Telescopes can be made with either lenses or mirrors. Using what you know about lenses and mirrors, you can think about ways to make small things that are faraway look larger.

Two members of the Physics Hall of Fame made important contributions to science by inventing telescope designs. Galileo designed a telescope that used lenses, Newton designed the first telescope that used mirrors.

A homemade telescope can be made from inexpensive materials. Build a telescope and explain its operation using what you have learned about lenses and mirrors. Take pictures to demonstrate your working telescope.

You can find directions online to help. For examples, see:

* [Exploratorium](http://www.exploratorium.edu/exploring/space/activity.html)
* [NOVA](http://www.pbs.org/wgbh/nova/galileo/telescope.html)
* [Telescope Making](http://telescopemaking.org/)

There are many other resources available. You can even find step-by-step instruction videos online.

Create a presentation to explain how you built your telescope and how it works. Include ray diagrams in your explanation.

**Criteria and Checklist:**

As you complete your assignment, please review the checklist below to ensure that you have included all needed items.

|  |  |
| --- | --- |
| ***Your assignment should include all of the criteria listed below to receive full credit.*** | |
| **Included?** | **Item** |
|  | 1. The telescope is functional. |
|  | 1. Includes enough descriptive information for someone to duplicate the construction process, including photos. |
|  | 1. Demonstrates use of the telescope and provides examples of the images it creates. |
|  | 1. Applies knowledge of lenses and or mirrors to explain how the telescope works. Explanation includes a ray diagram with at least two rays drawn from the object to the image. |
|  | 1. Presents information clearly to audience. |
| ***You may need to use resources outside of this course to complete this assignment. If so, please submit a Works Cited document. If you need assistance, visit the Developmental Module for information on citing any resources that you used.*** | |
| **Included?** | **Item** |
|  | For resources used outside of the course, a Works Cited document is submitted along with the assignment. |

**Alternative Assignment (if student cannot build a telescope)**

Compare and contrast the Newtonian and Galilean telescope designs. Explain the operation of each using your knowledge of optics. Illustrate the operation of each device using ray diagrams. Describe the advantages and disadvantages of each type.

**Criteria and Checklist:**

As you complete your assignment, please review the checklist below to ensure that you have included all needed items.

|  |  |
| --- | --- |
| ***Your assignment should include all of the criteria listed below to receive full credit.*** | |
| **Included?** | **Item** |
|  | 1. Describes Newtonian and Galilean telescope designs in detail. |
|  | 1. Compares and contrasts the design, functions, advantages, and disadvantages of each telescope. |
|  | 1. Applies knowledge of lenses and or mirrors to explain how the telescope works. Explanation includes a ray diagram with at least two rays drawn from the object to the image. |
|  | 1. Presents information clearly to audience. |
| ***You may need to use resources outside of this course to complete this assignment. If so, please submit a Works Cited document. If you need assistance, visit the Developmental Module for information on citing any resources that you used.*** | |
| **Included?** | **Item** |
|  | For resources used outside of the course, a Works Cited document is submitted along with the assignment. |