
THE INTRODUCTION
1.1

CHEMIPROJECT

1.1

¡Play and joy with chemistry!

Updated rules will be Online!

Welcome to CHEMIPROJECT game!

It is a game for **2 to 4** players (**8**, Expansion) and for ages **12** years or more. Increasing or reducing this number could lead to instant death from chemical intoxication! XD

ChemiProject is an educational game of chemistry. It tries to show and teach science concepts and some skills such as organization, concentration, memorization, calculation and strategy.

The Purpose of the game

Why do we play? The story of the game is very simple. You have just finished your studies and you are focusing on finding a job! Then a prestigious research center is looking for a new member for the team. You love that place! You can fit in really well! In addition, you have passed a pre-selection exam and presented an infinity of papers! But you still have one last effort to make... A chemical exam in a lab! Each of the participants has a chemical project and the first one that finishes it will be the winner. You can see the full history of ChemiProject on YouTube, and make sure to click on **Enabling Excellence** user, or on Facebook on the **ChemiProjectXD** page or **organic-chemistry-game.blogspot.com**.

Description.

ChemiProject is a card game that focuses on **winning your opponents.** All players have their own objective and the first one who reaches it will be the winner. Yes, this is an **educational game**, wherein very complicated concepts are explained in a simple way. Chemists know how to link or to combine molecules getting more complex compounds. That is because we know how functional groups work! The functional groups are structures defined within a molecule that endow chemical abilities. Some functional groups can be linked following a few rules. Then, two molecules can be put together to make larger ones, for example, to form proteins or polymers.

Do not panic! In this game each functional group represents a color (or symbol) and there are only 8. You will have a graph which shows the possible connections of the colors at any moment!

Example. For gamers I can tell you that red 

can connect with blue 

and yellow 

. Or I can freak out as a chemist and tell you that the carboxylic acid group can carry out addition/substitution reactions with amines and alcohols, but that is difficult, so we'll remove it.

Explanation of the chemistry. (If you don't care you can skip this part)

In chemistry there are several functional groups like acids, amines as well as alcohols. Other useful groups are aldehyde, alkenes and ketones, while borates or organometallics are considered to be more complex.

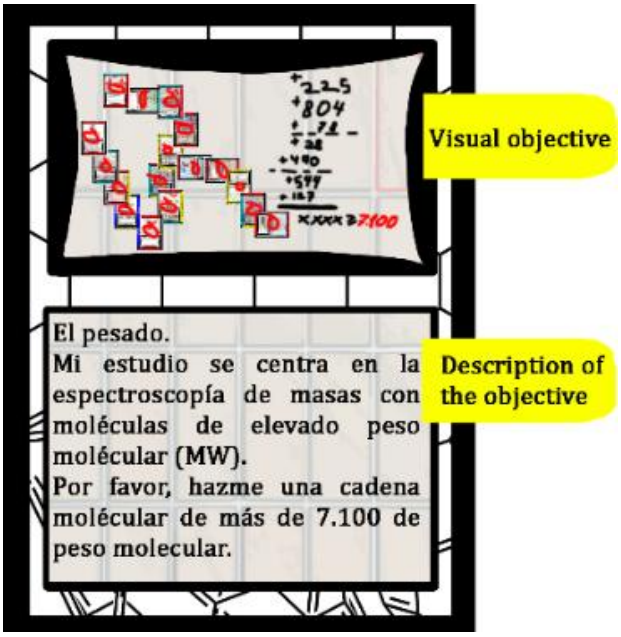
The game goal is to make a series of connections by using the functional groups and taking under account their properties. For example, normally the connections between amines or alcohols with acids are easy and very stable, while the connections of alkenes with halogens need radical or light reactions. However, the game is focused on possible connections between different functional groups. In addition, not every possible connection of the real compounds exists in the game. For example, borates can combine with themselves, but they usually make reversible reactions. Also, several reactions in the

game are really complex and difficult to get, when we have a lot of functional groups. Thus, the game gives us a general idea of what a functional group can do without introducing us in the complex world of organic chemistry. To make things easier, I put several groups together, as example, amides like ketone, and the only reactive amines are the primary ones.

End of the boring part

There are three types of cards in the game: *Storage, BreakRules* and *Project card*.

Project Card.



After shuffling the cards each player gets one ***Project card***. This card gives you an objective and the first one that finishes it wins.

