Name: _____

Section: _____

Appendix A: Pre- and Post-Math Assessment

CHM 1011
High Point University
Fall 2015

Please answer each of the following math questions by clearly circling the correct answer. Unclear responses will be marked wrong.

---

1. A bag of apples contains 6 green apples and 8 red apples. What is the approximate percentage of green apples?

   (a) 43% (b) 57% (c) 60% (d) 75% (e) 80%

2. Which of the following values is consistent with 9.17%?

   (a) 0.917 (b) $\frac{9.17}{1000}$ (c) 0.0917 (d) 9.17×10^{2} (e) 91.7×10^{-2}

3. A reaction requires 4 min 15 sec to complete. Which of the following is a correct representation of that time period?

   (a) 55 sec (b) 4.25 min (c) 0.0625 hr (d) 245 sec (e) 4.15 min

4. How many significant figures does the following number have: 1032.200

   (a) 4 (b) 5 (c) 6 (d) 7 (e) 8

5. Considering significant digits, what is the correct answer to this problem? 101.22 + 222.3 =

   (a) 323.520 (b) 323.52 (c) 323.5 (d) 323 (e) 320

6. If $A = \frac{b + 0.5f}{t}$, what does f equal?

   (a) $\frac{2At}{b}$ (b) $At - \frac{b}{0.5}$ (c) $\frac{tAb}{0.5}$ (d) $\frac{0.5 - b}{A} \times t$ (e) $\frac{At - b}{0.5}$

7. A "cubit" is an ancient measurement now defined as: 1.0 cubit (c) = 45.72 cm. Which of the following computations should you use to convert a measurement of 0.33 c to centimeters?

   (a) $0.33c \times \frac{1.0c}{45.72\,cm}$ (b) $0.33cm \times \frac{1.0c}{45.72cm}$ (c) $0.33c \times \frac{45.72\,cm}{1.0c}$ (d) $0.33c + 45.72c$

8. If 6p – 3 = 8p – 9, then p =

   (a) -6 (b) -3 (c) 3 (d) $-\frac{6}{7}$ (e) $\frac{6}{7}$

Appendix A continued: Pre- and Post-Math Assessment

9. Find the values of x and y that satisfy both of these equations simultaneously: $2x + y = 2$
$2x - y = 6$

(a) (-2, 6) (b) (3, -4) (c) (1, 1) (d) (0, 2) (e) (2, -2)

Use the graph below to answer question 10:

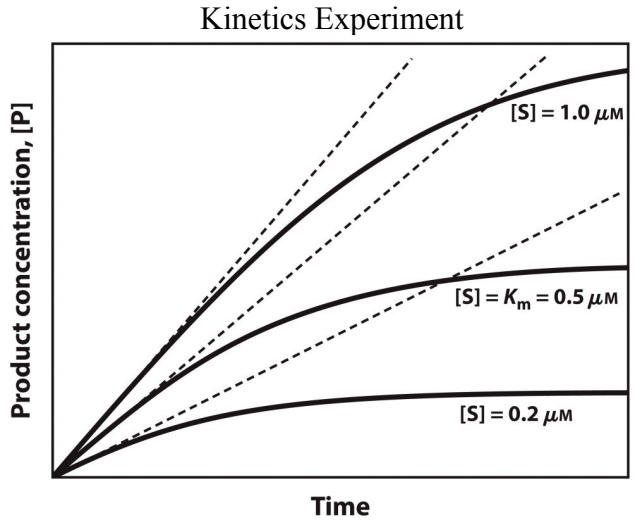


Figure 6-10
Lehninger Principles of Biochemistry, Sixth Edition

10. Which of the following is correct language to use about this graph?
(a) This is a graph of the kinetics experiment vs. time.
(b) This is a graph of the kinetics experiment vs. product concentration.
(c) This is a graph of the concentration of P vs. the rate of reaction.
(d) This is a graph of product concentration vs. time.
(e) All of the statements above describe this graph correctly.

11. What is the value of $8 + 3 \div 3 - 2$?
(a) 11 (b) 1.33 (c) 15 (d) 7 (e) 1.67

12. What is the value of $(2a^3)^2$?
(a) $4a^6$ (b) $2a^6$ (c) $2a^5$ (d) $2a^9$ (e) $4a^3$

13. Which of the following shows 0.02156 in scientific notation?

(a) 2156 (b) 21.56×10^2 (c) 2.156×10^2 (d) 2.156×10^{-2} (e) 2.156×10^3

Appendix B: General Chemistry Peer Learning Survey Questions

The first 17 questions will be administered in the initial, beginning of semester survey. Questions 4-6 and 13-25 will be administered in the final, end of semester survey.

