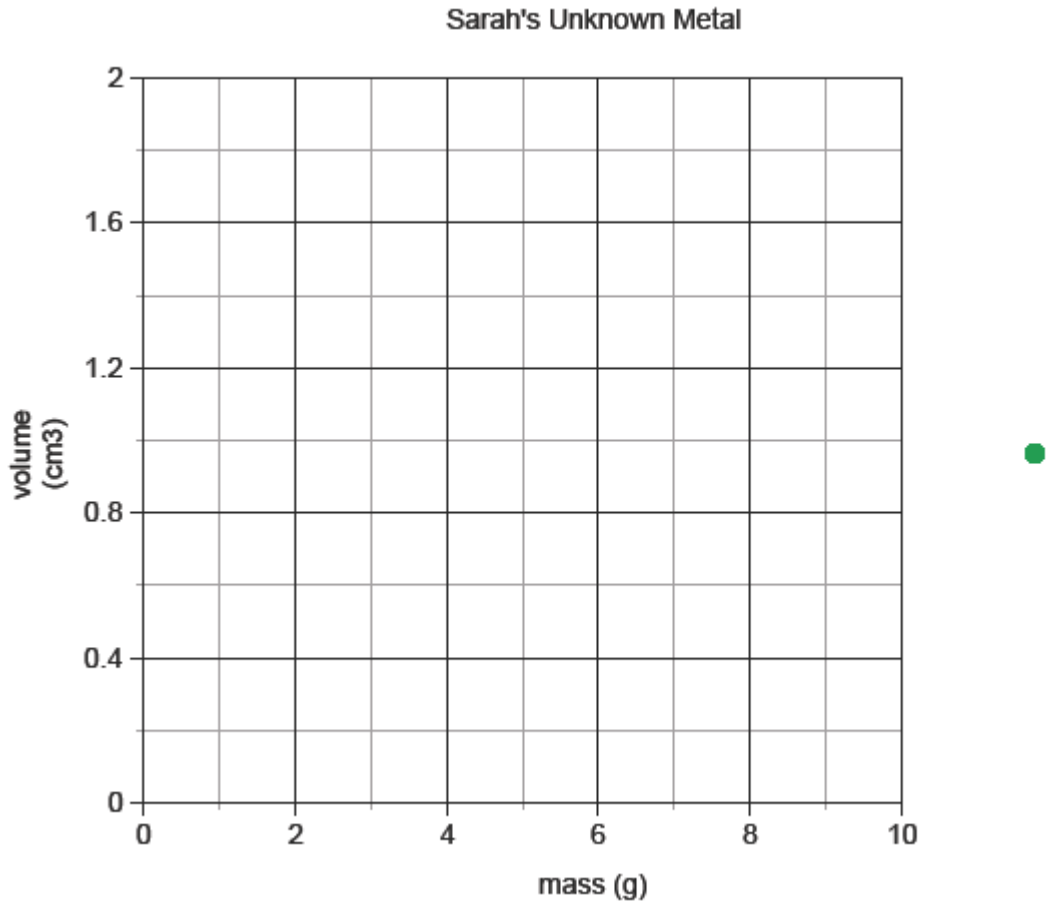
CHEM 201 assessment of student learning #1
Department of Physical Science and Engineering
Wright College
Spring 2016

Sarah is working with an unknown metallic substance. Once ignited, the metal burns in the presence of oxygen and is reactive with the halogens. Plot the data below in the graph and answer the questions provided.

