Name: _____ Date: _____ Class: _____

Panoptes and the Bionic Eye Worksheet

Vocabulary

Word	Definition	Notes
retina	The photo-sensitive region of the eye.	
cerebral cortex	The outermost layer of the brain, which is responsible for high-level sensory processing and integration (and more).	
visual field	The space visible to a person or other organism at a given time.	
visual cortex	The area of the brain that is responsible for processing visual data.	
primary visual cortex (V1)	The first area in the visual cortex to receive visual information from the eye.	
visual pathway	The anatomical route that visual information takes from the eye through the central nervous system.	
neuron	The primary cell of the central nervous system.	
histogram	A graphical representation of quantities in different categories.	
receptive field	A sub-region of the visual field that causes a reliable response from a given part of the visual pathway.	

Blind Spot Questions

1. Can you find your blind spots?

2. Why don't you notice a "hole" in your vision all the time? How do you think your brain hides your blind spots?

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Running the Experiment: Collecting Data

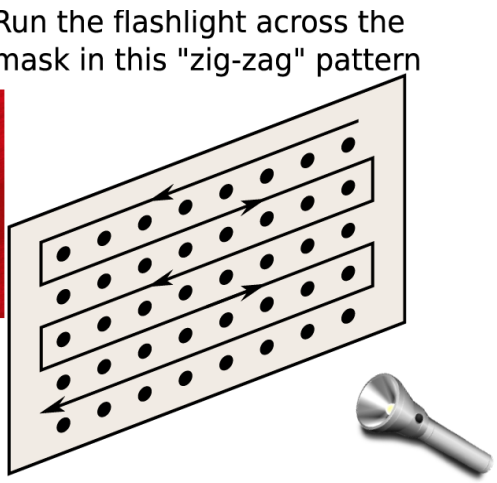
Steps

Find out how Panoptes sees the outside world by flashing the light in a regular pattern.

Quickly, make three or four passes of the zig-zag pattern shown below.

Stim expert:

- Hold the flashlight right up to the mask.
- Point the light straight ahead through the hole, and drag it along the path.
- Count off the holes as you pass them by.



Recording expert:

- Press the right arrow button on the NXT once each time the Stim expert counts.

Tips:

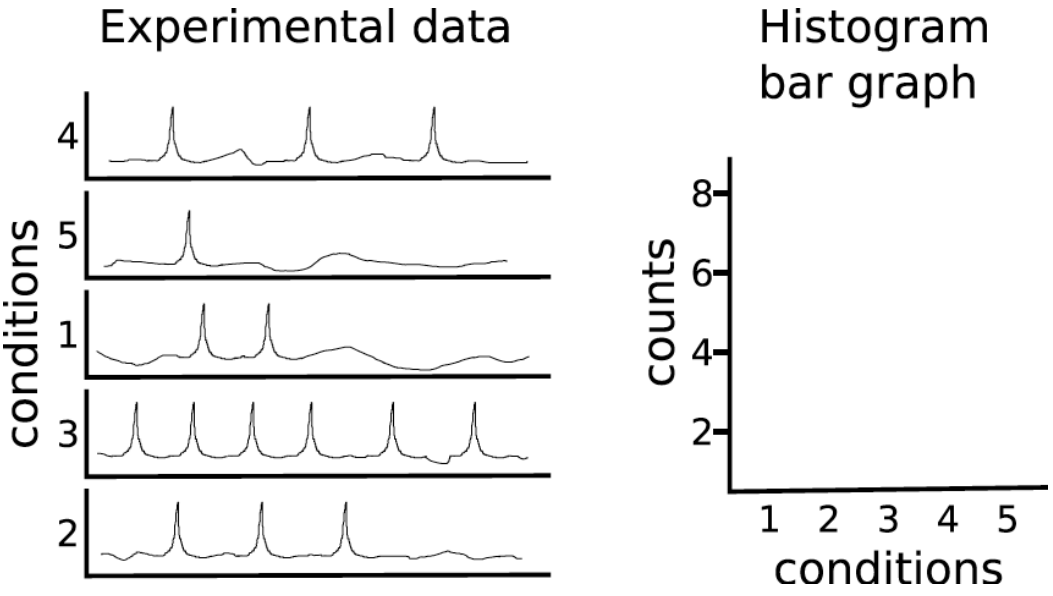
- Have the person scanning the light count off each hole **just before** shining light through it.
- The person marking time must mark every event **just once.**
- The amount of time the NXT can record is short, so move through the grid quickly, but shine through each hole for a full count.

End of Stage 1

Name: _____ Date: _____ Class: _____

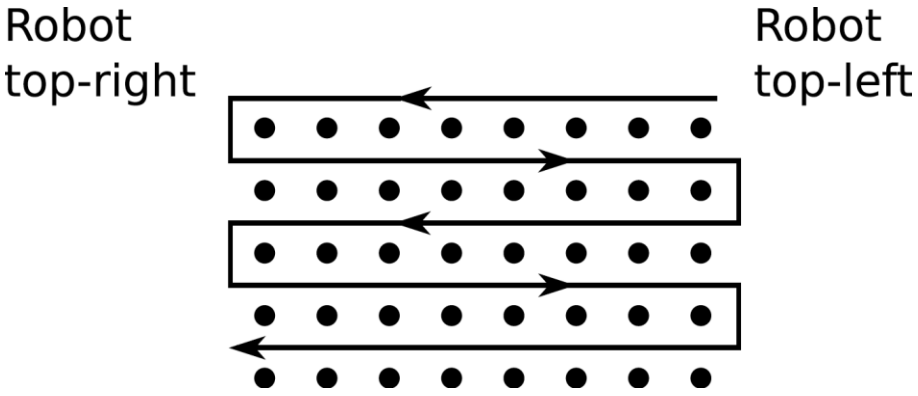
Making Histograms

Often, "raw" data is not as clear as it could be. Summarize the spike counts caused by the randomized conditions below by making a bar chart (histogram) of the counts according to condition.



Organizing the Results

Notice that we started the zig-zag pattern at the top right—from our perspective. But from the perspective of Pantopes, it is the top-left. The visual field chart on the next page begins numbering the locations from the top-left.



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Visual Field Chart