Demographics

1. What is your academic level?

Freshman Sophomore Junior Senior

2. What is your major?
Biology, exercise science, other

3. Are you male or female?

4. What is your section number?

5. What is your number code that your instructor provided you with?

6. What is your letter code that your instructor provided you with?

7. What was the highest level of chemistry you completed in high school?

no chemistry, gen chemistry I, gen chemistry II, AP chemistry

8. What letter grade did you receive in that class?
A, B, C, D, F

9. What letter grade did you receive in General Chemistry I lecture?
A+, A, A-, B+, B, B-, C+, C, C-, D+, D, D-, F

10. What letter grade did you receive in General Chemistry I lab?
A+, A, A-, B+, B, B-, C+, C, C-, D+, D, D-, F

11. What was the highest level of math you completed to date?

algebra I, algebra II, algebra III, trigonometry, pre-calculus, calculus I, calculus II, other

12.What letter grade did you receive in that class?
A, B, C, D, F

Attitudes

13. I consider my current chemistry knowledge:

above average slightly above average average slightly below average below average

Appendix B continued: General Chemistry Peer Learning Survey Questions

14. I consider my current chemistry *lab skills:*

above average slightly above average average slightly below average below average

15. I consider my current math skills:
above average slightly above average average slightly below average below average

16. If given the choice, would you work in this lab on your own or with a partner?
On my own with a partner

17. If "with a partner" was selected, would you prefer to pick your partner or be assigned?
pick my partner be assigned

18. How much did you contribute to the *overall work* in your lab partnership?

Very little	less than my partner	equal to my partner	more than my partner	vast majority
☐	☐	☐	☐	☐

19. How much do you feel your partner contributed to the *overall work* in your lab partnership?

Very little	less than me	equal to me	more than me	vast majority
☐	☐	☐	☐	☐

20. How much do you feel you contributed in terms of *math help* to your lab partnership?

Very little	less than me	equal to me	more than me	vast majority
☐	☐	☐	☐	☐

21. How much do you feel your partner contributed in terms of *math help* to your lab partnership?

Very little	less than me	equal to me	more than me	vast majority
☐	☐	☐	☐	☐

Appendix B continued: General Chemistry Peer Learning Survey Questions

22. How much do you feel you contributed to the *chemistry work* in your lab partnership?

Very little	less than my partner	equal to my partner	more than my partner	vast majority
☐	☐	☐	☐	☐

23. How much do you feel your partner contributed to the *chemistry work* in your lab partnership?

Very little	less than me	equal to me	more than me	vast majority
☐	☐	☐	☐	☐

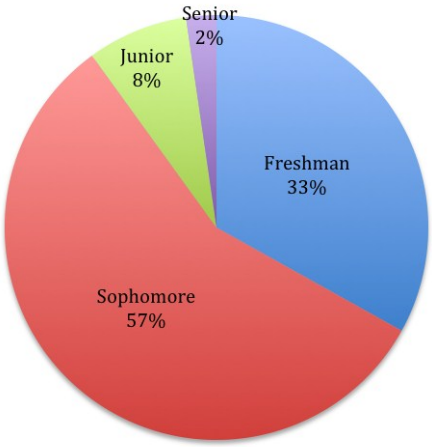
24. Please provide any additional comments you would like, specifically about working with your lab partner.

25. Please provide any additional comments about this laboratory course.

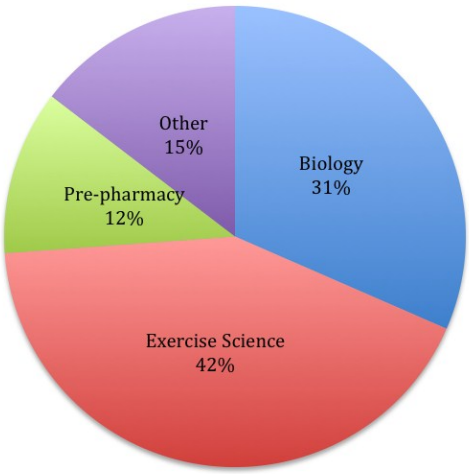
Your responses help contribute to the scholarship of teaching and learning at High Point University. Please remember that your answers cannot affect your grade in this course. All responses will be anonymous. Thank you for your participation.

Appendix C: Additional Student Demographics

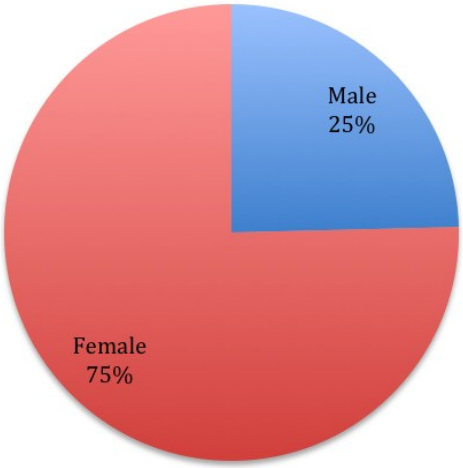
A.



B.



