

## Project – Coloring Platonic Solids:

### Problem Set 2: Tetrahedron and Hexahedron

Name: .....

Tetrahedron:

1. Make a tetrahedron model with gumdrops and toothpicks.
2. How many different tetrahedrons can we make under the following conditions? Draw diagrams.
  - a. Use two different colors of gumdrops.
  - b. We cannot move the object.
3. How many tetrahedrons that you made in Problem 1 are actually the same if we can rotate? How many rotations does a tetrahedron have? (\*)
4. How many tetrahedrons that you made in Problem 1 are actually the same if we switch a pair of vertices? (i.e., how many reflectional symmetries does a tetrahedron have?) (\*\*)
5. So if how many different tetrahedrons can we make if we do not double-count the same ones above? (What does “different” mean??)

Hexahedron

6. How many different hexahedrons can we make under the following conditions? Draw diagrams.
  - a. We want to make a hexahedron with two different colors of gumdrops.
  - b. We cannot move the object.
7. How many hexahedrons that you made in Problem 1 are actually the same if we can rotate? (How many rotations does a hexahedron have?) (\*\*)
8. How many hexahedrons that you made in Problem 1 are actually the same if we switch a pair of vertices? (How many reflection symmetries does a hexahedron have?) (\*\*)
9. If we can move the objects around how many **different** hexahedron ca we make? (What does “different” mean??) In other words, how many different hexahedrons can we make without double-counting the same ones?
10. For each of the following polyhedron, how many **different** polyhedrons can you make with two colors of gumdrops? (\*)
  - a. Octahedron
  - b. Dodecagon
  - c. Icosahedrons