

ELEMENTARY

THE CHEMISTRY CARD GAME

Welcome to Elementary, where players become Scientists as they compete to see who can craft the most potent compounds! Through skillful use of Lab Techniques, Element management and clever time track play, opponents gather the right combination of Elements and Bonds to score their chemical creation! But beware! Your esteemed colleagues are doing the same! Will they sabotage your best efforts? Or will you both end up in smoke?

Number of Players: 1-4.

Ages 10+

Playing Time: 15-20 min per player.

Game Objective:

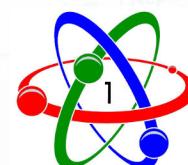
Complete compounds and collect glassware sets to score the most victory points.

Game Contents:

- 4 Laboratory Player Boards
- 1 Time Track Lab
- 62 Element cards
- 32 Starter Element cards
- 52 Lab Technique cards
- 6 Fire Extinguisher Compounds
- 63 Compound cards
- 4 Player Action / End of Game Bonus Scoring Reference cards
- 8 Player tokens
- 4 Research / Development charts
- 16 Research / Development markers
- 12 Uncommon Element fire strips
- 12 Common Element fire strips



- 28 Element/Bond trackers
 - (4) White - Hydrogen
 - (4) Red - Oxygen
 - (4) Black - Carbon
 - (4) Yellow - Sulfur
 - (4) Blue - Nitrogen
 - (4) Orange - Phosphorus
 - (4) Cloudy - Bonds



Game Setup:

Shuffle the Element, Lab Technique (LT) and Compound cards into three separate piles. Place the Compound deck adjacent to time track and put Compound cards equal to 4 plus the number of scientists playing face up. Ex.: for a 2 player game, turn 6 Compound cards face up.

Place Element cards on the time track board in the four spaces. There should be the same number of cards in each stack as the number of scientists plus 1. Example, for a 2 player game, put 3 Element cards in each stack. Place LT cards next to the time track.

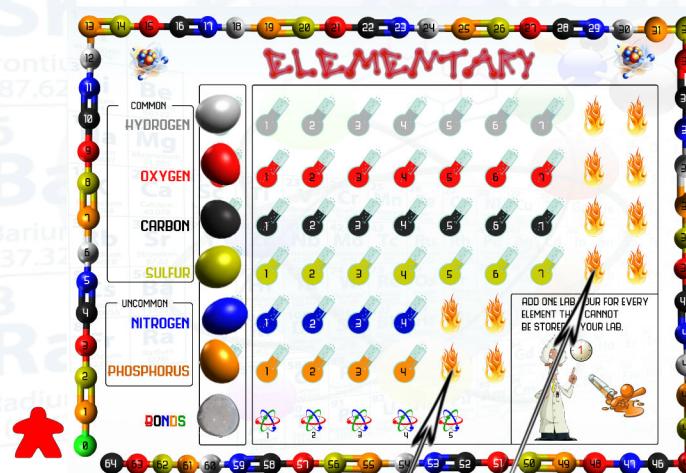
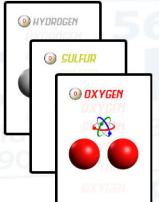
All players take a Laboratory board and place one set of colored gems on your board. Place the gems on the zero spaces, match up color to element, Cloudy/Clear for Bonds. Take 2 LT cards, 1 Research chart, 1 Development chart, 1 Lab Guide, 1 random 2 sided Fire Extinguisher card and 4 cube trackers.

Take 1 of each of the Starter Elements. There are 8 different cards in the set. Your starting hand will consist of the 6 Common Starting Elements (Hydrogen, Oxygen, Carbon, Sulfur cards) and 2 Lab Technique cards. Place the Nitrogen / Phosphorus Starting Elements off to the side.

Place one scientist tracker on your Lab on the zero victory point space and one next to the Time Track Start position. Flip over the top Elements on the Time Track. You are now ready to play!

