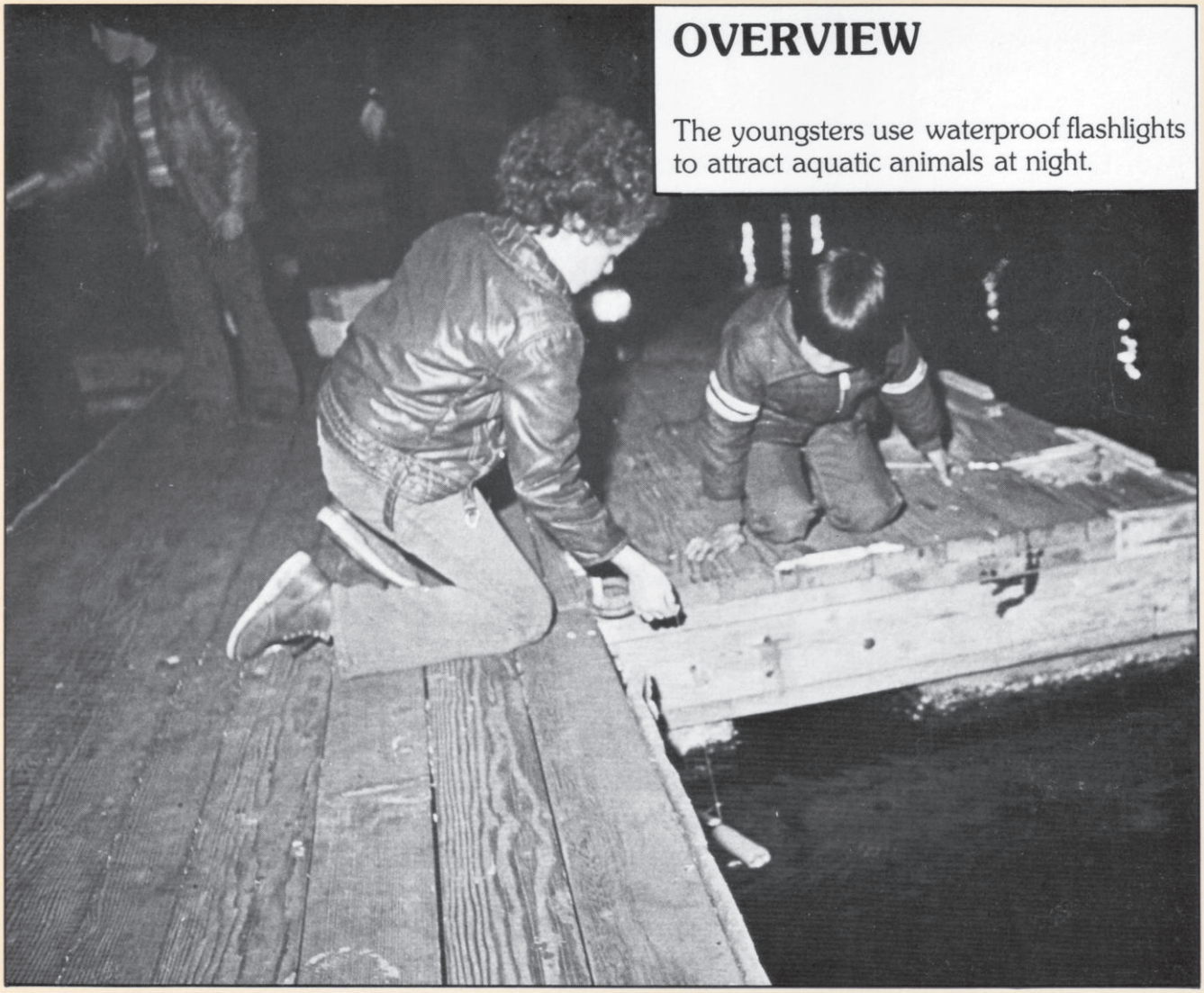
NIGHT SHINE

BIO KEY
Night Investigation
Aquatic Animal Behavior
Bio-Technique



OVERVIEW

The youngsters use waterproof flashlights to attract aquatic animals at night.

BACKGROUND

Many animals are more active during the night than they are during the day. These night animals are called *nocturnal*. Animals that are active mainly during the day are called *diurnal*. Skunks, mice, owls, shrews, raccoons, many moths, and bats are nocturnal animals. Humans, most birds, butterflies, and bees are diurnal animals.

Nearly everyone has seen moths and other nocturnal insects come to lights. There are also many nocturnal aquatic animals that are attracted to bright lights.

Fishermen often use powerful lanterns to attract squid and shrimp to the water's surface where they can be netted or hooked. For centuries, Japanese cormorant fishermen have used small fires to lure fish within the diving range of their birds. Many other night fishermen take advantage of the drawing power of a bright light when they fish for bass, catfish, or panfish. A lantern hanging over the water may even lure large fish by first attracting the small organisms upon which the large fish prey.

