



## CUB SCOUT BOOMERANG (GOLD) TEST 10 – DISCOVERY

*Make a signalling lamp with a battery, wire and globe and use it to signal SOS.*

### Resources

- Morse Sender template
- Morse Sender base
- Morse Sender key
- 1.5V Globe
- Globe holder
- 1.5V AA Battery
- Fuse/hook-up wire
- Small nails
- Small self-tapping screws



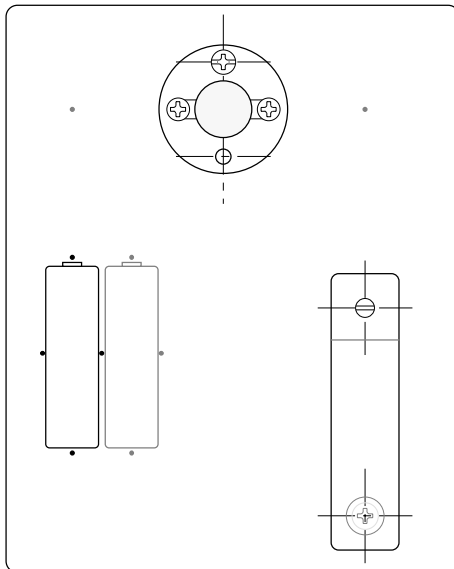
### Instructions

1. Place the paper template over the wooden base so that the globe holder and key screws are over the pre-drilled holes;
2. Hammer in four (4) small nails to hold the battery in place. The nails at the two ends of the battery should contact the battery terminals, and hold the battery firmly in place. Once these nails have been hammered in, you can remove the paper template;
3. Screw the Button Head screw into the pre-drilled hole at the bottom right hand corner of the base (this is the Morse Key Contact). Before tightening the screw completely, attach a piece of hook-up wire (~140 mm) just under the head, and then tighten the screw;
4. Wind the other end of the piece of hook-up wire, attached in Step 3 above, to the nail contacting the bottom end of the battery;
5. Attach the Morse Key to the base using the smaller self tapping screw. Before tightening the screw completely, attach a piece of hook-up wire (~120 mm), around the screw, on the under side of the Key, and then tighten the screw so that the Key is held firmly in place;
6. Attach the globe holder to the base using the larger self tapping screw;
7. Attach the hook-up wire from Step 5 to the right side globe holder terminal, and another piece of hook-up wire (~120 mm) to the left side terminal;
8. Wind the free end of the hook-up wire from the left side terminal (Step 7) around the nail contacting the top end of the battery;
9. Press down on the Morse Key so that it touches the Contact (the head of the button head screw). The globe should light up. Release the Key and it should spring away from the Contact and the globe should no longer be lit. It may be necessary to bend the Key up a little to ensure that it is not permanently in contact with the Contact. By pressing the Key and releasing it quickly (a dot or "dit"), or holding it down for a brief period (a dash or "dah") you will be able to transmit signals in Morse Code.

## Resource Preparation

Morse Sender Template

File: Morse Sender.pdf



Print the template file and cut in half (2 templates are printed per A4 page).

### Morse Sender Base

Softwood Planks (19 mm)      160 mm x 130 mm    ~\$0.50 ea      Timber Supplier

Recycled pine planks are ideal, taking care (if practical) to avoid too many knots—it can be difficult to drive nails into knots, and sometimes the knot gives way entirely.

### Morse Sender Key

8g Galvanised Iron Sheet      80 mm x 20 mm    \$~/m<sup>2</sup>      Metal Supplier

These components are most easily prepared with a guillotine, by the metal supplier, but can be cut out using tin snips. Smaller suppliers will often cut to size for a nominal charge. Round the corners (preferably) with a file or on a belt sander/grinder (some suppliers will do this too). Place a slight bend in the key (so that the key will clear the contact screw when the Sender is assembled), about 20 mm from one end. Drill a 3 mm (or as appropriate for the fastening screw being used) hole ~10 mm from the same end of the key.

### Globe

MES Std Tube (8147)      1.5V/300 mA    \$0.47/ea. Dick Smith Electronics

Ensure that the globe voltage is appropriately matched to the voltage of the battery to be used.

### Globe Holder

MES Black, Flanged (8161)    <to suite globe>    \$1.54/ea. Dick Smith Electronics

A globe holder can be fabricated from thin metal, such as that in a tin can, but this is a relatively low cost item which simplifies the construction process.

### Battery

AA      1.5V      \$0.50/ea. Dick Smith Electronics

Any battery can be used, but the template supplied assumes a AA battery. The globe voltage should also match the battery voltage.

Screw

Buildex Self Drilling	8g x 15mm	\$3.12/50	Magnet Mart
-----------------------	-----------	-----------	-------------

All that is required here is something to act as the Morse Key contact. The Button Head just makes it easy to attach and hold down the hook-up wire.

Screw

Zenith Self Tapping	6g x 16mm	\$2.02/14	Magnet Mart
---------------------	-----------	-----------	-------------

All that is required here is something to fasten the globe holder to the base. The smaller the screw, the easier it will be to screw in.

Screw

Zenith Self Tapping	4g x 12mm	\$2.02/16	Magnet Mart
---------------------	-----------	-----------	-------------

All that is required here is something to fasten the Morse Key to the base. The smaller the screw, the easier it will be to screw in.

Nails

Bullet Head	30 x 2.00	\$4.65/500g	Magnet Mart
-------------	-----------	-------------	-------------

All that is required here is something to hold the battery in place, and to which the hook-up wire can be attached.

[PAH 23-Jun-03]