Example play setup for 2 scientists:

Starter Elements



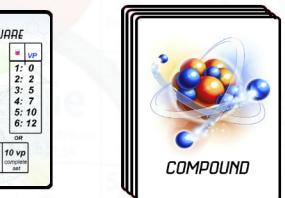
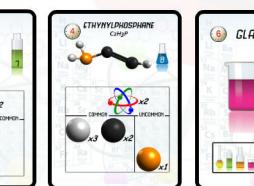
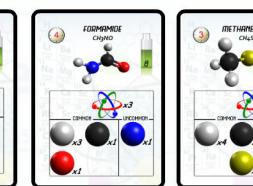
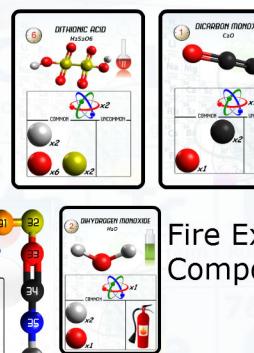
Stack Uncommon Element Fire Strips



Stack Common Element Fire Strips



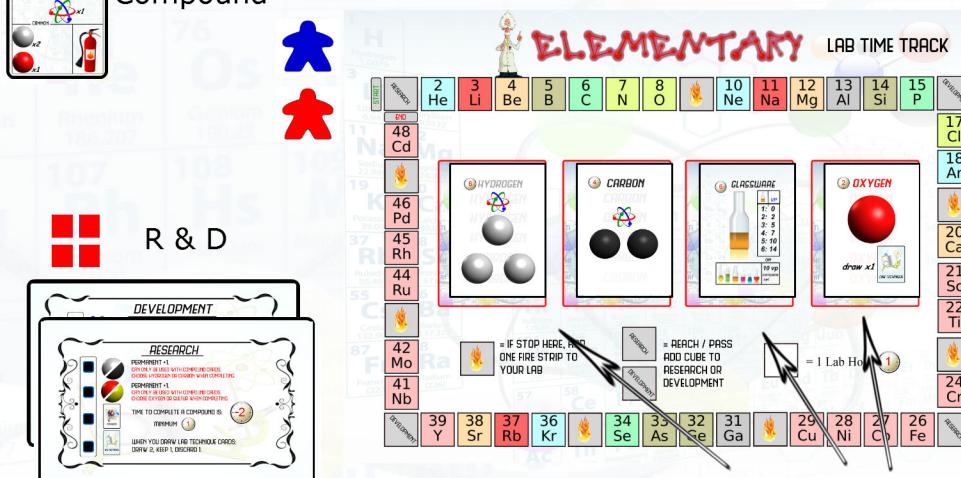
Start with 2 Lab Technique Cards



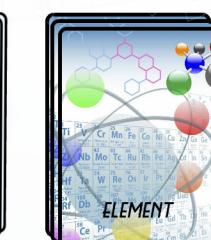
Fire Extinguisher Compound



Time Track



R & D



x +1

Game Play:

A turn consists of:

1. Add one Starter Element by flipping over card and sliding Element / Bond trackers on your lab.
2. Lab Technique cards can be used anytime during your turn unless otherwise stated.
3. Do time action(s) (Element, Compound or Fire Extinguisher) and move your scientist that many hours in the Lab. Continue to do this until you pass another scientist.

Move your scientist tracker on the time track when performing a time action. Whoever is behind on the time track gets to work in the lab. Tie goes to the active scientist. When you reach or pass a Research / Development space, add one to your Lab.

When you land on a fire hazard, add 1 fire strip to your lab. Either cover common or uncommon elements.

After you have used all Starting Elements, pick them up again to use for your next turn.

Additional Game Play Information:

Youngest player goes first. All scientists can hold two Lab Technique cards by the end of each turn. Discard any extras.

Hydrogen, Oxygen, Carbon and Sulfur are also referenced as "Common Elements" in the game.

Nitrogen and Phosphorus are also referenced as "Uncommon Elements" in the game.

When you see text "Add an Element or Bond", this means to slide your Element trackers to the right on your Lab board.

When you see text "Deduct an Element or Bond", this means to slide your Element or Bond trackers to the left.

Example: to "Trade an Element" would mean you do both. Slide one of your Elements to the right (to add one) while the opponent slides the same Element to the left (to remove one). Then you slide the Element you are trading to the left (to remove one) and they slide the same one to the right (to add one).