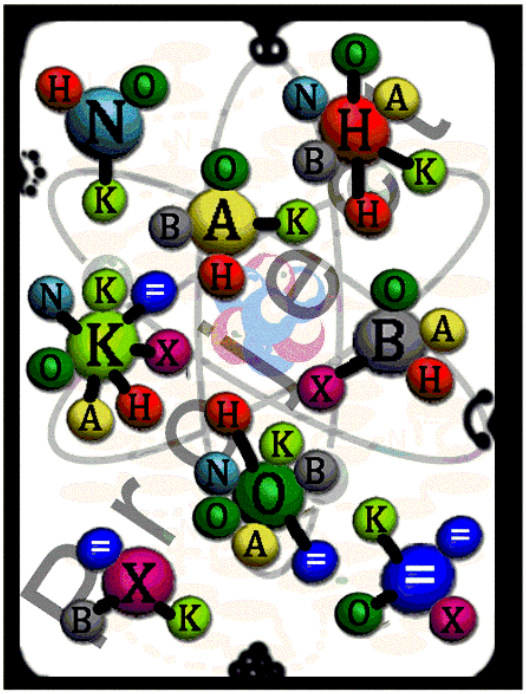
The objectives of the Project cards are based in a series of connections of Storage cards. Put this card face down in some place wherein you can see it well, since it contains the scheme that will guide you. In the scheme you can see all the functional groups and the connections that they make.

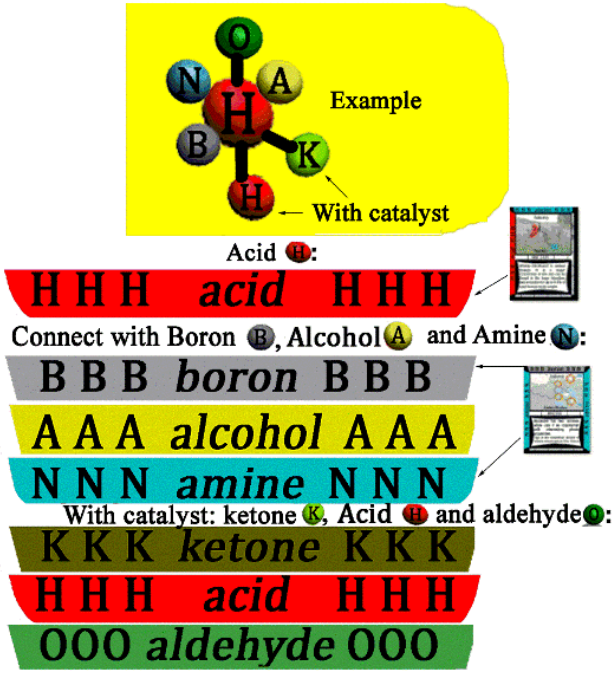
All the objectives of the Project cards are based on obtaining a series of connections from the Storage cards. The objective is private and only if it's explicitly specified for some *BreakRule*, you have to show it.

Graph:

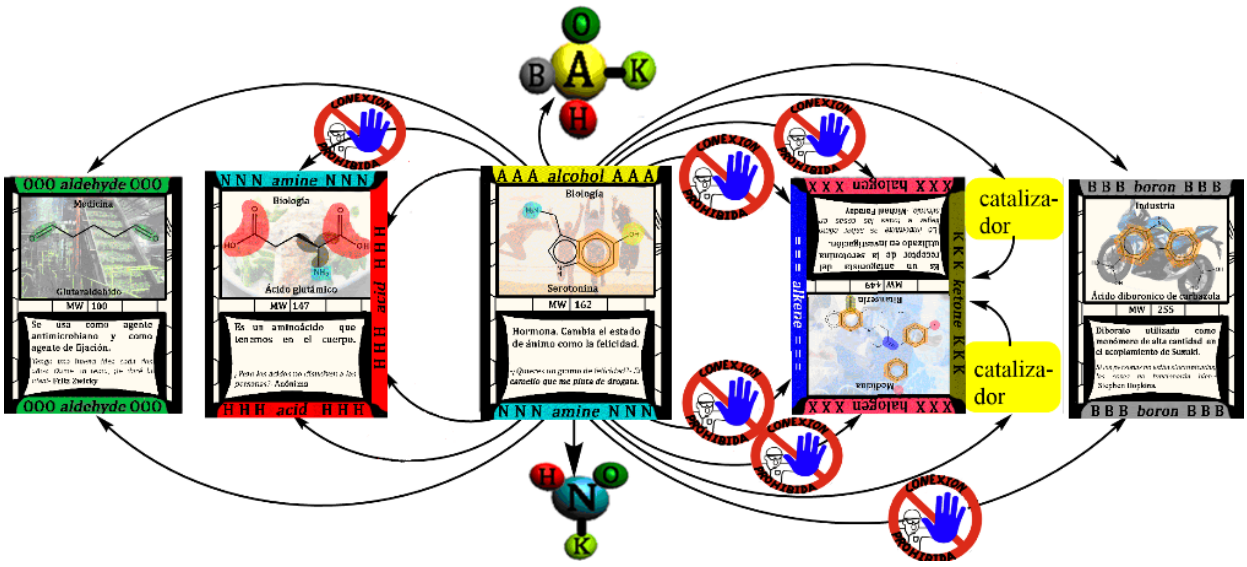
The Scheme shows large spheres surrounded by smaller spheres attached and / or others connected by a line. Each sphere has a specific color and symbol. Both give the same information and represent the functional groups.

