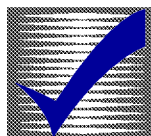




HOW-TO BOOKLET #3088

LIGHTSCAPING



TOOL & MATERIAL CHECKLIST

- Screwdriver
- Wire-Stripping Tool
- Tile Spade
- Heavy-Duty Extension Cord
- Weatherproof Electrical Box
- Outdoor Lighting Kit
- Pliers
- Utility Knife
- Graph Paper
- Wire Connectors
- Ready-Mix Concrete

Read This Entire How-To Booklet for Specific Tools and Materials Not Noted in The Basics Listed Above.

Exterior lighting, when properly placed, gives your home curbside appeal after dark, lets you continue work on hobbies outdoors, and expands entertaining and recreational possibilities. Equally important, strategically placed lights improve home security and assure the safe passage of family and guests.

DRAW A PLAN OF YOUR PROPERTY

Using graph paper to a scale, enter the boundaries of your lot. Next outline your house, garage, driveway, sidewalks, pool, deck, trees, shrubs and any other elements as seen from above (**Fig. 1**). Make copies of the basic plan as you'll want to design a number of alternate light-placement possibilities.

With different colored pens, indicate placement of various types of lamps. You might want red for spotlights, green for the little mushroom-type path lights, yellow for post lights, and so on or use numbers as in **Fig. 1**. This plan will give you the minimum number of lamps you'll need.

Experiment With Lights. To perfect your plan, make a trial run after dark using some small table lamps or the lighting kit if you've bought one already.

Move the lamps around to determine the most effective positions and direction of beams. Avoid lamp placements that create glare.

When choosing bulb wattage, 6 or 12 watts is adequate for illuminating pathways or steps. Floodlights or spotlights should be used for activity areas and security zones where 150 watts might be required. Less wattage will do for entries, plantings and driveways.

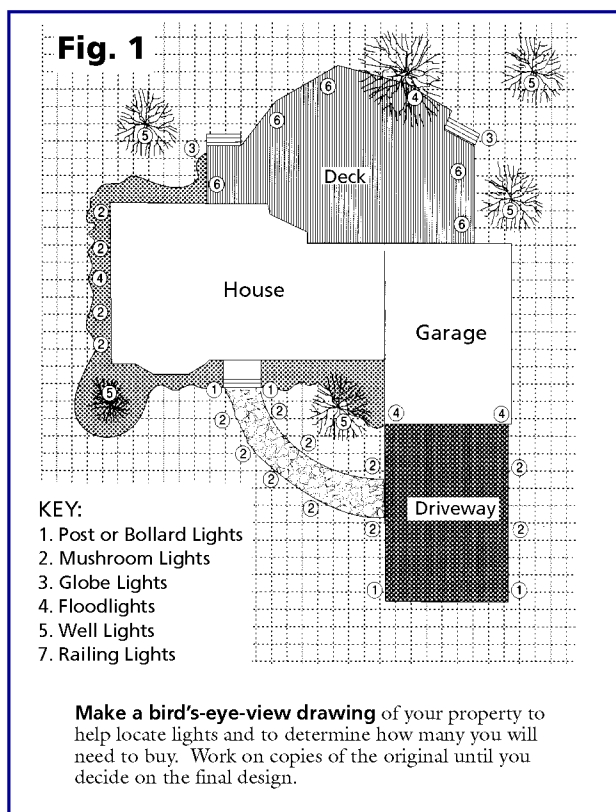
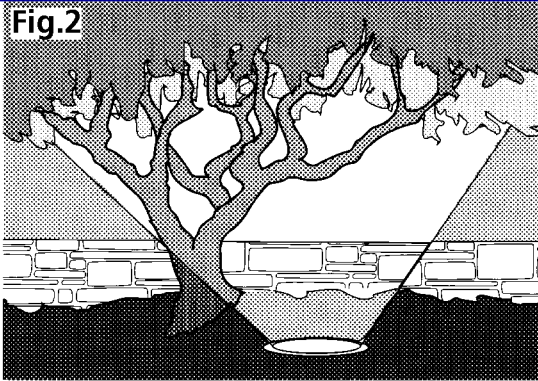


Fig. 2



Uplighting is a technique that can create dramatic effects in your landscaping. It's achieved by burying a well fixture in the ground beneath an ornamental tree or flowering bush you wish to highlight.

