

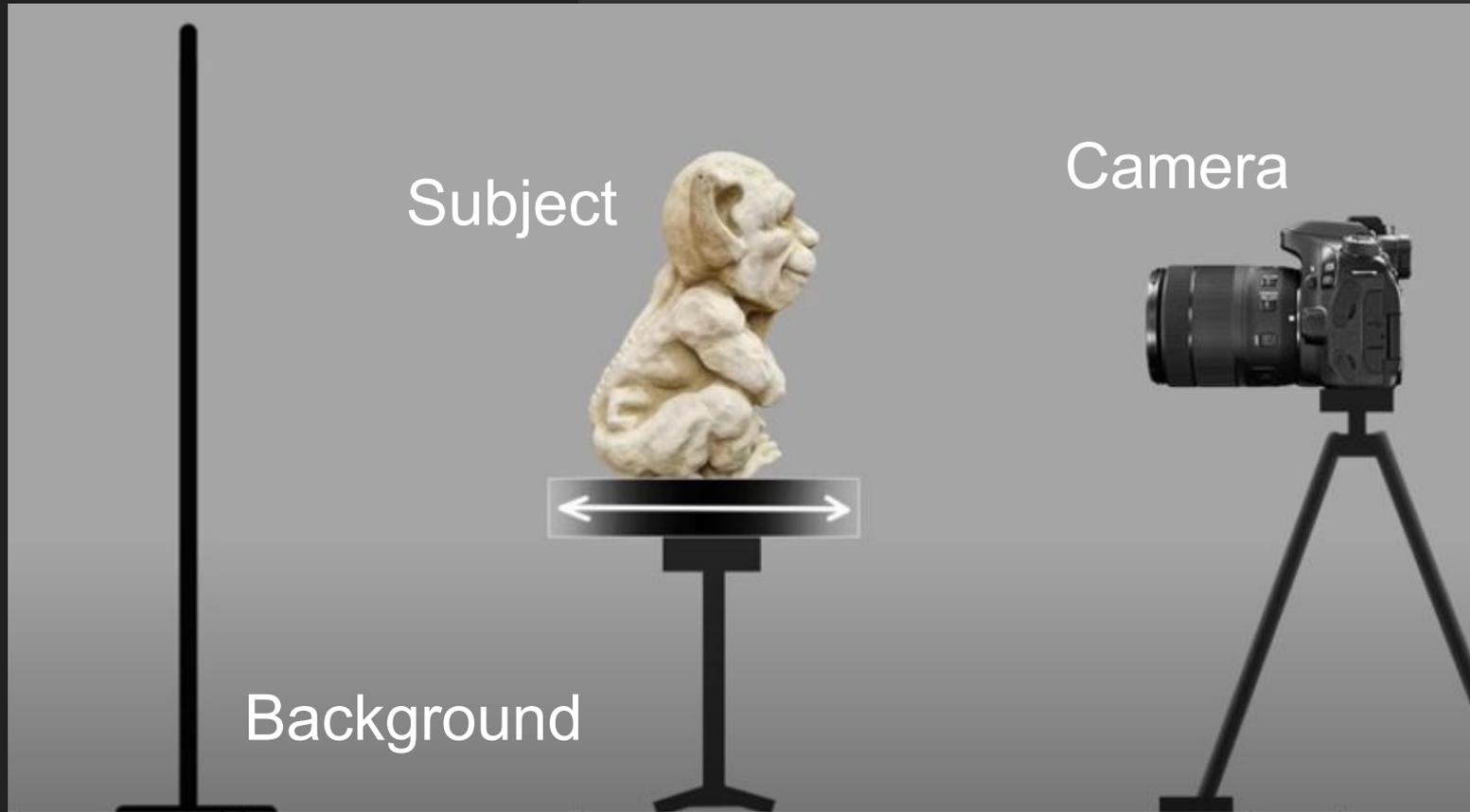
3D SCANNING AND PRINTING DAY3

Guide of good practice

Photography for photogrammetry

Cheat the software, use a dark background to absorb as much light as possible and make it easy to desimulate.

Set up



Get sharp images



To get rid of the reflection a polariser filter must be used over the light source and the objective of the camera applying a cross polarization filtration. The filter also helps with the background separation reducing highlights from the background material and the model holder.