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CHALLENGE: AT NIGHT, DISCOVER WHICH AQUATIC ANIMALS ARE ATTRACTED TO LIGHT.

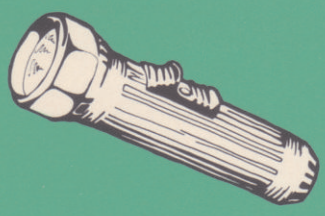
MATERIALS

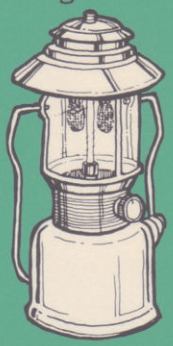
For each buddy team:

2 observation trays, one labeled "light" and the other labeled "dark" (See the "Aquatic Observation Aids" Equipment Card.)
1 long-handled dip net* (or sweepnet*)
1 waterproof flashlight* with fresh batteries* (See the "Night-Shine Flashlight" Equipment Card.)
1 hand lens* or bug box*
1 regular flashlight* with fresh batteries*

For the group:

1 lantern* (gas or battery) to light the central discussion area
1 marking pen*
extra flashlight batteries*





1 "Aquatic Observation Aids" Equipment Card*
1 "Night-Shine Flashlight" Equipment Card*
several copies of the *OBIS Pond Guide** (for freshwater sites)

* Available from Delta Education.

PREPARATION

Group Size. This activity is recommended for groups of up to twelve youngsters. We suggest one adult for every six to eight kids.

Time. Plan on forty to sixty minutes for this activity.

Site. Choose a freshwater or saltwater site that offers easy water access and a fairly level shore, dock, or other surface from which to work. Because the group will be working at night and guided by flashlights, footing should be secure. Work in well protected areas such as coves, harbors, and bays if you plan to work around salt water. Low docks, piers, and quiet tidepools usually make exciting *Night-Shine* sites. Calm, clear water will allow the kids to observe critters swimming through the flashlight beams. Visiting potential sites and trying out the *Night-Shine* techniques and equipment will help you choose a site that offers plenty of action for your group.

Safety. Because your group will be working around water at night, basic water safety becomes even more important. Clearly define boundaries for the activity site. Explain and use the buddy system. (See the "Safety" section of the *Leader's Survival Kit* folio.) Life preservers are always recommended, but especially when working from low piers or docks that stand over deep water (waist-high or more). Caution everyone to use care when moving about the site to avoid slipping, falling, or accidentally pushing someone into the water.

Equipment

1. See the "Aquatic Observations Aids" Equipment Card for instructions on making observation trays from half-gallon milk cartons.

2. See the "Night-Shine Flashlight" Equipment Card for the waterproof flashlight set-up. Rig one waterproof flashlight for each team before starting the activity.

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ACTION 

Setting Up

1. Set up the lantern in a spot that will serve as the central meeting area during the activity.

2. Explain the buddy system to the youngsters and assign partners. Caution the kids about the hazards of moving around at night. Ask everyone to move slowly and carefully. Mention that each team should have a regular flashlight to help them move about safely.

3. Point out the boundaries of the activity site, and emphasize that everyone should remain inside the boundaries during the activity.

Searching for Aquatic Animals in Dark Water

1. Tell the youngsters they are going to search for aquatic animals in dark water.

2. Show the youngsters how to use a dip net and how to transfer the net's contents into an observation tray partially filled with water. (See the "Aquatic Observation Aids" Equipment Card.)

3. Give each team a dip net and an observation tray labeled "dark." Challenge the teams to catch aquatic animals in the dark and to place them in their observation trays half filled with water. Tell the teams that the actual dip-net sampling should be done with flashlights off. Let the teams search for critters in the dark for ten to fifteen minutes. Instruct the teams to sweep their nets back and forth through the water every minute or so. After each series of sweeps, the youngsters should turn their nets inside out over their observation trays and dip the end of the net into the water in the tray.

4. Gather near the lantern and give the teams a few minutes to share their findings. Bug boxes or hand lenses are useful for close-up viewing. Ask how many different kinds of animals were captured. Save the "dark" observation trays and their animals for later review.

Searching for Light-Seeking Animals

1. Mention that some fishermen fish at night with bright lights to increase their catch. Tell the kids that the teams are now going to see how the aquatic animals living in the site respond to bright light.

2. Show the kids how to place a waterproof flashlight in the water so that the illuminated water in front of the flashlight can be sampled easily with a dip net. (See the "Night-Shine Flashlight" Equipment Card.)

3. Give each team an observation tray labeled "light" and a waterproof flashlight. Challenge the teams to catch animals that come to the light. Emphasize to the teams that they should sweepnet the water in front of their flashlights every minute or so, even if they don't see any animals.

4. Let the teams flashlight-fish and place captured animals in their "light" containers until about ten minutes remain in the period. Then ask the teams to return to the lantern with their "light" critters and equipment.

LIGHT CONVERSATION 

1. Ask the teams to take a look at the "light" critters and to compare them with the "dark" critters. Were animals caught in light different from those caught in darkness?