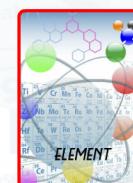
Example: to "Swap two Carbon for Any combination of three Elements" would mean that you slide two Carbon Elements to the left and add ANY combination of three (Hydrogen, Oxygen or Sulfur) to the right.



= Starter Element



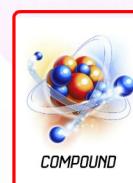
= Lab Technique



= Element



= Time Action



= Compound



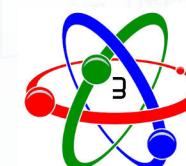
= Fire Hazard



= Research



= Development



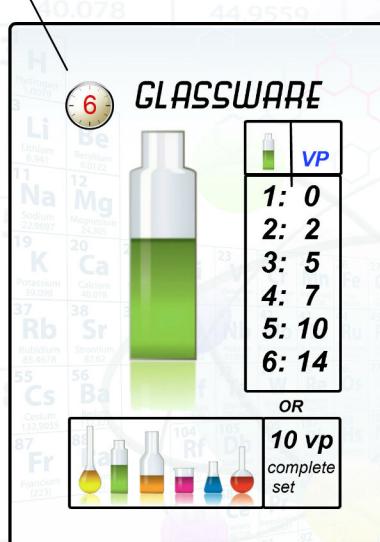
Understanding the Compound Cards:

When you have the correct amount of Elements and Bonds collected in your Lab that the Compound requires to complete, you may complete it. Update your Lab by sliding your Element and Bond trackers to the left as you use the Elements required. Update your Victory Point score track and keep the Compound until the End of Game Bonus scoring. Move your scientist on the time track the appropriate number of hours.

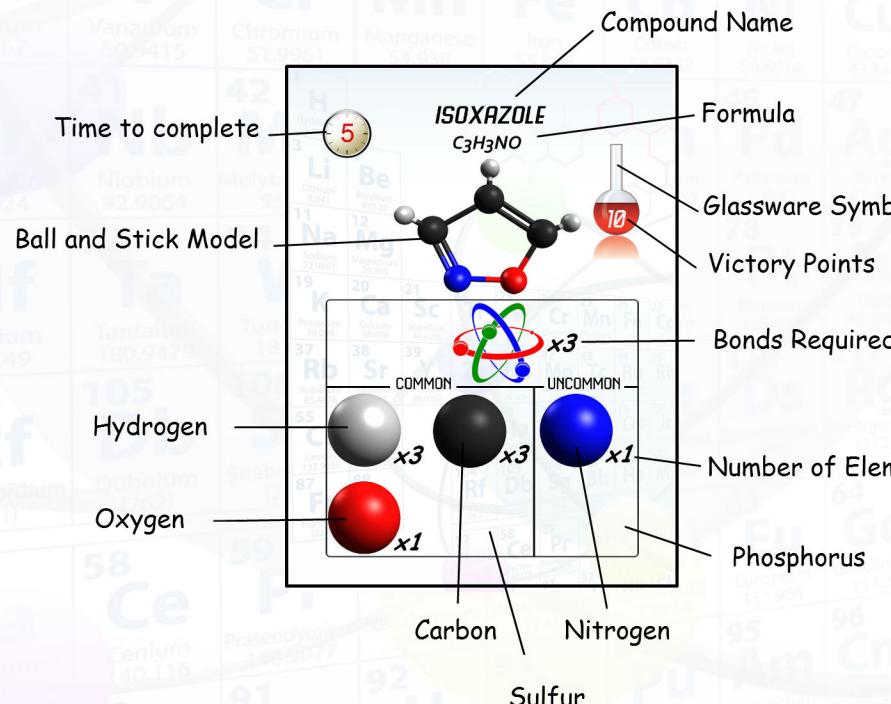


When completing your 2 sided Fire Extinguisher card, you only need to complete one side. Determine which glassware you are interested and complete that side.

