UNIT 2 – LESSON 6

ENCODE AN EXPERIENCE

ADDITIONAL VOCABULARY

- Arecibo Message
- Steganography
- De-facto standards
- Performance Task
- Objective Exam
- 5
- File extension
- Widget
- Algorithm
- Bytes

Note: This is NOT the official AP® Performance Task that will be submitted as part of the Advanced Placement exam; it is a practice activity intended to prepare students for some portions of their individual performance at a later time.

Vocabulary Alert:

Abstraction: Removing unnecessary details to focus on the essential characteristics. To break problems up into separate parts which can then be solved separately and recombined to form a complete solution. To focus on and use something based only on what it does and without concern for how that functionality is accomplished.

Design your own way to encode a personal experience (such as attending a party, playing a game, etc).

In terms of Big Ideas in AP CSP this lesson is very much about Abstraction. **Abstraction** is the practice of temporarily ignoring details to focus only on the most significant or relevant portions of a problem. In the instance of binary information, we know that it's just a sequence of bits underlying even seemingly complex data structures, but we don't have to worry about that all the time. The ability to rely on high-level encodings and temporarily ignore lower-level details is the key to building the complex systems that we use and interact with every day.

Objectives

Students will be able to:

Break a complex piece of information down into its component parts such that it could be represented on a computer.

Choose appropriate binary encodings for specific pieces of information and justify those choices.

Complete a project with written response in a format similar to the AP® performance tasks.

When programming you have to manage complexity in code by breaking things down into smaller procedures and routines.

You have to make many choices about how to represent and store the information your program needs.

The person who implicitly understands the difference between choosing to use the number 5 instead of the character "5" is more likely to make the right choice.

In the world of computer science, we call this abstraction - a mental tool that allows us to ignore low-level details when they are unnecessary. This ability to ignore small details is what allows us to develop complex encodings and protocols.

For example, the encoding for an image doesn't need to know that the RGB values in each pixel are actually 8-bit numbers, and an encoding for formatted text does not care how the ASCII symbols that comprise it are actually represented. As long as there is some way to encode numbers and characters, these high-level encodings will function.

Today we are starting a project in which you are going to apply this idea of abstraction as you set out to build your own encoding and layers of abstraction for a complex piece of information.

The Big Question is: How can you take something complex like a human experience, and break it down so that it could be represented in a computer?

Review the project guidelines

Review the "Birthday Party" Example

Pick something you really like, are interested in, or know a lot about. The most important thing is to pick a category of experience rather than a single instance. For example, “taking a trip to the grand canyon” is better than “that time I went to the grand canyon”.

Ultimately we’re trying to figure out if there is a way to encode this kind of experience in such a way that it could be represented in a computer.

College Board Performance Task Descriptions:

http://media.collegeboard.com/digitalServices/pdf/ap/ap-computer-science-principles-performance-assessment.pdf

College Board Rubric for Performance Task:

http://www.csprinciples.org/home/about-the-project

Making the diagram
You should first sketch your diagram on paper.

Then use the drawing tool provided in Google Docs (Insert -> Drawing).

Peer Consultation

After you have outlined your encoding, you should meet with your peer reviewers, present your work so far, and provide feedback regarding progress.

Potential Questions to address:
Do you think this experience is a good choice? Why or why not?
Have I identified the basic elements correctly? Did I miss any?
Do you think I will be able to encode this data? What challenges do you think I will have?
Do you have any suggestions for the next steps?

Creating the Detailed Encoding

Incorporate feedback from your peer reviewer to develop your encoding.

