

What's

toy

name?

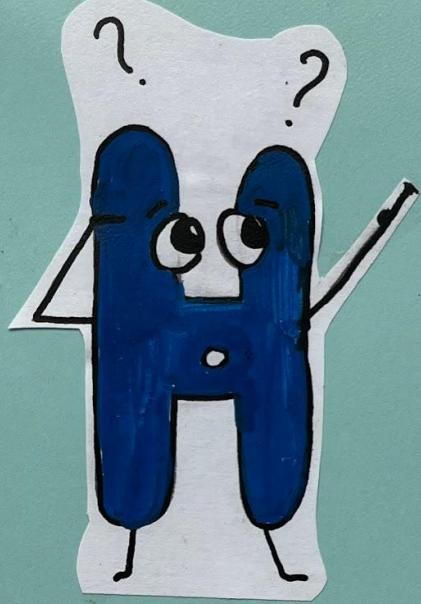
By Kate Town

1



This is hydrogen, it is a chemical element that is found on the periodic table. Hydrogen has seen all of its other friends form compounds with each other and understands the nomenclature but Hydrogen can't figure out how to name the compounds it forms with its friends.

2

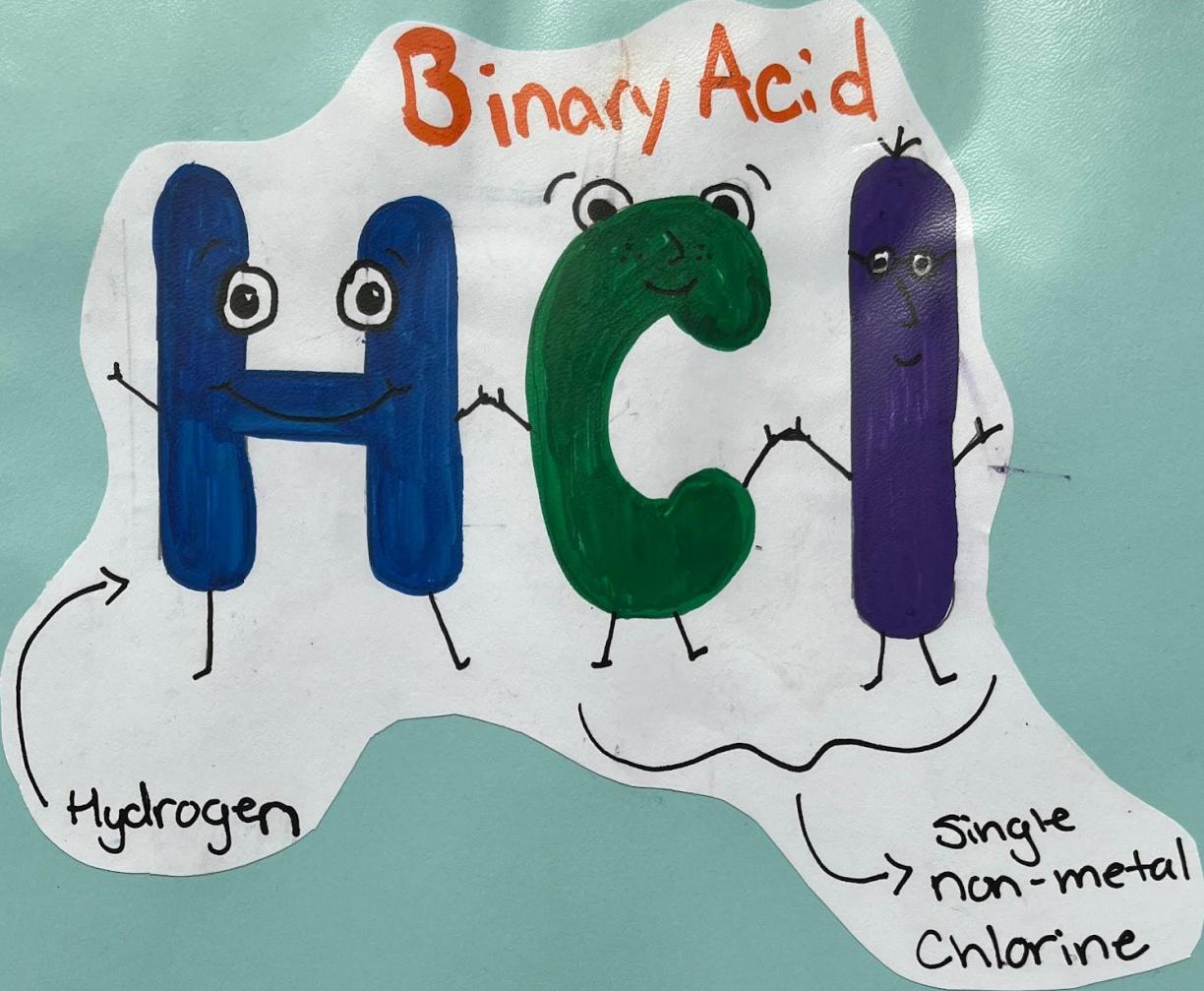


In the sky, what looks like a superhero comes swooping down to greet Hydrogen.

“Who are you?” asks Hydrogen.

“I’m Super-Scientist Sally and I’m going to help you learn how to name the compounds that you are in” she states.

