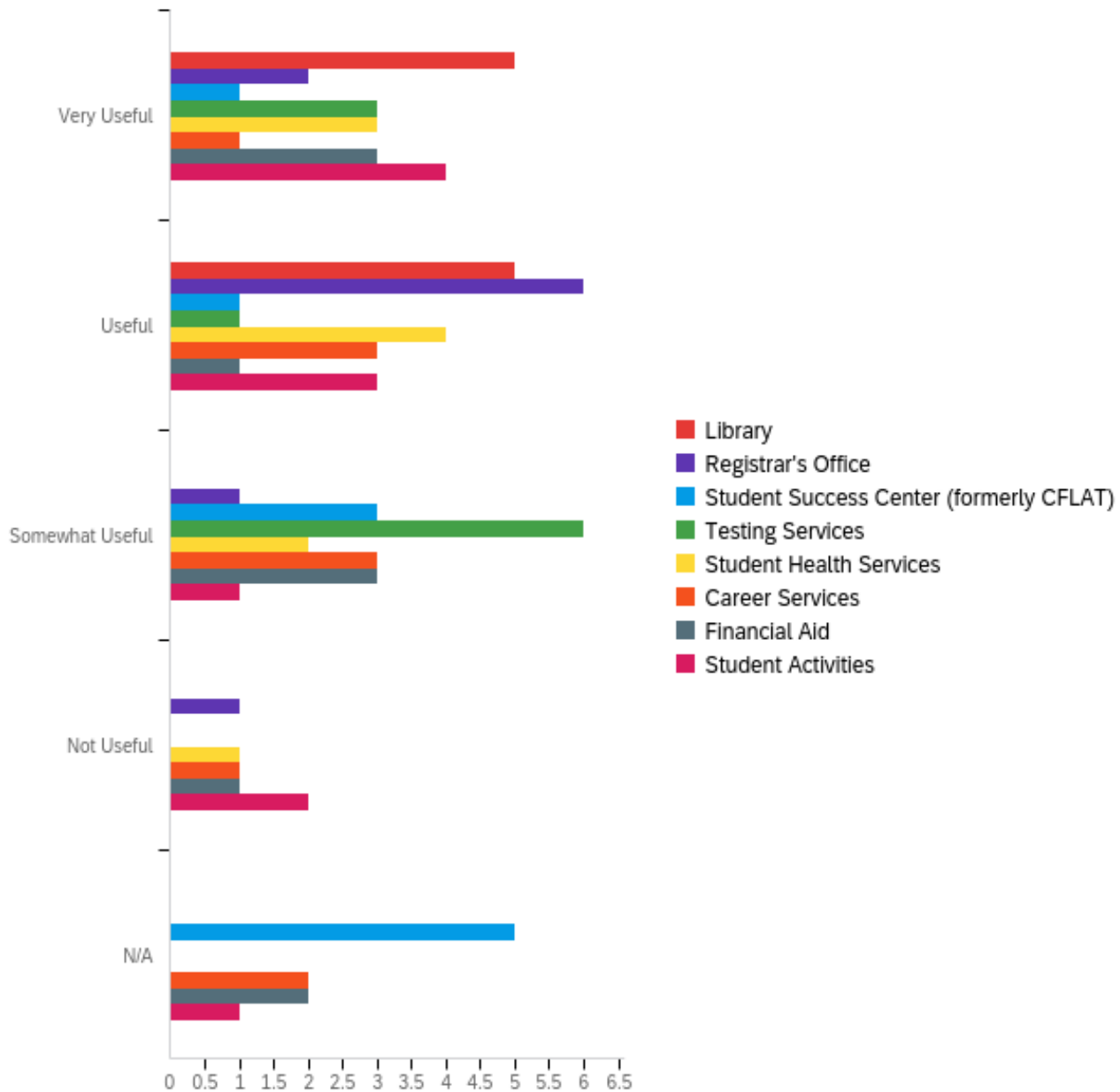
Have more upper biology electives that aligns with students goals for graduate school. Fix the curriculum so in the third year it is not stacked with A&P, O-chem, and physics.

I think it's been good, keep it how it is!

**Q BBHS 7 - Please provide feedback about how useful the following Oregon Tech services have been to you.**

#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	Library	1.00	2.00	1.50	0.50	0.25	10
2	Registrar's Office	1.00	4.00	2.10	0.83	0.69	10
3	Student Success Center (formerly CFLAT)	1.00	5.00	3.70	1.42	2.01	10
4	Testing Services	1.00	3.00	2.30	0.90	0.81	10
5	Student Health Services	1.00	4.00	2.10	0.94	0.89	10

#							
6	Career Services	1.00	5.00	3.00	1.26	1.60	10
7	Financial Aid	1.00	5.00	2.80	1.47	2.16	10
8	Student Activities	1.00	5.00	2.36	1.37	1.87	11

