



**CALIFORNIA SCIENCE & ENGINEERING FAIR
2019 PROJECT SUMMARY**

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Project Title Testing the <i>Oncopeltus fasciatus</i>' Neuromotor Responses to Olfactory and Visual Stimuli	
<p style="text-align: center;">Abstract</p> <p>Objectives Because we are constantly bombarded by sensory stimuli, we rely on our senses to identify critical information in a particular situation and environment. Humans and animals alike must integrate multitudes of stimuli, so we decided to investigate on insects (<i>Oncopeltus fasciatus</i>, also known as a milkweed bug), an organism that displays an optomotor response (stabilizing response to visual stimuli). We hypothesized that the milkweed bug would display a greater response to the visual stimulus as it increased in strength (due to the optomotor response) while keeping the negative olfactory stimulus unchanged. The objective of our study was to test if the <i>Oncopeltus fasciatus</i> optomotor response to positive visual stimuli would affect its response to negative olfactory stimuli.</p> <p>Methods 4 <i>Oncopeltus fasciatus</i> insects, 4 oz. bees & paraffin wax, 4 twist ties, 1 helping hand device, 1 y-maze globe, 1 optical stimulus video screen, (coded in the programming language Python with the help of Dr. Hinterworth), 4 sticks of rosemary, and 1 dark enclosure. To test the bug s behavior, we created a Y-maze globe for the insect to turn in response to a visual stimulus (perceived motion on a video screen) and a negative olfactory stimulus (rosemary). We tracked the direction in which the insect decided to turn on the y-maze globe while the visual and olfactory stimuli were present.</p> <p>Results When the insects were exposed to increasingly higher levels of visual stimuli, while simultaneously being exposed to negative olfactory stimuli, they frequently responded to the visual stimuli choosing to neglect their previous distaste for the odor and move towards the negative olfactory stimulus (statistically significant).</p> <p>Conclusions These results show that the insect s optomotor response will eventually overpower their initial instinct to turn away from the odor. It is concluded that if the <i>Oncopeltus fasciatus</i> is prompted towards a specific direction with a positive optical stimulus, while concurrently exposing it to a negative olfactory stimulus, the strength of the optical stimulus will determine whether the insect continues to move in that direction. This could help in predicting insect migration patterns and could lead to further experiments involving humans or different stimuli.</p>	
Summary Statement Measured by how often it turned toward or away from visual and olfactory stimuli, the <i>Oncopeltus fasciatus</i> increasingly followed the visual stimuli and turned toward the negative olfactory stimuli as the visual stimulus strength increased.	
Help Received We received assistance from Dr. Hinterworth in creating our visual stimulus video. Our parents also supported us by buying all necessary materials for this experiment to be conducted.	