3

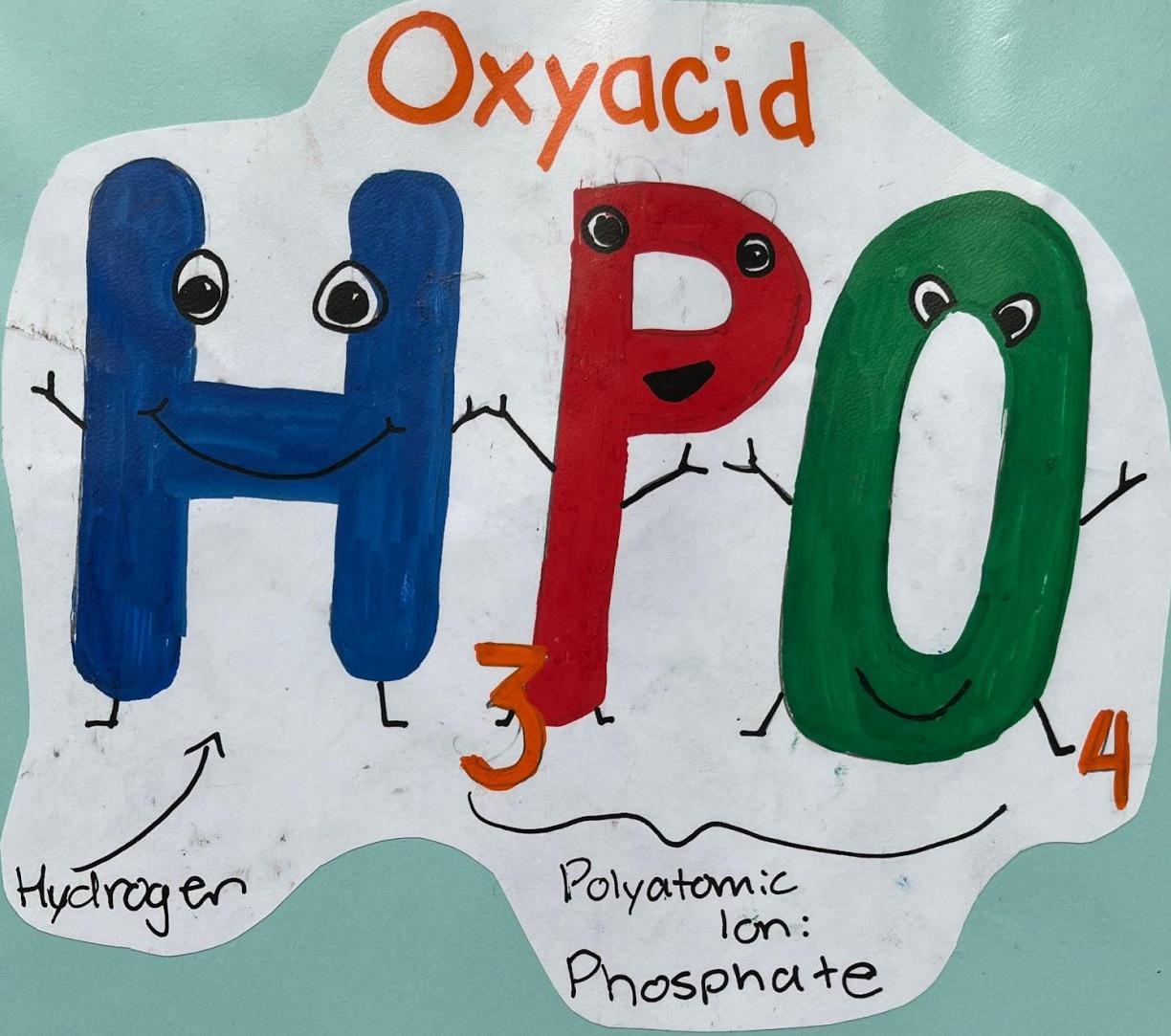


Sally begins to teach Hydrogen, that when it bonds with one of its other chemical element friends, and it is the beginning element, for example; HCl. The compound is called an acid.