Graph:



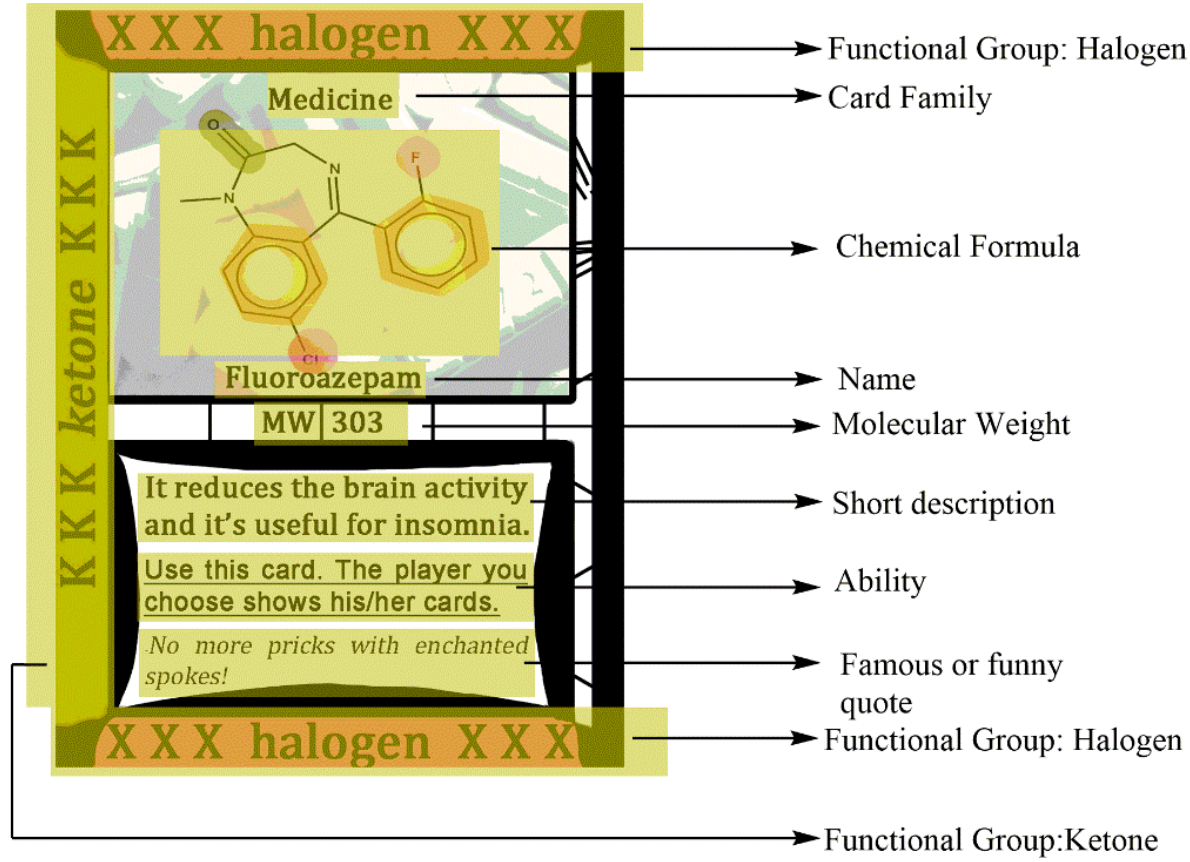


The large spheres represent each functional group in the game. Small spheres attached are those functional groups which you can connect with the large spheres directly. Finally, the small spheres connected by lines with the large ones are functional groups that can only be connected with the large spheres when you use a specific *BreakRule* card, the **catalyst.** (Each catalyst has only one use).



