

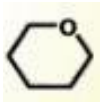
E! Canasta




Set Up

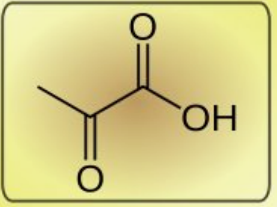
81 cards

- 4 suits (Glycolysis, Krebs, Acetyl-CoA, ETC)
- Special effect cards
- Joker






 PYR

Pyruvate

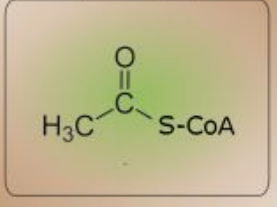


Pyruvate


 PYR


 ACOA 

Acetyl Coenzyme A

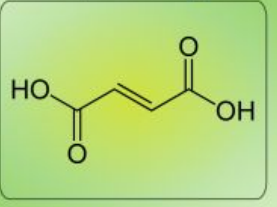


Acetyl Coenzyme A


ACOA 


 FUM

Fumarate

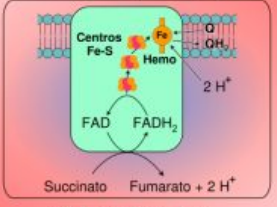


Fumarate


FUM 



 CII

Succinate dehydrogenase

