

1. GAC013 Science II: Scientific Principles

Starter Quiz

GAC Science

Name: _____ Score: _____

1. What does it mean that scientific ideas are provisional?
 - ☐ They are only opinions
 - ☐ They stand until better evidence arrives
 - ☐ They change every year
 - ☐ They are unreliable
2. Which is a testable hypothesis?
 - ☐ Nature is beautiful
 - ☐ Plants have feelings we cannot measure
 - ☐ Plants given fertiliser grow taller in four weeks
 - ☐ Some plants are luckier than others
3. A balance reads 2.001, 2.002, 2.001 g for a mass known to be 1.500 g. What is it?
 - ☐ Precise but inaccurate
 - ☐ Neither
 - ☐ Accurate but imprecise
 - ☐ Both
4. What is the role of peer review?
 - ☐ That the experiment was repeated
 - ☐ Scrutinise methods and whether claims fit the evidence
 - ☐ That the conclusion is true
 - ☐ That the raw data are correct
5. In this fictional lamp exercise, which statement is a recommendation rather than a numerical estimate?
 - ☐ Every room should be changed tomorrow
 - ☐ The new lamp uses 1.0 kWh under the given assumptions
 - ☐ The old lamp uses 6.0 kWh under the given assumptions
 - ☐ The assumed use time is 100 hours
6. Publication makes a scientific model unquestionable and immune to new evidence.
 - ☐ True
 - ☐ False

7. In a simple comparison intended to isolate fertiliser effects, changing light alongside fertiliser gives the same information as keeping light comparable.

☐ True ☐ False

8. Report the supplied length 12.4 cm with uncertainty 0.05 cm, matching the value's decimal place to the uncertainty.

9. Company funding of a study is a reason to examine its methods closely, not proof that its result is false.

☐ True ☐ False

10. Assessing a risk properly needs which of these? Choose all that apply.

- ☐ How likely the harm is
- ☐ How dramatic it sounds
- ☐ What the alternative is
- ☐ How serious it would be

Tick every correct option.

GAC Science

1. **They stand until better evidence arrives**

A theory can be the best-supported explanation available and still be open to revision.

2. **Plants given fertiliser grow taller in four weeks**

The growth statement can be tested against a defined comparison and conditions. A useful hypothesis needs measurable variables and observations that could challenge it.

3. **Precise but inaccurate**

The repeats are close but differ from the supplied reference. A systematic offset is one concern to investigate; three readings alone do not establish its cause or identical errors.

4. **Scrutinise methods and whether claims fit the evidence**

Reviewers examine methods and reasoning and may examine data. Practices vary, and the review label does not guarantee correctness or supply a new independent experiment.

5. **Every room should be changed tomorrow**

The recommendation goes beyond a numerical estimate. Suitability, cost, values and approval must also be considered.

6. **False**

Publication does not remove the need to test predictions, examine methods and reconsider scope. Explain the strength of the evidence rather than calling publication absolute proof.

7. **False**

The paired change cannot isolate fertiliser in that simple comparison. A different, deliberately structured design could investigate multiple factors; do not treat all multi-factor research as impossible.

8. **12.40 ± 0.05 cm**

Report 12.40 ± 0.05 cm: value, supplied uncertainty and unit. The task gives the uncertainty and no confidence level.

9. **True**

True. Disclose the interest and check methods, reporting and possible incentives; funding alone establishes neither falsity nor superiority.

10. **How likely the harm is; What the alternative is; How serious it would be**

Likelihood, seriousness and relevant alternatives help assess a decision. Clarify what safe means under the actual use conditions; a broad label is not automatically unanswerable.