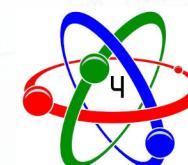
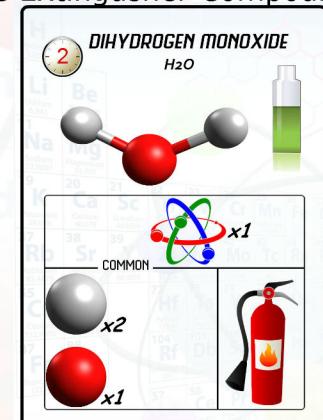
Time to complete



Time to complete



Fire Extinguisher Compound



Note about Elements, Lab Techniques and Fire Extinguishers:

If the Element card chosen has elements / bonds, add them to your lab and move ahead on the time track.

If the card chosen has a Lab Technique symbol, draw one. By the end of your turn, you may only keep two cards.

If the Enthalpy Of Combustion card is turned up, all scientists immediately add one fire strip to their lab.

Either cover common or uncommon elements. If all 6 of your fire strips have already been added to your Lab you must move ahead 1 hour on the time track for every additional fire hazard you encounter.



DRAW x1



Once you build your Fire Extinguisher Compound, use it to remove to remove fire strips from your lab.

Move 1 hour on the time track per strip removed.

Your lab can only hold so many of each Element. Elements are burned if you try to add more than your Lab can hold or if a fire hazard covers up any elements.

Example 1: You already store 4 Oxygen in your Lab. Fire strips cover common element test tubes marked 6 & 7, therefore your Lab can only hold 5 Oxygen. You try to add three more. You slide your Oxygen tracker to the 5th test tube to add one. The other two are burned and cannot be stored. Lose 1 hour in the time track for each that cannot be stored. (Move ahead 2 more hours on the time track.)

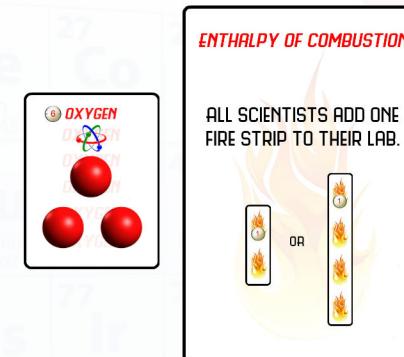
Example 2: You already store 6 Oxygen in your Lab. Fire strips cover common element test tubes marked 7. You encounter a fire hazard. If you add the fire strip to cover the test tubes marked 6, you will burn 1 of the Oxygen elements. (Move ahead 1 more hour on the time track.)

Your lab can only hold so many Bonds. Once at max, you add none to your lab when obtaining Bonds.

Note about completing Compounds:

When completing a compound, you can use any number of Lab Technique cards to finish it. Example - you can play any of the below, even multiples of them:

- No Bonds required to finish compound.
- To complete a Compound, any two common Elements are no longer required. (Hydrogen/Oxygen/Carbon/Sulfur)
- To complete a Compound, any one uncommon Element is no longer required. (Nitrogen/Phosphorus)

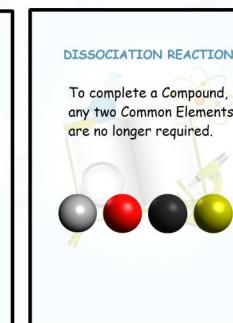


ADD ONE LAB HOUR FOR EVERY ELEMENT THAT CANNOT BE STORED IN YOUR LAB.



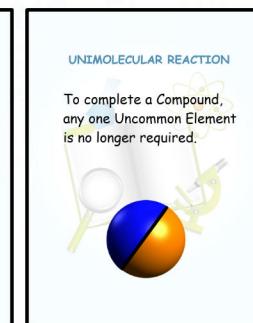
MAGNETIC STIRRER

No Bonds required to finish a Compound.



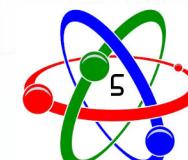
DISSOCIATION REACTION

To complete a Compound, any two Common Elements are no longer required.



UNIMOLECULAR REACTION

To complete a Compound, any one Uncommon Element is no longer required.



