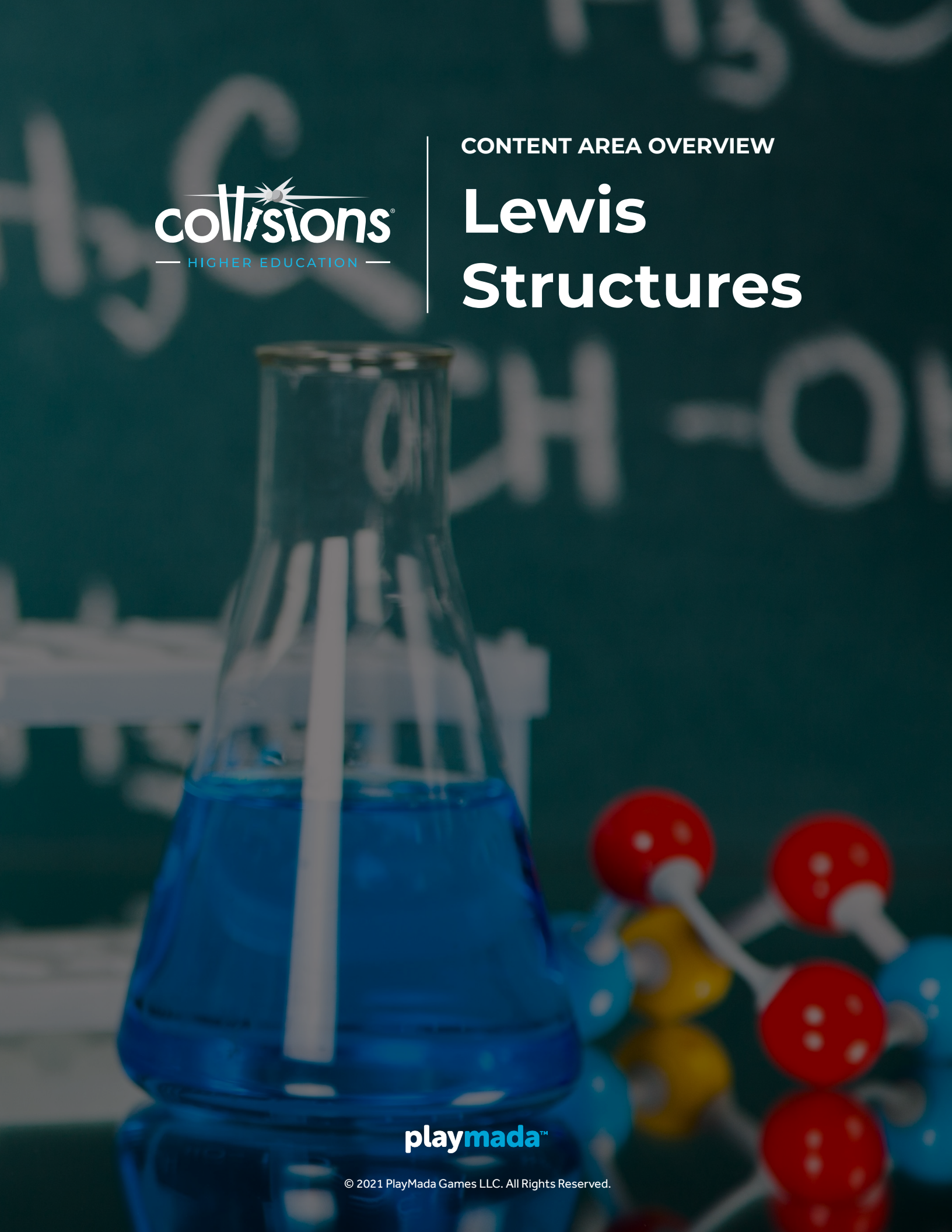


collisions
HIGHER EDUCATION

CONTENT AREA OVERVIEW

Lewis Structures

playmada™

SNAPSHOT

Challenges

- The Challenge Levels increase in rigor and complexity.
- The first 7 levels are tutorial levels.
  - 17 core levels
  - 4 Connected Levels to Radii Trends