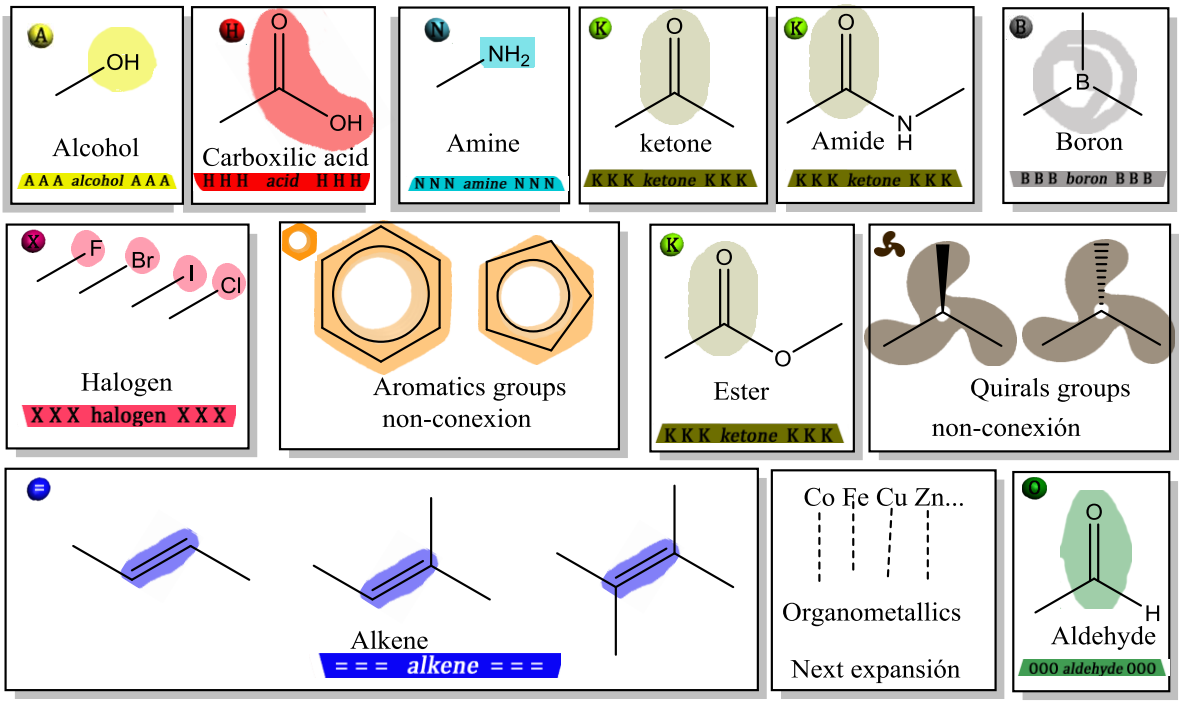
Storage Card.

The ***Storage*** **cards** are the ones that allow you to complete your objective. They can only be played during the player's turn.



The functional groups are placed at the sides of the cards. These can either be repeated or different, and usually with a range from 1 to 4. **But**, the player can only use **two** functional groups, and he/she can never connect two molecules at the same functional group. Remember that each functional group can be connected with a specific functional group, and players can see the possible connections at any time in their *Project* card.

Functional groups.



The *Storage* cards are composed of the family, a series of functional groups, the structure of the chemical formula, the molecular weight, a brief description, a card ability and a famous or funny quote. All of them are important!

Functional groups are found at the end of the cards. They can be acids, amines, borates, alcohols, aldehydes, halogens or alkenes. Remember, there are usually between 1 and 4 functional groups available in each *Storage* card, but **only 2 sides can be used** if there is no any card ability or *BreakRule* saying the opposite. You can never connect two *Storage* cards by the same sides. To know which functional groups can be connected, look the *Project* cart.

Family is important, we all know it, and the game likes that. There are 4 different types: Biology, Medicine, BadThings and Industry. When you connect two *Storage* cards of the same family in your molecular chain, you can get a *BreakRule* card.

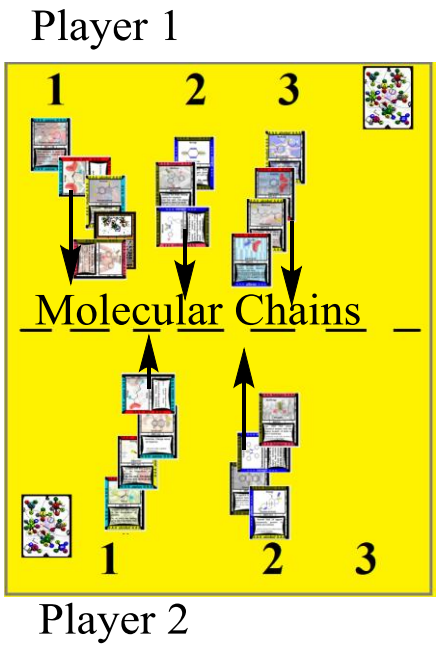
So, the **chemical formula** of the compound may or may not satisfy your academic curiosity. But you probably want to get something else, right?- Yes, when you connect two *Storage* cards in your molecular chain with aromatic groups you can take a *BreakRule* Card. You can also get a *BreakRule* after connecting two Storage cards with chiral molecules in your molecular chain. But remember that for every connection you can only get one *BreakRule* card.