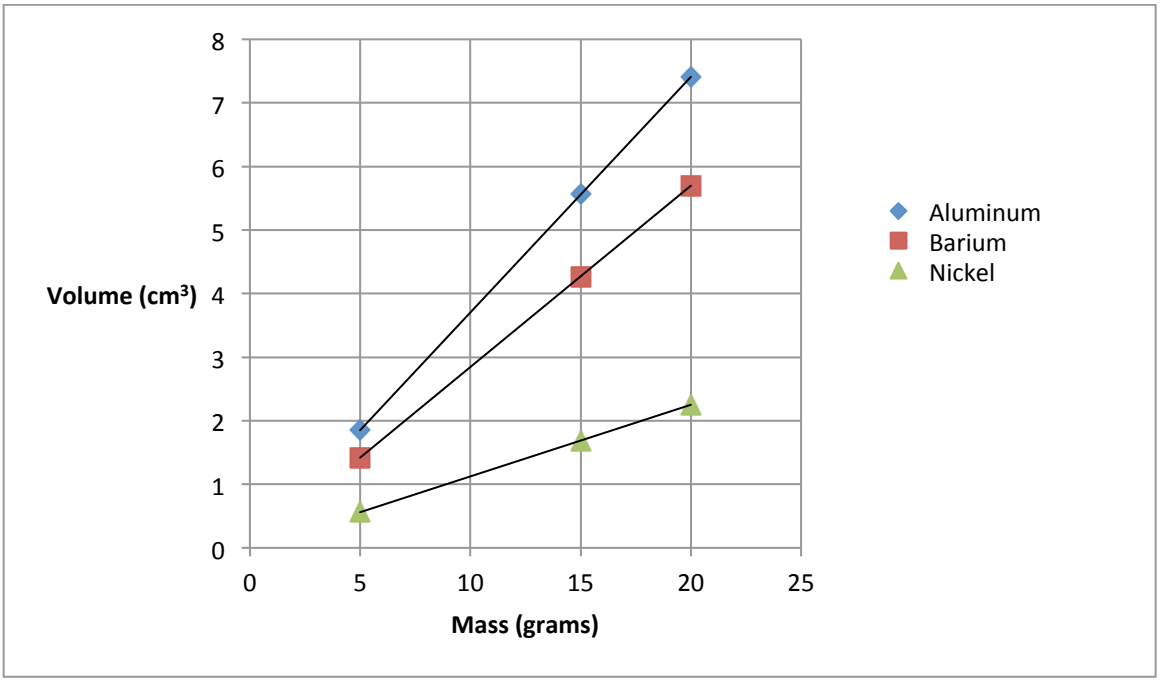
Mass of unknown metal (g)	Volume of unknown metal (cm^3)
2.3	0.66
6.5	1.85
4.9	1.40
1.8	0.51



1. If a sample of the unknown metal had a volume of 28 cm^3, what would be its mass, in grams? Explain your reasoning.

2. If a sample of the unknown metal had a mass of 15 grams, what would be its volume, in cm^3? Explain your reasoning.

3. Using the graph below, identify the unknown metallic substance that Sarah was working with. Explain your reasoning.



Chemistry 201 Assessment of Student Learning #1 (Reading, Writing)

