Tatiyahna Campbell
Anatomy & Physiology – Period 2
Ms. Francois
March 1st, 2014

Lab #4: Calcium & Bone Strength
Lab Completed on March 1, 2014

QUESTION: How does removing calcium from bones with various liquids affect bone strength?

INTRODUCTION: In this experiment, we are looking to see out of three liquids which will affect the bone strength. In order to do this we will put three bones into three liquids (Water, Vinegar, and Bleach). We will take data by first weighing the bone and then weighing both the bone and a paper towel. By doing so, we will see how the removal of calcium affects the amount of bone strength. If you place the bone inside the vinegar, then the calcium levels and strength of the bone will decrease because the vinegar will cause the bone to dissolve.

VARIABLES: Independent Variable- The chemicals being used

Dependent Variable- Strength of the bone/ Level of calcium

Constants- Amount of chemicals, Chicken bone

HYPOTHESIS: If you place the bone inside the vinegar, then the calcium levels and strength of the bone will decrease because the bleach will cause the bone to dissolve.

EQUATIONS: N/A

MATERIALS:

- 30mL Vinegar (Acetic Acid)
- 30mL Coke
- 30mL Water
- Graduated Cylinder
- 3 Beakers/cups
- 30mL Bleach
- 30mL Isopropyl Alcohol
- Triple Beam Balance
- 3 Chicken Bones
- Paper Towels

PROCEDURE:

First, three beaker/cups were taken and labeled with "W" for water, "V" for vinegar, and "X" for the liquid you chose. Next, water was poured into a graduated cylinder labeled "W" at 30mL. Then, vinegar was poured into the graduated cylinder labeled "V" at also 30mL. Following, the chosen liquid was then poured into a graduated cylinder at 30mL.

For the second part of the experiment, the muscle was removed from the three bones that were chosen to be used and they were dried with paper towel. Remember that HANDS WERE WASHED AFTER DEALING WITH THE RAW CHICKEN!! Next, paper towel and a triple beam balance were obtained so the we could weigh the paper towel. Then, with the paper towel

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on the scale the chicken bones were weighed separately. The weight of the paper towel was subtracted from the total weight with the bone. The bones weight was recorded as the starting weight for each column in the table.

For the third part, a bone was placed in the beakers containing the Water, Vinegar, and the chosen liquid. Then observations were made from the bones such as what the bones color was? How it felt? What it smelt like? Etc. Following, the three beakers were placed in a safe place where they wouldn't be disturbed. A piece of paper was used to write the group name on it and they were placed under the beakers so that we could identify them. The bones were then observed after a five day period. After this experiment was conducted HANDS WERE WASHED WITH SOAP AND WATER

AFTER 5 DAYS:

First, the bone was removed from the water beaker and dried off with a paper towel. Next, we used a paper towel to place on the triple beam balance and weighed it. Then, the bone was placed on the paper towel and the weight was recorded in grams. The weight from the paper towel was subtracted from the total weight with the bone, and then the weight of the bone was recorded in grams. Step 2 was repeated for other bones.

DATA AND CALCULATIONS:

Table 1. Bone weight

	Water (control)		Vinegar		Bleach	
Time pd.	Weight of paper towel + bone (g)	Weight of Bone	Weight of paper towel + bone (g)	Weight of Bone	Weight of paper towel + bone (g)	Weight of Bone
Initial (0hr)	4.2g	4.2g	0.4g	0.4g	7g	1g
96 hrs.	8.3g	8.3g	72.9	7.2g	6.2g	6.2g

Table 2. Bone Observations & Weight

	Water (control)		Vinegar		Bleach	
Time pd.	Weight from table 1	Observ.	Weight from Table 1	Observ.	Weight from Table 1	Observ.
Initial (0hr)	4.2g	• wet • Looks the same	0.4g	• Looks the same	1g	• Dissolving • Bubbles are coming up
96 hrs.	8.3g	Pink	7.2g	Brown	6.2g	Black