She then explains that there are two different types of acids, the first is called a binary acid which is hydrogen bonded to a single non-metal element.

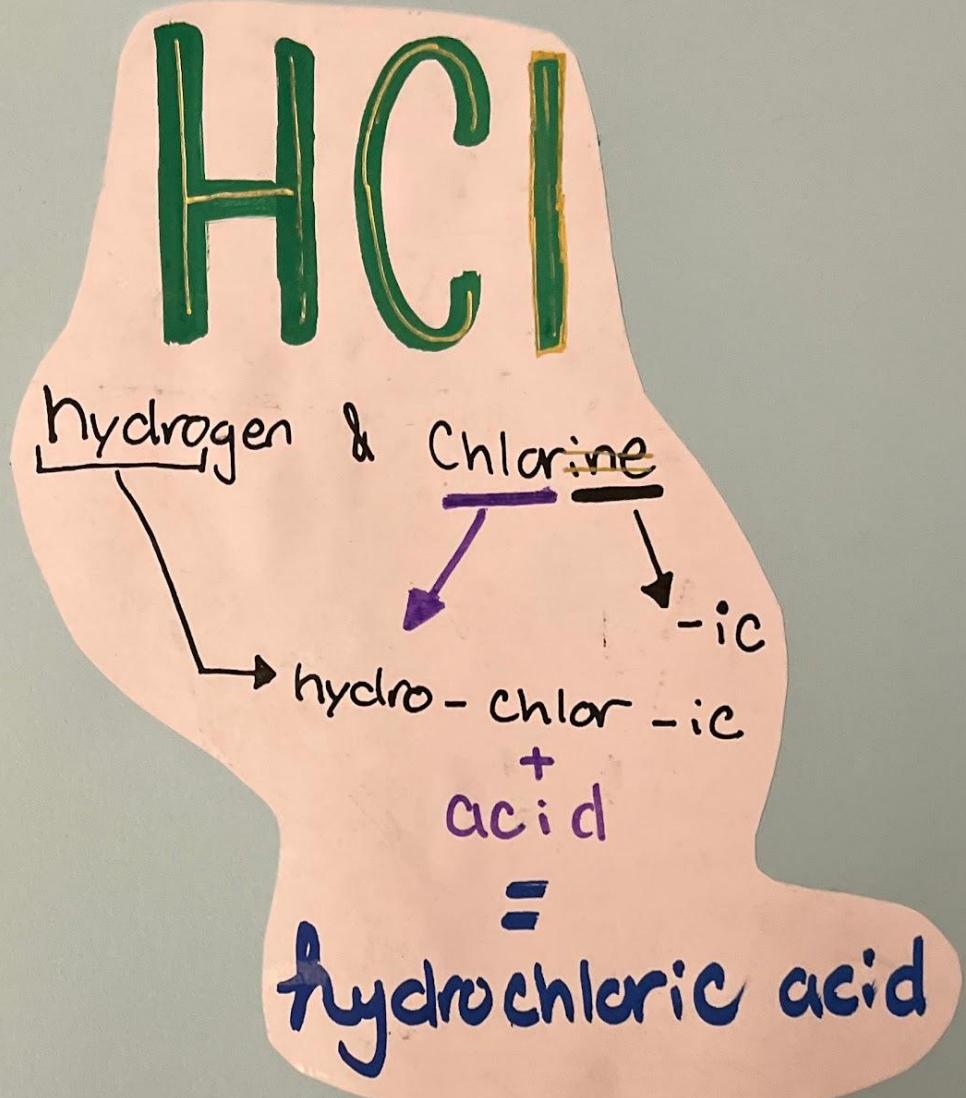
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Oxyacid

