# Optics model 5 – Shadows

## Topic

*Optics – Umbra and penumbra*

## Construction task

## Building a shadow experiment

*Build the model for the shadow experiment*



## Topic task:

Turn on **one** LED and sketch the shadows:

Now, turn on **the second** LED as well and sketch the shadows:

How many different kinds of shadows can you see? Move the projection screen away from the column and observe how the individual shadowed areas change.

Set the distance of the screen so that you see a clear “umbra”. Add it to your sketch and label the individual areas. Where are there no shadows? Where is the “umbra”? And where is the “penumbra”? Can you explain why there are an umbra and penumbra?