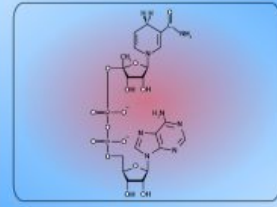


Succinate dehydrogenase


CII 

 NADH 

Nicotinamide adenosine dinucleotide



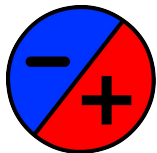
Nicotinamide adenosine dinucleotide

NADH 

E!nergizing



E!nergizing



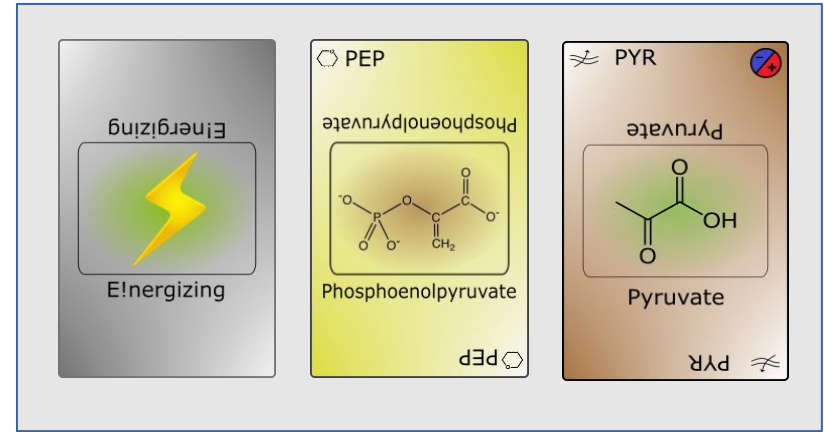
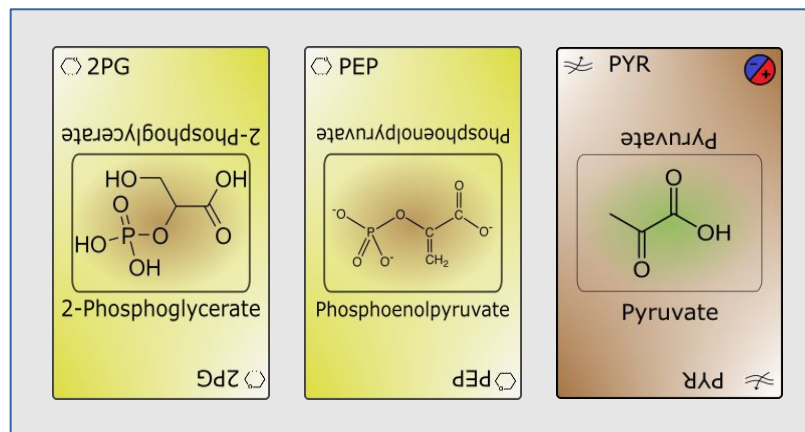
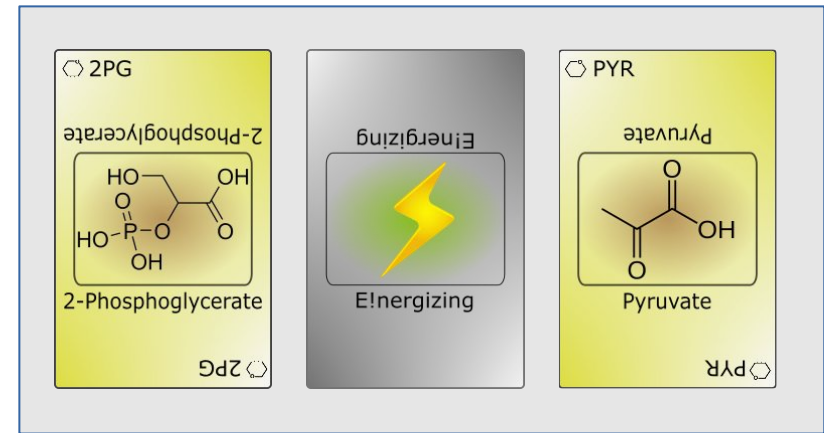
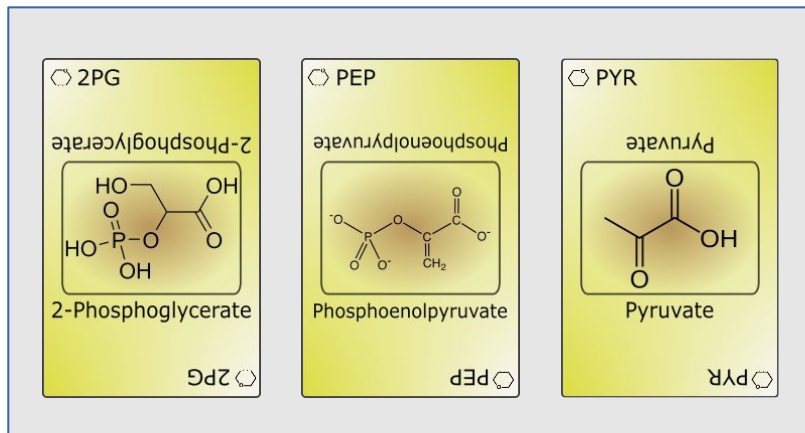
Indicator of positive or negative effect of a card upon another (look up chart)