Sandbox

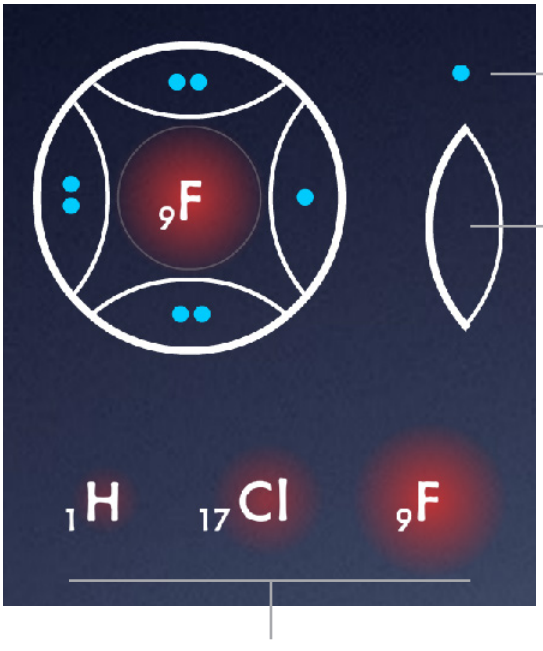
- The Sandbox is an exploratory learning space for extended practice and review of Lewis Structures.
- 14 Achievements

Integrated Chemistry Concepts

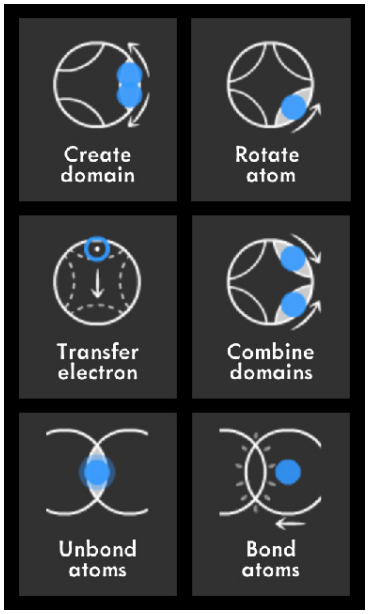
- Single Bonds, Double Bonds, and Triple Bonds
- Octet and Duet Rules
- Electron Domains
- Electronegativity
- Bond Polarity
- VSEPR Theory and Molecular Geometry
- Coordinate Covalent Bonds