Department of Physical Sciences and Engineering

Wright College

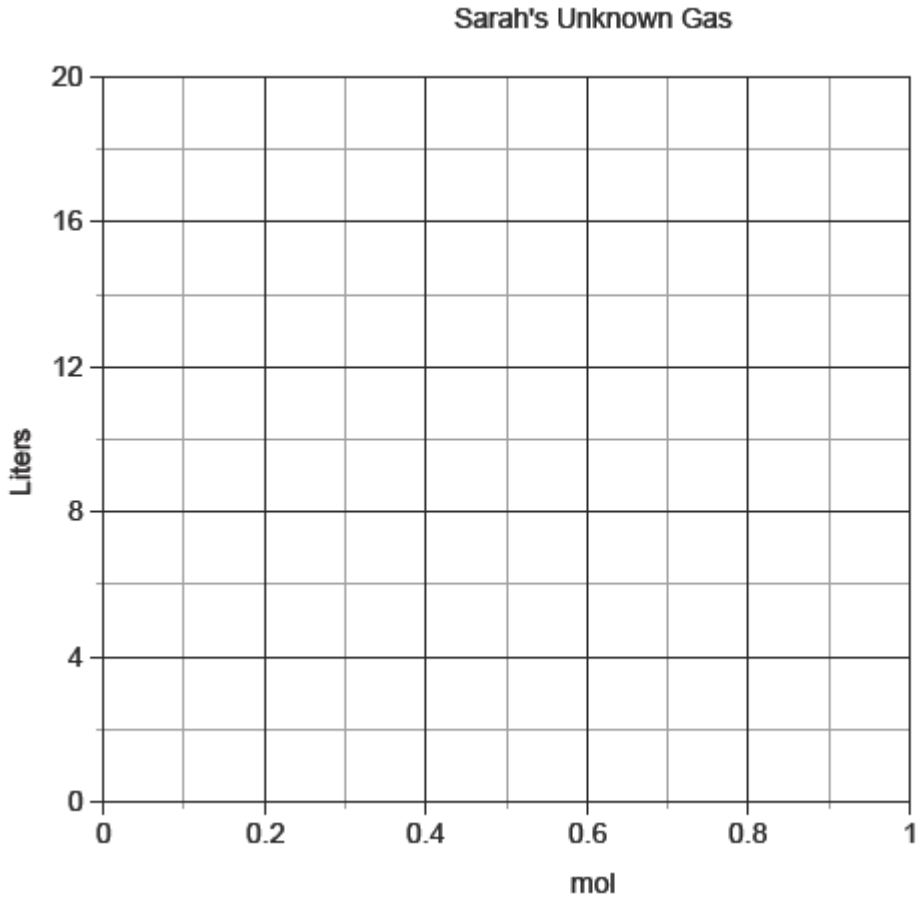
Spring 2016

Objective/Criteria	Does not meet expectations	Partially meets expectations	Meets expectations
Evidence – Can the student identify relevant/irrelevant data? Explanations for questions 1 and 2.	Does not calculate density from data. 61%	Calculates density from data, but incorrectly calculates questions 1 and 2. 12%	Calculates density from data and correctly calculates questions 1 and 2. 27%
Analysis – Can the student collect and organize data? Putting data points on graph.	Not all data points are near correct positions in graph #1. 8%	Data points are near correct positions in graph #1. 35%	Data points are in correct positions in graph #1. 57%
Evaluation – Can the student interpret data? Calculation of densities of unknown and Al, Ba and Ni.	Does not use data to calculate any densities in graph #2. 69%	Calculates some densities in graph #2. 27%	Calculates all 3 densities from graph #2. 4%
Synthesis – Can the student make conclusions about the data? Identify the correct metal.	No idenfication. 58%	Doesn't compare densities, but correct identification. 17%	Compares densities and correctly identifies. 25%

CHEM 201 assessment of student learning #2
Department of Physical Science and Engineering
Wright College
Spring 2016

Sarah is working with an unknown gas. The unknown gas reacts with O_2 to yield N_2 and H_2O by a moderately exothermic reaction. Combustion of the gas was obtained by using a platinum catalyst. Plot the data below in the graph and answer the questions provided.

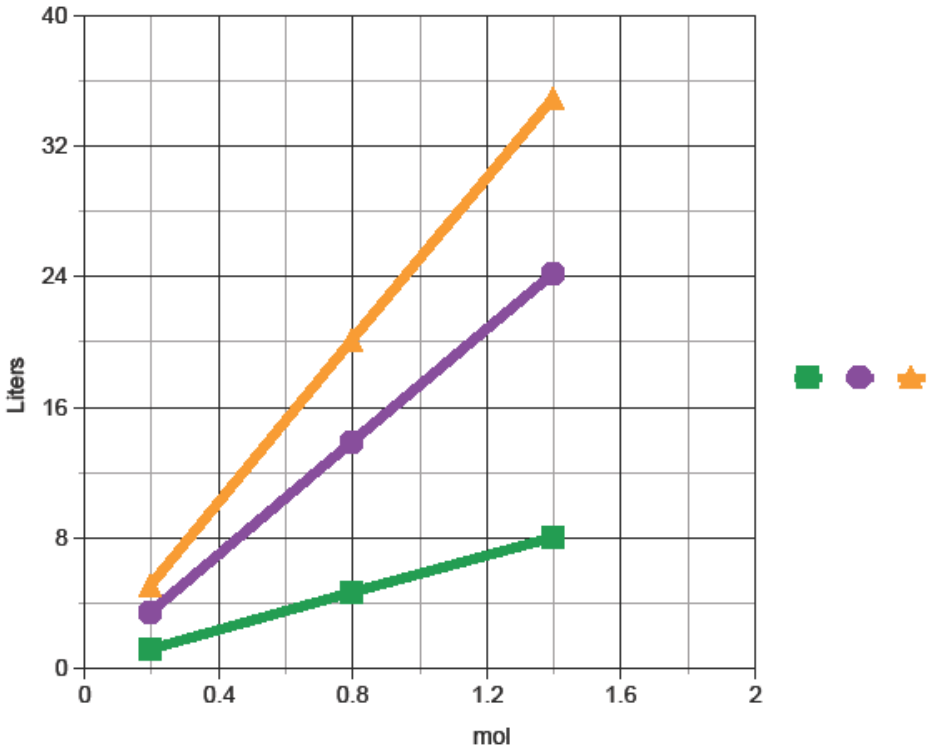
Moles	Liters
0.51	13
0.37	9.2
0.13	3.2
0.68	17