Light Passing Through Crossed Polarizers

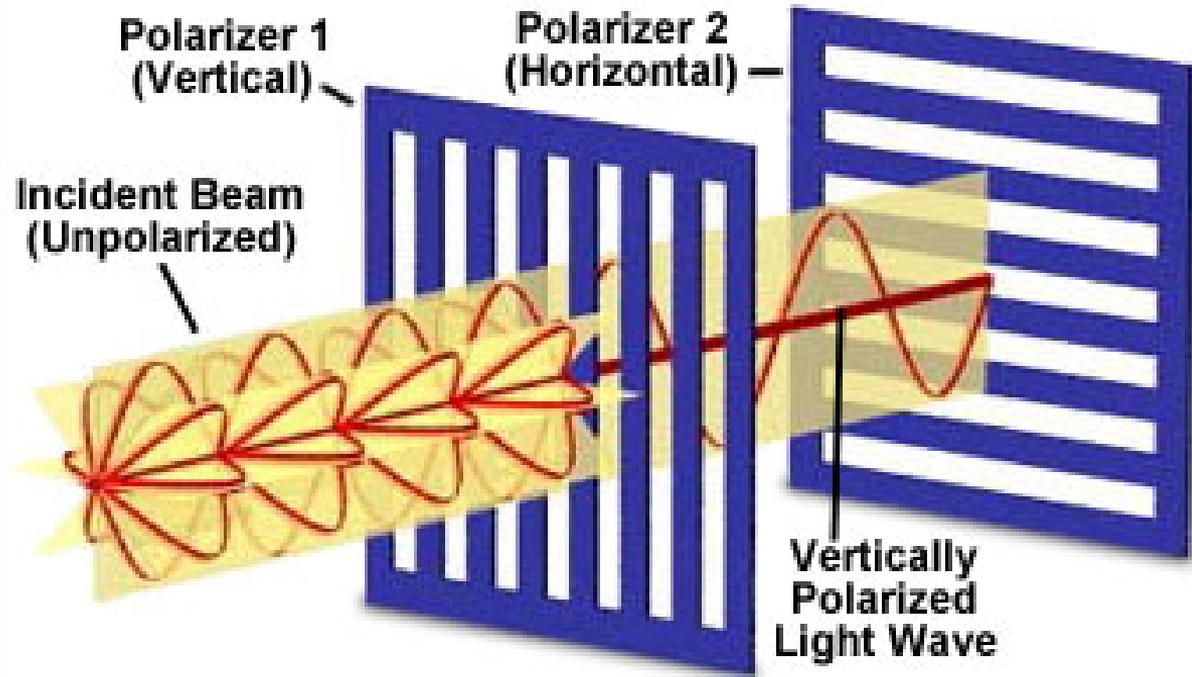
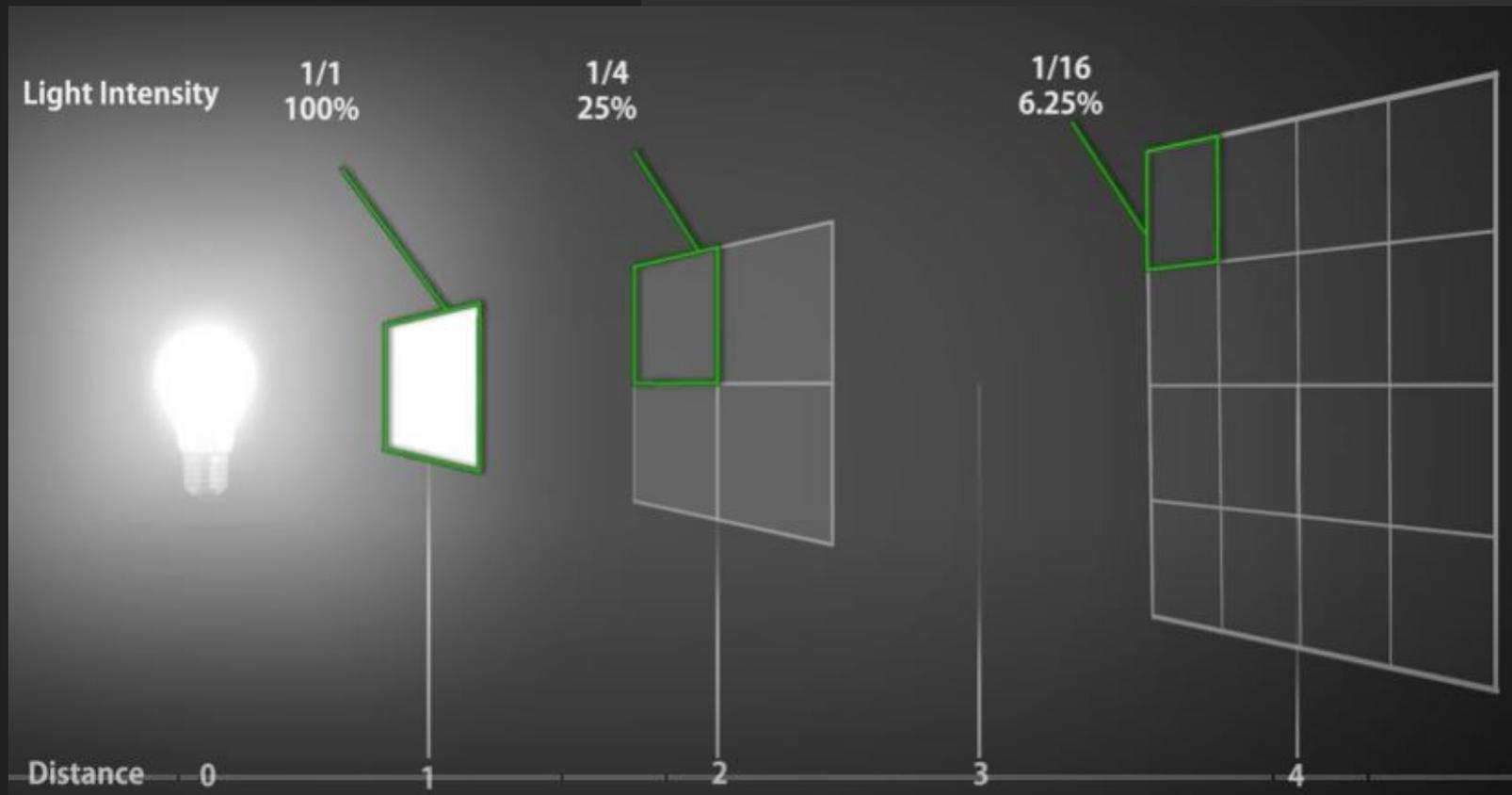