GAMEPLAY BASICS

‘Bond Mode’ Atom

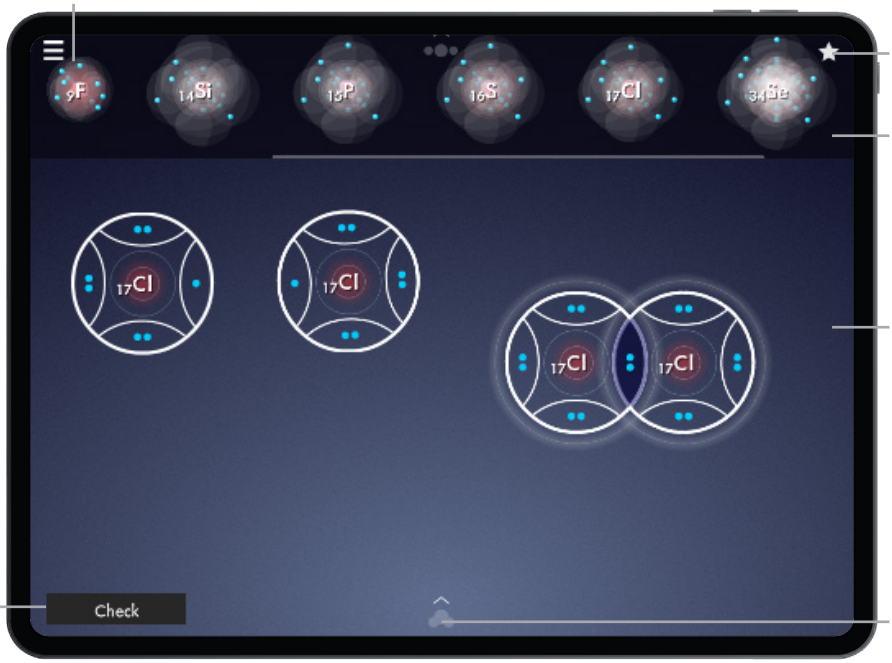


Skills



OVERVIEW

Lewis Structures Sandbox



Achievements

- Br_2 molecule
- CO_2 molecule
- C_2H_2 molecule
- SO_2 molecule
- Single bond: nonpolar
- Single bond: semipolar
- Single bond: very polar
- Double bond: nonpolar
- Double bond: semipolar
- Triple bond: nonpolar
- Triple bond: very polar
- Tetrahedral shape
- Trigonal planar shape
- Straight shape

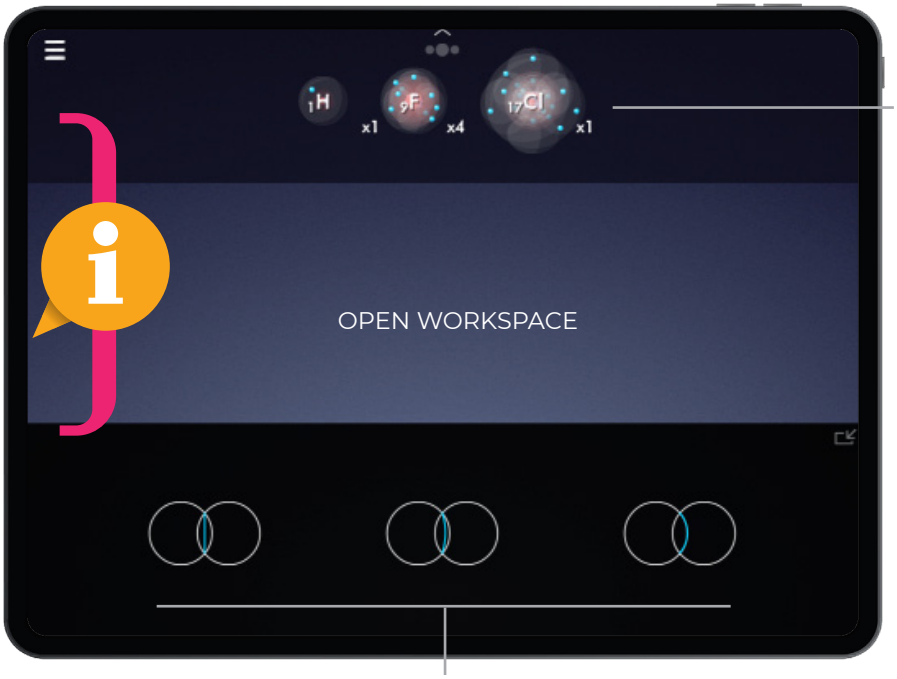
Selected Bank of Atoms

The bank includes the following atoms:

- Hydrogen
- Carbon
- Nitrogen
- Oxygen
- Fluorine
- Silicon
- Phosphorus
- Sulfur
- Chlorine
- Selenium
- Bromine

OVERVIEW

LEVELS 1-17 GOAL:
Bond the atoms to complete the shapes and hit the bond polarity targets.

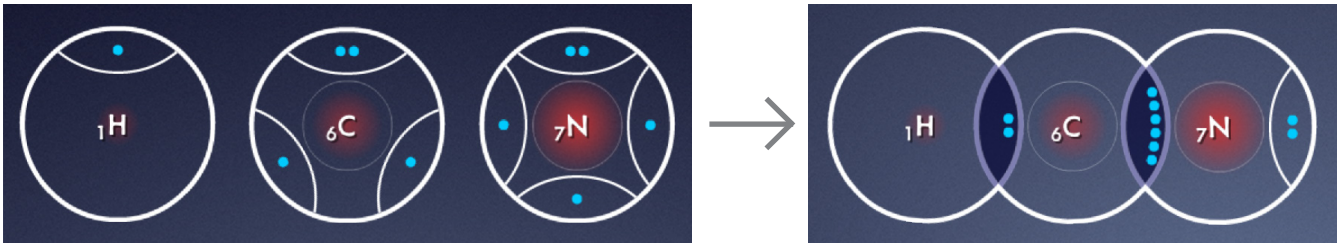


Lewis Structures Challenges

RADII TRENDS TO LEWIS STRUCTURES CONNECTED LEVELS GOAL:
Some atoms are missing from the bank. Use the button on the left to go to Radii Trends. Solve the challenge and bring back the missing atoms!