Playing

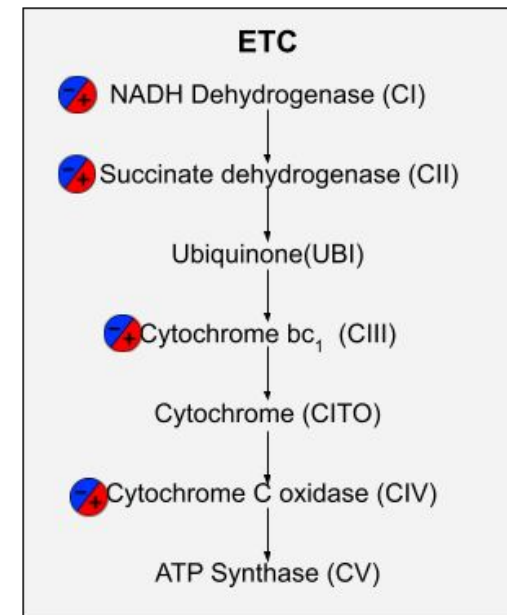
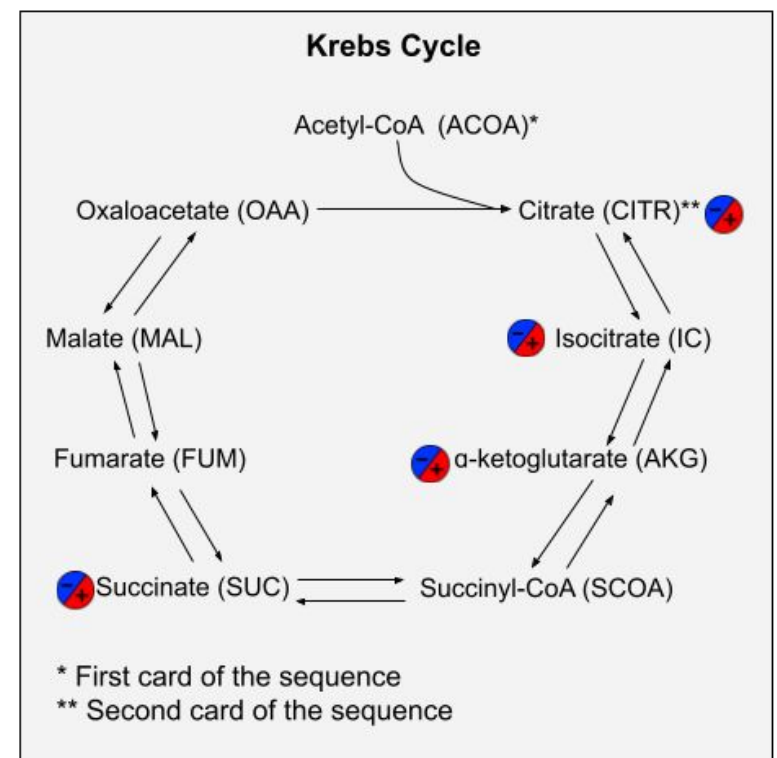
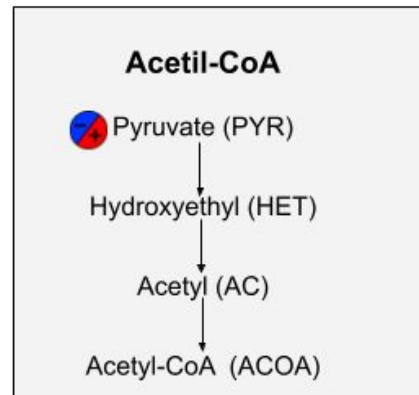
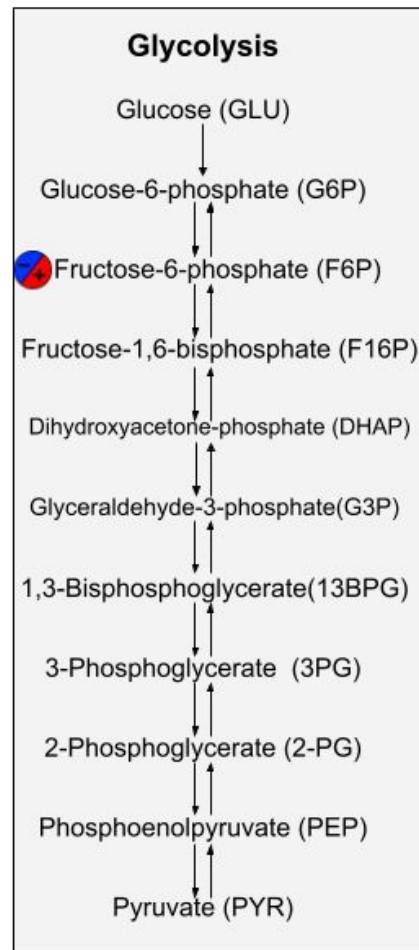
- 1** – Set teams and organize yourselves between 4 to 6 players, with each duo sitting on opposing sides;
- 2** – Shuffle cards;
- 3** – Allow the player to the right to cut the deck (No more than 2 times);
- 4** – Distribute 10 cards for each player in a clockwise fashion;
- 5** – Wait for a few minutes until all players get their own cards arranged;
- 6** – Start the game from whoever first received the cards and carry on clockwise;

Playing

7 - A player may meld organized sequences of, at least, 3 cards (cards of special effect do not apply to meld the first set). **The canasta may be natural (with a single suit), mixed or dirty (with a card from another suit that may be used as part of the set or using a joker, respectively).**