CHOOSING LAMPS FOR EFFECT

Too much light can ruin the overall effect of your lighting plan by washing out the contrasts. Try to create pools and ribbons of light as well as special effects such as playing a light on a wall to silhouette shrubbery, shining a lamp down from high up in a tree, or focusing a beam upward to establish a mood (Fig. 2). Colored lenses can also be used for effect.

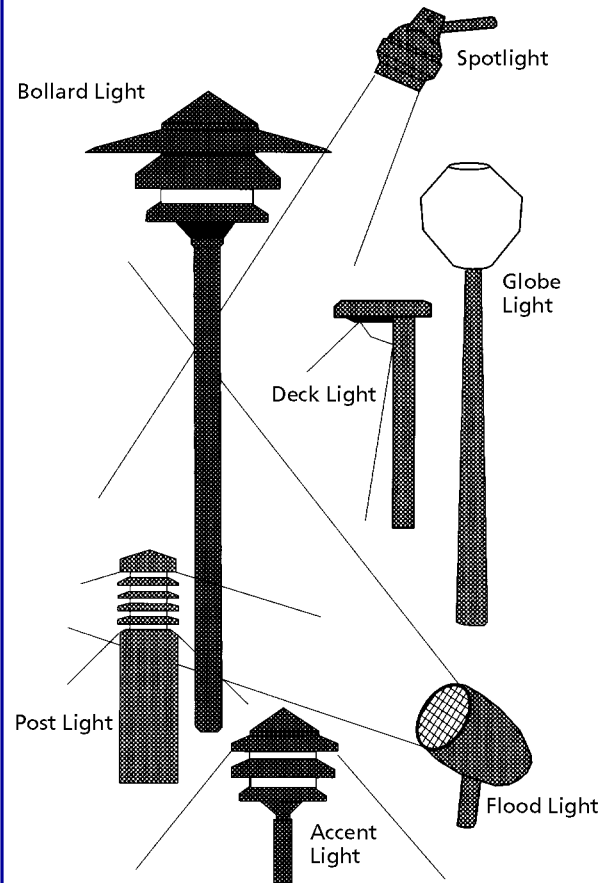
Lamps can be used in combination to soften harsh moods or create impressions. See Fig. 3 for a rundown of the various types and their uses.

DECIDE ON A POWER SOURCE

Electricity for outdoor lights can be provided in three different ways—using standard 120-volt household current, low voltage equipment, or solar-powered devices. Or you might try a combination of all three.

Here's how that could work. You can tap into your home's existing circuits (or run a new line from the circuit box), bringing a line through the wall or under an eave. This is a simple way to hook up floodlights or spotlights that will focus on basketball or tennis courts, garage doors and security areas.

Fig. 3



TYPES OF LIGHTING FIXTURES

Bollard lights stand about 3 feet high and cast light downward. Ideal for flower bed and driveway lighting.

Post lights also direct light down to cut glare. Often used at entryways and along garden paths.

Accent lights are short and subtly light winding walkways. One small version is called a mushroom light.

Floodlights and spotlights provide maximum illumination for activity and security areas.

Globe lights provide general illumination at decks and patios without creating glare.

Deck lights mount unobtrusively under railings. Wiring is concealed under floors.

To light steps, walks, flower beds and shrubs, you might be best served by a packaged kit or two low-voltage light units. These lights are powered by a transformer that hooks up to 120-volt household current and converts it to 12 volts. The kits contain just about everything needed for installation, including wire and from four to as many as 16 lamps.

And how to highlight a beautiful stand of birches all the way at the back of your property? Consider solar-powered lamps that can store the energy of the sun during the day in batteries. If you buy the type that turns itself on (with a light-sensitive cell) at dusk, it'll save you the trouble and expense of a long run of wire. See Fig. 4 for tips on buying solar lighting.