CHEMISTRY CONNECTIONS

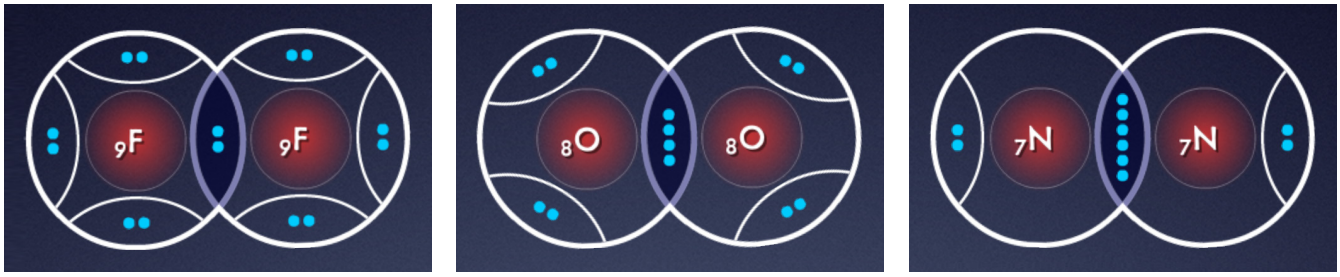
CHEMISTRY CONCEPT:
Octet and Duet rules
Players can combine atoms in such a way that each atom of a molecule has a full set of valence electrons.



VALENCE ELECTRONS REPRESENTED

OCTET SATISFIED

CHEMISTRY CONCEPT:
Types of bonds
Players can create single, double, and triple bonded molecules.



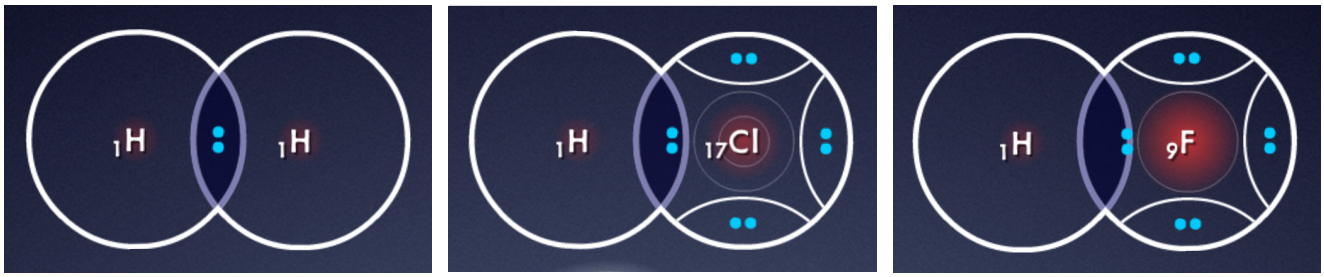
SINGLE BOND
2 SHARED ELECTRONS

DOUBLE BOND
4 SHARED ELECTRONS

TRIPLE BOND
6 SHARED ELECTRONS

CHEMISTRY CONNECTIONS

CHEMISTRY CONCEPT:
Bond polarity
Players can create non-polar, semi-polar, and very polar bonds by combining atoms of various electronegativities.