The **molecular weight** (MW) is important because the player that holds a card with the lowest MW starts the game. Additionally, it could be important for your *Project* card, if your objective is related with the summation of MW numbers.

The **description...** Just Read it! because many *BreakRules* cards usually ask something about the *Storage* cards played, and if you answer incorrectly when an opponent asks you something, probably you will lose something.

Card Ability: Some *Storage* cards have advantages. If you see some underlined information, read it, it may benefit you!

Quote or funny phrase: It's information that will satisfy those with scientific curiosity. It is probably only loosely related to the card.



A series of connected *Storage* card (molecules) by functional groups is called **molecular chain**. The ends of the molecular chain are all the *Storage* cards played in the game with only 0 or 1 connection.

Each player will have his/her own molecular chains, and the goal only works with his/her chains, and not with the others. However, it´s allowed to add your *Storage* cards or molecular chains to the opponents' chains in order to block them.

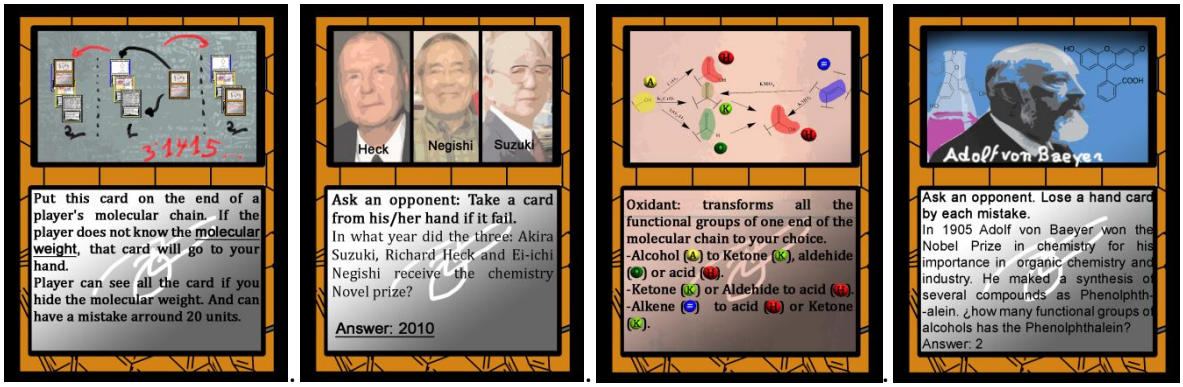
Each player can have up to 3 molecular chains. Don’t worry if you have a blocked molecular chain, you can still have two more, and you will always have the option to discard a whole chain to start a new one.

If you do not see any good possibilities with your *Storage* cards, you can discard them whenever you want during your turn. You can also discard one or several molecular chains (full).

The molecular chains cannot be split, ever! They can increase or decrease, but not split.

BreakRules Cards.

Finally, the *BreakRules* cards will help you achieve your goals and block your opponents.



The *BreakRules* cards will be obtained after a connection of two *Storage* cards in your own molecular chain, which have:

1- The Same Family, eg. Biology with Biology.

2- At least one aromatic ring each one.

3- At least one chiral group each one.

But beware, a connection between two *Storage* cards can only give you a maximum of one *BreakRule* card, even if all three conditions are met.

BreakRules cards have a single use and can be played at any time, regardless if it's the player's turn or not.