1. If a sample of the unknown gas had a volume of 27 L, how many moles of gas would be present? Explain your reasoning.

2. If a sample of the unknown gas contained 1.3 moles, How many liters would the gas occupy? Explain your reasoning.

3. Using the graph below, was Sarah working with gas A, B or C? Explain your reasoning.



Chemistry 201 Assessment of Student Learning #2 (Reading, Writing)

Department of Physical Sciences and Engineering

Wright College

Spring 2016

Objective/Criteria	Does not meet expectations	Partially meets expectations	Meets expectations
Evidence – Can the student identify relevant/irrelevant data? Answers and explanations for questions 1 and 2.	Incorrectly calculates questions 1 and 2, and offers no correlation between L and mol. 33%	Correctly calculates questions 1 and 2, but offers no correlation between L and mol. 21%	Calculates L/mol from data and correctly calculates questions 1 and 2. 46%
Analysis – Can the student collect and organize data? Putting data points on graph.	Not all data points are near correct positions in graph #1. 8%	Data points are near correct positions in graph #1. 44%	Data points are in correct positions in graph #1. 47%
Evaluation – Can the student interpret data? Calculation of L/mol relationship.	Does not show relationship between L and mol from data or calculations. 64%	Shows relationship between L and mol in data or graph. 22%	Shows relationship between L and mol in data and graph. 14%
Synthesis – Can the student make conclusions about the data? Identify the correct gas.	No identification. 32%	Doesn't use relationship between L and mol, but correct identification. 40.%	Compares L/mol to gases and correctly identifies. 28%

Course: _____ Instructor: _____ Date: _____

Instructions: This questionnaire is part of a college-wide assessment of critical thinking for students. This is anonymous and you will not be graded on it. Please refer to the graph to answer the following questions. Please answer each question as best you can, with one or two sentences explaining your answer.

In the attached graph, data is plotted showing the weight and height of four groups of people. The four groups of people, in no particular order, are:

I. Average people who exercise regularly and are "in shape".
II. NBA Basketball Players, who are in shape but taller than usual.
III. Sumo Wrestlers, who are heavier than average.
IV. Runway Models, who are typically taller and lighter than average.

A line is also drawn showing the average relationship between weight and height for a typical person who is in shape. Please refer to the graph to answer the following questions.

