3-D Molecular Designs

. . .where molecules become real™

Contents of Water Kit©

Water Kit© Contents Per Cup

24 Oxygen* Pieces (Used to Assemble 12 Water Molecule Models)
24 Hydrogen* Pieces (Used to Assemble 12 Water Molecule Models)
1 Chloride* (Chlorine) Model
1 Sodium* Model
2 Carbon Pieces (Used to Assemble 1 Ethane Model)
6 Hydrogen** Pieces without Magnets (Used to Assemble 1 Ethane Model)
1 Post (Used to Assemble 1 Ethane Model)
1 Hydroxyl* Group Model (Preassembled)

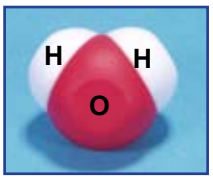
**North and south poles on embedded magnets simulate the partially positive and negative charges of oxygen and hydrogen atoms, and chloride and sodium ions.*

***The hydrogen pieces for the ethane model do not include embedded magnets, since ethane is nonpolar.*

Assembly directions begin on page 2.

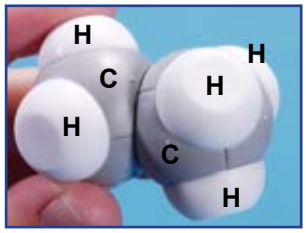
Please note as part of our quality control program, we pre-assemble some kits.

Misconception Caution – Although we use magnets to represent the partial positive and negative charges that exist on the hydrogen and oxygen atoms of water, it is important to explain to your students that the bonds between atoms are not magnetic.

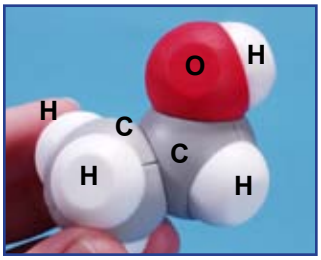


Water molecule (H_2O)

Sodium Chloride (NaCl)



Ethane molecule (CH_3CH_3)



Ethanol molecule (CH_3CH_2OH)

⚠WARNING:
SMALL MAGNETS — This product contains small magnets. Swallowed magnets can stick together across intestines causing serious infections and death. Seek immediate medical attention if magnets are swallowed or inhaled.

⚠WARNING:
CHOKING HAZARD — This product contains small parts and should be kept out of the reach of children under the age of 3, because the parts or their pieces may present a choking hazard to small children.

CAUTION:
This is a science education product, not a toy. It is not intended for children under 8 years old.

Assembly directions begin on page 2

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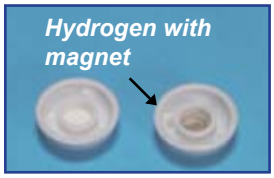
Assembling 3D Water Molecules

Start by selecting two red oxygen pieces and two white hydrogen pieces **with magnets**.

Take one red piece in each hand. You will see one post and one hole on the inside rim of each red piece.

Position the post of one piece into the hole of the other piece. Place your thumbs on the flat surface of each oxygen piece, and push the two pieces together until they fit tightly and you no longer see a space between the pieces.

The red oxygen atom will now roughly resemble a sphere with two knobs sticking out of each half.



Take the red oxygen atom in one hand and one white hydrogen piece **with a magnet** in the other and place the open side of the hydrogen piece onto the knob on the oxygen.

Push the two together until the hydrogen fits tightly onto the oxygen, with no space between the two pieces.

Repeat with a second white hydrogen piece **with a magnet**.

You now have one complete water molecule model. Repeat steps 1 through 6, until 12 water molecule models are assembled.

Assembly directions continued on page 3

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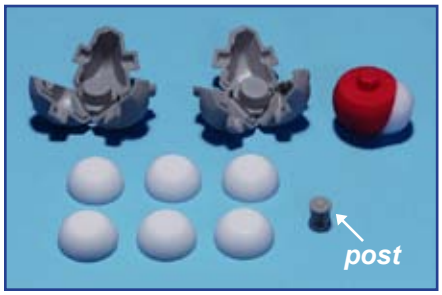
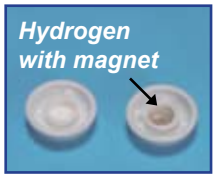
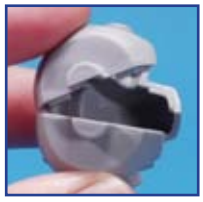
Assembling Ethane

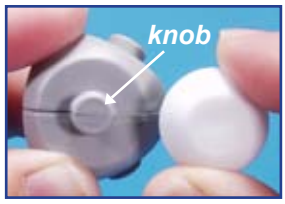




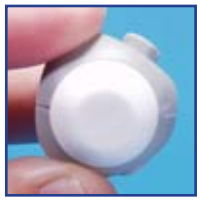
You will use two gray carbon pieces, six white hydrogen pieces **without magnets** and the small gray post to assemble the ethane model. The six hydrogen pieces without magnets are packed in a zip bag to keep them separate from the hydrogen pieces that attach to the oxygen for water molecules.



Start by selecting one of the gray carbon pieces and folding the three sections together until it is completely closed.



Attach one white hydrogen piece to one of the knobs on the carbon.

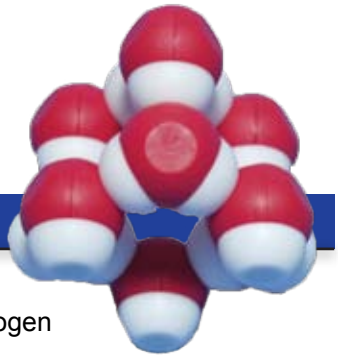


Repeat with two more hydrogen pieces.

Turn the carbon until you see the hole on one side. Take the other carbon, press the three sections together and insert one of its knobs into the hole of the first carbon. Attach the three remaining hydrogen pieces to the knobs on the second carbon piece.

Insert the gray post into the last white hydrogen piece.

Assembly directions continued on page 4



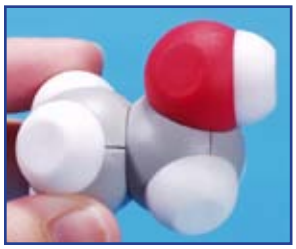
Assembling Ethanol Cont.

Insert the post (now attached to the hydrogen piece) into the hole of the second carbon.

You now have an ethane model.

To change ethane into ethanol, first locate the hydrogen with the attached post. Look for the hydrogen that is surrounded by three ***tiny*** triangular bumps (*see black circles on photo*).

Remove the hydrogen with the post and insert the exposed knob on the hydroxyl group into the exposed hole on ethane model.



Now you have an ethanol model.

For Water Kit© lessons and other activities go to http://3dmoleculardesigns.com