

1.1 Explain how evidence changes scientific models

Name: _____ Class: _____ Date: _____ **Total: 24 marks**

KEY WORDS model 模型 • evidence 证据 • provisional 暂定的

Objective

Explain how evidence changes scientific models. This is original GAC013-aligned practice, not an official assessment. All supplied case data and review records are fictional; explicitly cited historical context is factual. The case data are invented for learning; they are not findings about a real school, country or population. Use the supplied evidence and do not invent missing observations.

1 Key knowledge and worked examples

■ **Key knowledge: a model makes an explanation open to observation and revision**

A scientific **model** 模型 represents selected features of a system and helps explain observations or make predictions. **Evidence** 证据 can support, challenge or limit it. Scientific explanations are **provisional** 暂定的: they remain open to justified revision, without implying that every well-tested result is equally doubtful. Physics studies matter and energy; chemistry studies substances and their changes; biology studies living systems. Their questions can overlap.

■ **Source A: text or task brief**

Historical context, paraphrased from Nobel sources checked 2 October 2026: J. J. Thomson identified the electron in 1897. In 1911, Rutherford published an atomic-structure analysis using scattering measurements, including work by Geiger and Marsden. Chadwick established evidence for the neutron in 1932. These are selected developments, not a complete history of science. Sources: Nobel atomic-history timeline, electron discovery, and Chadwick facts.

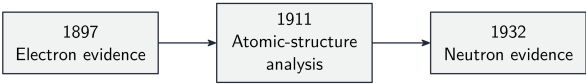
Three fictional student investigations ask: how does a ball’s measured speed change on a ramp; how does a substance change when it reacts with another; and how does a plant’s measured growth vary under permitted light conditions? Each requires a question-specific method and appropriate safety review.

■ **Source B: response or review record**

Draft revision note: “Chadwick discovered the electron in 1911. Each scientist’s award date must be the discovery date. A scientific model becomes an unquestionable fact once published. Chemistry and biology cannot use ideas from physics, so a plant’s growth question is answered only by naming its field.”

The teacher asks for corrected chronology, a distinction between a model and an observation, and an explanation of why naming a field does not supply an investigation result.

■ **Worked example: use a source for the date it actually establishes**



Known: the supplied timeline distinguishes 1897, 1911 and 1932 developments. Why check the event attached to each year? A publication or prize date is not automatically a discovery date. The history shows explanations changing with evidence and contributions from several researchers. It does not show that every later claim is correct merely because it is newer.

2 Practice

2.1 Match Thomson and Chadwick to their supplied discoveries and years. [2]

2.2 Identify the main field of the ball-speed question and the plant-growth question. [2]

2.3 Explain THREE corrections needed in the first two sentences of the draft note. [3]

2.4 Distinguish a model from an observation and explain why publication does not make the model unquestionable. [3]

3 Exam-style questions

3.1 Evaluate the draft’s claims about scientific fields and progress using six distinct points. [6]

3.2 Write an 80–110-word note correcting the draft and explaining a lesson from this history. [8]
