

Small-Group Version - Build a Battery Card Game Instructions

Game Objective: Win application cards by creating batteries.

How to Create a Battery: Combine cathode, electrolyte and anode cards to form a battery. An additional Bonus card can be added to the battery to improve it.

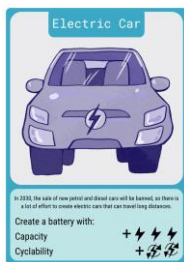
Number of players: 2-4 people. Each player receives 6 initial cards at the start of the game.

How to set up the game:

Place **6** application cards down, 3 face up and 3 face down. The application cards have a blue background such as this one.

Keep the application cards separate to the rest of the deck.

There are **8** application cards in total (1 Electric Car, 1 Tablet, 1 Phone, 1 Green Battery, 1 Sodium Battery, 1 Children's Toy, 1 Cobalt Free Battery, 1 Affordable Battery)



When an application card is won, the player takes it for themselves and a new application card is added to the 6.

When someone wins an application card, they turn one of the 'face down' cards over so that it is face up, putting that application card in play.

When all the application cards have been won, then the players total are added up.

The winner is the player with the most application cards.

At the start of the game there are 3 piles:

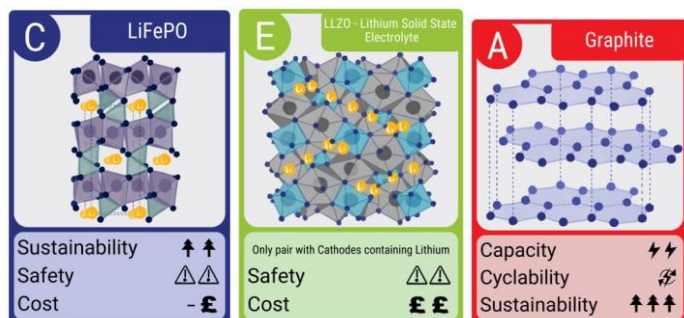
- The pile of **application cards** which are not to be dealt out, but to replace won application cards throughout the game.
- The **spare deck**, the remaining cards that were not dealt.
- There will be a **used card** pile, when a battery trio has been used to win an application card, the battery cards are placed in the discard pile.

What's in the deck?

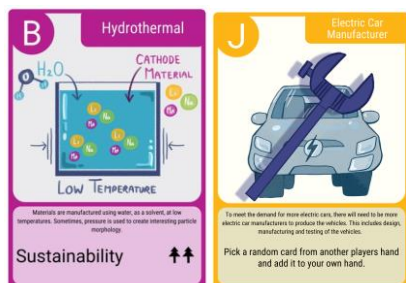
These are the cards in the pack that are to be dealt out among the players in a random way.

- 12 Cathodes (1 $\text{LiNi}_x\text{Mn}_y\text{Co}_{1-x-y}\text{O}$, 1 NaNmO_2 , 2 of NaFePO_4 , 2 of $\text{Li}_2\text{NiMnO}_3$, 2 of LiFePO_4 , 2 of LiMn_2O_4 , 2 of LiCoO_2)
- 10 Anodes (2 Silicon, 2 Graphene, 3 Graphite, 1 Hard Carbon, 1 LiTiO , 1 Soft Carbon)
- 12 Electrolyte (2 Lithium Solid Electrolyte, 2 Lithium Polymer Electrolyte, Lithium Organic Electrolyte, Sodium Organic Electrolyte, 2 Sodium Polymer Electrolyte, 2 NASICON Sodium Solid Electrolyte)
- 8 Bonus Cards (2 Solid State synthesis, 2 Sol-gel method, 2 Hydrothermal, 2 Bio-templating)
- 10 Job Cards (2 Battery Researcher, 2 Crystallographer, 2 Battery Trend Analysis, Electric Car Manufacturer, 2 Investor)

A battery is made up of an **anode**, a **cathode**, and an **electrolyte**. These three cards must be compatible with each other. Guidance is given on the cards if they need to be paired with another specific card.



Other cards to help you win the game!



Bonus Cards: Up to one bonus card can be played with each battery to improve it's characteristics.

Job Cards : Once per turn, the player has the opportunity to play a job card. Each card has a set of instructions that the player needs to follow.



What happens in a turn?

- Each player is given an opportunity to study their cards and compare their hand to the face up application cards.
- Each player then has the chance to present a battery or part of a battery (place face up in the middle).
- One at a time, players are then able to play any relevant job cards:
For example, if you hold the 'battery researcher' card you could steal one card from someone else's battery to improve or complete your battery.
- Once everyone has played their cards, going round in a circle, players will then compete for application cards. Going through the application cards, the player with the best battery for that card and matching the characteristics (such as sustainability/cost/capacity) will win it.
You can only win 1 application card per turn.
- If an application card is won then the winning battery cards are placed in the **used card pile** and the player takes the relevant application card for themselves.
- Once an application card has been won, one of the 3 face down application card is turned face up by the winner of an application card. If there are still spare application cards, a new card can also be added face down.
- At the end of the turn, the players whose batteries have been discarded can select 3 new cards form the **spare deck pile**
- If the draw pile is depleted, the cards from the discard pile can become the new draw pile.

Next turn

- These steps are then repeated for the next turn.
- If the player was looking to match a specific application card in the previous round, they can change to match cards to any new application cards that have now been revealed.
- The turns continue until all the application cards have been won.

Winning the Game:

- Once all the application cards have been won, the player with the most application cards is the winner.
- If there is a draw and 2 players have the same number of application cards. A 'quick draw' can be undertaken where another player (who is not in the draw) puts a new application card out and the player with the best match to that new application card will win.