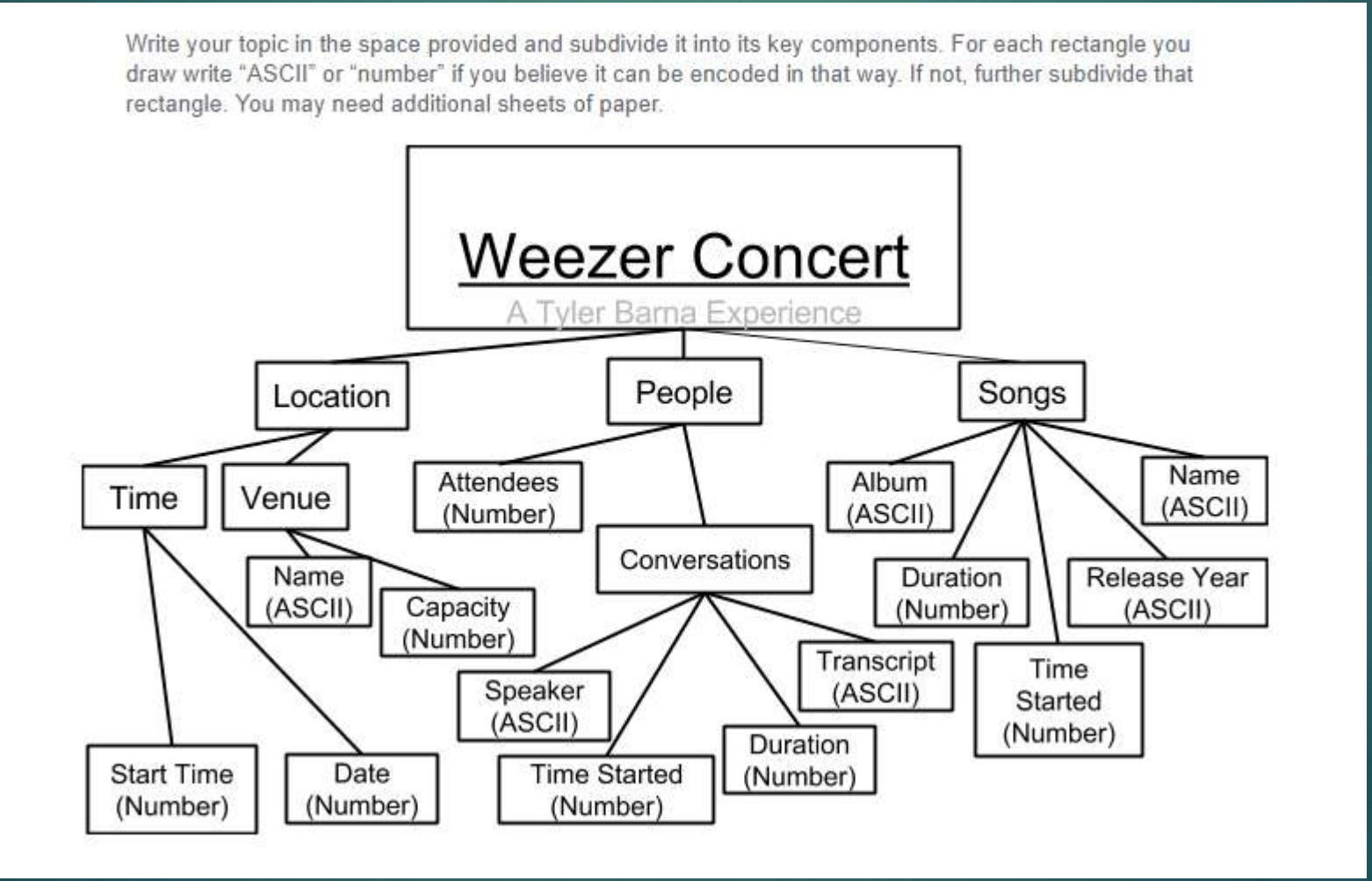
Final project will be on poster board.

Type up a written reflection according to the handout.

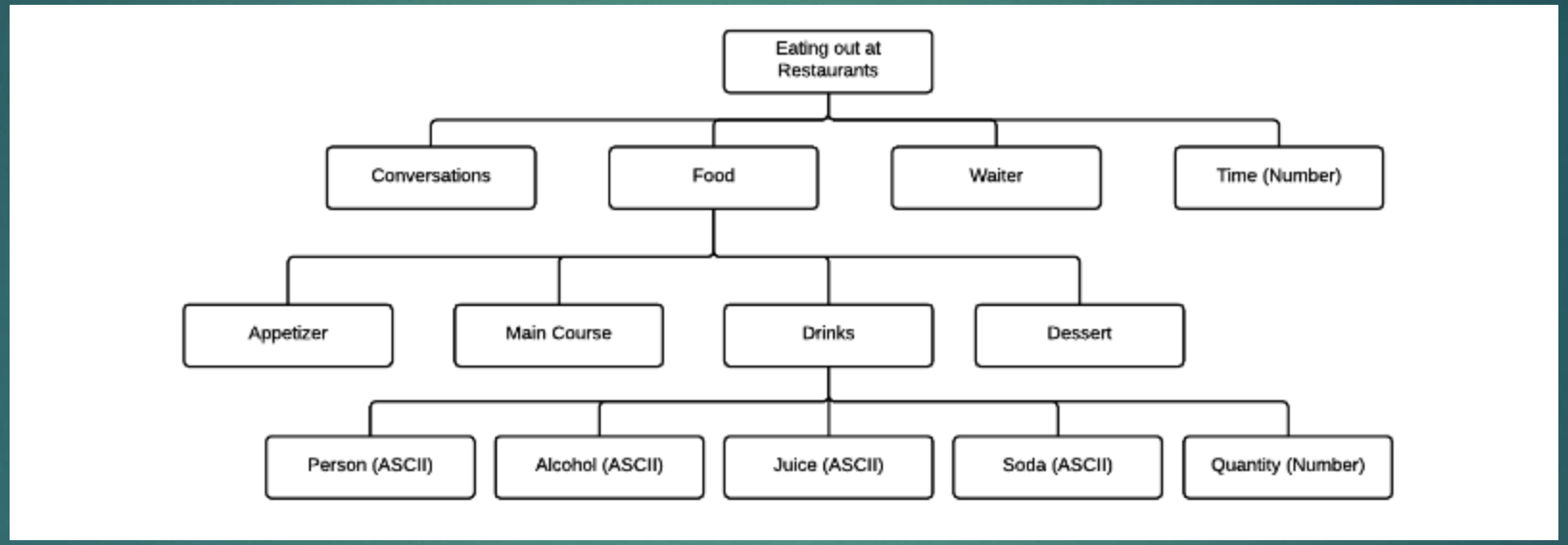
Double-space.
USE PARAGRAPHS!