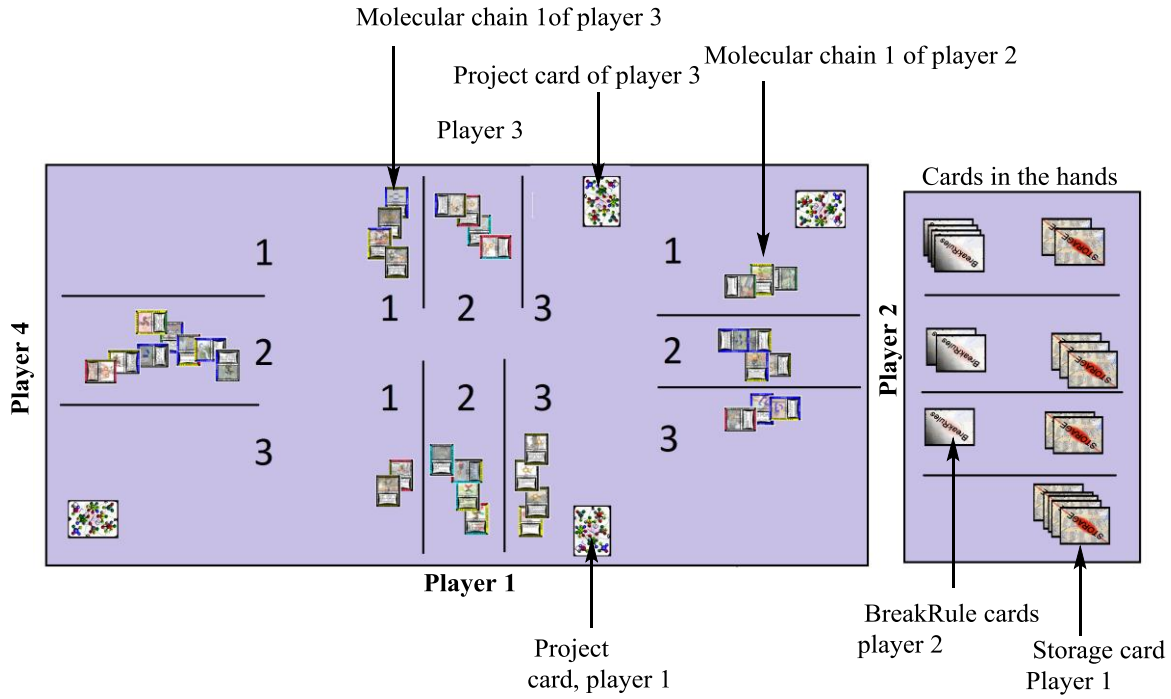
If a question related to the information of a *Storage* card at one end of the molecular chain is asked, the player has the right to know the rest of the information on the card.

For example, if they only ask for the description and the family: The player has the right to know the name of the molecule, its molecular weight, the quote, the functional groups and the determined ability.

If someone asks about the molecular weight: Player has the right to know the name of the molecule, its description and the family, the quote, the functional groups and the determined action.

Normally, the *BreakRules* related with questions only act on the cards of the hand, not on the *molecular chains* or *Project* card if.

Example of the game:



Game Mode.

1- Each player is handed out 1 *Project* card which should not be seen by the opponents.
2- Each player gets 5 *Storage* cards. All players put a single card on the table. The player with the lowest molecular weight will start the game.
3- Each player can have a maximum of **three molecular chains** at the same time, being able to make all the connections that she/he wants in his/her turn.
4- *Storage* cards can only be played during the player's turn.
5- *BreakRules* cards can be played at any moment, following the instructions of the card.
6- At the end of the turn the player takes *Storage* cards until he/she is holding 4 of them. If he/she already has 4 or more he/she doesn't take any. It is no possible to have more than 7 *Storage* cards in your hands at any moment.
7- Maximum number of *BreakRules* cards that a player can hold is 5.
8- Players can discard the cards whenever they want during their turn.
9- Every turn could have a maximum duration. It's up to the players to decide. 1-3 min is usually enough. The time doesn’t count when a *BreakRules* is used.
10- Incorrect connections will be valid at the end of each turn if the opponents don´t realize the mistake.
11- Make a deal with the players if during the game there is any problem.
12- When you are playing this game remember that you can learn, you can set your own strategy, you train your mind and your memory but more importantly, you can joke with the others and get fun! XD.

There are 3 different games of *ChemiProject. ChemiProject A, ChemiProject B* and *ChemiProject 1.1*. *Chemiproject A* (269 cards) have different objectives and *BreakRules* than *ChemiProject B* (269 cards). *ChemiProject 1.1* = *ChemiProject A* +*ChemiProject B*.

	Different	Repeat
Project cards	(4)	8 cards, 2 are repeated in the expansion
Storagecards	(125)	X2 in the expansion
BreakRules	(70)	Several cards are repeat, 150 in the expansion
*Storagecard*s	number	Total of functional groups
Amine (N)	32	41
Acid (H)	36	27
Halogen (X)	25	48
Alkene (=)	32	63
Ketone (K)	47	61
Aldehyde (O)	11	12
Boro (B)	11	14