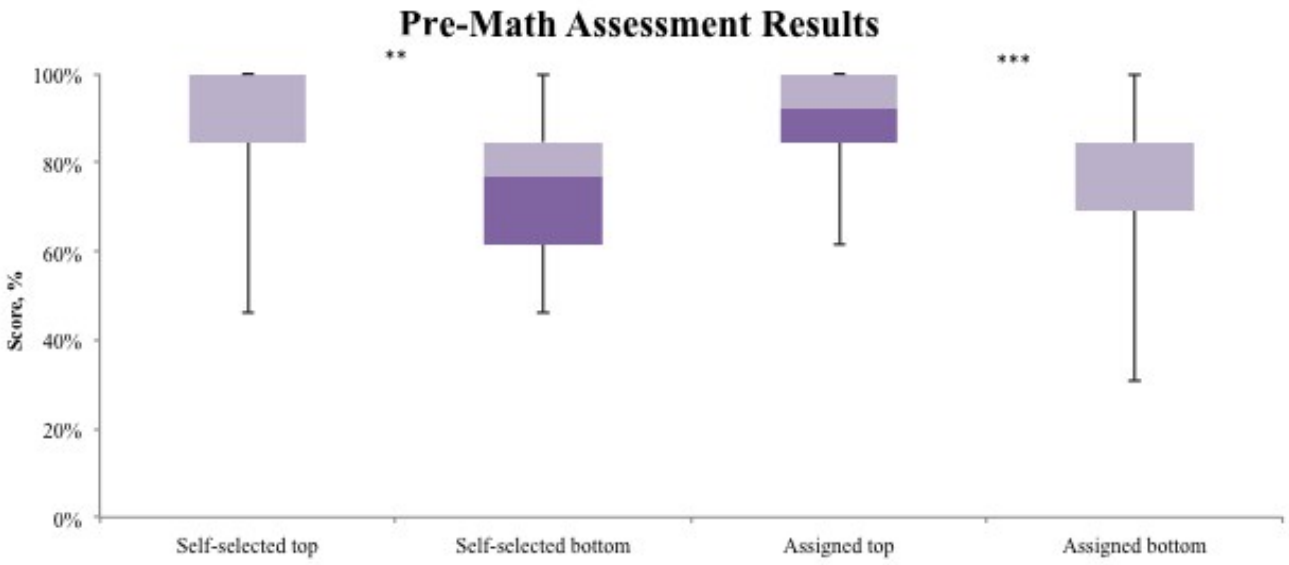
C.



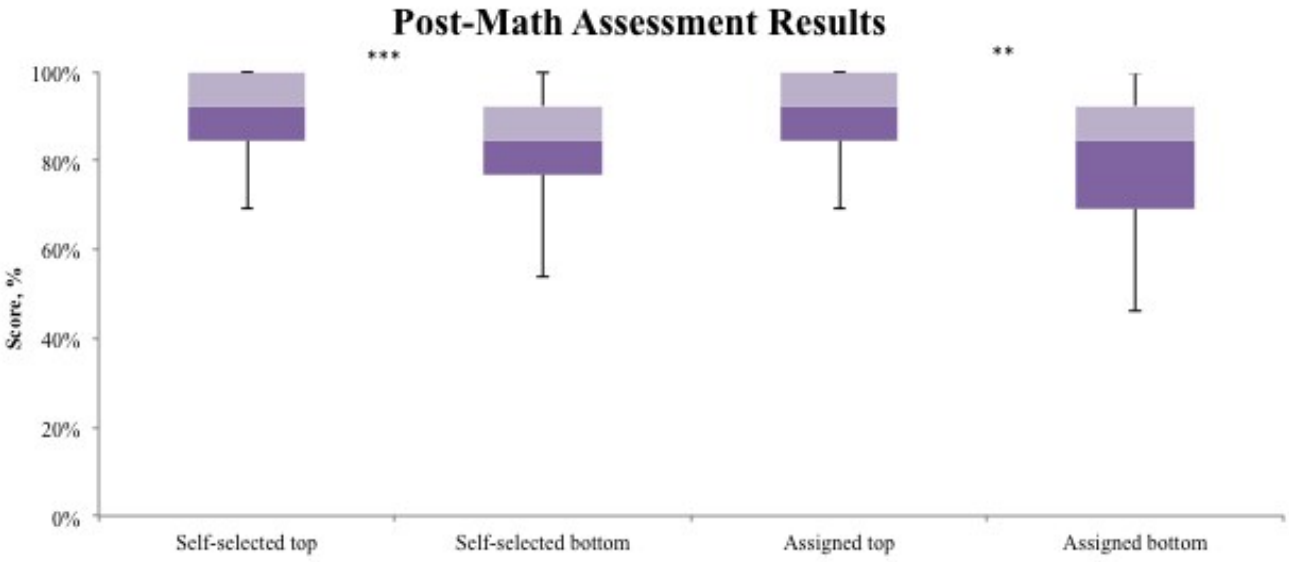
Appendix C: A) Study participants were primarily underclassmen. Freshmen (first-year), Sophomore (second-year), Junior (third-year), Senior (fourth-year). B) Study participants were primarily exercise science and biology majors. C) Study participants were primarily female.

Appendix D: Top Math Performers Score Significantly Higher on Multiple Assessment Methods

A.