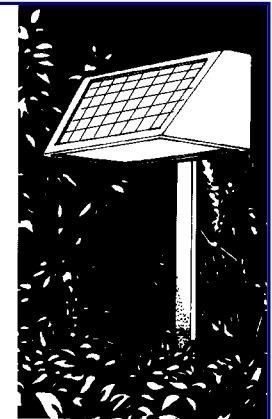
Fig. 4

TIPS FOR BUYING SOLAR LIGHTS

Solar-charged lamps ideally serve locations with plenty of sun. Batteries store the electricity generated by solar cells, and a light-sensitive switch turns the unit on at dusk. The fixture can be mounted on a wall or on its own post. When selecting a solar-powered lighting unit, look for one that has the latest technology. This will assure you of better looks and long-lasting performance.

Here's what to place particular emphasis on:

- High-temperature nickel-cadmium batteries specially designed to withstand the heat of solar recharging;
- Vented battery case that permits heat to escape easily;
- Crystalline solar cells, soldered together, that can generate double the electrical output of thin-film cells;
- Enhanced protection for the solar cells, enabling them to resist moisture, accidental impacts, humidity, and sharp temperature changes;
- Protection for electronic elements—circuits, switches, and sockets—with top-grade corrosion resistance; and
- Full warranty for at least a year or two.



Each of the three power sources has distinct advantages and disadvantages and only you can determine what's best for your situation. In general, though, it can be said that 120-volt equipment will do a better job providing intense light for activity and security areas, while low-voltage units create more pleasing visual effects and cost less to operate.

The major drawbacks to solar lamps are their higher initial cost, as compared to the relatively inexpensive low-voltage lamp kits, and lack of sunny days in some regions during certain seasonal periods could limit their effectiveness.

Note: Check with local building codes before buying lamps or starting your lightscaping project. Codes usually require that all wiring for 120-volt outdoor fixtures be buried. That restriction may not apply to low-voltage units, but check manufacturer's literature and local codes.

Optional Equipment. Operation of your outdoor lighting system can be hassle-free with use of the same type of light sensor previously mentioned on the solar lamp to turn on spotlights and other fixtures automatically at dusk. Timers can produce the same results with the added flexibility of deciding for yourself when the lights go on and off. They must, of course, be reset periodically as the seasons change.

Another useful option and an effective security device is the motion sensor. These turn on fixtures automatically whenever the sensor detects motion within its set range. Fine-tuning is essential, however—you don't want the light coming on for every stray cat and dog that runs through your yard.

STEP-BY-STEP PROCEDURES

Before beginning, check with your local building inspector to determine if a permit and/or inspection is required for 120-volt installations. There may be specific requirements for how deep cable or conduit must be buried, for instance, and how high overhead wiring must be strung.

The Power Source. Tapping into a 120-volt circuit to install floodlights or spotlights under eaves is simple if there's a convenient junction box or outlet in the attic.

Caution: Disconnect the power at the main service panel before proceeding.

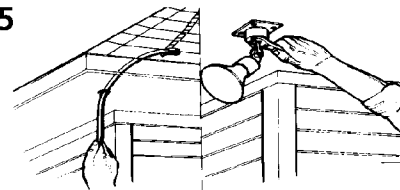
Connect the proper wires including the ground inside the box, and run your cable toward the location of the new light so it can be "fished" out (**Fig. 5**). You can follow the same procedure to attach soffit lights to many garages and outbuildings.

To tap a power source on the first or basement level of a house is equally simple if you already have an outdoor receptacle in place. Mount a low-voltage transformer on the adjacent wall and plug it in. The wiring system for your lights then runs from the transformer into the yard, under the deck or wherever.

Almost as simple is if you have an electrical outlet located inside and close to a basement or storeroom window at the point you want to start the outdoor circuit. In this case, mount the transformer on the wall inside and plug it into the outlet. The wire for the lighting fixtures can run to the outside through a hole or groove cut into the window frame.

