

INVESTIGATE BATTERY BREAKDOWN

Teacher Guide • Thought-Provoking Case Discussion

Middle School

Each case number and location is a hyperlink to a more detailed report

Goal

The goal is not simply for students to identify what happened. Guide them to think like investigators: What happened? What evidence supports that conclusion? What could have prevented or reduced the risk? What warning signs or safety practices matter?

Suggested Discussion Flow

1. Read one case aloud
2. Ask students to identify the facts they know—not guesses or assumptions.
3. Ask one or two “why” or “what could have” questions.
4. Have students identify a prevention or preparedness action.
5. Have students work with a partner or alone and pick one of the two next cases.
6. Finish with the cross-case questions to identify patterns.
7. Connect the cases to their life and changes they can make.

Case 1: Topsfield, Massachusetts

The case describes a cell phone left charging overnight in a bedroom. The phone exploded and sparked a fire that damaged the second floor. Fire crews contained the fire, and no injuries were reported. Officials emphasized charging devices on hard, flat surfaces and avoiding overnight charging.

Thought-provoking questions

- What started the fire?
- What do we know happened before the fire started?
- Why might charging a device overnight make it harder to recognize a problem early?
- What could have prevented the fire—or reduced the chance of it becoming serious?
- Why might the surface where a device is charging matter?
- What warning signs might a person notice if something is wrong with a charging device?
- If you were investigating this incident, what additional information would you want to know?
- What safety decision could have changed the outcome?

Case 2: Brixton, London

The case describes a nighttime house fire caused by the explosion of a converted e-bike's lithium-ion batteries. A woman and three children evacuated; the children experienced smoke inhalation and the woman was hospitalized. The second floor was severely damaged and the third-floor sustained heat and smoke damage. The case highlights risks associated with DIY battery conversions and improper charging practices.

Thought-provoking questions

- What started the fire?
- What choices or conditions may have contributed to the incident?
- What makes this case different from the cell-phone case?
- How could a DIY battery conversion change the level of risk?
- What could have prevented this incident?
- Why is nighttime especially important when thinking about a fire in a home?
- How did smoke affect the people in the home?
- What safety systems or actions helped the family escape?
- If you could change one thing before the fire occurred, what would you change and why?

Case 3: Ellendale, Delaware

The case describes a lithium-ion battery in a charging iPad that ignited a fire in an unoccupied two-story home. A neighbor heard a smoke alarm and saw smoke. Firefighters extinguished the fire. The Fire Marshal's Office emphasized the importance of working smoke alarms.

Thought-provoking questions

- What started the fire?
- Why is this case different because no one was home?
- What alerted people that there was a fire?
- What could have happened if the home did not have a working smoke alarm?
- How did the neighbor's actions affect the outcome?
- What role does early detection play in fire safety?
- What could a family do before leaving the house to reduce risk?
- What additional information would you want before deciding exactly why the battery ignited?

Compare the Three Cases

After students discuss all three cases, ask them to look for connections rather than treating each incident separately.

- What patterns do students notice across the three cases?
- What was similar about the three incidents?
- What was different about the three incidents?
- What was happening with the battery or device before the fire in each case?
- What role did charging play across the cases?
- Which cases involved people being home? Which involved an unoccupied home?
- What safety practices were mentioned in the cases?
- Which actions could have prevented a fire? Which actions helped limit the consequences after a fire started?
- What role did smoke alarms, firefighters, or evacuation play?
- What information is missing from these summaries that would help us better understand what happened?
- Can we say with certainty that one action would have prevented every incident? Why or why not?
- What is one battery-safety message you would give to a friend after reading all three cases?

Go Deeper: Cause, Contributing Factors, and Prevention

Help students understand that an incident can have a starting event and also have other conditions that influence the outcome. Avoid telling students that every factor is proven to be the cause unless the case summary states it.

- What is the difference between what started the fire and what made the situation more dangerous?
- Which facts in the case are confirmed, and which ideas are students inferring?
- What could have reduced the chance of the fire starting?
- What could have reduced the damage after the fire started?
- What safety actions happen before an emergency? What actions happen during an emergency?
- Which prevention strategies depend on technology, and which depend on human decisions?

Exit Ticket

Choose one: What is the most important battery-safety lesson you learned today, and what evidence from a case or the experiment supports your answer?

OR: What is one question you still have about lithium-ion batteries and fire safety?