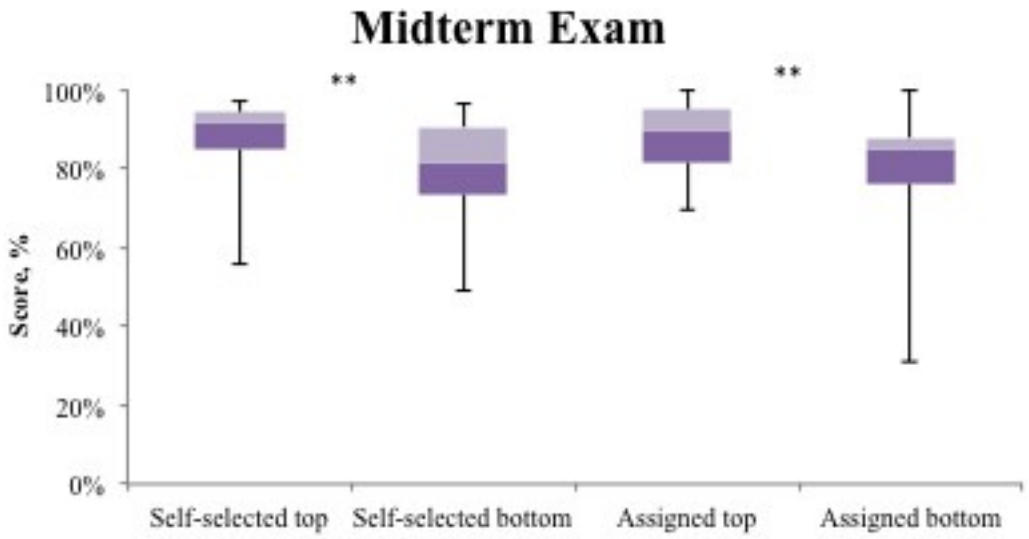
B.



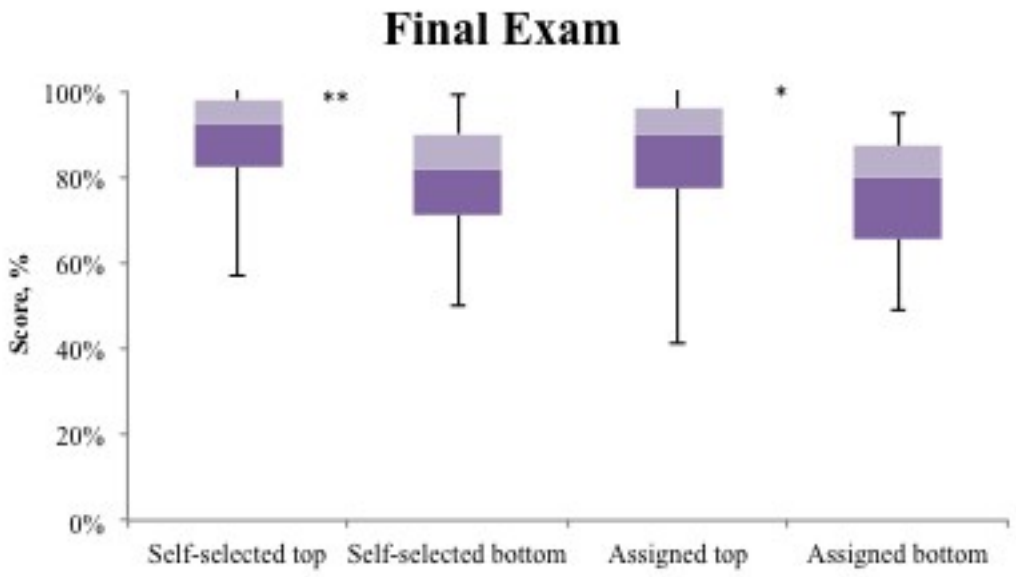
Appendix D. Top math performers score significantly higher on multiple assessment methods. In all panels, error bars represent the range of scores. Statistical significance was determined using t-tests. *= $p \leq 0.05$ **= $p \leq 0.01$ ***= $p \leq 0.001$ See Methods for details on quartile groupings. A) Math assessment scores earned at the beginning of the semester, divided by top and bottom math performers. B) Math assessment scores earned at the end of the semester, divided by top and bottom math performers. C) Midterm exam scores earned, divided by top and bottom math performers. D) Final exam scores earned, divided by top and bottom math performers. E) Overall course scores earned, divided by top and bottom math performers.

Appendix D continued: Top Math Performers Score Significantly Higher on Multiple Assessment Methods

C.



D.



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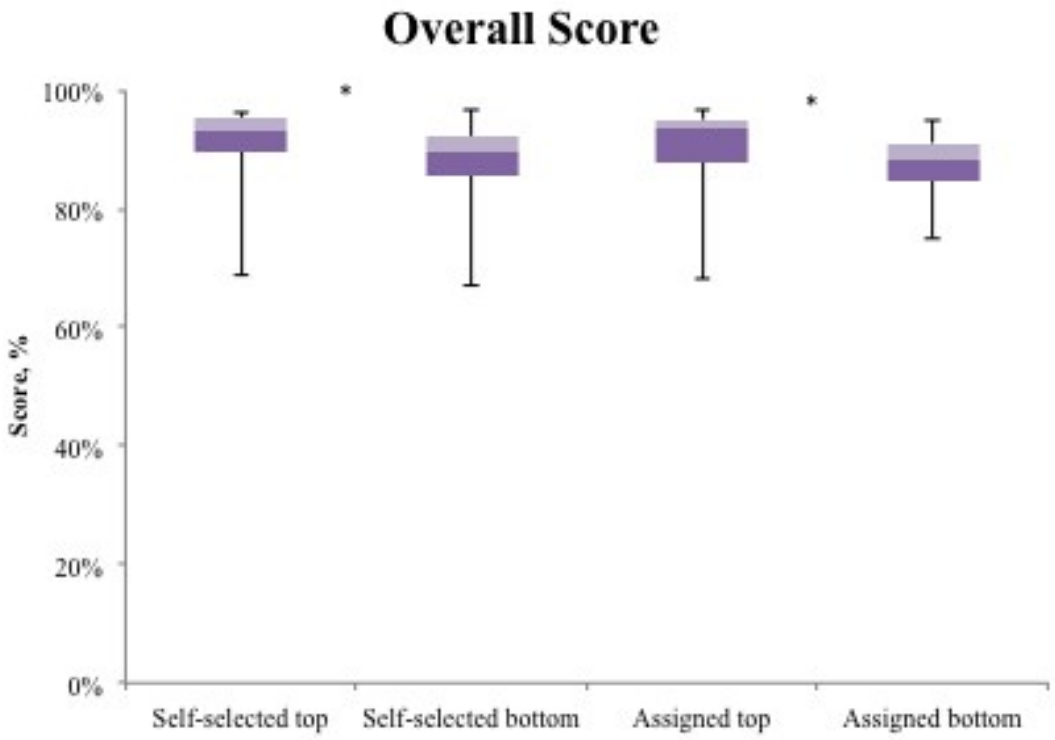
Appendix D continued: Top Math Performers Score Significantly Higher on Multiple Assessment Methods

