

Marking Guide and Model Answers — Egg-Drop Design Challenge (A2-CHEM)

Teacher marking pack for the Chemical sciences summative 'Egg-Drop Design Challenge'. Contains a full model answer / exemplar response for every part, a comprehensive annotated marking guide for the four rubric criteria (High/Sound/Limited evidence + common issues), a worked on-balance judgement, and notes on marking adjusted (ABLEWA) responses. For teacher and moderation use only.

This pack supports fair, consistent marking of the **Egg-Drop Design Challenge**. It contains a model exemplar, an annotated marking guide for each rubric criterion, a worked on-balance judgement, and notes for marking adjusted responses. It is for teacher and moderation use — not shown to students beforehand.

Golden rule of marking this task: judge the *quality of the property-to-use reasoning and the reflection* — **not** whether the egg survived. A cracked egg with excellent reasoning can still be a High.

Model exemplar response (a "High" answer)

Part A — materials chosen (model):

Material	Property	Why it helps
Bubble wrap	Soft / cushioning	Squashes on impact and soaks up the landing force so the shell doesn't crack.
Cotton wool	Soft / springy	Wraps around the egg to hold it still and cushion it from all sides.
Cardboard box	Strong / stiff	Holds the shape and stops the padding squashing flat too soon.
Tape	Strong / sticky	Holds the whole design together so it doesn't fall apart on impact.

Part B — design (model). A labelled drawing: egg in the centre, wrapped in cotton wool, surrounded by bubble wrap, inside a cardboard box, taped shut. Each layer labelled with its material.

Part C — safety (model). "Risk: dropping the box could hit someone below. Manage it: check the drop zone is clear and only drop when the teacher says."

Part D — test & reflect (model). "My egg survived. The bubble wrap worked best because it is soft and squashed on landing, which cushioned the egg. Next time I would add more padding on the bottom, because that is the side that hit first — this would cushion the landing even more."

Comprehensive marking guide — applying the four criteria

1. CHOOSING MATERIALS BY THEIR PROPERTIES (35 — HIGHEST WEIGHT)

Band	What you should see
High (5–6)	Each material clearly justified by a relevant property (cushioning, strength, flexibility).
Sound (3–4)	Suitable materials chosen; most linked to a property.
Limited (1–2)	Materials chosen with little or no link to their properties.

Look for / common issues: the giveaway of a Limited response is a list of materials with no "because". This criterion carries the most weight because "properties influence use" is the mandated understanding — protect it in your marking.

2. DESIGN, LABELLING AND SAFETY (30)

Band	What you should see
High (5–6)	Clear, labelled design showing each material and where it goes, plus a named risk with a way to manage it.
Sound (3–4)	Labelled design and a named risk.
Limited (1–2)	Basic diagram with few labels.

3. TESTING, EVALUATING AND IMPROVING (20)

Band	What you should see
High (5–6)	Tests the design, evaluates which property worked, and proposes a sensible, property-based improvement.
Sound (3–4)	Tests, evaluates and suggests an improvement.
Limited (1–2)	Describes the result with little evaluation.

Look for: High reflections connect the *result* back to a *property* ("the bubble wrap worked because it is soft") — not just "it worked".

4. COMMUNICATION AND SCIENTIFIC VOCABULARY (15)

Band	What you should see
High (3)	Clear ideas using correct terms (material, property, strength, flexible, absorbent, force) throughout.
Sound (2)	Clear with some scientific vocabulary.
Limited (1)	Unclear or little scientific vocabulary.

Worked on-balance judgement

A student justifies three of four materials well by their properties (Properties 5/6), draws a clear labelled design with a good safety note (Design 6/6), but their egg cracked and their reflection says only "I would use more bubble wrap" without linking to a property (Testing 3/6), with generally good vocabulary (Communication 2/3). Total $\approx 16/21 \rightarrow$ **High-to-Sound border, judged High:** the strong property reasoning and design outweigh a thin reflection, and the crack is irrelevant to the mark.

Marking adjusted (ABLEWA) responses

Where a student used the additional-support approach (choosing real materials, a photo of the build, scribed or symbol-choice answers), mark the science evidence. Choosing the cushioning materials and indicating "soft" is valid evidence for the Properties criterion at an emerging level; a yes/no reflection plus a "more / less padding" choice is valid for Testing. Record adjustments beside the result; see the lesson's additional-support approach for Stage A–D descriptors.

Co-mark 3–4 scripts across the range first and agree annotations, so the bands mean the same for everyone — and re-anchor the "don't mark the crack" rule before you start.