



# Kinesthetic Telescope



**Learn how telescopes work and how MicroObservatory images get made by working together as a team to create a human telescope**

## Materials

- Telescope vocabulary words (with definitions) – cut out, or written on index cards
- Kinesthetic Telescope Narration – printed out or posted somewhere in large type
- Hat, bag, box, or similar object
- Astronomical image



## Preparation

Clear a path across a room, down a hallway, or in an open area outside  
Print and cut out or re-write the telescope vocabulary words  
Place the words into the hat, bag, or box

## Procedure

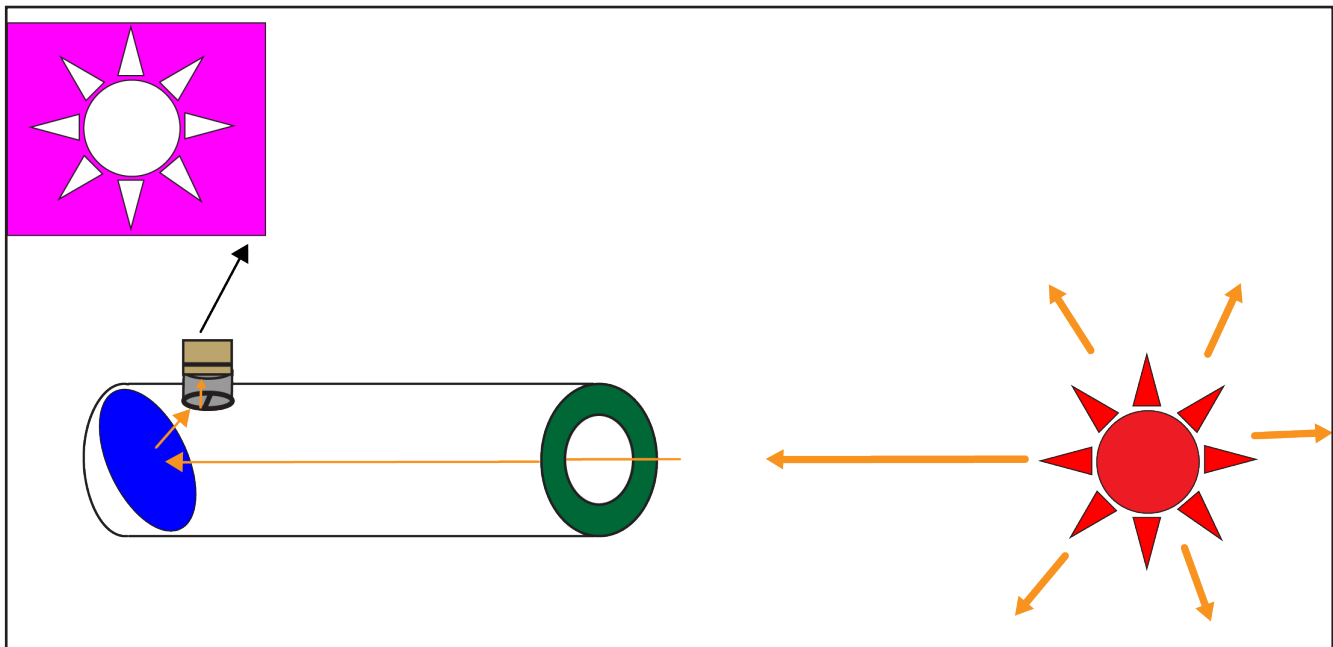
1. Participants draw vocabulary words out of the hat (some words are repeated). Explain that each different vocabulary word represents part of the process of how images are made.
2. Have participants read their vocabulary words and definitions aloud.
3. Read the narration, moving the participants into formation as you read their vocabulary words. If you like, demonstrate what is happening at each stage.
4. Give the astronomical image to the detector when you reach that part of the narration. Make sure (s)he keeps it hidden until the very end of the narration.
5. Demonstrate the path that light takes and what each part of the telescope does.
6. Have participants recreate the demonstration and present the narrated sequence on their own. Each part of the telescope must explain what he or she is doing. The light cannot move forward until it is given permission from the appropriate telescope part:
  - Light: travels from objects in space to the telescope
  - Aperture: lets the light into the telescope
  - Mirror: focuses the light toward the detector
  - Shutter: lets the light through to the detector
  - Detector: records the light to create an image

## Kinesthetic Telescope Narration

1. **Light** travels from an **object in space** to the telescope
2. The **aperture** lets the light into the telescope
3. The **mirror** focuses the light toward the detector
4. The **shutter** lets the light through to the detector
5. The **detector** records the light to create an **image**

When you request an image from MicroObservatory, you tell the telescope which object in space to point at, and how long to keep the shutter open.

## Kinesthetic Telescope Formation (color coded to match narration above)



Not to scale. Note that some of the light will never reach the telescope. Similarly, not all the light will make it through to the detector...you can simulate this by having longer or shorter "exposure times" (how long the shutter stays open) in multiple demonstrations, or adding a light filter to your kinesthetic model.



# Kinesthetic Telescope



## Kinesthetic Telescope Vocabulary Words

Print out and cut apart or re-write on index cards

<b>Narrator</b>	<b>Aperture</b> The opening of the telescope that lets light in	<b>Aperture</b> The opening of the telescope that lets light in
<b>Mirror</b> The piece of the telescope that reflects and focuses the light	<b>Shutter</b> The piece of the telescope that opens and closes to let light through to the detector	<b>Detector</b> The piece of the telescope that collects the focused light, and records it as an electronic image
<b>Object in Space</b>	<b>Light</b>	<b>Light</b>
<b>Light</b>	<b>Light</b>	<b>Light</b>