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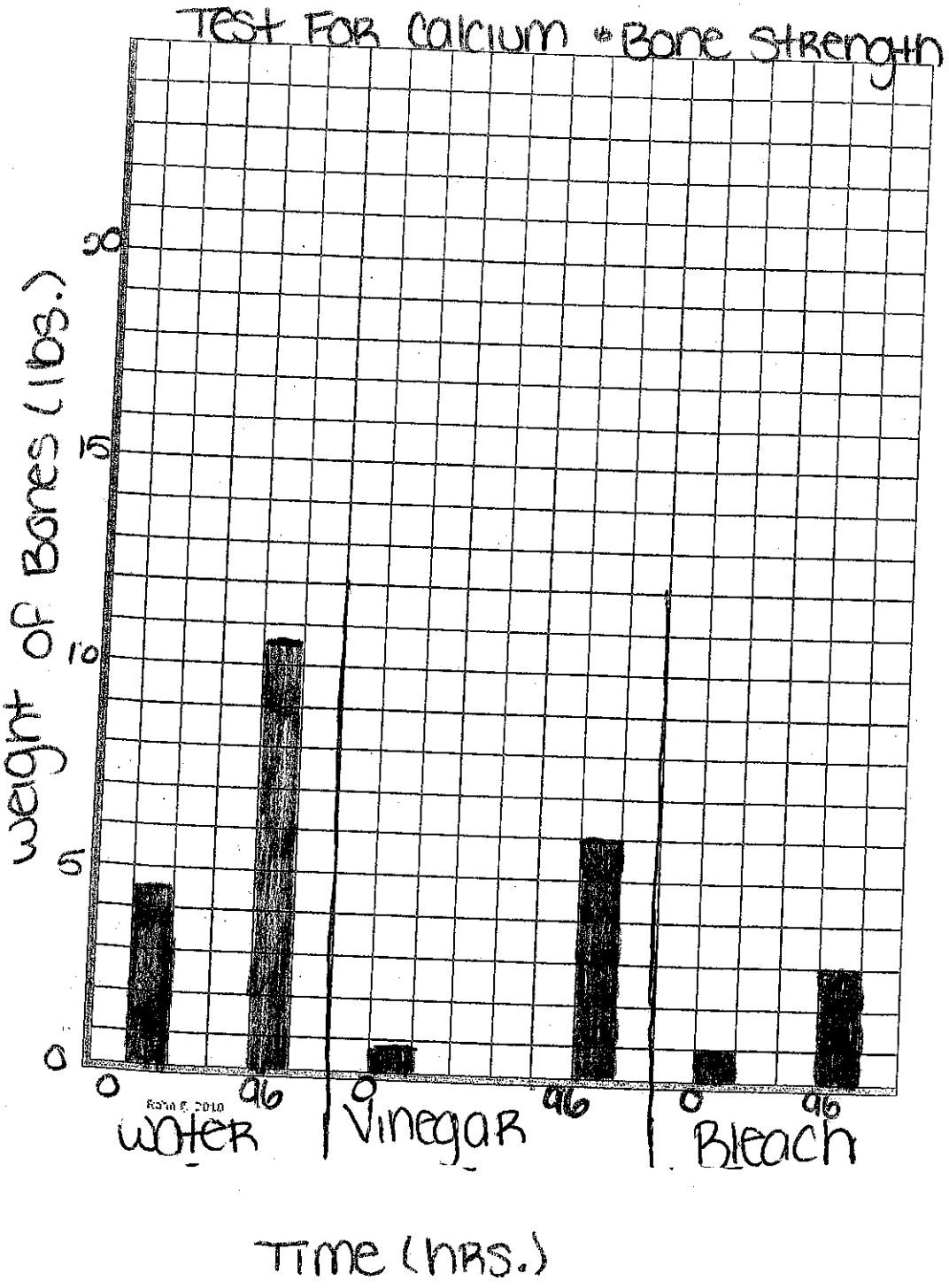

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CONCLUSION:

For my hypothesis, I stated if you place the bone inside the vinegar, then the calcium levels and strength of the bone will decrease because the vinegar will cause the bone to dissolve. Now my hypothesis was incorrect and I have evidence on why that was. For one, the water is the one that increased the bone's weight, while the vinegar didn't really have an effect on its weight. Another would be that the vinegar had a weak effect on the bones strength.

