

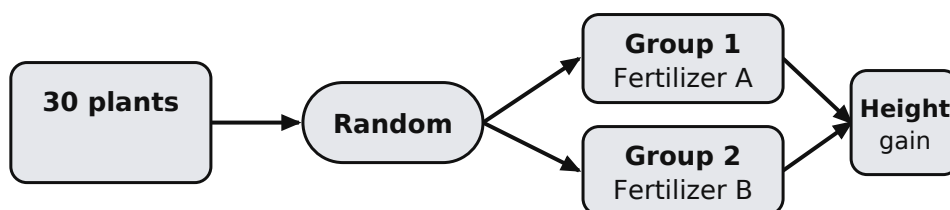
AP Statistics - Experimental Design and Random Assignment - Test Answer Key

Common Core AP STAT 3.4, AP STAT 3.5, AP STAT 3.6, HSS-IC.B.3, HSS-IC.B.5 · maths-pdf.fr/en/

Each solution includes a scoring guide. Give credit for naming the key design feature and for explaining why it matters in the context of the experiment.

AP Statistics · Common Core State Standards: **AP STAT 3.4, AP STAT 3.5, AP STAT 3.6, HSS-IC.B.3, HSS-IC.B.5**

Question 1 - Identify the design parts [3 pts]



A design diagram.

- (a) Completely randomized design.
- (b) Explanatory: type of fertilizer; response: height gain.
- (c) $\frac{30}{2} = 15$.

Completely randomized; fertilizer and height gain; 15 plants.

Scoring: 1 point per part.

Question 2 - Confounding [2 pts]

Families who pay for lessons may also support academic work in other ways.

Family resources (or motivation) are confounded with taking lessons, so the study cannot show that lessons raise grades.

Scoring: 1 point for naming a confounding variable, 1 point for explaining its link to both variables.

Question 3 - Random assignment [3 pts]

Random digits
07 41 15 22 03 38 09 14 26 30

Random digits.

07 selected, 41 skipped (out of range), 15 selected, 22 skipped (out of range), 03 selected, 38 skipped (out of range), 09 selected.

Treatment group: students 07, 15, 03, 09.

Scoring: 1 point for pair reading, 1 point for skipping out-of-range values, 1 point for the correct four.

Question 4 - Blocking [3 pts]

(a) A randomized block design, blocking by grade.

(b) Within grade 3, randomly assign 10 students to app 1 and 10 to app 2; do the same within grade 6. Compare the apps within each grade.

Randomized block design with 10 per app per grade.

Scoring: 1 point for blocking by grade; 2 points for randomizing within each block.

Question 5 - Placebo [2 pts]

A placebo gives the control group the experience of a treatment without the active ingredient. Blinding keeps subjects and evaluators from letting expectations affect responses.

Placebo controls for the psychological effect; blinding prevents bias in reporting and measurement.

Scoring: 1 point for each purpose.

Question 6 - Scope of inference [2 pts]

	Random assignment	No random assignment
Random selection	Generalize and cause	Generalize only
No random selection	Cause for the sample	Neither

Scope of inference.

Random assignment allows cause and effect; volunteers are not a random sample.

Cause and effect for these volunteers; not generalizable to all adults.

Scoring: 1 point for each conclusion.

Question 7 - Significance [2 pts]

1% is small, so chance alone is unlikely to explain the difference.

The difference of 14 points is statistically significant, which gives evidence the treatment works better than the placebo.

Scoring: 1 point for 'unlikely due to chance', 1 point for the conclusion in context.

Question 8 - Evaluate a study [3 pts]

Teachers differ and the classes may differ in ability, so the policy is confounded with the teacher.

Students were not randomly assigned to policies.

Confounding with teacher and class, and no random assignment; improve by randomly assigning students (or sections) to the policies.

Scoring: 1 point for each problem; 1 point for an improvement involving random assignment.

Total
20 points