E.



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Appendix E: Example midterm and final exam questions assessing chemistry-specific math concepts

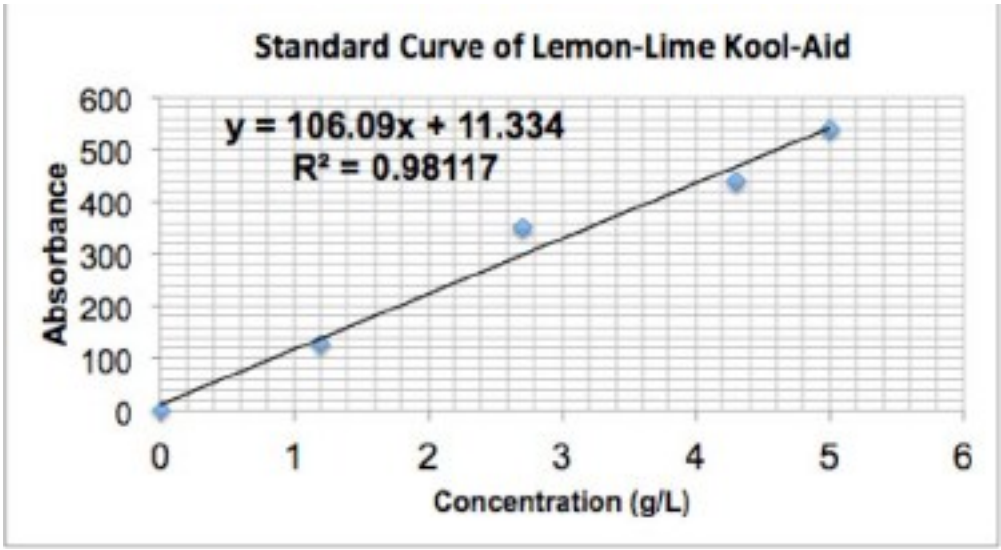
You have a 1.314 g sample of iron filings, salt, and sand. After removing the iron, dissolving the salt, and boiling off the water, you find that you have 0.418 g of salt. What was the percent composition of salt in your original sample?

Perform the following conversion showing all your work. Please use scientific notation and significant figures where appropriate.

The volume of an object is 27.2 cm3.
_____mL
_____L

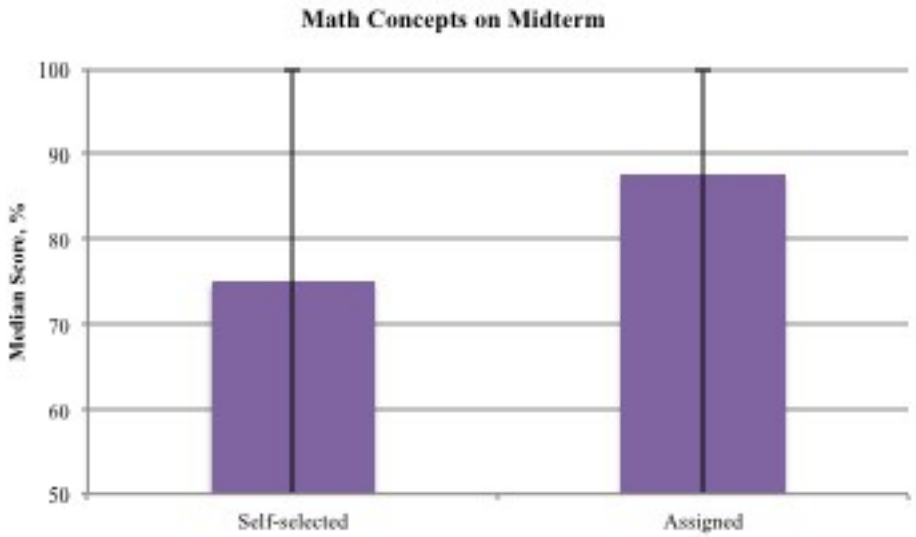
You need to make 500.0 mL of 0.0750 M NaCl. Show the calculations for making this solution from the solid reagent and describe how you would prepare it in the lab based on these calculations. The atomic mass of sodium is 22.9898 g/mol and the atomic mass of chlorine is 35.4527 g/mol.