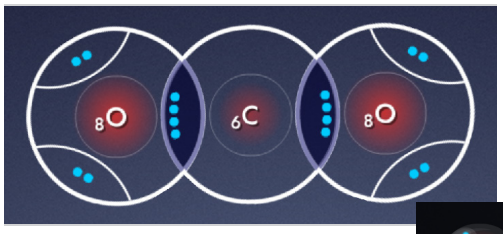


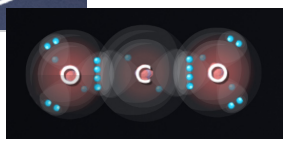
NON-POLAR BOND | SEMI-POLAR BOND | VERY-POLAR BOND

PLAYER CAN OBSERVE SHARED ELECTRONS MOVING CLOSER TO THE ATOM WITH THE HIGHER ELECTRONEGATIVITY.

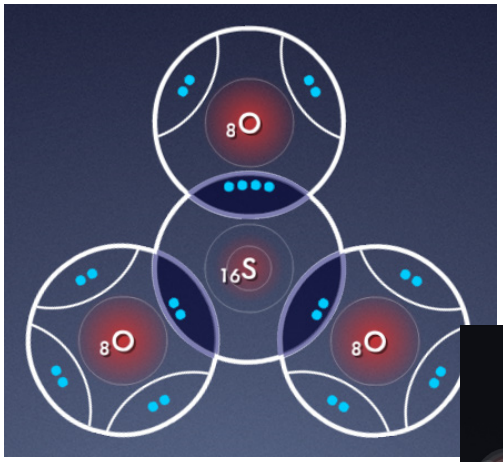
CHEMISTRY CONNECTIONS

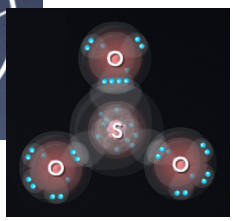
CHEMISTRY CONCEPT:
Molecular shape
Players can create molecules that have the basic molecular shapes with 4 or fewer electron domains.