Canasta Sequences



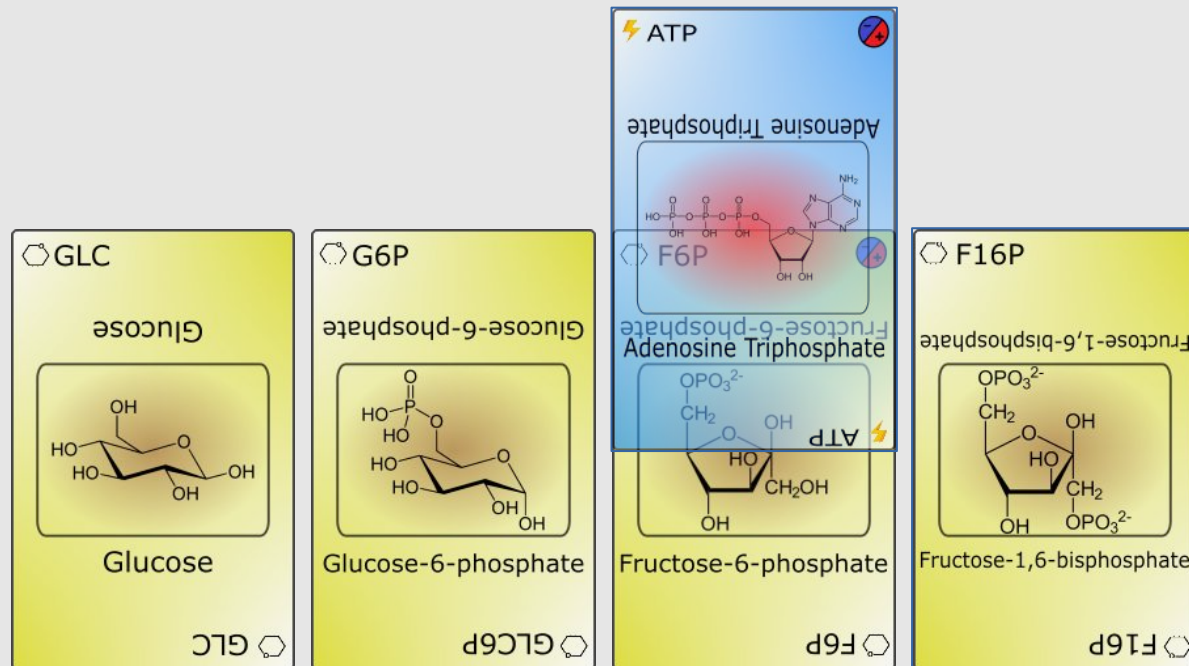
 Point of regulation/inhibition: look up chart of interactions for which cards may be used and the effects (+ or -).

Playing

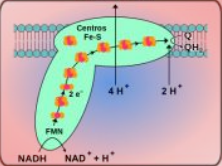
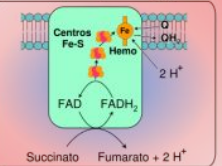
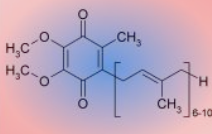
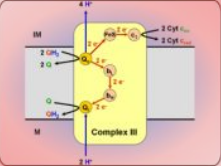
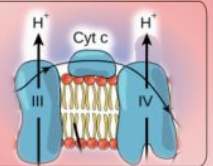
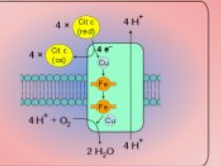
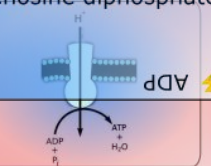
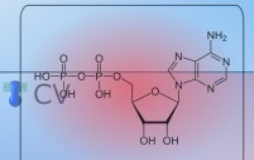
8 – A player may use cards of special effect or any other that has an effect over their own sequences. Such cards  may only start getting used if at least one of the duo has put down a meld of no less than three cards;

9 – If a player uses a special effect card incorrectly, the card is discarded and the player loses 50 points;

In this example, upon playing the ATP card over the opposing duo's F6P, a negative effect occurred over the canasta and the player who owns the meld must write down his score loss: **- 50 (ATP)**



Example of Scoring + a special effect card

 <p>NADH dehydrogenase</p> <p>CI</p>	 <p>Succinate dehydrogenase</p> <p>CII</p>	 <p>Ubiquinone</p> <p>UBI</p>	 <p>Cytochrome bc</p> <p>CIHI</p>	 <p>Cytochrome</p> <p>CITO</p>	 <p>Cytochrome C oxidase</p> <p>CIV</p>	 <p>ATP Synthase</p> <p>CV</p>
						 <p>Adenosine diphosphate</p> <p>ADP</p>