Understanding the Research / Development Charts:

When you reach or pass a Research / Development space on the time track, add 1 cube tracker to the respective chart. These R&D advancements will help you!

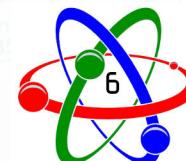
You will only get two of each, so choose wisely!

Research

- 1) Each time you complete a Compound it will cost 1 less Hydrogen OR Carbon.
- 2) Each time you complete a Compound it will cost 1 less Oxygen OR Sulfur.
- 3) Time to complete a Compound Card is 2 hours less. There is a minimum of 1 hour that must be used for completing any Compound Card.
- 4) Each time you would draw a Lab Technique card, draw 2, keep 1 and discard 1 of the drawn cards.

Development

- 1) Each time you complete a Compound Card it will cost 2 less Bonds.
- 2) Lose zero hours on the time track when using your Fire Extinguisher to remove fire strips from your Lab. You must build your Fire Extinguisher compound before using.
- 3) Add a Nitrogen or Phosphorus to your Starter Elements. When you do this, you must remove any 1 Common Starter Element from the game.
- 4) When scoring End of Game Bonus you may select any one Glassware to improve your bonus.



End of game BONUS scoring:

When the first scientist PASSES the 48th hour in the time track, the game is in its last round. All other scientists may continue to use time actions to pass hour 48. Once past, remove your scientists from the time track.

Add the bonus points as described here:

Glassware can be found on Element and Compound cards.



Each Glassware symbol can be used in 1 of the 2 types of sets for Victory points at the end of the game:

1. For each SAME shape Glassware symbol (up to 6)
you score: 0 / 2 / 5 / 7 / 10 / 14 bonus Victory Points.

Example: If you have 4 Red Glassware, 2 Green Glassware and 1 Orange Glassware at the end of the game, you score 9 bonus VP. (7 VP for the Red, 2 VP for the Green and 0 VP for the Orange)

2. For a complete set of the 6 different colored glassware symbols you score 10 vp.



Lose one VP for every fire strip covering elements in your Lab.

In case of a tie add up remaining Elements and Bonds. Common = 1, Uncommon = 2 and Bonds = 1/2 point. Least amount wins. If there is still a tie, play again!



Solo play:

A turn consists of:

- 1) Use one Starter Element
- 2) Do two time actions for Elements, Compounds or Fire removal.

You may hold 3 Lab Technique cards and use them at any time.

How did you do? 50 vp = Master Chemist. 40 vp = Apprentice Alchemist. 30 vp = Barista.

Terms and Definitions:

ABSOLUTE ZERO

AVOGADRO'S LAW

BOLTZMANN's CONSTANT

BOND ENTHALPY

CATABOLISM

CHAIN PROPAGATION

CHLORINATION REACTION

COVALENT BOND

CRYSTALLIZATION

DALTON'S LAW

DECOMPOSITION REACTION

DISSOCIATION REACTION

DOUBLE REPLACEMENT

DYNAMIC EQUILIBRIUM

ELECTROPHILIC SUBSTITUTION

GIBBS' FREE ENERGY

- is the lowest possible state at which matter can exist, 0 K or -273.15°C.
- is the relation which states that at the same temperature and pressure, equal volumes of all gases contain the same number of molecules.
- is the proportionality constant between the kinetic energy and temperature of molecules of an ideal gas.
- is the enthalpy change when one mole of bonds are broken in a substance at 298 K.
- is the decomposition of complex molecules into simpler molecules by chemical reactions.
- is an intermediary step reaction in a chain reaction where the products of one reaction supply reactants of the next reaction without outside intervention.
- is a chemical reaction where a chlorine atom is integrated into a molecule.
- is a chemical link between two atoms in which electrons are shared between them.
- is a technique which chemists use to purify solid compounds.
- is the relation which states the total pressure of a mixture of gases is equal to the sum of the partial pressures of its component gases.
- is a type of chemical reaction where one reactant yields two or more products.
- is a chemical reaction where a compound breaks apart into two or more parts.
- is a chemical reaction where two reactant ionic compounds exchange ions to form two new product compounds with the same ions.
- is a chemical equilibrium between a forward reaction and the reverse reaction where the rate of the reactions are equal.
- is a chemical reaction in which an electrophile displaces a functional group in a compound, which is typically, but not always, a hydrogen atom.
- is a thermodynamic property that was defined to predict whether a process will occur spontaneously at constant temperature and pressure.