All ChemiProject versions were created by ***Rubén Cantón Vitoria*** as part of the project ´´Grand Challenge´´ on the fellowship Marie Skłodowska-Curie grant agreement No 642742 ´´Enabling Excellence´´, In the Physical Chemistry Institute, National Hellenic Research Foundation (NHRF). The **acknowledgments** in this English version are for: Ana Gallo and Antonia kagura, that help to the translate, from Spanish to English. Dr. Nikos Tagmatarchis and Dr. Chris Ewels, my supervisor in NHRF and coordinator of Enabling Excellence, respectively, for give me the opportunity to show the *ChemiProject* idea in European commission and in ESOF conference. To Christina Stangel and George Tsotsis for help me with the instructions. The full Ph.D student of the network Enabling excellence: Mario Peláez Fernández, Emin Istif, Lorenzo Vallan, Yuman Sayed-Ahmad Baraza, Manuela Meloni, Dominik Winterauer, Ana Santidrián, Daniel Funes, Giuseppe Fratta and Sebastion Nufer, also,

Edward Goldwyn and my friends/family Maria Dolores Vitoria Real, Jose Román Cantón Lopez, Pepe Canton Vitoria, Alejandro Canton Vitoria, Lola Canton Vitoria, Joan Marc Bardes Vera, Judit Bardes Vera, Hercules Da Cruz Sousa, Juan Ramon de Antonio López, Alba Virto Senderos, Intios Asier Sudupe, Javier Portugués, Theodosis Skaltsas and more people that I do not remember (sorry) for help me to test the game.

