

LED Pointers Made Easy:

Tools: pencil, ruler, Scissors, masking tape, hot glue gun (or white glue and clear tape), slide masking tape, railroad board (aka: tack board, file folder board), convex lenses, and a single LED flashlight.



Parts: All cut from railroad board.

#1 *Focus Cylinder*: 2 in. X 6 in.

#2 *Cap Cylinder*: 1 ½ in. X 6 in.

#3 *Lens Cylinder*: ¾ in. X 6 in.

#4 *Lens Mask*

#5 *Arrow Silhouette Insert* (cross shaped)

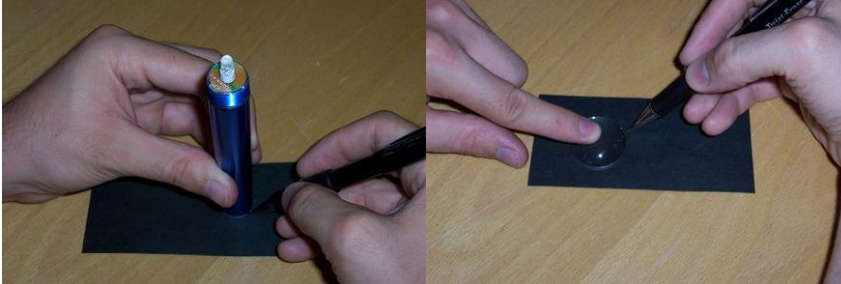
*These measurements can be altered for different sized flashlights. Incidentally, LED adapters are available for Mag-lite brand flashlights as an alternative to buying new flashlights.



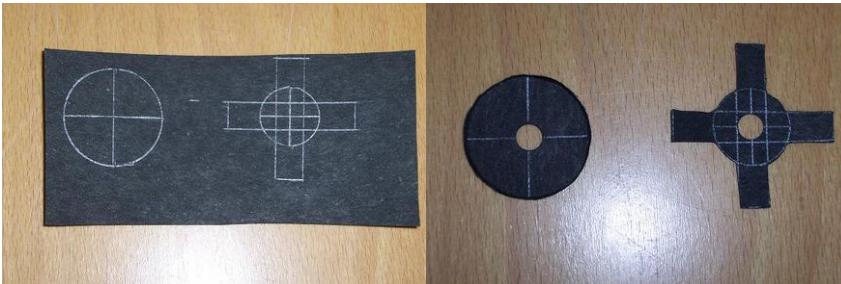
Construction:

A. Making the *Arrow Silhouette Insert* (#5) and the *Lens Mask* (#4):

1. Remove the battery cap from the flashlight and trace the circumference of that end on the railroad board with a pencil. Also trace the circumference of your lens.



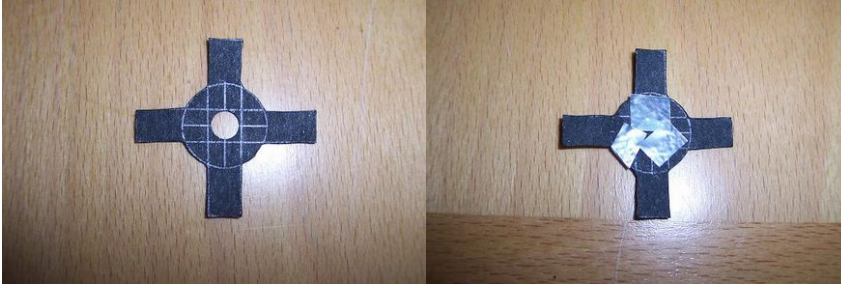
2. Draw two perpendicular lines through the circles. Make sure that they cross at the center. Next draw a wide cross over the smaller circle. This will be the *Arrow Silhouette Insert* (#5). Cut out the *Arrow Silhouette Insert* (#5) and the *Lens Mask* (#4). Lastly, punch a hole at each center of the two circles.



3. The completed *Lens Mask* (#4) should appear as follows:



4. Take the *Arrow Silhouette Insert* (#5) and apply slide masking tape over the hole to form an arrow silhouette.



5. Remove the reflective cone and the original lens from the flashlight. Then insert the *Arrow Silhouette Insert* (#5) so that the arrow is almost resting on the LED light. It can then be affixed with your choice of tape or glue.



B. Making the *Focus Cylinder* (#1), the *Cap Cylinder* (#2) and the *Lens Cylinder* (#3)

1. Wrap the 2 in. X 6 in. piece of railroad board around the head of the flashlight and roll it gently. Leave a little space at the end to apply your choice of hot glue or white glue/clear tape. Then continue rolling so that the glue adheres. If you use white glue you will need to hold the cylinder closed with clear tape. This is the *Focus Cylinder* (#1). Mount it on the head of the flashlight.



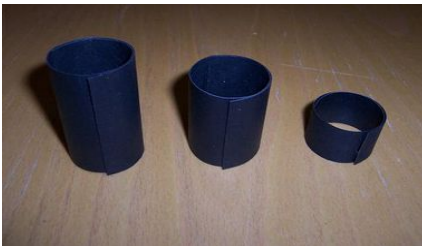
2. Wrap the 1 ½ in. X 6 in. piece of railroad board around the *Focus Cylinder* (#1) and roll it gently. Leave a little space at the end to apply your choice of hot glue or white glue/clear tape. Then continue rolling so that the glue adheres. If you use white glue you will need to hold the cylinder closed with clear tape. This is the *Cap Cylinder* (#2).



3. Remove the Focus and Cap cylinders from the flashlight head and wrap the ¾ in. X 6 in. piece of railroad board around the head of the flashlight and roll it gently. Leave a little space at the end to apply your choice of hot glue or white glue/clear tape. Then continue rolling so that the glue adheres. If you use white glue you will need to hold the cylinder closed with clear tape. This is the *Lens Cylinder* (#3).



Once completed the three cylinders should appear as follows:



4. Place *Lens Cylinder* (#3) inside *Cap Cylinder* (#2) and adhere it with glue. Next slide the new convex lens into *Cap Cylinder* (#2) so that the convex side is resting against the lip of *Lens Cylinder* (#3). Then insert *Lens Mask* (#4) behind the lens. Finally, slide *Focus Cylinder* (#1) into *Cap Cylinder* (#2) until it is pressed against the *Lens Mask* (#4). Then adhere it. As an alternative to adhesive assemble of the cylinders, you may opt to secure them by wrapping the ends in masking tape until a snug fit is achieved.



5. Slide *Focus Cylinder* (#1) onto the head of the flashlight. If *Focus Cylinder* (#1) is loose add masking tape until the fit is snug. Lastly, turn on the flashlight and move *Focus Cylinder* (#1) back and forth until the arrow is in focus.



This technique for making an LED flashlight work as a pointer can be applied to other brands and makes of LED flashlights. You just need to adjust the dimensions of the cylinders and diameters of the lens and lens mask to fit your flashlight.

Though we have not researched this, it's probably even possible to use a flashlight that has more than one LED in it, as long as you design the Arrow Silhouette Insert to mask all the LEDs but one."