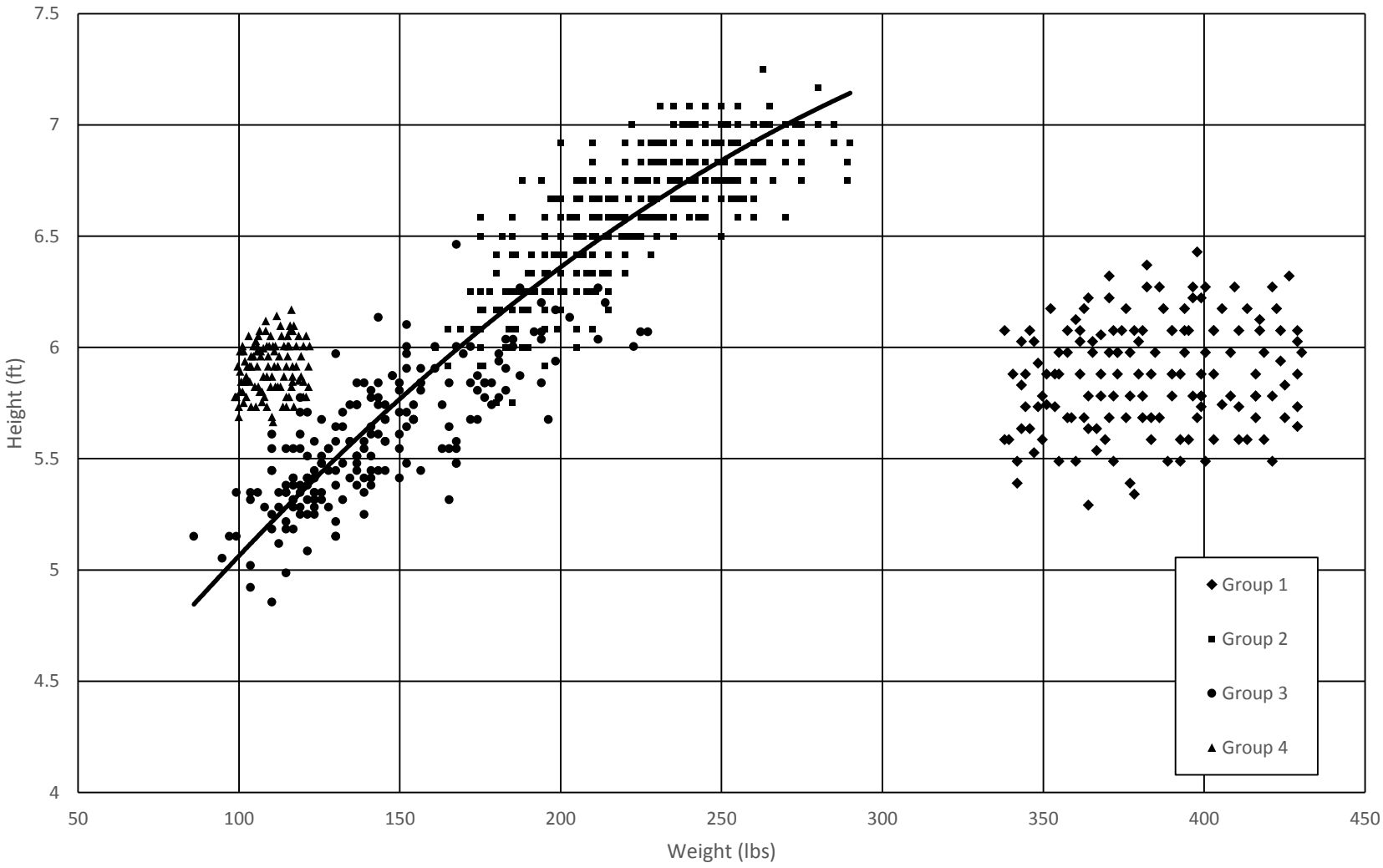
1. Which data set (Group 1, 2, 3, or 4) is most likely of NBA Basketball Players? Explain your reasoning.

2. Which data set (Group 1, 2, 3, or 4) is most likely of the Sumo Wrestlers? Explain your reasoning.

3. Which data set (Group 1, 2, 3, or 4) is most likely of the Runway Models? Explain your reasoning.

Please plot the following people on the graph according to their height and weight, and indicate on the graph which data point you drew is for which person. Indicate here whether these people are likely thin, average weight ("in shape"), or heavy compared to what's expected for their height. Also indicate which data group they were most likely a part of.

	Height	Weight	(circle one):	Group (circle one):
Person A:	6 ft	100 lbs	thin | average | overweight	1 | 2 | 3 | 4
Person B:	6 ft	325 lbs	thin | average | overweight	1 | 2 | 3 | 4
Person C:	7.2 ft	310 lbs	thin | average | overweight	1 | 2 | 3 | 4
Person D:	5.7 ft	180 lbs	thin | average | overweight	1 | 2 | 3 | 4
Person E:	5.8 ft	460 lbs	thin | average | overweight	1 | 2 | 3 | 4


7.5
7
6.5
6
5.5
5
4.5
4
Height (ft)
50
100
150
200
250
300
350
400
450
Weight (lbs)
Group 1
Group 2
Group 3
Group 4

Course: _____ Instructor: _____ Date: _____

Instructions: This questionnaire is part of a college-wide assessment of critical thinking for students. This is anonymous and you will not be graded on it. Please refer to the graph to answer the following questions. Please answer each question as best you can, with one or two sentences explaining your answer.

