

# Lighting Up the Ocean – Phosphorescence

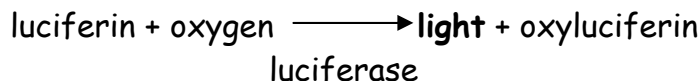
*Presented at the 2003 NSTA National Convention*

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**Phosphorescence** is the emission of light caused by the absorption of light.

**Bioluminescence** is the production of light generated by a chemical reaction within a living thing. Below is a basic description of the reaction.



We will use phosphorescence to simulate bioluminescence in this activity. Using "glow in the dark" paint (phosphorescence), your "ocean in a box" will light up with bioluminescent animals!

## Materials

- \* box
- \* black Paint (if students are doing the painting, use non-toxic, washable paint) – we used house paint
- \* black card stock paper
- \* 38 lb. single strand stainless wire
- \* wire cutters – use caution & may only be used by adults
- \* non-toxic glue (white glue or glue sticks work well for the paper; hot glue works well for the wire supports – use caution with the hot glue & the teacher may make all supports if using hot glue)
- \* line drawings of bioluminescent deep sea animals
- \* glow in the dark paint (Tulip® Glow in the dark™ Dimensional Fabric Paint); use care not to get on clothes – it's permanent
- \* scissors
- \* sharp box cutting utensil to be used by teacher only – use extreme caution
- \* flashlight

## Directions

1. Cut a rectangular opening in one end of the box for viewing. This will probably require a sharp box-cutting utensil. Students should not do this part of the project. The adult cutting the opening should use extreme caution.
2. Paint entire inside of box with black paint and allow drying.
3. Making Wire Supports: (Note: Teachers should use caution and make these in advance for younger students.) Cut stainless wire into pieces approximately 7 cm -

8 cm in length with wire cutters. Cut black card stock paper into approximately 1 cm x 3 cm pieces. Fold paper in half. Carefully apply a small dot of hot glue and attach wire folding the paper over it. Glue another piece of the card stock to the opposite end of the wire in the same way. Allow cooling and drying.

4. Paint the deep sea animals in ways that represent their bioluminescence. You may want to illustrate photophores (light producing organs) used in a variety of ways like counterillumination, bait, predator escape, etc. Allow drying.
5. Glue some of the animals directly to the inside of the box using white glue or glue sticks.
6. Attach some of the animals to the card stock end of a wire support using white glue or glue stick. Using the same glue, secure the other end of the support to the inside of the box. Be sure to position it correctly so that it can be seen from the viewing opening. This will give your "ocean in a box" a three-dimensional effect.
7. Close the box shutting out all light except through the viewing opening. Shine a flashlight into the box to "activate" the phosphorescent paint. Then WATCH your ocean light up with bioluminescence!

## SOME STRATEGIES OF BIOLUMINESCENCE

BAIT – bioluminescence acts as a lure attracting prey

### Anglerfish

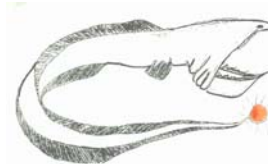
light at the tip



### Gulper Eel

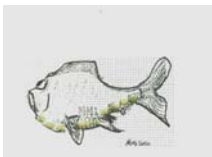
(Some believe the red

of the tail might serve as a lure.)



COUNTERILLUMINATION – bioluminescence hides silhouette from below

### Hatchetfish



### Squid (Histiotteuthis sp.)



QUICK ESCAPE – release of bioluminescent clouds may confuse predator

## Shrimp (*Systellaspis* sp.)



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