**KEY**

Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Cellular Delivery**

Imagine you’re the executive delivery manager inside the nucleus of a nerve cell in the brain. You need to get a neurotransmitter called acetylcholine out to some muscle cells so they can contract the body’s muscles. The neurotransmitter is made by enzyme A (a protein). Unfortunately you just got a new delivery boy and you need to make him a video map to take with him on his journey so he doesn’t get lost.

1. First, fill out this planning guide to help you get your thoughts together:
2. Step 1 – get the instructions for building enzyme A from DNA inside the nucleus.
3. Step 2 – go through the nuclear membrane to the RIBOSOME and give it the instructions so it can build the protein (enzyme A).
4. Step 3 – send enzyme A through the ENDOPLASMIC RETICULUM in order to move across the cell.
5. Step 4 – use enzyme A to make some acetylcholine.
6. Step 5 – send the acetylcholine through the GOLGI BODY to be packaged into vesicles.
7. Step 6 – the vesicles take acetylcholine to the CELL MEMBRANE which regulates what can go in or out.
8. Step 7 – the acetylcholine leaves the nerve cell and continues on its way to the muscle cell!
9. Next, get your steps checked by your teacher in order to receive your building materials!
10. Use the app stop motion on your phones, dry erase markers and whiteboards, legos and other assorted items to make a video for your delivery boy. Be sure to show 1) instructions leaving the nucleus 2) the travels of enzyme A and 3) the travels of acetylcholine.

**Teacher Notes**

Materials:

* the stop motion app: available free for download from the app store
* Dry erase markers and whiteboards are preferable for students to make their drawings on, but you could also use chalkboards, blank paper and markers, or print out the cell pictures below in the modifications section.
* Other supplies are variable - you just need about 20-30 small pieces of various materials (legos, paper clips, beads, etc) per team

Modifications: For students who may struggle with this activity, print out several copies of this cell diagram for them to use as a template for their video rather than drawing themselves on the dry erase boards. If it is still too challenging, you can label it with them (or for them prior to beginning the activity).

