|  |
| --- |
| **Lesson Number: 28.4** |
| **Lesson Title: Non-optical telescopes** |
| **Specification Reference** | **3.9.1.3, 3.9.1.4** |
| **Learning Objectives** |
| Similarities and differences of radio telescopes compared to optical telescopes. Discussion should include structure, positioning and use, together with comparisons of resolving and collecting powers.Minimum angular resolution of telescope.Rayleigh criterion, Collecting power is proportional to *diameter 2*Students should be familiar with the rad as the unit of angle. |
| **Opportunities for Assessment** |
| Work through the example question; calculate how big a telescope on Earth needs to be to resolve the footprints on the moon |
| **Starter:** | Slide #1 can be used to create a discussion on the benefits of using all of the E-M spectrum in astronomy |
| **Main:** | Slide #2 introduces the idea of resolving power; link to diffraction and diffraction patterns for a single slit from previous lessonsSlide #3 shows the various overlapping patterns that occur from two sources at various angular separationsSlide #4 defines the Rayleigh CriterionOptional practical – Place a sheet of paper on a wall at the end of a long corridor with several pairs of spots on them. Walk away from the sheet looking through on ly one eye, see how far away you can go until you cannot resolve separate spots in each pair.Slide #5 is the results from the experiment or can be considered the various results from looking at binary star systems at different distances / separationsSlides #6 - #7 go through the formula for resolving powersSlide #8 is a worked example |
| **Plenary:** | Slide #9 is a summary |

|  |  |
| --- | --- |
| **Homework:** | Research telescopes and their radii; how far away can they resolve stars / exo-planets |
| **Differentiation / Extension / S&C** |
| Discussion of exo-planets and their detection; benefits of arrays over single telescopes |
| **Numeracy / Literacy** | **SMSC / Fundamental British Values** |
| Formulae and limits | Creation / expense of telescopes and their benefits to mankind |
| **RESOURCES:** |
| Sheet of paper with spots on (See worksheet) x1Sticky tape or tac |
| **Risk Assessment** e.g. CLEAPSS card reference |
| None |
| **Working Scientifically (HSW)** |
| Telescope design and aperture size |

Pictures courtesy of:

Slide #1 - CSIRO [CC BY 3.0 (http://creativecommons.org/licenses/by/3.0)], via Wikimedia Commons

Slide #2 and #5 - By Spencer Bliven - Own work, Public Domain, https://commons.wikimedia.org/w/index.php?curid=31456019

Slide #2 - By Nmurdoch - Own work, Public Domain, <https://commons.wikimedia.org/w/index.php?curid=6432626>

Slide #3 - <https://upload.wikimedia.org/wikipedia/commons/thumb/6/61/RayleighCriterion.svg/337px-RayleighCriterion.svg.png>

Slide #4 - By Gisling (Own work) [CC BY-SA 3.0 (http://creativecommons.org/licenses/by-sa/3.0)], via Wikimedia Commons