If you need several outlets for several transformers, you can run a cable from a conveniently placed inside outlet or junction box and install a waterproof outdoor receptacle wherever you wish (see **Fig. 6** and **Fig. 7**). For safety reasons, make sure the receptacle is a GFCI (ground fault circuit interrupter).

Fig. 5



Use fish tape or wire to snare electric cable and pull it through hole drilled in soffit. Then mount outdoor spotlight fixture, and focus the beam on barbecue grill, tennis court or whatever.

Transformers. If you buy a prepackaged lighting kit, the transformer will have sufficient power to operate the number of 12-watt lamps included. It may or may not be able to accommodate more.

To find out, add the number of watts for all your bulbs; the total should not exceed the wattage rating of your transformer. For example, a 250-watt transformer can power five 50-watt bulbs, 10 25-watt bulbs, or 20 12-watt bulbs.

Transformers work most efficiently when close to the lamps they serve. You can extend runs of wire, but as you go farther out, the voltage level drops and bulbs get dimmer.

Wiring. Two factors are at work here: the length of the run and the gauge (thickness) of the wire. Normally, 16-gauge wire is fine for 12-volt systems with a 150-watt transformer and a wire run of no more than 100 feet. To go out farther than that, you should upgrade to a 200-watt transformer and 14-gauge wire. For runs of 150 feet, figure on a 250-watt transformer and 12-gauge wire.

Beyond this, you might have to piggy-back transformers and use one of the wiring strategies shown in **Figure 8**. Or you might run a long 12-gauge wire out to a distant string of post lamps, connecting the heavy wire to the middle of a 16-gauge wire connecting the lamps.

Low-voltage wiring doesn't have to be buried, but you may want to do so if it crosses open spaces (where it would be unattractive) or places where a lawnmower might cut the wire.

For easy burying, use a sidewalk-edging machine, which on flat ground will cut a neat, narrow trench just the right size for your cable. Push the wire down a couple of inches all along the slot; to cover the wire, simply step down with your shoe. That will collapse the narrow trench, and in a few days, you won't even see the cut anymore.

If you don't own a sidewalk-edging machine, crevices can also be created with a flat spade or even a knife, but be careful not to break the insulation when burying the wire.

Lighting Fixtures. Units should be tough and weatherproof, preferably made of durable, high-impact plastic that can withstand mercury shifts of from 35°F below zero to 120°F above. You can also look for the UL seal of approval. For aesthetic reasons, you may prefer fixtures made of metal and wood, but don't expect them to outlast plastic.

Many fixtures that come in lighting kits snap easily together, with some making electrical connection with the wire in the same process. Others have connectors that use a screw and clamp device that tightens down, piercing the wire and making electrical connection. You don't even have to trim the wire. This enables you to move lamps around easily; the fixture snaps on or off.

Note: It's a good idea to hook up all your lighting fixtures to the transformer to check if they work before placing them outside.

IMPLEMENTING THE PLAN

With your lighting fixtures tested and your final layout plan in hand, begin stringing the first wiring run. Leave enough slack in the line so that you can move lights later on if you change your mind about locations.

Position the lamps according to the plan and make any necessary connections. Do not set light posts into the ground just yet. Plug the transformer into its outlet, and double check that all lights are operating. Make adjustments if necessary and disconnect the transformer.

Dig holes as needed for the light posts. This may not be necessary for sets that have metal stakes for posts, which can easily be forced into soft earth. If you encounter resistance, stop and dig a hole for the post—too much force can break the unit.

Once all lamps are in place, wait for dark to test the system. Are there any unsafe areas in need of light? Do some lamps cause glare? Are your bulbs powerful enough to do the intended job? Are some too powerful? Would another type of lighting fixture do a better job? Would colored lenses be appropriate?