Figure 1

cross polarizer filter



Inverse square rules



**Inverse square
rules, how light
will affect the
process.**

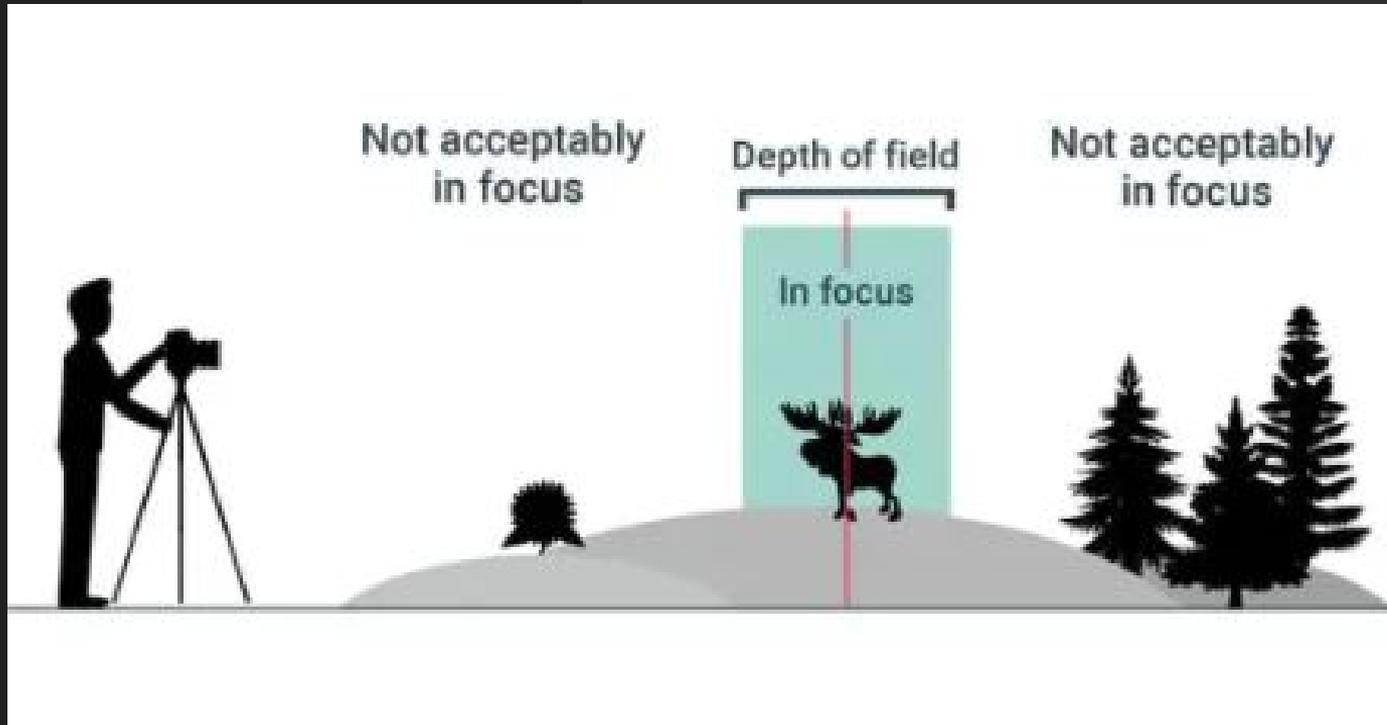
**The closer the model to
the camera the more light
it gets, the darker the
background the easier it
is to hide it and the
closer it can be to the
model. The further the
background the less
reflective and therefore
the less light comes back
to the subject.**

