

30-minute Blend Lesson Plan – Electricity (Grade 6, CA)

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Lesson Overview

- Grade: 6 | Subject: Science | Duration: 30 minutes | Approach: Blend (peer workshops + multimedia + targeted mini-lessons)
- Mastery threads: phenomena observation, evidence and reasoning, models and systems, cause and effect
- Alignment: Aligned to CA NGSS middle-school expectations related to energy and electrical circuits (modeling circuits, explaining energy transfer and cause-effect in circuit behavior)
- Materials: low-cost, minimal items and virtual options

Learning Objectives (measurable)

Students will be able to:

1. Observe a surprising electrical phenomenon and generate testable hypotheses (phenomena observation).
2. Build a simple circuit model and use evidence to explain why a circuit does or does not light a bulb (models and systems; evidence & reasoning).
3. Describe cause-and-effect relationships in circuits (e.g., open vs closed, series effects) and communicate findings via a short group multimedia report (cause and effect; communication).

Materials (low)

- Per group (3 students recommended): 1 AA battery, 1 small flashlight bulb or LED, 2 short insulated wires with stripped ends (or alligator clips), 1 paper clip or metal connector, tape
- Optional: 1 phone/tablet per group (for 30–60s audio/video “journalist” clip) or use teacher device
- Virtual alternative: free circuit simulator link (teacher projects): e.g., PhET Circuit Construction Kit

Roles and Rotation (3 students per group; rotate roles each round)

- Engineer: assembles/disassembles the circuit, ensures safety, tests configurations.
 - Success behavior: completes a working circuit attempt and records configuration.
- Data Analyst: measures/records observations (bulb on/off, brightness), times, and notes variables changed.

- Success behavior: logs at least 3 trial records per iteration.
- Journalist: captures a 30–60s audio or written summary of claim–evidence–reasoning (CER) and asks a clarifying question to another group.
- Success behavior: produces a concise CER and records one peer question/response.

Rotation routine: 6-minute cycles for experimentation so each student will hold each role across the class if time allows (see timeline).

Lesson Timeline (30 minutes)

1. Launch – Discrepant Event and Hypothesis Gathering (5 minutes)

- Teacher action: Present a short discrepant demonstration (phenomenon).
 - Example discrepant event: Teacher shows two identical bulbs and a single battery. Teacher connects both bulbs in series with the battery and the bulbs are dim (or one doesn't light), then swaps to a different wiring where one bulb lights brightly despite same parts. Video alternative: 30-second clip showing series vs parallel brightness difference.
- Student action (30–60 seconds): Individually write 1–2 quick hypotheses to explain the surprising result (Why did one bulb light brighter or not light?).
- Group action (2 minutes): Share hypotheses in groups; journalist collects 3 different hypotheses and posts them for group review.
- Outcome: A short list of testable hypotheses per group.

2. Targeted Mini-lessons + Evidence Plan (7 minutes)

- Teacher delivers two very brief mini-lessons (1.5–2 min each) targeted to gaps seen in hypotheses:
 - Mini-lesson A (conductors vs insulators): Quick demo or slide showing that metal allows current, plastic does not.
 - Mini-lesson B (closed vs open circuit & series vs parallel basics): Quick drawing/model showing path(s) of current and how opening a gap stops flow.
- Group action (2 minutes): Using mini-lesson language, each group chooses 1 hypothesis to test and designs a simple experiment plan (what to change, what to measure). Data Analyst records the plan.
- Teacher supports groups with probing questions and ensures plans are feasible with low materials.

3. Iterative Experimentation with Role Rotation (12 minutes)

- Structure: Two 6-minute rounds so students rotate roles once (engineer ↔ data analyst ↔ journalist).
- Round tasks:
 - Engineer builds a circuit according to group's plan (test open vs closed, series vs parallel variation).
 - Data Analyst records at least 3 data points: configuration, bulb state (on/off/dim), and one observation (temperature, spark absent, etc.).
 - Journalist records a 30–60s audio/video or 2–3 sentence CER entry: claim (does the bulb light?), evidence (what was observed), reasoning (link to mini-lesson concept).
- Peer feedback: After each round, groups exchange journalist entries with another group and provide one written piece of feedback (what is strong evidence; one question to strengthen the claim).
- Teacher circulates, prompting evidence-focused explanations (What evidence supports or contradicts your hypothesis? What change caused the result?).

4. Share Evidence-Driven Explanations & Pulse Check (4 minutes)

- Two groups share a 30–60s journalist clip (multimedia) and the class votes for the clearest evidence-based explanation using thumbs-up/thumbs-down.
- Teacher highlights model elements connecting to cause-and-effect and systems (current path, open gaps, number of bulbs).
- Pulse Check #2 occurs here (details below).

5. Exit Quiz-style Checkpoints and Metacognitive Prompt (2 minutes)

- Individual short written quiz (see 10 checkpoints below; teacher selects 3 quick items) completed in 90 seconds.
- Metacognition prompt to write one sentence: How does today's experiment explain something about electricity you might see at home (appliance not working, holiday lights, etc.) and name which role you found most helpful.