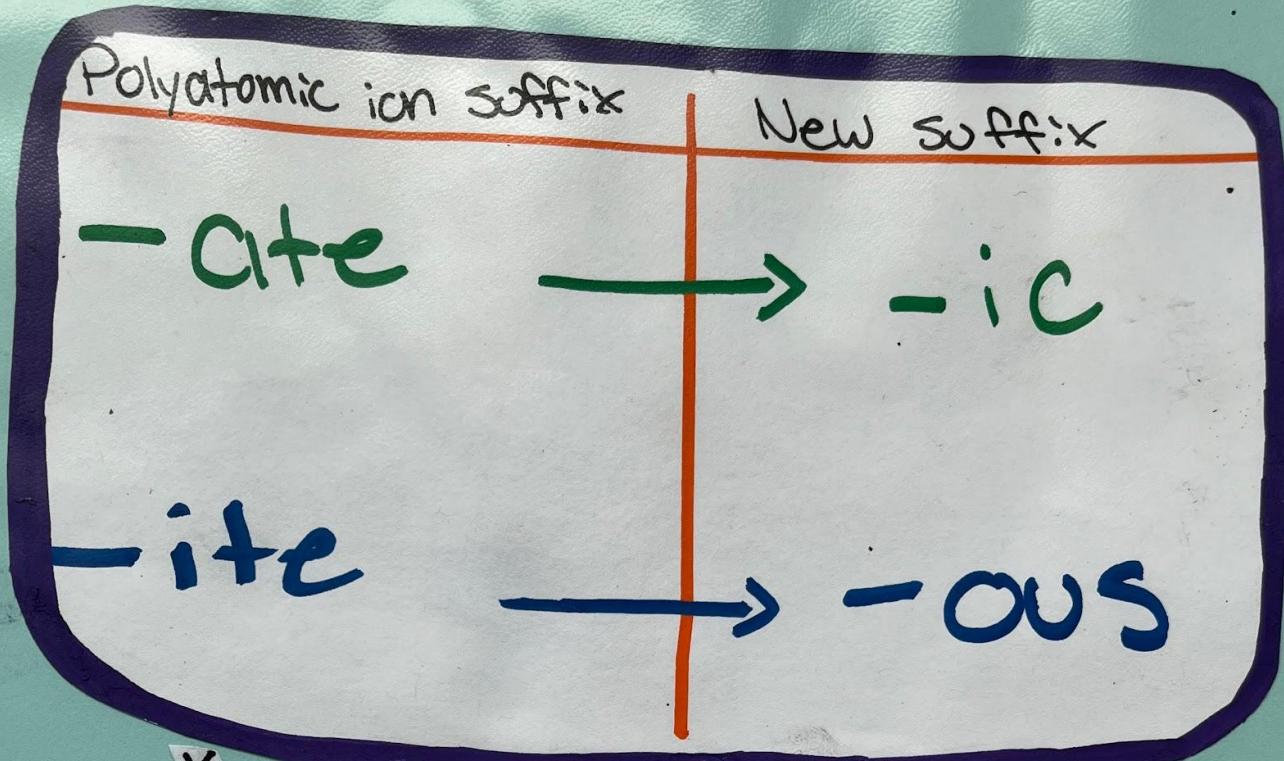


The second acid is called an oxyacid, which is when hydrogen bonds with a polyatomic ion. It is called an oxyacid because the majority of polyatomic ions are oxyanions that contain oxygen.

