CALIFORNIA STATE SCIENCE FAIR
2015 PROJECT SUMMARY

Name(s)
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Project Number
J2210

Project Title
Sea Urchin Reaction to UVA and Various Wavelengths of Visible Light

Abstract

Objectives/Goals
I was inspired to visit an aquarium, and there I noticed a surprising pattern in sea urchin behavior. A purple urchin was nestled nearby a purple sea star, a red urchin was beneath a red piece of coral, and a light green urchin was at the base of a long, green piece of seaweed. The urchins looked as if they were attracted to objects of similar color to themselves. Previous research has revealed that urchins can sense white light. I designed an experiment to test whether or not urchins can sense individual colors of visible light as well as UVA light at 385 nm.

Methods/Materials
I purchased ten sea urchins, including; tuxedo urchins, common urchins and pencil urchins. I used patented UVA light at 385 nm that emits no white light and compared these reactions to LED white light responses. I also used narrow range wavelength colored LED lights to test urchin reactions to red, blue, and green light. In another test, I placed a computer monitor behind the tank which displayed colors of warm hues on one half and cool hue colors on the other half. In black and white (grayscale), the two colors would have the same appearance, but in color they would appear very different.

Results
Urchin responses to light, whether negative or positive, varied. Blue tuxedo urchins and common purple urchins appeared attracted to blue light. Common purple urchins were also attracted to green light. Pencil urchins seemed more attracted to red light than to green or blue, but in the monitor test appeared to prefer green light.

Conclusions/Discussion
It was difficult to conclude whether the urchins reacted to the individual colors of light or simply to the light stimulus. According to my results, all three species of sea urchins responded to the presence of red, green, and blue wavelengths of light, and also to UVA light at 385 nm. I would recommend further testing to confirm these intriguing findings.

Summary Statement
I designed an experiment to test sea urchin responses to various frequencies of visible light and UVA light at 385 nm.

Help Received