# Light or gravity and seedling growth

Biology required practical | AQA GCSE Biology 8461 only (not Combined Science) | 14 questions, 35 marks

GCSE science required practicals

This practical online

**Name:** _____ **Date:** _____ **Score:** _____ / 35

**Aim:** To find out how the direction of light affects the growth and bending of cress seedlings.

**Equipment:** Cress seeds; Four petri dishes; Cotton wool and water; Four cardboard boxes, two with a slot cut in one side; Two lamps (one above dish A, one shining into the slots for dishes B and D); Aluminium foil (to cover shoot tips); Ruler marked in mm; Labels and pen.

## Results

Aaliyah and Rhys grew 20 cress seedlings in each of four dishes. They measured the seedlings after 2 days of germination (day 0) and again 5 days later.

| Dish | Conditions | Mean height on day 0 in mm | Mean height on day 5 in mm | Seedlings bending towards the light (out of 20) |
|---|---|---|---|---|
| A | Light from above | 4 | 32 | 1 |
| B | Light from one side | 4 | 30 | 18 |
| C | Darkness | 4 | 47 | 0 |
| D | Light from one side, tips covered with foil | 4 | 29 | 2 |

## Questions

**1** Give the independent variable and the dependent variable for dishes A, B and C. (2 marks)

**2** Aaliyah added 5 $cm^3$ of water to every dish each day. Give one other control variable and explain why it matters. (2 marks)


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**3** Describe one hazard when growing seedlings on damp cotton wool for a week, and how to reduce the risk.

(2 marks)

**4** Compare the results for dishes A and B. What does this show about how shoots respond to light?

(2 marks)

**5** Calculate the percentage of seedlings in dish B that bent towards the light.

(2 marks)

**6** Calculate the mean growth per day for the seedlings in dish A over the 5 days.

Show your working.

(3 marks)

**7** Rhys measured six seedlings from dish B on day 5. Their heights in mm were:

31 29 33 12 30 28

a. Which value is anomalous?

b. Calculate the mean height without the anomalous value.

Show your working.

(3 marks)


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**8** Calculate how much taller, as a percentage, the dish C seedlings were than the dish A seedlings on day 5. Give your answer to the nearest whole number. (2 marks)

**9** Suggest why the seedlings in darkness (dish C) grew the tallest. (2 marks)

**10** Explain, in terms of auxin, why the seedlings in dish B bent towards the light but most in dish D did not. (3 marks)

**11** A bean seed is left on its side on damp paper. Its root bends downwards. Explain why, in terms of auxin. (2 marks)

**12** Cress seedlings are thin and curved, so measuring their height with a ruler is difficult. Suggest one improvement to the measuring method and explain why it helps. (2 marks)

**13** Another class did the same investigation and got similar results. What does this tell you about the results? Explain your answer. (2 marks)


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**14** Plan an investigation to show how gravity affects the direction in which young roots grow. (6 marks)

End of questions | Total 35 marks | The answers sheet has the full method as revision notes.


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