

Battery Storage Lab

Classroom worksheet · Interactive simulation: <https://lkforge.com/tools/physics/battery/>

Name: _____ Date: _____

Learning objectives

- Describe how a battery stores and releases energy.
- Relate capacity, charge, and discharge.
- Define round-trip efficiency.

Variables to change

- Charge/discharge rate (C-rate)
- Capacity
- State of charge

Procedure

1. Charge the battery and watch the state of charge rise.
2. Discharge it under load and watch it fall.
3. Compare energy put in during charging with energy delivered on discharge.

Observations

Record energy in vs energy out, and how discharge rate affects delivered energy.

Questions

1. What form of energy does a battery store?
2. What is battery capacity?
3. What is round-trip efficiency?

4. Why does energy out fall short of energy in?
5. What does a high C-rate mean?

Answer key (instructors)

- **1.** Chemical energy, converted to and from electrical energy.
- **2.** The charge it can deliver, usually in amp-hours (Ah) or energy in watt-hours (Wh).
- **3.** The fraction of energy recovered on discharge compared with energy used to charge (typically ~85–95% for lithium-ion).
- **4.** Internal resistance and chemical inefficiencies dissipate some energy as heat.
- **5.** Fast charging or discharging relative to capacity, which usually lowers efficiency and can heat the cell.

A battery stores chemical energy and converts it to electricity on demand. Its capacity (Ah/Wh) sets how much it holds; round-trip efficiency (~85–95% for Li-ion) reflects losses to internal resistance, which grow at high charge/discharge rates.