25%
of light
intensity

100%
of light
intensity



Understanding depth of field



Understanding depth of field

Depth of field is affected by the aperture, the focus distance and the focal length.

<https://capturetheatlas.com/depth-of-field-photography/>

Focal Plane

Aperture

DoF



f4



Depth of Field



f11



Depth of Field



f27



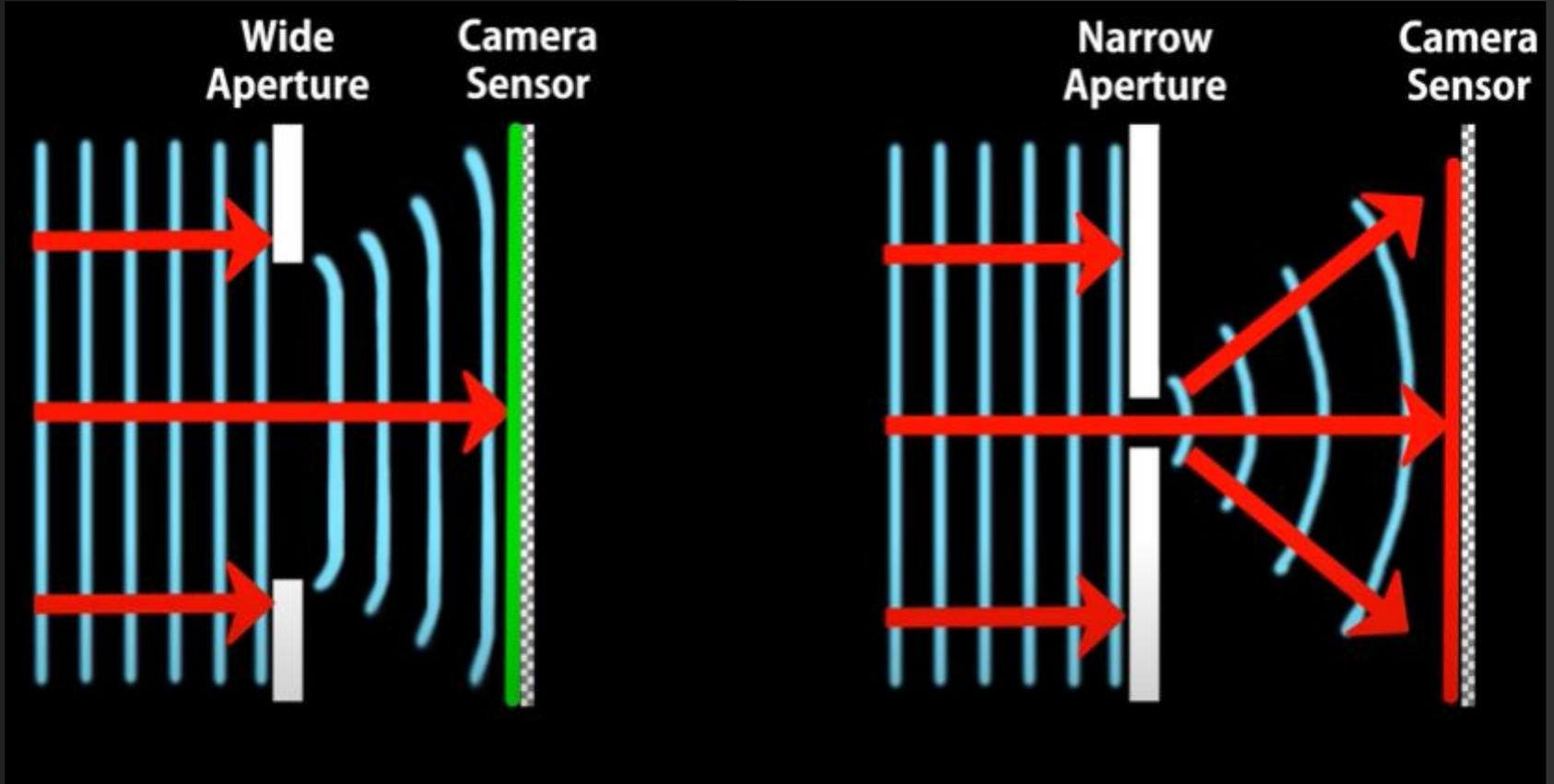
The more open the aperture the more light gets to the sensor but the shallower and sharper edges the depth of field will have. With a smaller aperture, the less light but the wider and more spread the edges of the depth of field will be. It is important to note that the wider the focal length, the further the far limits and near limits but the near limit will always be closer to the model than the far limit.