Terms and Definitions:

LABORATORY GLASSWARE

- refers to a variety of equipment, traditionally made of glass, used for scientific experiments and other work in science, especially in chemistry and biology laboratories.

MAGNETIC STIRRER

- is a laboratory device that employs a rotating magnetic field to cause a stir bar (also called "flea") immersed in a liquid to spin very quickly, thus stirring it.

NEUTRALIZATION REACTION

NUCLEAR FISSION

- is a chemical reaction in which an acid and a base react to form a salt.

- is either a nuclear reaction or a radioactive decay process in which the nucleus of a particle splits into smaller parts (lighter nuclei).

NUCLEOPHILC SUBSTITUTION

- In organic and inorganic chemistry, nucleophilic substitution is a fundamental class of reactions in which an electron nucleophile selectively bonds with or attacks the positive or partially positive charge of an atom or a group of atoms to replace a so-called leaving group; the positive or partially positive atom is referred to as an electrophile.

- is the loss of electrons during a reaction by a molecule, atom or ion.

- is a branch of chemistry whose primary focus is the application of quantum mechanics in physical models and experiments of chemical systems.

- In organic chemistry, a radical-substitution reaction is a substitution reaction involving free radicals as a reactive intermediate.

- is a chemical compound in which one or more atoms have been replaced by a radioisotope so by virtue of its radioactive decay it can be used to explore the mechanism of chemical reactions by tracing the path that the radioisotope follows from reactants to products.

- is a type of reaction where the atoms of a molecule are rearranged to form a new isomer of the original molecule.

- (reduction-oxidation) reactions include all chemical reactions in which atoms have their oxidation state changed; in general, redox reactions involve the transfer of electrons between species.

- is a type of oxidation-reduction chemical reaction when an element or ion moves out of one compound and into another, that is, one element is replaced by another in a compound.

- is a form of radioactive decay that is found only in very heavy chemical elements.

- A system of particles is in static equilibrium when all the particles of the system are at rest and the total force on each particle is permanently zero.

- is a type of chemical reaction where an atom or functional group of a molecule is replaced by another atom or functional group.

- or "direct combination reaction" is one of the most common types of chemical reactions. In a synthesis reaction two or more chemical species combine to form a more complex product.

- may be an optical, acoustic, or an electron microscope with three eye pieces.

- is a chemical reaction involving only one molecule.

- is the coupling of two alkyl halide molecules to form an alkane.

OXIDATION

QUANTUM CHEMISTRY

RADICAL SUBSTITUTION

RADIOACTIVE TRACER

REARRANGMENT REACTION

REDOX REACTION

SINGLE REPLACEMENT

SPONTANEOUS FISSION

STATIC EQUILIBRIUM

SUBSTITUTION REACTION

SYNTHESIS

TRINOCULAR MICROSCOPE

UNIMOLECULAR REACTION

WURTZ REACTION



Credits and Acknowledgements:

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Brian Hoffman

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Kristian McAloon

Tim Nordin

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The Franek family

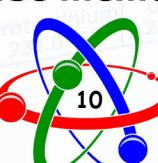
Ben Cohen

Andy Knorr

Logan & Holly Kagan

Unpub 5

Double Exposure Dexcon, Dreamation, Metatopia



Ball and Stick modeling software:

Avogadro: an open-source molecular builder and visualization tool.
Version 1.1.0. <http://avogadro.openmolecules.net/>.

Terms and Definitions:

Helmenstine, Ph.D., Anne Marie. Definitions. 25 Jan. 2014.
<http://chemistry.about.com/>

This game is dedicated to Bob Poulson, whose memory will always bring a smile to our faces.

Gary Kagan's

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<http://elementarycardgame.com>

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