FREE MINI MISSION · 1 DAY · SINGLE SESSION

The Overheat

The longest run time isn’t worth it if the battery can’t stay safe.

GRADE 8 · SCIENCE (ENGINEERING DESIGN & DATA) · ~45 MINUTES · GROUP FORMAT

The robotics team needs a battery for its competition drone, and one supplier is shouting “LONGEST RUN TIME!” In this free single-session lesson, your eighth graders read the test data, weigh a hard safety limit, and decide which battery to trust — learning that the flashiest spec isn’t automatically the right engineering choice. Graded on reasoning, not a single right answer.

WHAT'S INCLUDED

- Teacher quick-start (timed, no prep).
- A marketing claim plus a short test-data table (run time and max temperature).
- An analysis sheet — apply the safety limit and defend a choice.
- Answer key.
- A reasoning rubric and a reflection prompt.

A taste of PATIENCE Learning — engaging simulations that build the critical thinking and judgment tests can’t measure.

THE MISSION

Pick the Drone Battery

THE SITUATION

BrightCell's ad says "LONGEST RUN TIME — 3 hours!" The team tested two batteries. But there's a safety rule: the battery must stay at or below 45°C under load, or it can't be used.

The loudest number on the box isn't the whole story.

The safety rule
Any battery over 45°C under load is DISQUALIFIED — no matter how long it runs.

Battery	Run time	Max temp under load
X (BrightCell)	3.0 hours	50°C (over the limit!)
Y (TrueCharge)	2.7 hours	40°C

Step 1. Which battery breaks the 45°C safety rule? **Step 2.** Battery X runs a little longer — does that make it the better choice? Why or why not? **Step 3.** Which battery should the team use, and what's your evidence? _____

TEACHER ANSWER KEY

Battery X hits 50°C — over the 45°C limit — so it is disqualified for safety.

No. X's 0.3-hour-longer run time doesn't matter, because a battery that overheats can't be used safely at all — the safety constraint comes first.

The team should use Battery Y: it stays safely at 40°C and still runs 2.7 hours. The lesson: the flashy "longest run time" loses to the design that meets the safety limit.

REASONING RUBRIC

	3 — Strong	2 — Developing	1 — Beginning
Applies the safety limit	Disqualifies the over-limit battery	Notes the temperature	Ignores safety
Uses evidence	Cites the data to defend the pick	Some evidence	Opinion only
Resists the flashy spec	Explains why “longest” isn’t best	Partial	Picks the loud number

REFLECTION

“Why did the battery with the longest run time turn out to be the wrong choice? What does that teach you about trusting the biggest number in an ad?”

STANDARDS (Grade 8)

NGSS MS-ETS1-2 (evaluate competing solutions against criteria and constraints) and MS-ETS1-3 (analyze test data to compare solutions), with a physical-science energy/thermal connection (MS-PS3).

WANT THE FULL MISSION?

The full 3-day Overheat mission adds a third battery, charge-time data, a real criteria-and-constraints analysis, and a misleading “20% longer” sales claim to catch — plus the full PATIENCE catalog — at patiencelearning.com. Follow our store for new mini missions across grades and subjects.