Name_____ Period _____ Date _____

# Influenza

STEM Sims

**Lesson 2: Gene Reassortment**

Viruses spread by infecting cells and injecting a part of their genetic material inside the cell. Can a cell be infected by more than one type of virus? Yes, virus genes of two different types of viruses can combine to form a new virus. This is known as antigenic shift. Since there are many types of influenza, this is can happen, and the new cell will be infected with a combination of RNA from both viruses.

**Doing the Science**

1. Start the Influenza Simulation by clicking on the "Sim" tab.
2. The RNA inside the Influenza virus will code for the NA and HA proteins on the outside of the cell.
3. Click and drag on one of the NA proteins icons into the influenza virus cell.
4. Click on drag one of the HA proteins icons into the influenza virus cell.
5. Click on "Check Your Build" to see if the correct proteins are attached.
6. If the build was incorrect, repeat steps 3-5 with a different combination of NA and HA proteins.
7. If the build was correct, click on "Reassort Genes".
8. Click on "Avian-Swine" to merge the genetic material from the two viruses into a new virus strain.
9. Click on "Swine-Human" to move the new virus from the pig into a human cell.
10. Repeat steps 3-5 to match the proteins to the RNA.
11. If the build was correct, review the gene reassortment by clicking on "View History". Record the colors of each gene reassortment into Table 1 below.
12. Click on "Reset" and repeat steps 3-11 fourteen more times.

**Table 1.**

| | **Pig** | **Duck** | **Human** |
|---|---|---|---|
| **Trial 1** | | | |
| **Trial 2** | | | |
| **Trial 3** | | | |
| **Trial 4** | | | |
| **Trial 5** | | | |
| **Trial 6** | | | |
| **Trial 7** | | | |
| **Trial 8** | | | |
| **Trial 9** | | | |
| **Trial 10** | | | |
| **Trial 11** | | | |
| **Trial 12** | | | |
| **Trial 13** | | | |
| **Trial 14** | | | |

**Do You Understand?**

1. Are there any specific RNA sequences that occur more frequently than others?

2. How do viruses and living organisms evolve? Do they always stay the same?