Using your stock solutions created above, you plot the absorbance versus concentration at a wavelength of 425 nm. Using the standard curve created below determine the concentration of an unknown Kool-Aid solution with an absorbance value of 125.

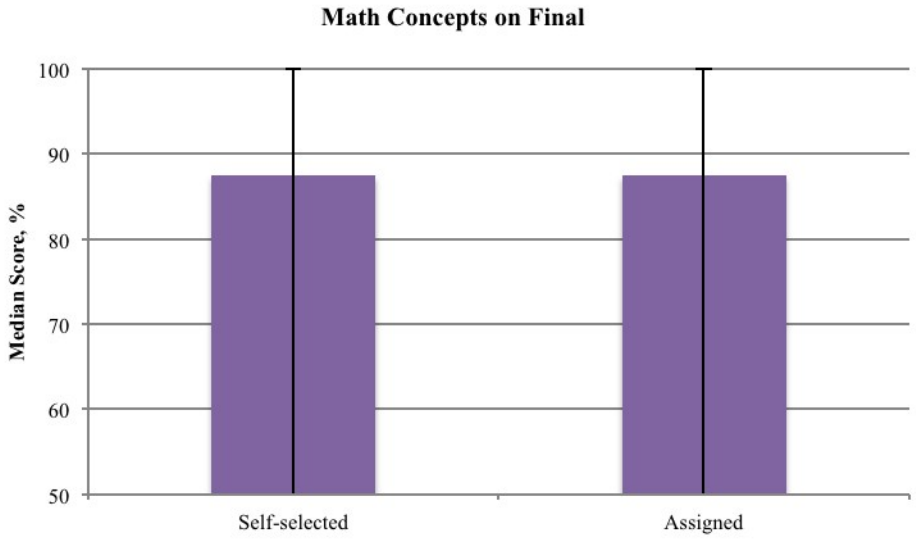


Appendix F: Math Performance on Midterm and Final Exams

A.



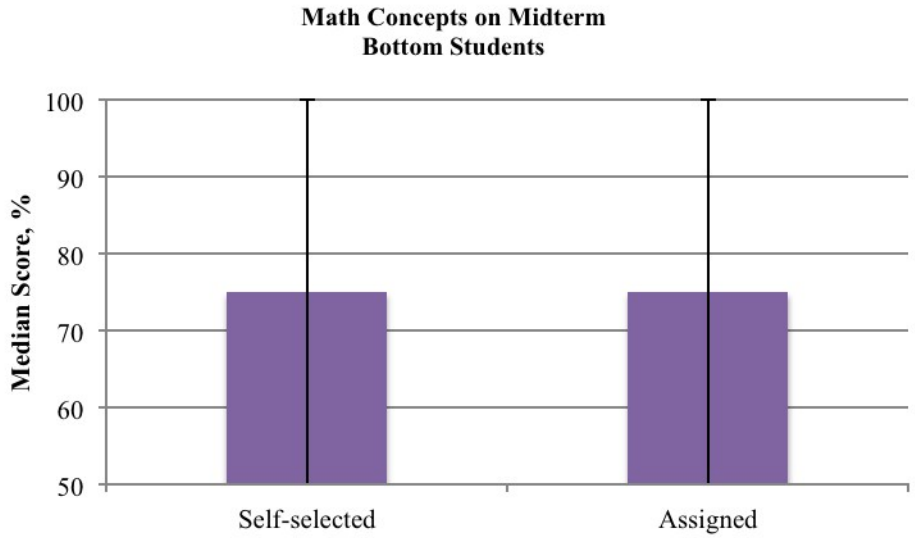
B.



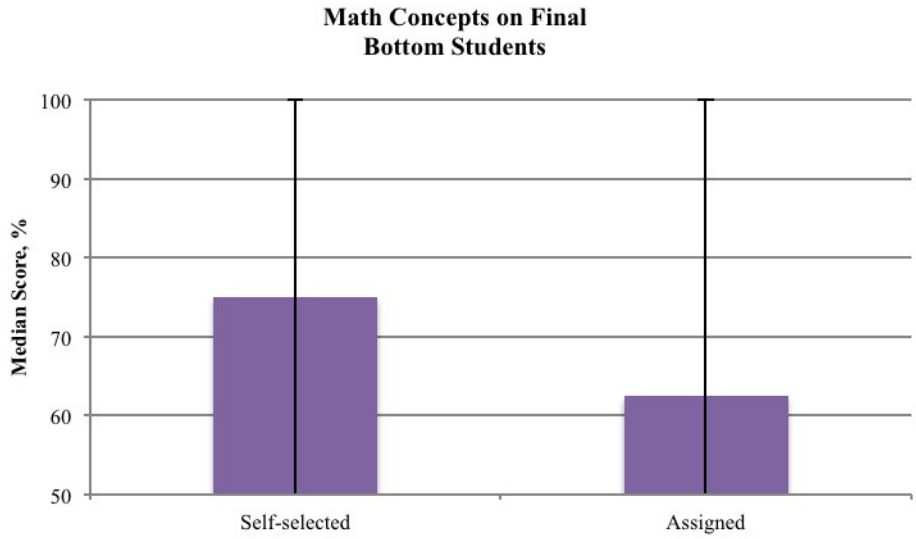
Appendix F. Math performance on midterm and final exams. In all panels, error bars represent the range of scores. Statistical significance was determined using t-tests. *= $p \leq 0.05$. A) Math performance on the midterm exam. B) Math performance on the final exam. C) Math performance among bottom math performers on the midterm exam. D) Math performance among bottom math performers on the final exam. E) Math performance among top math performers on the midterm exam. F) Math performance among top math performers on the final exam.