These two bonds have different ways of being named!



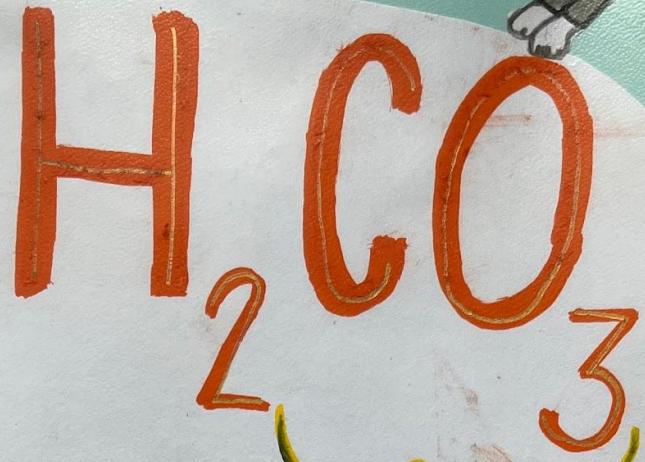
For the binary acids, Super Scientist Sally explains to Hydrogen that it is needed to alter the start and end of the word for the element that it bonded to. For example, HCl is Hydrogen bonded to chlorine so we take the word chlorine, add the prefix hydro- and change the suffix from -ine to -ic and you keep the root of chlorine. It will then look like hydrochloric, from there you then add the word acid, so it becomes hydrochloric acid!



"For the Oxyacids, the first step is to identify and name the polyatomic ion that hydrogen is bonded to," states Super Scientist Sally.

The process in which oxyacids are named depends on the ending of the polyatomic ion name. The root of the name for the polyatomic ion stays the same, add the new suffix and add the word 'acid'.