SOME EXAMPLES?!

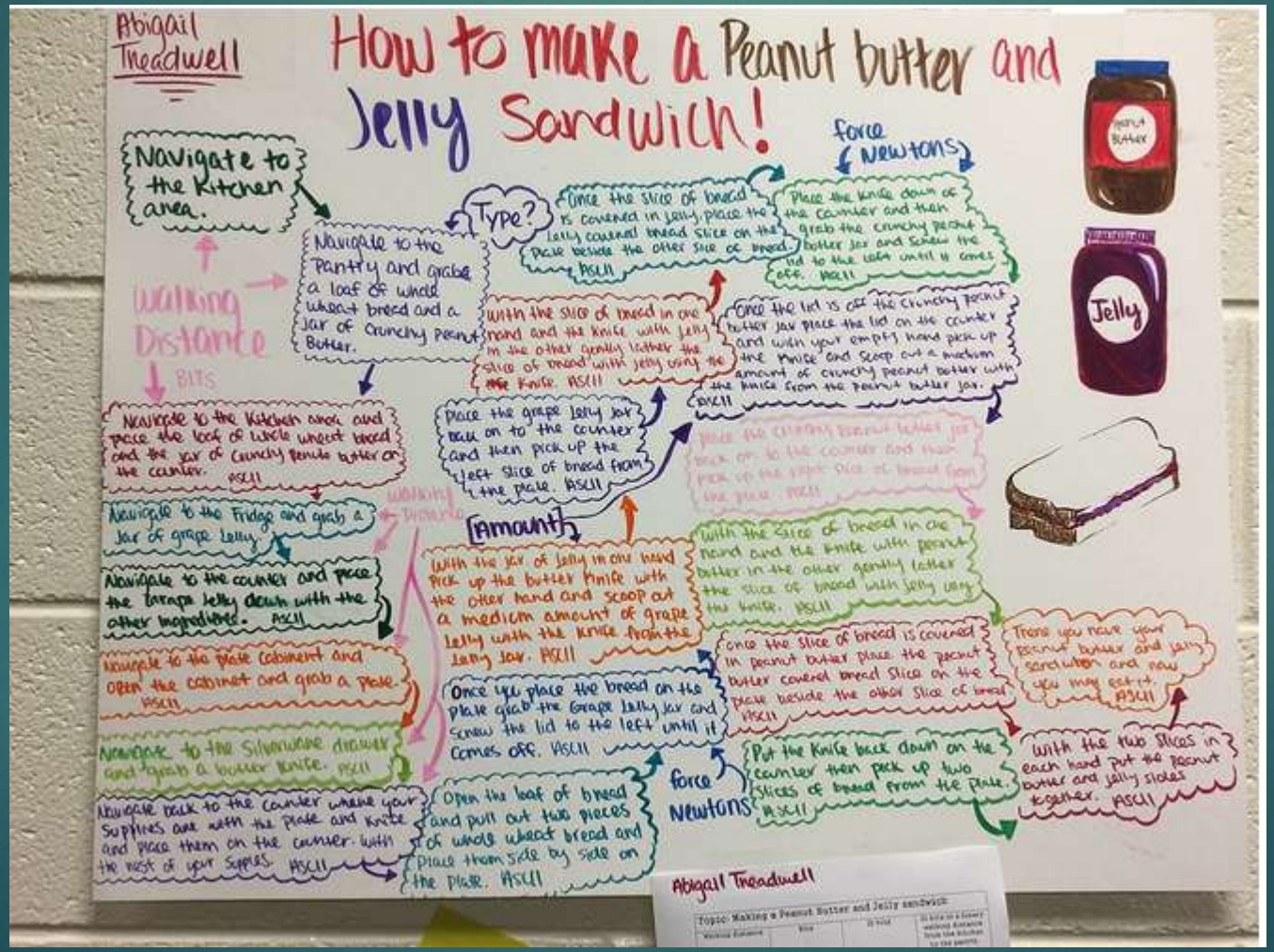
Drawn on paper



Done in Google Drive



Final Result



Self-assess:

Briefly assess yourself using the rubric you were provided at the beginning of the project.

Identify points where you could improve, and this is a reminder that this rubric is very similar in structure to the one that will be used on the actual AP Performance Tasks you will see later in the year.

Complete assessments and reflections in Code Studio.