Example of zeroed canasta with a special effect card

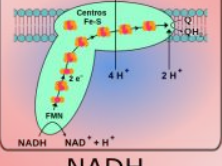
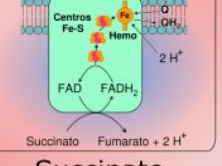
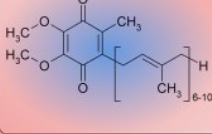
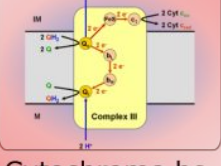
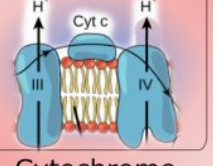
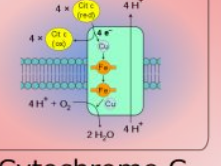
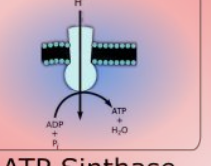
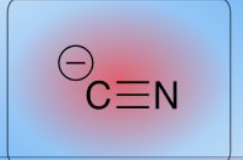
 <p>NADH dehydrogenase</p> <p>CI</p>	 <p>Succinate dehydrogenase</p> <p>CII</p>	 <p>Ubiquinone</p> <p>UBI</p>	 <p>Cytochrome bc</p> <p>CIHI</p>	 <p>Cytochrome</p> <p>CITO</p>	 <p>Cytochrome C oxidase</p> <p>CIV</p>	 <p>ATP Synthase</p> <p>CV</p>
						 <p>Cyanide</p> <p>CN</p>

Table of interactions

Card	Biochemical Context	Effects in-game - upon the indicated card			
		Positives		Negatives	
2,4-DNP	Decoupler	--	--	Any card from the ETC	-50
Acetyl-CoA	Pyruvate dehydrogenase complex	---	---	Pyruvate (Acetyl-CoA suit)	-20
ADP	Used by enzymes that synthesize ATP, which can work as a modulator of isocitrate dehydrogenase	1-3-Bisphosphoglycerate Phosphoenolpyruvate Isocitrate ATP-synthase	+20	---	---
Antimycin A	Acts upon complex III	---	---	Complex III	zeroes
ATP	Participates in phosphorylation reactions and may work as a negative modulator.	---	---	Fructose 6-phosphate α -Ketoglutarate Complex IV	-50

⋮

see more in the rulebook

Points table

Points Earned					
Canastas			Special Effect Cards		Going Out
Natural					
Dirty					
Mixed					
Royal					
Unfinished					

Lost Points					
Time (-10 after 1 min)		Special Effect Cards			Wrong Moves (-10 per card)

Playing

10 – If a player makes a meld of an incorrect sequence, they lose 10 points per card laid out wrong, in which they must return to his hand;

11 – If a player does not have a meld to put down or does not wish to do so, they must take a card from the stock or take the first card from the discard pile e discard themselves one card, finishing their turn. (Whenever a card is taken, one must be discarded).

12 – When played in duos, both players may add to their shared sets or play special effect cards that may apply both to their own game or their opponents, although following the turns sequence;

13 – A player may join or split sets of cards however they wish. For example, they may split the canasta in two sets to separate a card of negative effect, as long as each set has at least 3 cards;

Playing

14 – If the stock is depleted, the cards from the discard pile must be reshuffled to make up a new stock;

15 – The game may end in two ways:

I – When either of the players play all of their cards, leaving none in their hands (Going Out, bonus of 100 point to whoever goes out);

II – When there are no more cards to be taken from the stock and none of the players can make any moves (in such case, no points are awarded).

16 – As the game ends, players must compute their points, paying attention to special effect cards (negative or positive), which can be checked on the sheet of card interactions, sequences and scoring.