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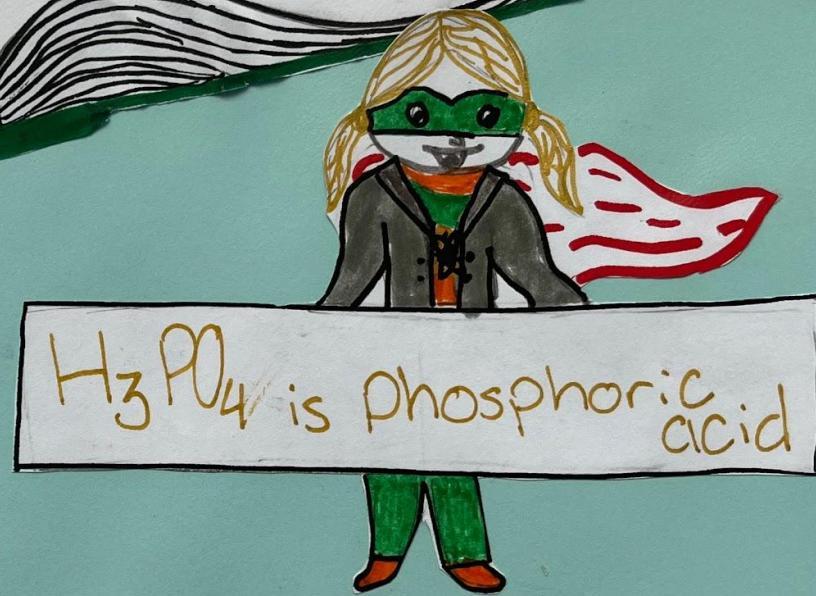
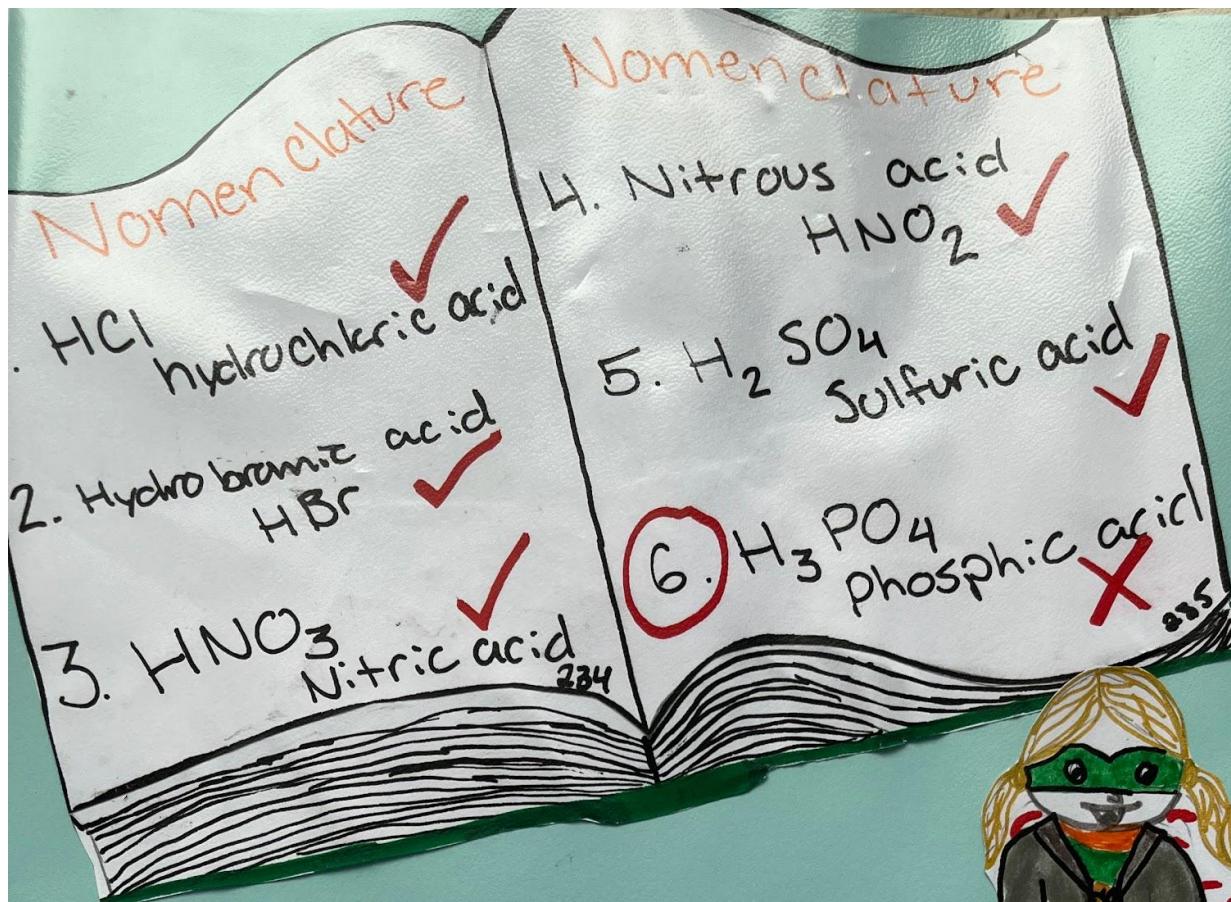


hydrogen & Carbonate

-ic + acid

Carbonic acid

An example of an oxyacid is H_2CO_3 . Since the first step is to name the polyatomic ion CO_3 , this is carbonate. Since the suffix on carbonate is -ate, the new suffix is -ic. That means that this acid is called carbonic acid!

