Worm Descriptions

N2 = wild-type animals; hermaphrodites (possibly a few males among all the plates)
There should be all different stages of the life-cycle (eggs, 4 different larval stages and adult).

u4 = *unc-4* (“Unc 4”)
These are “uncoordinated” animals. They can move forward fairly well, and if the students tap the plates some of them should move. The animals can’t move backward properly. These will all be hermaphrodites, again all stages. The *unc-4* gene encodes a transcription factor, which has homologues in vertebrates. The unc-4 transcription factor in worms is needed for motor neurons that control backward movement to differentiate properly. Without unc-4 function, they differentiate instead as motor neurons for forward locomotion. Thus, an unc-4 mutant does not have motor neurons for backward locomotion and, when it tries to back up, it sort of seizes up into a “w” shape or a coil.

u54 = *unc-54* (“Unc 54”)
These animals are also “uncoordinated” but they hardly move at all and are very close to paralyzed. They sometimes bring up an interesting discussion about whether they are dead and how do you tell when something is dead. Their pharyngeal muscles work normally and so they can eat normally. The *unc-54* gene encodes the major myosin protein in body wall muscles. There is a minor myosin gene in these muscles as well, so the worms can actually move a tiny bit, very slowly. The pharyngeal muscle uses a different myosin gene.

d8 = *dpy8* (“dumpy 8”)
The animals are short and plump (hence Dumpy). The dumpiness of the animals makes them move a little abnormally as well. The students may have questions about whether they are just all larvae and not adults and that’s why they look smaller than wild-type. This is a good question if they bring it up. Although it’s difficult for them to know that they are looking at adults, the largest animals on the plates are adults; there will be larvae as well. The students may be able to see some eggs on the plates indicating that there are adults there. In the lab, we can tell adult hermaphrodites by their vulval structure and by seeing eggs inside the animal but you may not be able to see this. The students should be able to see, though, that there is a different length/width ratio in these animals compared to wild-type – shorter and fatter, not just smaller. They may also be able to tell from the tracks through the bacteria that the “sine wave” that the animals make has a shorter “wave length.” The *dpy-8* gene encodes another, different collagen. Without this collagen, the cuticle is not formed normally and is too short.

L = *lon-2 mec-10* (“Lon 2, Mec 10”)
These animals are longer than wild-type and will look thinner because of that. Again the tracks look a little different and the students may be able to see that the animal's body makes up “more” of a sine wave. This gene encodes an extracellular protein that is required for proper signaling between cells to regulate body length -- actually a pretty interesting pathway! The *mec-10* is subtle and was actually just in the strain that I got out for Lon! However, the students may notice that the worms don't “startle” and start moving when they take the lid off the plate. They will still react to banging the plate. These Mec worms have a defect in mechanosensation that affects just light touch response. The gene encodes a channel protein in mechanosensory neurons.