With a small aperture an external strong added light may be needed, or longer exposure time.

The aim is to find the best balance between the depth of field and the exposure time to get the sharpest image in as little time as possible.

Take care of diffraction when using a small aperture.

Diffraction



Focal Plane

Aperture

DoF



f8



Depth of Field



f8



Depth of Field



f8



The closer to the subject the shallower the depth of field, the further the wider and the more spread the edges of the depth of field will be.

F

Focal Plane

Focal Length

Aperture

Depth of Field

Field of View

24mm

f8

Depth of Field

Field of View

70mm

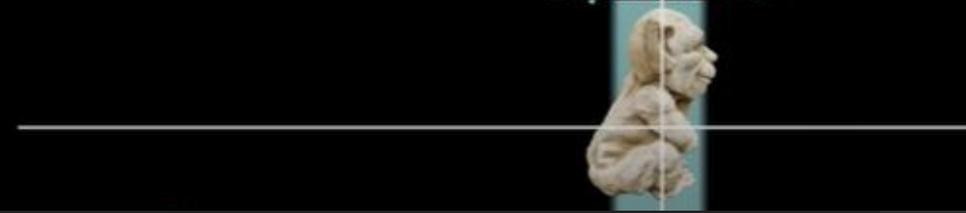
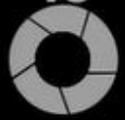
f8

Depth of Field

Field of View

135mm

f8



The longer the focal length the narrower the angle of view and the higher the magnification, with a long focal length we obtain a more orthogonal view and therefore a more accurate coverage of the model..

The longer the focal length the narrower the angle of view and the higher the magnification, with a long focal length we obtain a more orthogonal view and therefore a more accurate coverage of the model...

The shorter the focal length the wider the angle of view, less coverage and the more perspective distortion will occur...

The aim is to compensate for the change of focal length by adjusting the distance between the model and the camera.

Care needs to be taken to ensure that the model does not go out of the focal range and the frame when rotating it.

Light source

Light source ideally would come from the camera view point to avoid shadows. If possible use a powerful flash ring. A smaller LED flash ring will also work or a twin flash mount. The better and stronger the light source the faster the process.

Holding the models

Use a stand to make the process more comfortable. A simple turntable for heavier props with a can, cardboard tubes with a small diameter for rounded models and small adjustable clamps for smaller models.

Cover everything with the darkest material or paint as possible.

Set up the camera to manual mode with the autofocus and image stabilization turned off.

Useful links:

<https://capturetheatlas.com/depth-of-field-photography/>

<https://www.youtube.com/watch?v=REA3XNgUMJg>

<https://scholarslab.lib.virginia.edu/blog/documentation-photogrammetry/>

Education purpose only