In the attached graph, data is plotted showing the temperature and absolute magnitude of four groups of stars. The four groups of stars, in no particular order, are:

I. The most common type of stars, average stars in space called "Main Sequence" stars.
II. O/B type stars, which are Main Sequence stars but are hotter than usual.
III. Giants and Supergiants, which have a lower absolute magnitude (more negative) than average.
IV. White Dwarfs, which have a higher absolute magnitude (more positive) and are hotter than average.

A line is also drawn showing the average relationship between temperature and absolute magnitude for a Main Sequence star. Please refer to the graph to answer the following questions.

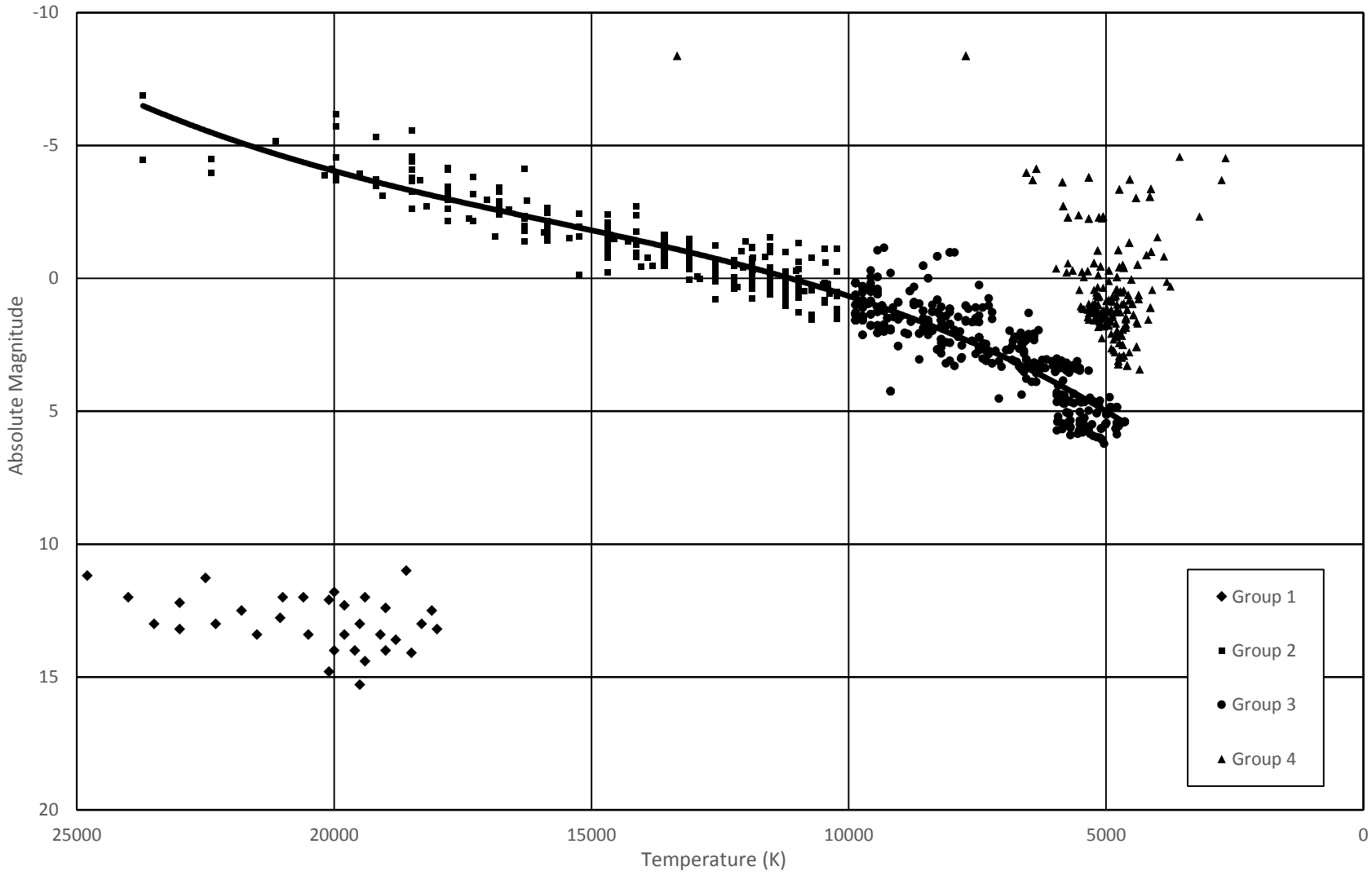
1. Which data set (Group 1, 2, 3, or 4) is most likely of the O/B type stars? Explain your reasoning.

