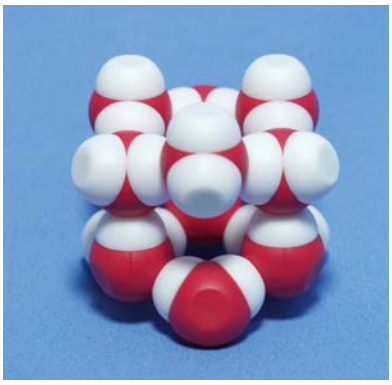
Hexagonal Ice



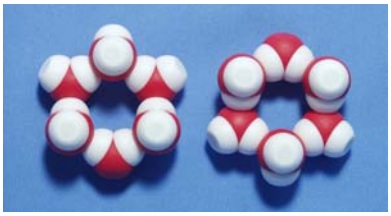
Scientists have described twelve structures of ice, many of which can be constructed with the Water Kit©. Check the 3D Molecular Designs website for more information on ice and how to construct some of the twelve different structures of ice. To construct Ice 1h, hexagonal ice, follow the directions for the Step Method or the Pattern Method (on the next page).

Step Method

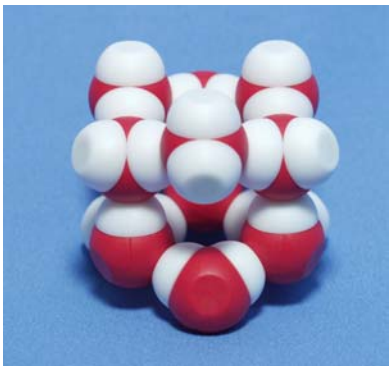
1. Hold one molecule horizontally in front of you with the hydrogen atoms to the sides.
2. Add two vertical (hydrogen atoms pointing up and down) molecules to the two hydrogen atoms from the first step. See the first picture on the right.

3. Add a horizontal molecule to the lower hydrogen on each molecule added in step #2. See the 2nd picture to the right.

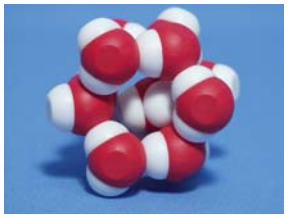
4. Add one vertical molecule to connect the hydrogen atoms from the molecules added in step #3. See the 3rd picture to the right.
5. Create a second hexagonal ring following steps #1-4.



6. Orient the two hexagonal rings the same way – then rotate one ring 180 degrees. See the 4th picture to the right.



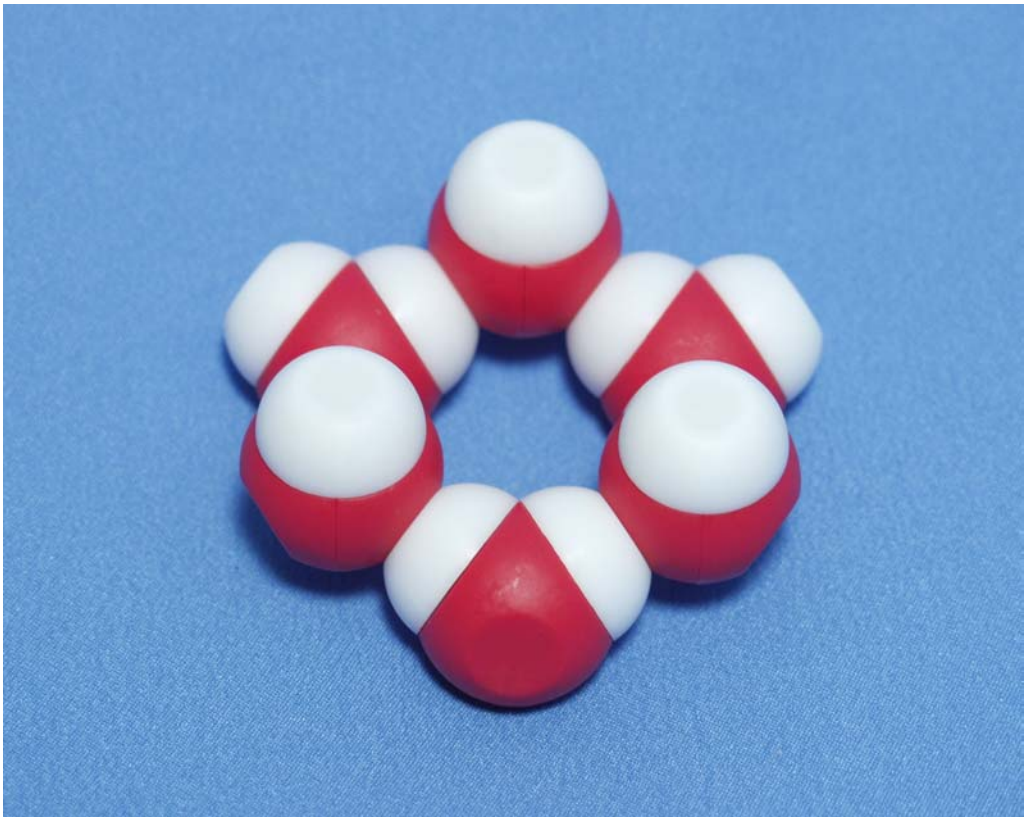
7. Place one hexagonal ring on top of the other. Do not flip one ring over – the hydrogen atoms on both rings should point the same way. See the 5th picture to the right.

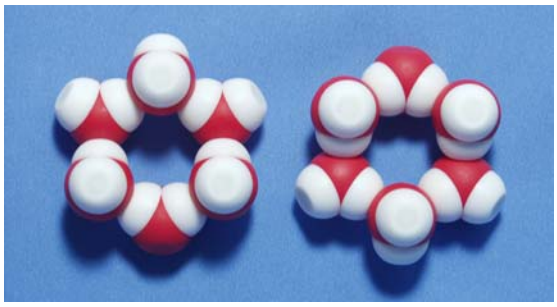


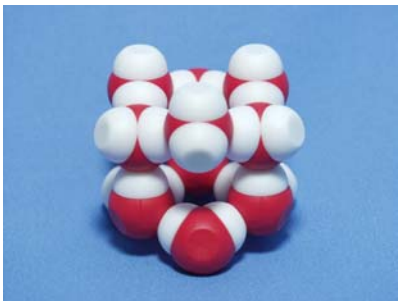
You have now formed an "ice cube." Note that it is possible to place a 13th water molecule into the hole formed by this lattice. Now students can see why ice floats. Ice has holes, or empty space, in it. The same volume occupied by 12 water molecules in a solid ice lattice, can contain 13 water molecules in its liquid form.

Pattern Method

Use this pattern to construct hexagonal Ice (Ice Ih). Create two rings, turn one 180 degrees, and stack one ring on top of the other.







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