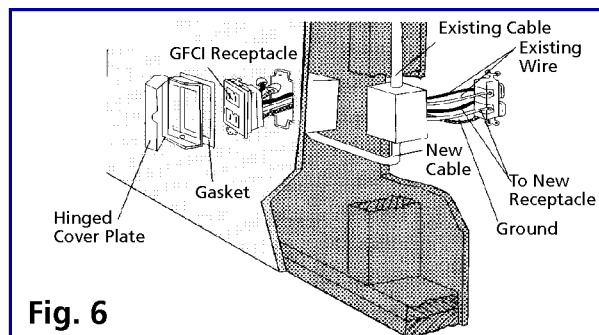


Fig. 6

A new weatherproof outdoor outlet equipped with a ground fault circuit interrupter (GFC) can be installed simply by extending wires from an indoor outlet. Drawing shows how to do this with an end-of-run outlet, but any outlet can be tapped in similar fashion.

In fine-tuning your system, don't hesitate to experiment. You may find areas that you've neglected or that you've overdone the project and need to remove some lighting. With each change, stand back and assess the effect on the whole picture. Check out the appearance from across the street and from other vantage points.

Once you're sure everything's the way you want it, bury, conceal, or cover up the wiring.

CARE AND MAINTENANCE

A good quality outdoor lighting set should last you for years with very little maintenance required. About the hardest thing you'll have to do is change a burned-out bulb occasionally. Remove the bulb as soon as possible because the remaining ones will get more voltage than needed thus shortening their lives.

As shrubbery and other plantings grow, you'll need to cut back around some fixtures or even relocate them for better effect. This is another good reason to leave extra slack in the lines as you lay them.

Remove any leaves that obscure or even bury smaller fixtures. While transformer boxes are weatherproof, you may want to brush off any snow that accumulates.

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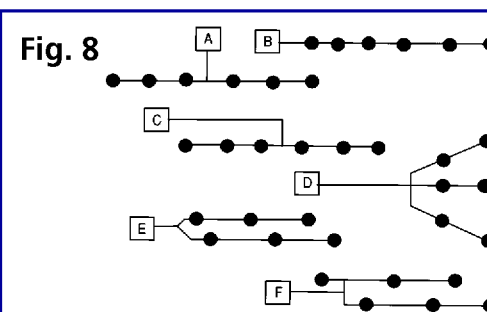


Fig. 8

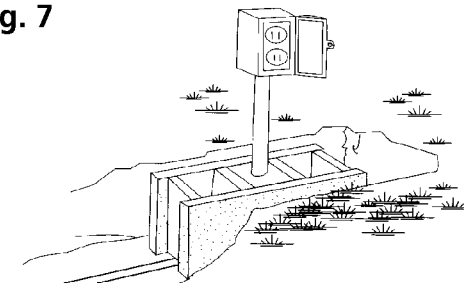
GETTING THE MOST FROM LOW-VOLT SYSTEMS

Above are six ways to wire lighting circuits. These diagrams represent some basic patterns for stringing low-voltage outdoor lights, but you can design your own plan to accommodate more than six lamps per transformer. Lettered squares are transformers; black dots are light fixtures. On long runs with multiple lamps, be sure the total bulb wattage doesn't exceed the transformer's capacity.

Follow a few basic rules when installing low-voltage, outdoor lighting, and you will end up with a result that both improves the value of your home and your lifestyle:

- Conceal wiring under gravel, mulch, wood chips, bark, or earth;
- Hide light fixtures under shrubs, behind plantings, or beneath the eaves of your house;
- Avoid too much light; rely on a number of smaller lamps rather than one or two with great wattage;
- Strive for effects that compel onlookers to focus on the illumination—not the light source;
- Adjust lamps to prevent glare;
- Keep wiring runs short to prevent voltage dropoff; and
- Check bulb wattage to make sure that the total for a circuit doesn't exceed each transformer's capacity.

Fig. 7



A sturdy support base for a weatherproof outlet or a lamp post can be made out of a buried cinderblock. The vertical conduit or post goes in the center opening and is secured with concrete. Buried cable runs up through the hollow conduit or PVC pipe to the outlet or lamp.