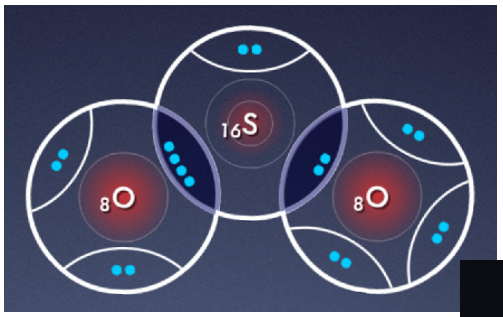


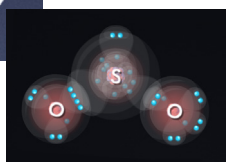
LINEAR



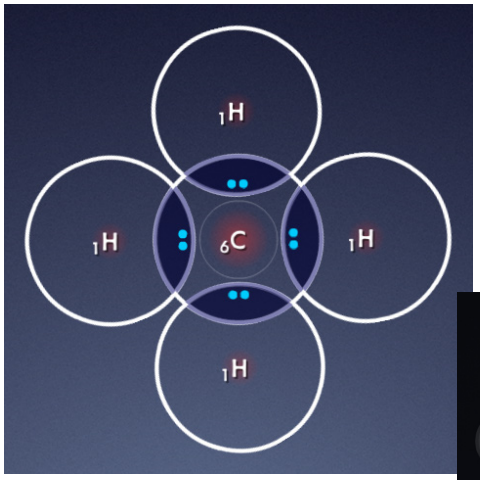


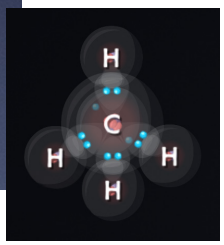
TRIGONAL PLANAR



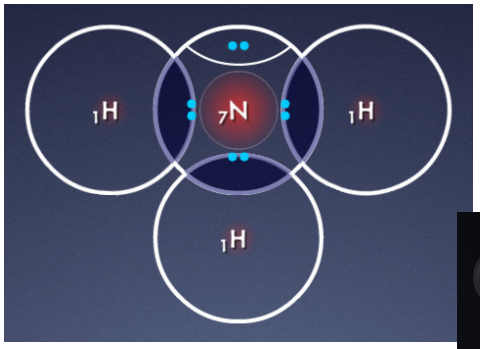


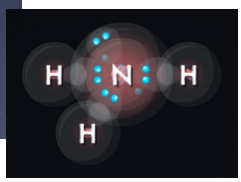
BENT 120°



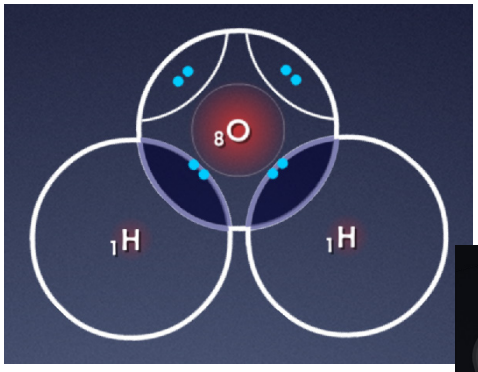


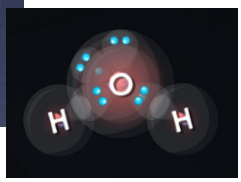
TETRAHEDRAL





TRIGONAL PYRAMIDAL



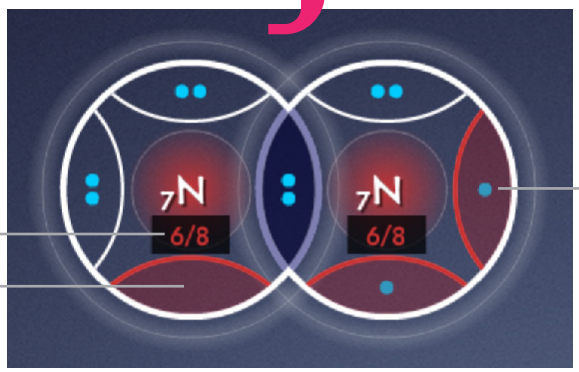


BENT 109.5°

IN-GAME FEEDBACK

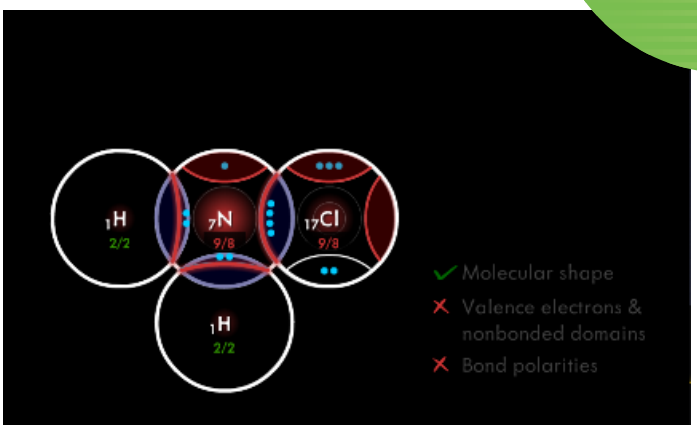
Sandbox Check

Players can use the **Check** button in Sandbox to receive immediate feedback.

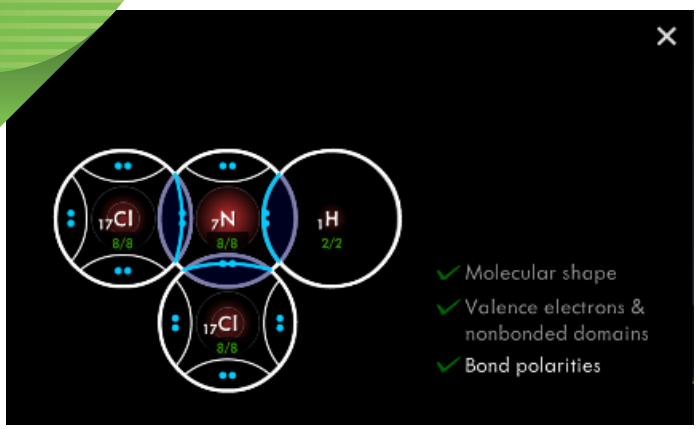


Challenge Level Check

To check work in a Challenge level, players can drag a 'bond mode' molecule to a chosen target. Molecule will be checked against the target based on key chemistry content, as outlined below.



INCORRECT



CORRECT