

# Science Olympiad 2016-2017 Optics LSS Tips and Tricks

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**NOTE: COMPETITORS ARE NOT REQUIRED TO BUILD AN LSS.  
EVENT SUPERVISORS WILL PROVIDE ONE DURING THE COMPETITION.  
GET THE MAIN LSS DOCUMENT FOR DETAILS ON HOW TO BUILD A BASIC LSS**

The purpose of this document is to show how to make improvements to the basic LSS that allow for more robust usage. All of these are recommended for Event Supervisors in actual competition settings.

Sections:

- Mirror Coverings
- Laser Lock/Adjustment
- Target Marking

## Mirror Coverings

Mirror coverings of some sort are required by the rules. In a pinch, items such as post-it notes can be used, but are not an ideal solution.

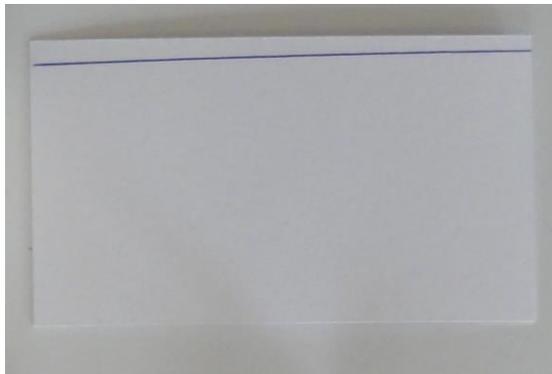
Materials / Tools:

- Standard size business cards
- Scotch tape
- Mounted LSS mirrors
- Scissors

Note this assumes you are using 2" square mirrors mounted on 4" x 2" blocks (as created in the main LSS document).



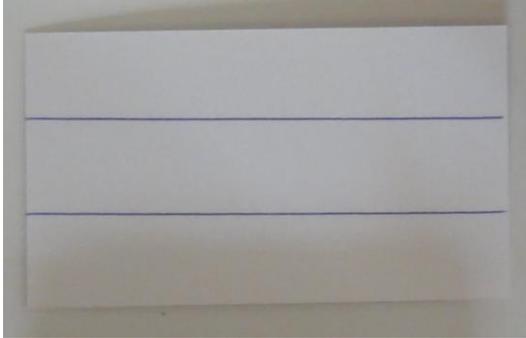
1. A standard business card is 2" wide. Cut off  $\sim 1/8$ " from one side, as indicated by the line in the picture below:



2. Fold the top  $\sim 1/2$ " at a right angle, to create a small 'handle'. This will be the removable covering:



3. With another business card, cut it approximately in thirds lengthwise, as indicated by the lines below:



4. Fold both ends at  $\sim 1/2$ " so that the middle section is the same width as the mirrors ( $\sim 2$ " ):



5. Tape the folded card near the top of the mirror, as shown below. Be sure to leave a gap between the mirror and the card:



6. Slide the removable covering into the gap. It should loosely fall into place and be held up by the handle.



## Laser Lock/Adjustment

### Materials / Tools:

- 1 ½" corner braces ("L" brackets)
- #4 ½" wood screws
- ½" threaded eye bolts with nuts
- Screwdriver
- Pliers
- Drill

1. As shown in the pictures below, the eye bolts are passed over the body of the laser.
2. Depending on your specific laser you might need to use the pliers to open up the eye bolts a bit, use another size eye bolt, or use something like electrical tape to increase the effective diameter of the laser so that there is a snug fit.
3. Likewise, you might need to use a drill to increase the size of the holes in the corner braces so that the eye bolt can fit through it.
4. Thread the eyebolts onto the laser and corner braces before screwing the braces to the LSS wall in order to ensure you position them correct.
5. By tightening or loosening one or the other nuts, you can shift the laser left or right to get it aligned properly. Note the up/down adjustment isn't possible, but also isn't needed for the event.



# Target Marking

## Materials / Tools:

- Roll of calculator tape/paper
- Scotch tape
- Screwdriver
- Scissors

1. As shown in the pictures below, the paper is taped to the target wall above the ruler to allow for marking of the target and results of each team.
2. You might need to use the screwdriver to loosen the ruler a bit from the wall, in order to allow the edge of the paper to slide down between the wall and ruler.
3. Use a pen to indicate with an arrow the target for teams.
4. Also use the pen to mark the location the laser hits the wall for each team. This provides a permanent record that can be used in case of arbitration or questions over the results. Likewise, it's often easier to measure the marks after all the teams are done and the paper is removed from the LSS.