But all together the experiment was a success & we got the results that some were hoping for. Although that was the case we still had some sources of error. One source of error would be that with one of the liquids, we didn't fill it fully to where it had covered the bone like it was supposed so that it the experiment could have been a complete success. Another source is was that in my opinion the liquid we chose was a weak one since it didn't do much to the bone like we thought it would. Things in the experiment that I would've changed would be the amount of days that the bones were in the liquids and the liquids we used.

After doing the lab, I asked myself a couple questions. One question was that what would've happened if we had put the bones in the liquids for a couple more days would the bones have just dissolved altogether? But my most important is the how come in the experiment the water made the bone much heavier from when we started?

Name: Tatiyahna Campbell 9-10 Period: 2

SCIENCE LAB REPORT RUBRIC

Discussion and Conclusion	☐ Restates hypothesis ☐ States hypothesis is incorrect/correct ☐ Data is analyzed thoroughly and correctly to support valid conclusions ☐ 2 Sources of error in experiment explained ☐ 2 ways to improve the experiment explained ☐ Asks a new question ☐ Makes a connection to how experiment could be used in life. ☐ Written in 3 paragraphs	One key element of conclusion is missing/not fully expanded ☐ Restates hypothesis ☐ States hypothesis is incorrect/correct ☐ Data is analyzed thoroughly and correctly. to support conclusions ☐ 2 Sources of error in experiment explained ☐ 2 ways to improve the experiment is explained ☐ Asks a new question ☐ Makes connection of how experiment could be used in life ☐ Written in 3 paragraphs	Two key elements of conclusion are missing: ☐ Restates hypothesis ☐ States hypothesis is incorrect/correct ☐ Data is analyzed thoroughly and correctly to support valid conclusions ☐ 2 Sources of error in experiment explained ☐ 2 ways to improve the experiment is explained ☐ Asks a new question ☐ Makes a connection to how experiment could be used in life ☐ Written as one paragraph	☐ Paraphrases manual with little data analysis ☐ Conclusions may be wrong or data misinterpreted. ☐ Written as one paragraph or written in bullet points ☐ More than two key elements missing from conclusion.

Category	Excellent (4 pts)	Proficient/Good (3 pts)	Developing (2 pts)	Needs Revision (1 pt)
Student's transitions are...	... varied and sentence structures to link the major sections of the text, create cohesion, and clarify the relationships among complex ideas and concepts.	... varied and sentence structures to link the major sections of the text, create cohesion, and clarify the relationships among ideas and concepts.	... appropriate and varied transitions to create cohesion and clarify the relationships among ideas and concepts.	... inappropriate and ineffective transitions in attempt to create cohesion and clarify the relationship between ideas.
Student's word choices show...	...precise language, science-specific vocabulary to manage the complexity of the topic; convey a knowledgeable stance in a style that responds to the experiment's context as well as to the level of knowledge of readers.	...precise language and science-specific vocabulary to manage the complexity of the experiment's context as well as to the level of knowledge of likely readers.	...precise language and age-appropriate vocabulary to inform about or explain the experiment completed.	...imprecise language and age-appropriate vocabulary to inform the reader about the experiment.
Student's tone...	...is formal, objective, and established early and maintained throughout the lab report.	...is formal and/or objective, and may occasionally become information/subjective without hindering the overall integrity.	...is provides for a formal style and objective reading.	...is established but is neither formal nor objective.
Student's illustration	Drawing goes beyond in a significant way, e.g. drawing is particularly clear, colorful	Drawing is neat, easy-to-read, and completely labeled.	Drawing is missing key labels; is sloppy; is misleading.	Drawing missing, illegible, or not included.
Student's quality of writing	No spelling/ grammar (s/g) errors.	Few s/g errors.	Some spelling/grammar errors.	Many errors.
Student's presentation	Extremely neat, organized, and presentable.	Looks OK	A really rushed job	Completely illegible
Student's professionalism	Handed in on time	Handed in one day late	Handed in two days late	Handed in more than two days late