Pulse Checks (with explicit success criteria)

- Pulse Check 1 (after hypotheses & mini-lessons, minute ~7)
 - Prompt: Each student states one hypothesis and identifies one piece of evidence that would support it.
 - Success criteria: At least 2/3 group members verbally present a hypothesis and a matching evidence type (e.g., "If closing the gap makes the bulb brighter, evidence would be: bulb lights when gap closed").
- Pulse Check 2 (after group multimedia share, minute ~24)

- Prompt: Groups choose the strongest claim from their experiment and list the two most compelling data points that support it.
- Success criteria: Group presents 1 clear claim and cites 2 distinct observations or measurements that directly support the claim.
- Optional Pulse Check 3 (if time permits during rotation)
 - Prompt: Data Analyst reads aloud a data row and explains why that row strengthens or weakens the hypothesis.
 - Success criteria: Student connects a recorded observation to hypothesis with correct causal language (e.g., “opening the circuit broke the path so the bulb went off; that weakens the hypothesis that battery was dead”).

10 Quiz-style Checkpoints (teacher selects 3 for exit quiz). Each item includes clear success criteria.

1. Multiple choice: A bulb is off in a circuit. Which change would most likely make it light?
 - Options: A) Move wire to close gap; B) Replace bulb with tape; C) Remove battery; D) Put bulb in pocket
 - Success criteria: Correct choice A and brief justification: “closing gap completes circuit so current can flow.”
2. Short answer: Define “closed circuit” in one sentence.
 - Success criteria: Mention of a complete path for electric current allowing device to work.
3. Multiple choice: Which material is a good conductor?
 - Options: plastic, wood, copper, rubber
 - Success criteria: Correct choice copper and note: “allows current flow.”
4. Short answer: What is one observable difference between series and parallel circuits with two bulbs?
 - Success criteria: Mentions brightness change or that one open bulb in series turns both off; in parallel one bulb can go out while others remain lit.
5. True/False: Adding more batteries in the same orientation can increase current through a bulb.
 - Success criteria: True and one-line support: “more voltage pushes more current if circuit

resistance unchanged.”

6. Short answer: Write a one-sentence claim about what caused the bulb to go out in your experiment and cite one piece of evidence.
 - Success criteria: Claim connects cause (open gap/wrong connection) to observed evidence (bulb off).

7. Multiple choice: Which best describes the battery in a simple circuit?
 - Options: energy source, switch, light bulb, conductor
 - Success criteria: Correct choice “energy source” and brief reason.

8. Short answer: How would you test whether a wire is connected properly? Name one measurement/observation.
 - Success criteria: Student describes testing by completing a circuit and observing bulb light or measuring continuity with a multimeter.

9. Multiple choice: If two bulbs are dim when connected, one possible cause is:
 - Options: too many bulbs in series for battery strength, bulb is too bright, wires are too short, battery type is paper
 - Success criteria: Correct choice “too many bulbs in series for battery strength” with short justification.

10. Short answer: Explain cause-and-effect: “Why does opening a circuit stop the light?”
 - Success criteria: Student states opening breaks the path for current, so charges cannot flow and bulb receives no energy.

Assessment and Feedback

- Formative assessment through pulse checks, data logs, and journalist multimedia CERs.
- Rubric (brief):
 - Claim: Clear, specific (0–2 pts)
 - Evidence: At least two relevant observations/measurements (0–2 pts)
 - Reasoning: Connects evidence to claim using circuit concepts (0–2 pts)
 - Collaboration & role fulfillment: Completed role tasks, peer feedback given (0–2 pts)
 - Multimedia clarity: 30–60s CER is understandable and includes one question for peers (0–2

pts)

Metacognition Prompts (use during exit or journaling)

- How did today's experiment explain something observable at home (e.g., why a holiday light goes out when one bulb fails)?
- Which role (engineer, data analyst, journalist) helped you understand cause-and-effect best and why?
- How would you explain to a friend why replacing wires or making a closed path matters for a functioning light?

Differentiation & Extensions

- Differentiation:
 - Struggling learners: Use virtual simulator with teacher-guided steps; provide sentence stems for CER (Claim: "The bulb...", Evidence: "We saw...", Reasoning: "Because...").
 - Advanced learners: Challenge to compare series vs parallel using two bulbs and predict changes when adding batteries; ask for quantitative reasoning about relative brightness qualitatively.
- Extension: Assign groups to produce a 60–90s "mini-podcast" describing how a household appliance demonstrates similar circuit principles (homework).

Safety and Classroom Management Notes

- Emphasize safe handling of batteries and bulbs (no shorting batteries intentionally for long periods).
- Keep group sizes to 3 to ensure role clarity and low material use.
- If phones are used, limit recording time and secure device storage.

End of lesson plan.