Scoring

Canasta	Scoring
Natural Canasta (full set of the suit)	Glycolysis: 400 points; Krebs Cycle: 300; Acetyl-CoA synthesis: 100 points; ETC: 200
Royal Canasta (natural canasta + substance that precedes or succeeds the pathway):	Score of a natural canasta + 50 points per card chained.
Dirty Canasta (full pathway with a joker or card from another suit)	Glycolysis: 200 points; Krebs Cycle: 150; Acetyl-CoA synthesis: 75 points; ETC: 100
Mixed Canasta/Unfinished (only part of a pathway, with at least 3 cards, which may be part of the same suit or be a sequence between suits.	3 cards: 50 points; 4 cards 75 points; 5 cards or more 100
Going Out (the first player going out)	100 points

Scoring - Natural Canasta

<p>CI</p> <p>NADH dehydrogenase</p> <p>NADH dehydrogenase</p> <p>CI</p>	<p>CII</p> <p>Succinate dehydrogenase</p> <p>Succinate dehydrogenase</p> <p>CII</p>	<p>UBI</p> <p>Ubiquinone</p> <p>Ubiquinone</p> <p>UBI</p>	<p>CIII</p> <p>Cytochrome bc₁</p> <p>Cytochrome bc₁</p> <p>CIII</p>	<p>CITO</p> <p>Cytochrome</p> <p>Cytochrome</p> <p>CITO</p>	<p>CIV</p> <p>Cytochrome C oxidase</p> <p>Cytochrome C oxidase</p> <p>CIV</p>	<p>CV</p> <p>ATP Synthase</p> <p>ATP Synthase</p> <p>CV</p>
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<p>≠ PYR</p> <p>Pyruvate</p> <p>≠ PYR</p>	<p>≠ HET</p> <p>Hydroxyethyl</p> <p>≠ HET</p>	<p>≠ AC</p> <p>Acetyl</p> <p>≠ AC</p>	<p>≠ ACOA</p> <p>Acetyl Coenzyme A</p> <p>≠ ACOA</p>
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Glycolysis: 400 points; **Krebs Cycle:** 300; **Acetyl-CoA synthesis:** 100 points; **ETC:** 200.

Scoring - Royal Canasta

\neq PYR Pyruvate Pyruvate \neq PYR	\neq HET Hydroxyethyl Hydroxyethyl \neq HET	\neq AC Acetyl Acetyl \neq AC	\neq ACOA Acetyl Coenzyme A Acetyl Coenzyme A \neq ACOA	ACOA Acetyl Coenzyme A Acetyl Coenzyme A
--	--	--	--	--

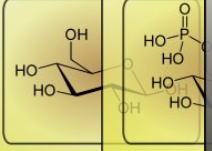
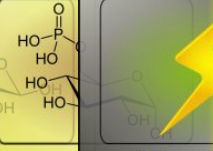
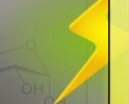
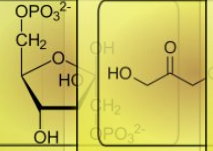
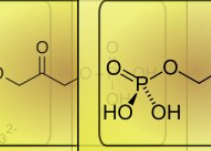
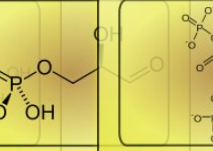
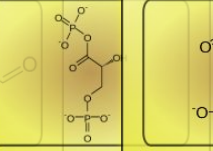
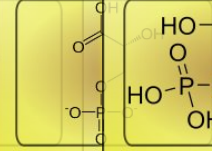
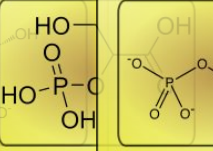
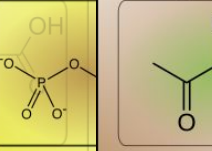
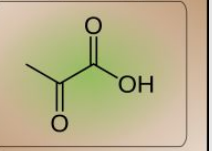
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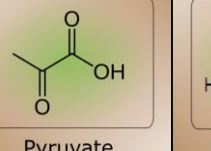
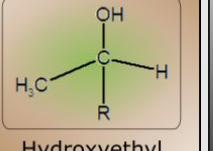

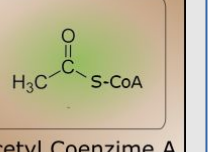
Glycolysis: 400 points; Krebs Cycle: 300; Acetyl-CoA synthesis: 100 points; ETC: 200.

