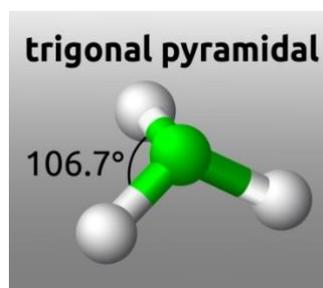
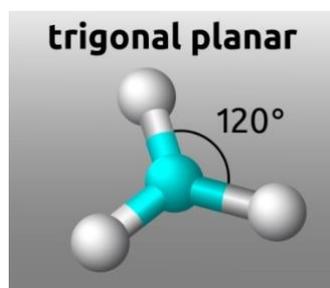
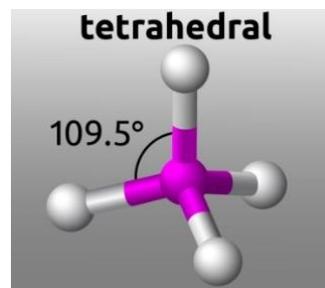
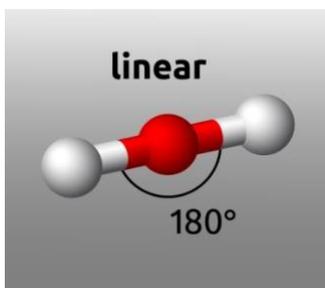
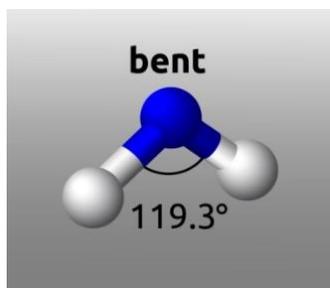


# VSEPR Candy Molecules

## Background Information and Theory:

The valence shell electron pair repulsion (VSEPR) theory (or “VESPER” for short) is how the geometry of a molecule is determined around a central atom. The main shapes are tetrahedral, trigonal planar, trigonal pyramidal, bent, and linear and are named by measuring the bond angles between the central atom and another atom bonded to it.



This practical activity allows students to practice drawing Lewis structures for a number of different covalent compounds in order to use them to assemble their candy molecules. These molecules can then be used to determine the geometry of the compounds.

As well as learning the names for each 3D shape, students should also start to see how their two-dimensional drawings actually exist in three dimensions.

## Curriculum Link:

- **HS-PS1-1.** Use the periodic table as a model to predict the relative properties of elements based on the patterns of electrons in the outermost energy level of atoms.
- **HS-PS1-2.** Construct and revise an explanation for the outcome of a simple chemical reaction based on the outermost electron states of atoms, trends in the periodic table, and knowledge of the patterns of chemical properties.

## Objectives

By the end of this lesson, students should be able to:

- Name the different geometric shapes using a 2D or 3D image
- Identify molecules which show resonance
- Give examples of molecules which have each geometric shape.
- Recognize from a Lewis structure the molecular geometry of a compound.
- Understand VSEPR theory.

## What you'll need:

Pinterest has loads of ideas on the kinds of candy that are appropriate for this activity. However, having run this lab a few times, the following types of candy always work well:

- Large gumdrops (or colored marshmallows, or foam balls) (single atoms)
- Toothpicks (chemical bonds)
- Models of each type of geometry at the front of the classroom for student reference.
- Protractors for measuring bond angles.

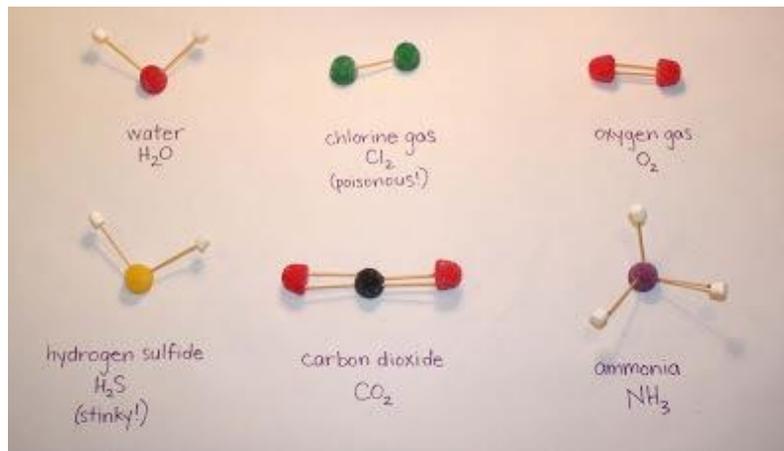
## Additional Notes:

- Teachers could also use modelling clay or playdoh to make single atoms as an alternative to candy.
- This investigation only covers compounds that observe the octet rule.
- This investigation could be extended for advanced placement students to add more complicated molecules which extend past the octet rule.

## What to do:

1. Use gumdrops which match the same color code that chemists use for their molecular models:  
Black = carbon  
White = hydrogen  
Red = oxygen  
Purple (or blue) = nitrogen  
Green = chlorine  
Yellow = sulfur  
Orange = phosphorus
2. Students first need to identify the number of bonds each element has:  
Hydrogen = one toothpick coming out if it.  
Chlorine = one  
Oxygen = two  
Nitrogen = three  
Phosphorous = three  
Carbon = four  
Sulfur = two or four

3. Give students a few simple molecules to try first such as:



4. Students work through the lab sheet, building molecules as they go to assist them.