#	Question	Very Useful		Useful		Somewhat Useful		Not Useful		N/A		Total
1	Library	50.00%	5	50.00%	5	0.00%	0	0.00%	0	0.00%	0	10
2	Registrar's Office	20.00%	2	60.00%	6	10.00%	1	10.00%	1	0.00%	0	10
3	Student Success Center (formerly CFLAT)	10.00%	1	10.00%	1	30.00%	3	0.00%	0	50.00%	5	10
4	Testing Services	30.00%	3	10.00%	1	60.00%	6	0.00%	0	0.00%	0	10
5	Student Health Services	30.00%	3	40.00%	4	20.00%	2	10.00%	1	0.00%	0	10
6	Career Services	10.00%	1	30.00%	3	30.00%	3	10.00%	1	20.00%	2	10
7	Financial Aid	30.00%	3	10.00%	1	30.00%	3	10.00%	1	20.00%	2	10
8	Student Activities	36.36%	4	27.27%	3	9.09%	1	18.18%	2	9.09%	1	11

Q BBHS 8 - What is your overall rating of the quality of education you received?
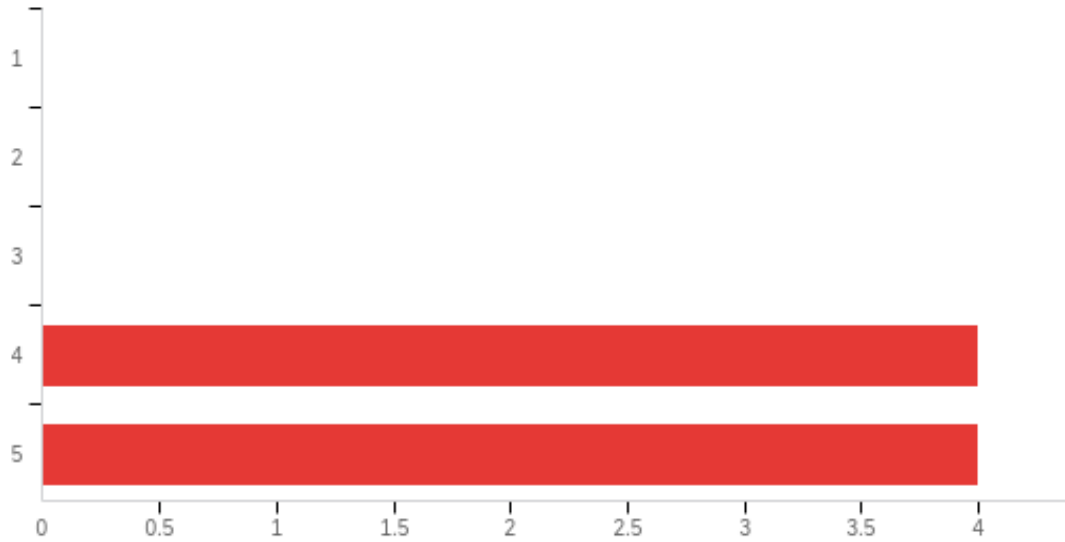
#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	What is your overall rating of the quality of education you received?	4.00	5.00	4.50	0.50	0.25	8

#	Answer	%	Count
1	1	0.00%	0
2	2	0.00%	0
3	3	0.00%	0
4	4	50.00%	4
5	5	50.00%	4
	Total	100%	8

Q BBHS 9 - Do you have any other comments about your time at Oregon Tech?

Do you have any other comments about your time at Oregon Tech?

My favorite thing about Oregon Tech is the amount of effort and funding the school provides to make student activities like free bowling/ice skating and diversity events! Definitely the reason I felt like Oregon Tech was a community I belonged in.

THANKFUL FOR IT

It started strong and quickly went on a downward trajectory year after year. It is quite sad to see. Mainly due to president Nagi, the board of trustees, the dean of HAS, and how little it seems facilities cares to interact with certain professors to help them.

I think Nagi should definitely be fired, he does absolutely nothing for this school but give a bad reputation. He is pompous and he tries so hard to get people to like him but it's the fakest attitude anyone could see. He is making an inexcusable amount of money when professors only have a starting salary of 67k. There needs to be a lot of work administratively if I ever recommend this school to someone, because while the education is very good for BHS this school has raised tuition every year I have been here so there obviously needs to be some administrative changes.

I would say that overall it was good, but with the electives it didn't interest me as I didn't need to know what I was taking. If I was going to be a doctor in medicine, cells, or things in that nature it would have been good, but I'm going to be attending Physical Therapy school as long with at least 1/4 of my class. Learning about diseases, how bacteria works, and things along that nature doesn't apply to me as much as bio kinetics and things more in depth about how the muscles work together, how they heal, etc. this was covered in A&P but that is about it. Other than that it was about immune systems fighting off diseases and bacteria. The only elective that I thought was beneficial in was ornithology and pharmacology because then it can help me relate to patients who might be interested in birds and also for me to understand how the medications that they are taking may affect how well treatment will be for them. Some classes that discussed Parkinson's and other neurogenic disorders are also beneficial, but it wasn't covered as deep.