



For Assessment Submission in June 201X

**GCSE TWENTY FIRST CENTURY SCIENCE
FURTHER ADDITIONAL SCIENCE A A194**

Practical Investigation

Resolution

**CONTROLLED ASSESSMENT
INFORMATION FOR CANDIDATES (2)**

This assessment will be changed every year. Please check on OCR Interchange that you have the Controlled Assessment material valid for the appropriate assessment session.

- To be issued to candidates **only** on completion of the data collection part of their Practical Investigation.
- Your quality of written communication will be assessed.
- The total number of marks for this Controlled Assessment task is **64**.
- This Controlled Assessment task is valid for submission in the June 201X examination series only.
- This document consists of **4** pages. Any blank pages are indicated.

Teachers are responsible for ensuring that assessment is carried out against the Controlled Assessment set for the relevant examination series (detailed above).

Assessment evidence produced that does not reflect the relevant examination series will not be accepted.

These secondary data can be used as part of your Practical Investigation.

You can select the data that is useful for you.

1. Resolution of the eye

In an investigation of the resolution of the eye, two lines of equal thickness were drawn on a piece of paper. The distance at which the lines could just be seen as two separate lines was measured. This was repeated with different gaps between the lines.

gap between lines in mm	distance at which two lines could just be seen in m
1	0.8
2	1.6
3	2.5
4	3.3
5	4.1
6	4.9
7	5.7
8	6.5
9	7.4
10	8.2

2. Objective lens diameter

The best resolution of a telescope working with visible light can be estimated with a simplified version of Dawes Limit ($116/D$ in mm). This value depends upon the diameter of the objective lens of the telescope (usually equal to its aperture).

Diameter of objective lens in mm	Resolution using Dawes Limit in arc seconds
60	1.93
120	0.97
150	0.77
200	0.58
250	0.46
300	0.39
400	0.29

3. Wavelength of electromagnetic radiation

The theoretical limit of resolution for a telescope (or lens) is determined by the aperture and the wavelength:

$$\text{resolution (arc seconds)} = \frac{0.02 \times \text{wavelength (nm)}}{\text{diameter of aperture (cm)}}$$

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