2. Which data set (Group 1, 2, 3, or 4) is most likely of the Giants and Supergiants? Explain your reasoning.

3. Which data set (Group 1, 2, 3, or 4) is most likely of the White Dwarfs? Explain your reasoning.

Please plot the following stars on the graph according to their absolute magnitude and temperature, and indicate on the graph which data point you drew is for which star. Indicate here whether these stars are likely cooler, average (Main Sequence) or hotter compared to what's expected for their absolute magnitude. Also indicate which data group they were most likely a part of.

	Magnitude	Temperature	(circle one):	Group (circle one):
Star A:	-5.0	5000 K	cool | average | hot	1 | 2 | 3 | 4
Star B:	15	17500 K	cool | average | hot	1 | 2 | 3 | 4
Star C:	6.0	4000 K	cool | average | hot	1 | 2 | 3 | 4
Star D:	4.0	7000 K	cool | average | hot	1 | 2 | 3 | 4
Star E:	12	26000 K	cool | average | hot	1 | 2 | 3 | 4


-10
-5
0
5
10
15
20
Absolute Magnitude
25000
20000
15000
10000
5000
0
Temperature (K)
Group 1
Group 2
Group 3
Group 4

Wright College Academic Department/Program Assessment Project
Fall 2015-16

WHAT?
This project will assess the student learning of course outcomes for Chemistry 201 and Physical Science 101/111 that relate to the general education SLOs related to reading and writing for the Fall 2015 institutional assessment.

WHY?
The Physical Sciences and Engineering Department is participating in the Assessment Committee's ongoing assessment of Wright College's general education student learning outcomes. For Fall 2015, the Assessment Committee is assessing the learning outcome of Reading and Writing, which the department has mapped as one of the outcomes they deliver. We are assessing this general education SLO in general chemistry and physical science courses.

HOW?
Andrew Kruger wrote the assessment for Physical Science 101/111 with the help of Justin Lowry, and Maria Valentino wrote the assessment for Chemistry 201 with the help of Warren Menezes. There were two long-answer form assessments for each course, one at the beginning (1^{st} -3^{rd} week) and toward the end (11^{th} -15^{th} week). The first will cover information the student is expected to understand when they come into the course, and the second assessment will cover information they have been taught in that course.

The students will be asked to answer questions that are relevant to a course SLO that has been mapped to the departmental SLO: "Students will demonstrate an understanding of the basic principles in the physical sciences to evaluate and solve qualitative and quantitative

problems using appropriate scientific models and/or mathematical manipulations."

The Physical Science 101/111 assessment will be focusing on the course-level SLO that students will be able to "identify major star classes in the Hertzsprung-Russell diagram"

The Chemistry 201 assessment will be focusing on the seventh course-level SLO: "Students should apply the principles of thermochemistry to study calorimetry, specific heat, standard enthalpies of formation and change in enthalpy for endothermic and exothermic reactions."

WHAT WE FOUND

The Physical Science 101/111 assessments are still in the process of being administered and graded. The Chemistry 201 assessments were graded by Maria Valentino and a rubric was created that categorizes student performance with regard to "Evidence" (ability to exclude irrelevant data), "Analysis" (ability to collect and organize data), "Evaluation" (ability to relate and interpret data), and "Synthesis" (ability to make logical conclusions). The rubrics with percentage of students who A) did not meet expectations, B) partially met expectations, or C) met expectations are given below.

We found there was a significant increase in student ability to identify and exclude irrelevant information from the analysis, with a decrease from 61% to 33% of students not meeting expectations, and an increase from 27% to 46% for students meeting expectations. A moderate 10% decrease in students meeting expectations in collecting and organizing data was seen, but a 10% increase in students meeting expectations in interpreting data. For students being able to make conclusions about the data, a significant percentage of students (~25%) moved from not meeting expectations to partially meeting expectations.

Intervention Plan

We will be identifying areas of growth that can be addressed, and we'll communicate these findings to the Department of Physical Sciences and Engineering. We will also provide a list of ways to address these areas of growth that are currently being used and that other faculty can implement in their classes.