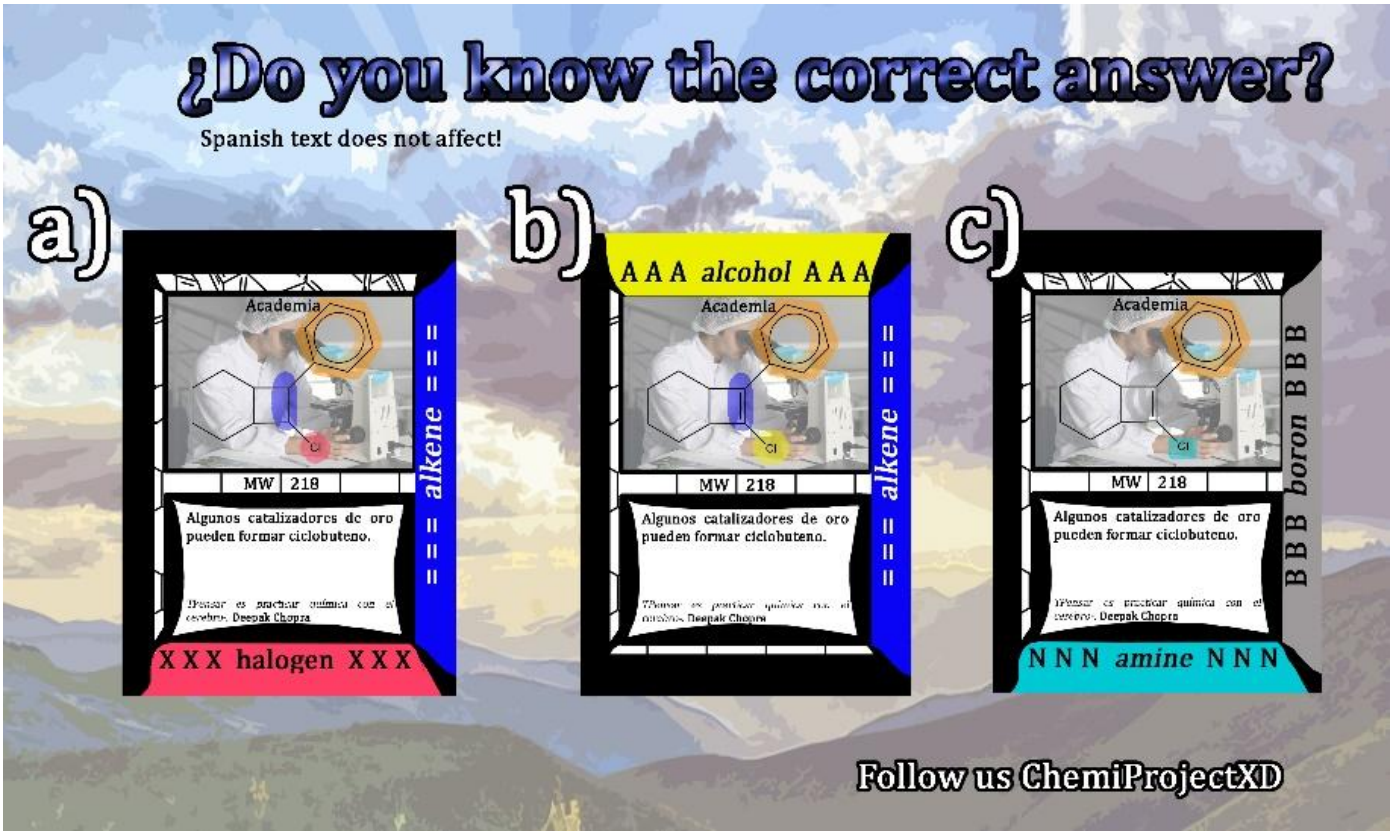
Contact: Rubén Cantón Canton@eie.gr

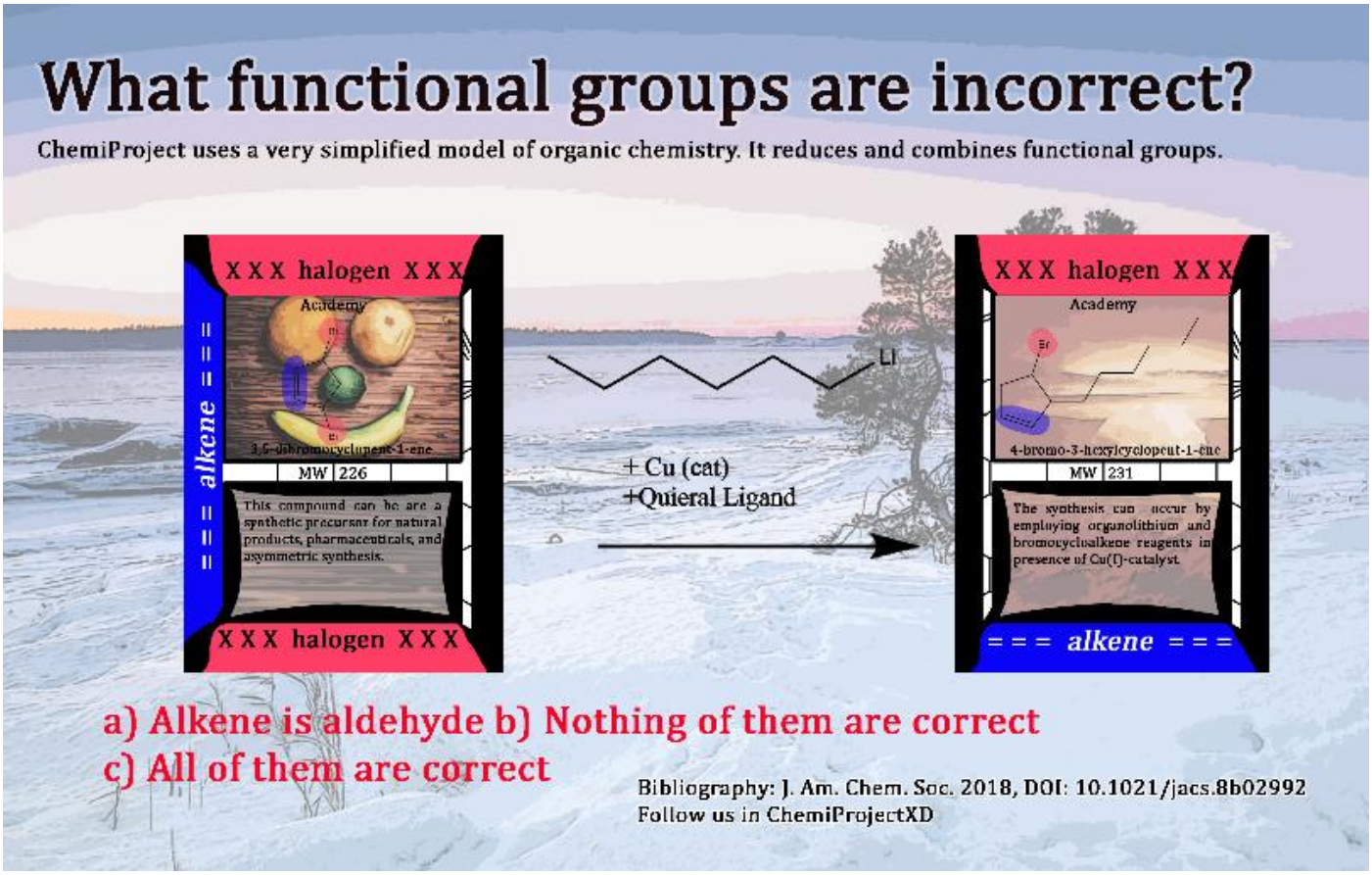
Rubén Cantón Vitoria is the creator of ChemiProject, chemist and specialized in organic chemistry. Born in Valencia, Spain, he is doing a doctorate in Athens in relation to the functionalization of organic 2D materials, such as graphene or TMDs. It has several scientific articles in prestigious scientific journals. And this game has an award for the European commission: Fellow of the week!

Play…

Enjoy…

And… ¡WIN!





http://organic-chemistry-game.blogspot.com (answers)