Appendix F continued: Math Performance on Midterm and Final Exams

C.



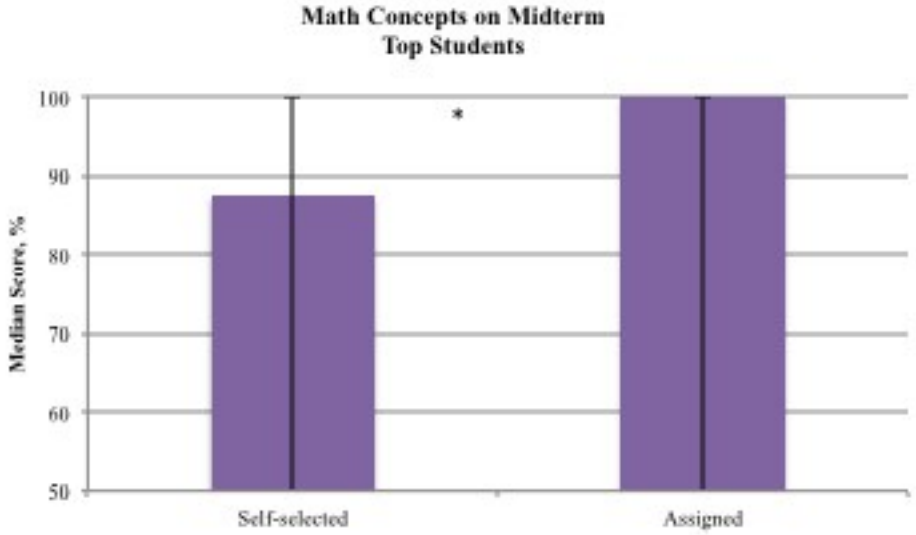
D.



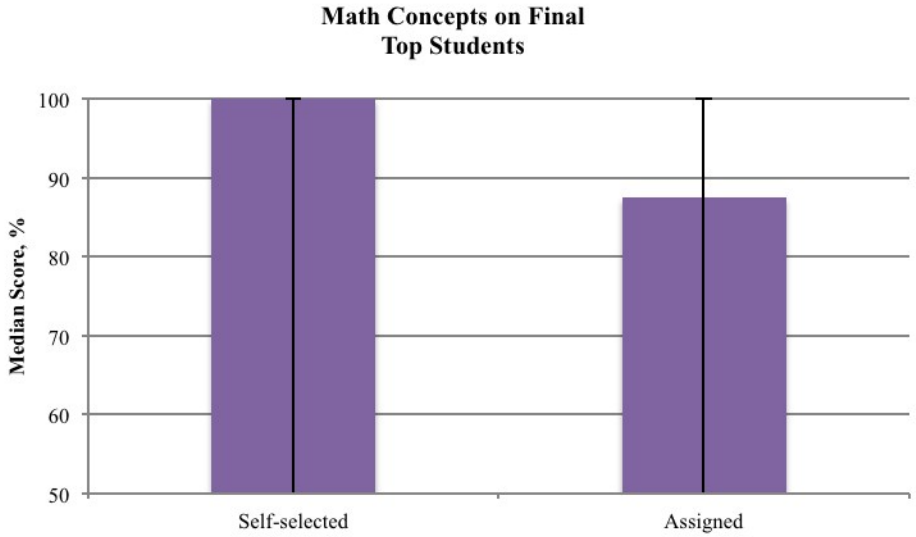
Appendix F. Math performance on midterm and final exams. In all panels, error bars represent the range of scores. Statistical significance was determined using t-tests. *= $p \leq 0.05$. A) Math performance on the midterm exam. B) Math performance on the final exam. C) Math performance among bottom math performers on the midterm exam. D) Math performance among bottom math performers on the final exam. E) Math performance among top math performers on the midterm exam. F) Math performance among top math performers on the final exam.

Appendix F continued: Math Performance on Midterm and Final Exams

E.



F.