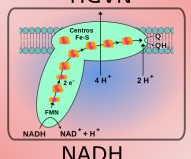
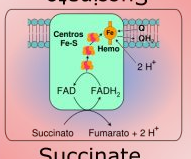
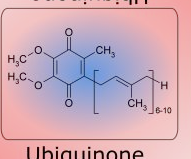
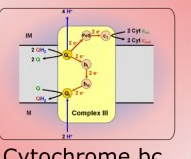

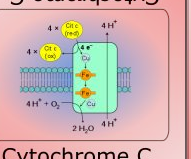
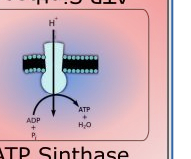
Royal Canasta:

Points from the Natural Canasta + 50 points for each chained card

Scoring - Dirty Canasta

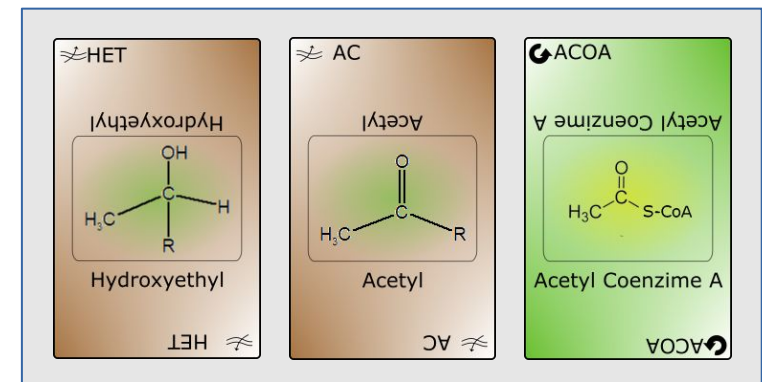
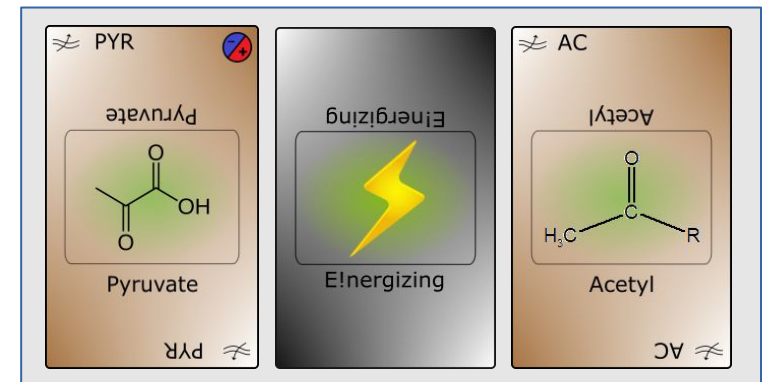
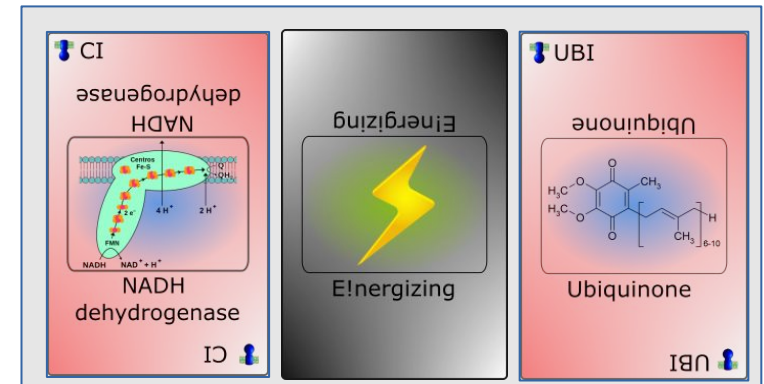
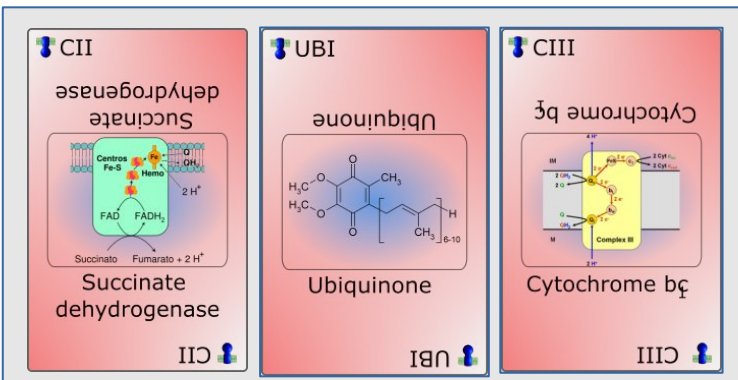
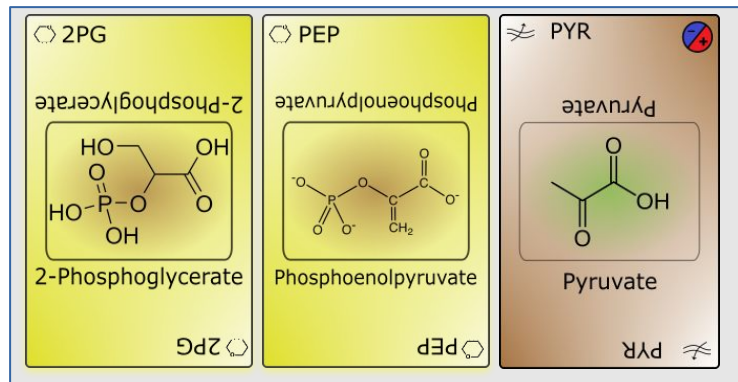
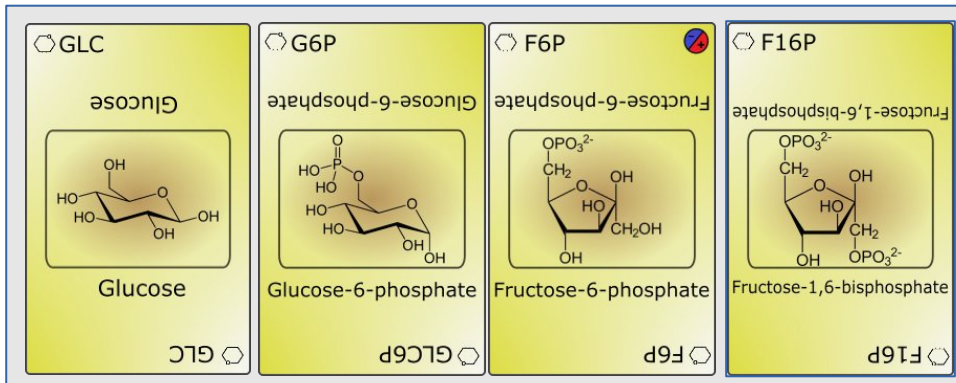
GLC Glucose 	G6P Glucose-6-phosphate 	Energizing 	F16P Fructose-1,6-bisphosphate 	DHAP Dihydroxyacetone phosphate 	G3P Glyceraldehyde-3-phosphate 	13BPG 1,3-Bisphosphoglycerate 	3PG 3-Phosphoglycerate 	2PG 2-Phosphoglycerate 	PEP Phosphoenolpyruvate 	PYR Pyruvate 
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PYR Pyruvate 	HET Hydroxyethyl 	Energizing 	ACO Acetyl Coenzyme A 
--	---	---	---

CI NADH dehydrogenase 	CII Succinate dehydrogenase 	UBI Ubiquinone 	CIII Cytochrome bc 	Energizing 	CIV Cytochrome C oxidase 	CV ATP Synthase 
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Glycolysis: 200 points; Krebs Cycle: 150; Acetyl-CoA Synthesis: 50 points; ETC: 100

Scoring - Mixed Canasta



Glycolysis: 400 points; Krebs Cycle: 300; Acetyl-CoA Synthesis: 100 points; ETC: 200

Credits



LABORATÓRIO DE MÍDIAS
EDUCACIONAIS



Thalles Henrique Faria de Souza
Eduardo de Figueiredo Peloso
Gabriel Gerber Hornink

<http://www.unifal-mg.edu.br/lme>



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SOUZA THF, PELOSO EF, HORNINK GH. E! Canasta: energizing ATP's synthesis. Alfenas: UNIFAL-MG, 2022.