2. Ask how the "dark" animals behave (react) when exposed to light. How about the "light" animals?

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3. Ask if the youngsters think the flashlights actually attracted the animals or simply illuminated animals that would be there anyway. Ask the teams for evidence to support their views (e.g. seeing the animals bumping into the flashlight lens).

4. Introduce the terms *nocturnal* and *diurnal* to the group. Ask the group if they think they caught nocturnal or diurnal animals. Why do they think so?

BRANCHING OUT

1. To determine if the animals your group captured are really nocturnal, return to the same site during the day and use dip nets and containers to see if the same animals can be found.

2. Do *Night Shine* on a clear night with a full moon and on a cloudy, overcast night. Compare your results.

NIGHT-SHINE FLASHLIGHT

MATERIALS FOR ONE FLASHLIGHT

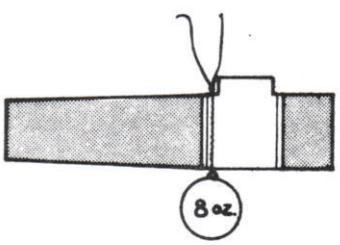
1 waterproof flashlight* (See "The Waterproof Flashlight" section.)
1 6- to 8-oz. sinker* (Choose a weight heavy enough to sink the flashlight.)
1 to 3 meters of braided fishing line* (20 lb. test) or strong string* for hanging the flashlight
1 strip of duct tape*

* Available from Delta Education.

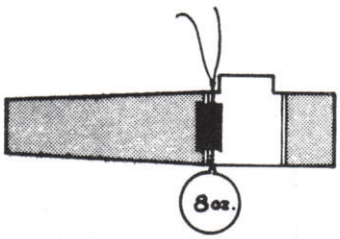
RIGGING THE FLASHLIGHT WITH LINE AND WEIGHT

1. Cut off a 30- to 40-cm piece of line. Tie the sinker to the middle of this piece.

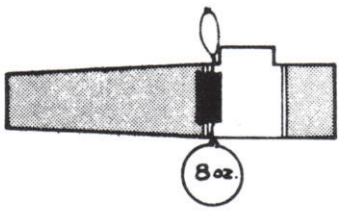
2. Wet the line to prestretch it. Then tie the line and sinker tightly around the flashlight. Position the sinker in such a way that the flashlight is horizontal when placed in the water. "Skipper" flashlights stay horizontal when the sinker is attached just behind the switch. (See "The Waterproof Flashlight" section.)



3. When the sinker has been positioned properly, dry off the flashlight and tape the line in place to keep it from sliding.



4. Securely tie the loose ends of the line together to make a loop. Tie the hang line to the loop.



NIGHT-SHINE TECHNIQUE

1. Launching the Light. Select a calm, accessible spot, preferably close to shore where the water is shallow. Turn the light on and position the flashlight a few centimeters under the water. (In some cases, this means the flashlight may be resting on the bottom.) Secure the hang line to hold the flashlight just beneath the surface of the water.

2. Sampling the "Light" Water. With dip net in hand, closely observe the water that is illuminated directly in front of the flashlight. Whenever an animal enters the illuminated water, try to net it. Every minute or so sweep the net back and forth through the illuminated water

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even if no animals are spotted. After each series of sweeps, turn the net inside out over the "light" container and dip the end of the net into the water in the container.

Note: Animals will often be captured that were not observed beforehand. Kids, however, usually won't sweep their nets through the water unless they see something moving. Ask them to sample the illuminated water periodically even if they don't see any movement.

THE WATERPROOF FLASHLIGHT

Basically, you have two choices for a waterproof flashlight:

1. A commercially available flashlight such as the Eveready "Skipper."

2. A homemade waterproof flashlight (wrapped in two plastic bags).

Homemade waterproof flashlights have several disadvantages. Waterproofing is time consuming and traps air so that more weight is required to sink the flashlight. The added layers of plastic also reduce the flashlight's brightness. If you can't obtain commercial waterproof flashlights, however, homemade ones will work adequately.

MATERIALS FOR WATERPROOFING ONE FLASHLIGHT

1 flashlight*
2 zip-lock bags* (wide enough to hold the flashlight sideways)
2 rubber bands*

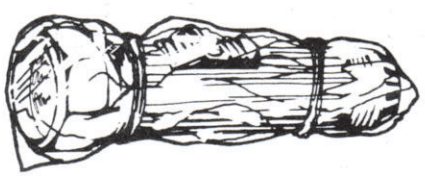
* Available from Delta Education.

HOW TO WATERPROOF

1. Place the flashlight in one bag and roll the bag around the flashlight to squeeze out the extra air. Then seal the bag.

2. Place the bagged flashlight into the second zip-lock bag and repeat the rolling and sealing procedure.

3. Use rubber bands at each end to keep the zip-lock bag from unrolling.



4. Follow the same line and weight-rigging instructions outlined above.

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