**The Cellular Arms Race**

 So far in Mr. Tran’s science class, we have learned that **prokaryotic** (unicellular bacteria) cells were the first cells to appear on earth. Billions of years later, more complex **eukaryotic** (unicellular or multicellular plants and animals) cells developed. These cells had an advantage in that they had complex **organelles** or “tiny organs” that allowed them to perform very **specialized** **functions**. We have also learned that the number of each organelle in a eukaryotic cell can vary depending on what job the cell needs to perform. But now it’s time to ask the question…

*If eukaryotic cells are more complex than prokaryotic cells, why do* ***BOTH*** *still exist everywhere you look? In fact, bacteria even live inside of you and are essential to keeping you alive!*

Surely there must be some *benefits* and some *limitations* to existing as a single celled or multicellular organism. We will begin this exploration into the advantages and disadvantages of each type with a **simulation**.

**Rules of the game:**

There will be two teams

**Team Unicellular**

 Your cells (students) are not allowed to **talk** during the game

 Must keep hands in “**fists**” (like a boxer) at all times

**Team Multicellular**

 Your cells (students) are not allowed to **talk** during the game

 Must keep hands in “**fists**” (like a boxer) at all times

You have four “specialized” cell types, however, that have the following abilities

 Cell 1: *Can* Talk

 Cell 2: **MUST** hold a marker at all times

 Cell 3: **MUST** hold a whiteboard with **TWO HANDS** at all times

 Cell 4: Can use *hands*, but they must be **BEHIND YOUR BACK**

Each team will have a series of tasks to complete. One student should serve as the **timer** and record the times of each task to share on the class page. We will then **analyze the data** and determine what the **advantages and disadvantages of being unicellular or multicellula**r were.

**Task 1: Passing the stuffed animal**

Team Unicellular Time\_\_\_\_\_\_\_\_\_\_\_

Team Multicellular Time\_\_\_\_\_\_\_\_\_\_\_\_

**Task 2: (task 1, plus) Writing “I love Science” on the whiteboard**

Team Unicellular Time\_\_\_\_\_\_\_\_\_\_\_

Team Multicellular Time\_\_\_\_\_\_\_\_\_\_\_\_

**Task 3: (task 1 and 2, plus) Lining Up in Order of Birthday**

Team Unicellular Time\_\_\_\_\_\_\_\_\_\_\_

Team Multicellular Time\_\_\_\_\_\_\_\_\_\_\_\_

**Task 4: (task 1, 2, and 3, plus) Untying and tying a teammate’s shoe**

Team Unicellular Time\_\_\_\_\_\_\_\_\_\_\_

Team Multicellular Time\_\_\_\_\_\_\_\_\_\_\_\_

**Analysis Questions:**

1. Which type of organism (unicellular or multicellular) is better at **simple tasks**? (cite evidence from today’s simulation)
2. Which type of organism (unicellular or multicellular) is better at **complex tasks**? (cite evidence from today’s simulation)