TOTAL SCORE ON REFLECTION: _____/56 + 2/- 2) points for heading

SCORE = _____

Name: Tatyahana Campbell Period: 2

SCIENCE LAB REPORT RUBRIC

Category	Excellent (4 pts)	Proficient/Good (3 pts)	Developing (2 pts)	Needs Revision (1 pt)
Problem / Question	☐ Problem is correctly identified.	☐ Problem is sufficiently identified.	☐ Question is partially identified.	☐ Question is incorrectly identified.
Introduction	☐ State the goals and objectives of lab ☐ Describes what data will be collected ☐ Briefly summarizes experiment ☐ Describe how that data will be used to arrive at conclusions at the completion of the laboratory.	One key element is missing: ☐ State the goals and objectives of lab ☐ Describes what data will be collected ☐ Briefly summarizes experiment ☐ Describe how that data will be used to arrive at conclusions at the completion of the laboratory.	Two key elements are missing: ☐ State the goals and objectives of lab ☐ Describes what data will be collected ☐ Briefly summarizes experiment ☐ Describe how that data will be used to arrive at conclusions at the completion of the laboratory.	A confusing of misleading introduction missing more than 2 elements: ☐ State the goals and objectives of lab ☐ Describes what data will be collected ☐ Briefly summarizes experiment ☐ Describe how that data will be used to arrive at conclusions at the completion of the lab
Variables	☐ Independent var. ☐ Dependent var. ☐ controlled variable.	One variable is missing: ☐ Independent var. ☐ Dependent var. ☐ controlled variable.	Two variables are missing: ☐ Independent var. ☐ Dependent var. ☐ controlled variable.	☐ All variables are missing.
Hypothesis	☐ Link between problem and predicted results direct and relevant. ☐ Use if-then-because ☐ Ind & Dependent variable featured	☐ Reasonable link between problem and predicted results. ☐ Use if-then-because ☐ Ind./Dep var featured	☐ Weak link between problem and predicted results. ☐ Missing if-then-because ☐ Missing ind./dep. var.	☐ Unreasonable link between problem and predicted results. ☐ Missing if-then-because ☐ Missing ind/dep var.
Materials and Procedure	☐ Includes list of all materials in bullets. ☐ Procedure written in past tense ☐ Does not use I, you, or we ☐ Procedure in paragraph form using transition words ☐ Specific ☐ Refer to glassware instruments used ☐ Includes any measurements ☐ Paraphrased procedure in own words	☐ Includes list of most materials in bullets. ☐ Procedure written in past tense ☐ Does not use I, you, or we ☐ Procedure in paragraph form w/ transition words ☐ Missing some specifics ☐ Refer to glassware instruments used ☐ Includes any measurements ☐ Procedure mostly paraphrased	☐ Includes list of some materials in bullets. ☐ Procedure written mostly in past tense ☐ Uses I, you, or we sometimes ☐ Procedure in paragraph form w/ missing transition words ☐ Missing specifics—not in order ☐ Refer to glassware instruments used ☐ Includes any measurements ☐ Some of procedure paraphrased	☐ Includes list of a few materials in bullets. ☐ Procedure not written in past tense ☐ Uses I, you, or we ☐ Not paragraph form/ missing transition words ☐ Missing specifics—not in order ☐ Does not refer to glassware/ instruments Includes little measurements Copied from the handout
Observations and Data Analysis/ Calculations	☐ Observations are plentiful and specific for each experiment ☐ Charts and graphs are recorded where necessary. ☐ Data is properly recorded in a coherent table Proper calculations are carried out. ☐ Proper units are used.	Missing one of the following: ☐ Observations are plentiful and specific for each experiment ☐ Charts and graphs are recorded where necessary. ☐ Data is properly recorded in a coherent table Proper calculations are carried out. Proper units are used	Missing two of the following: ☐ Observations are plentiful and specific for each experiment ☐ Charts and graphs are recorded where necessary. ☐ Data is properly recorded in a coherent table Proper calculations are carried out. Proper units are used	No data table present. Observations are vague and unclear. Calculations unclear or incorrect.