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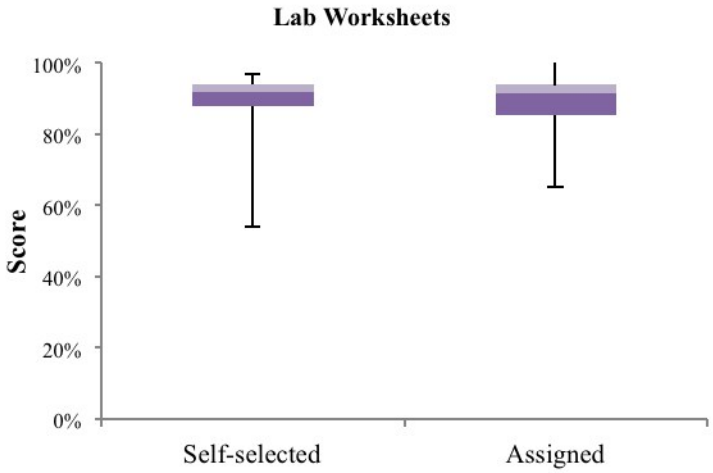
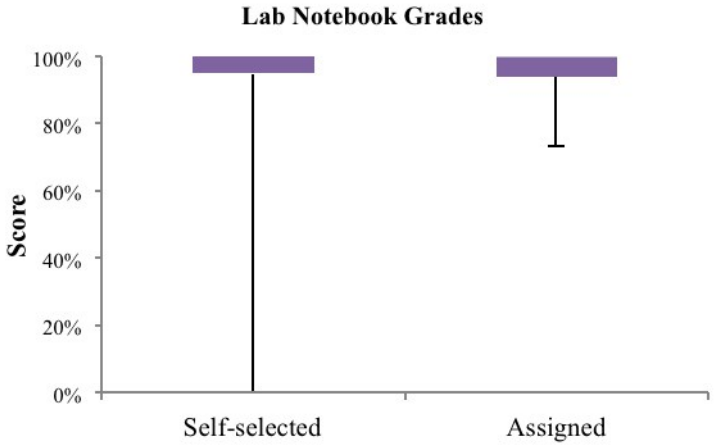
Appendix G: Self-selected and assigned student performance on multiple assessment methods

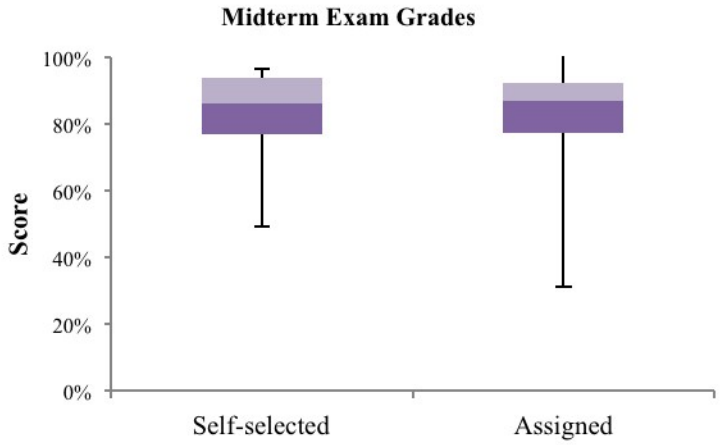
A.



B.



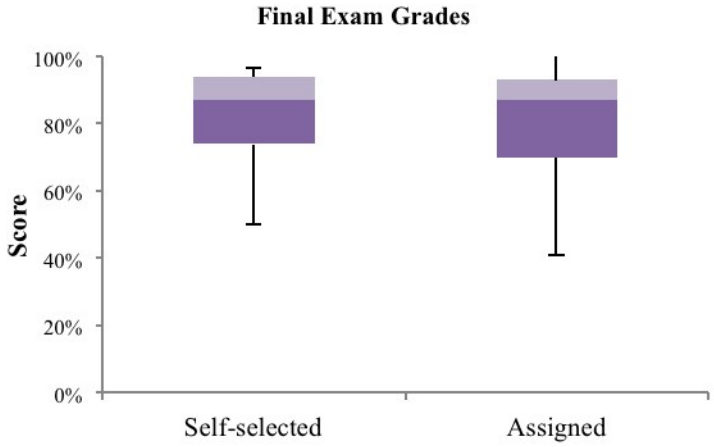
C.



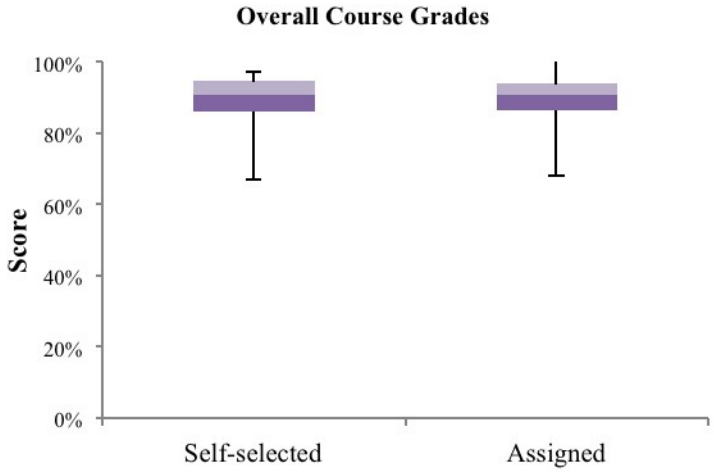
Appendix G. Self-selected and assigned student performance on multiple assessment methods. In all panels, error bars represent the range of scores. A) Lab worksheet scores B) Lab notebook scores C) Midterm exam scores D) Final exam scores E) Overall course grades

Appendix G continued: Self-selected and assigned student performance on multiple assessment methods

D.



E.



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