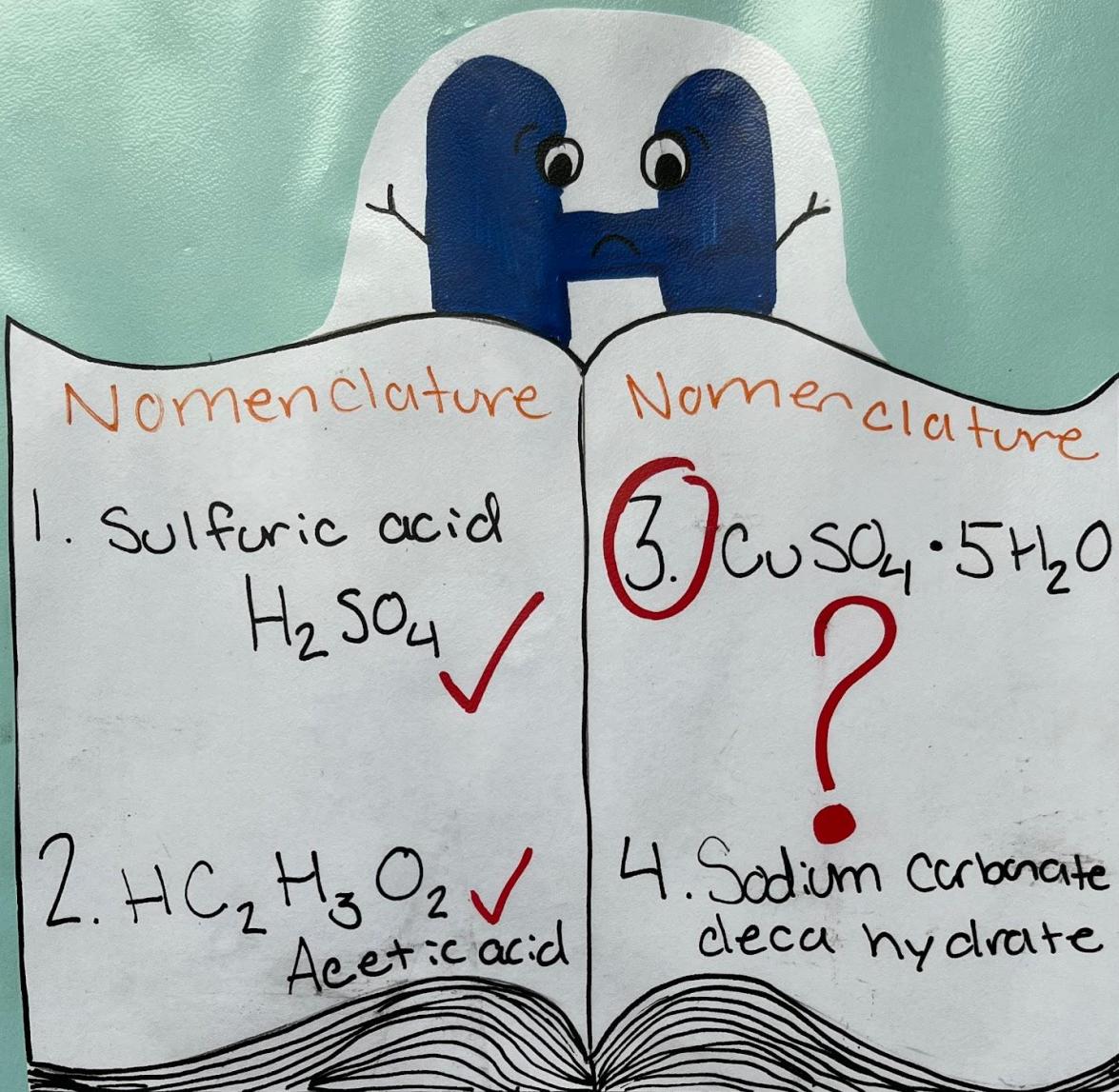


As Hydrogen does its chemistry homework it comes across an acid nomenclature problem that they cannot seem to get right, even though they are following all of the rules. The problem is H₃PO₄. Hydrogen's initial answer is phosphic acid. Super Scientist Sally explains that it is wrong because it sounds incorrect so this is exempt from the rules and is called phosphoric acid. There are a few other exceptions that make the name sound more correct, but there is, unfortunately, no rule to follow these are just memorized.

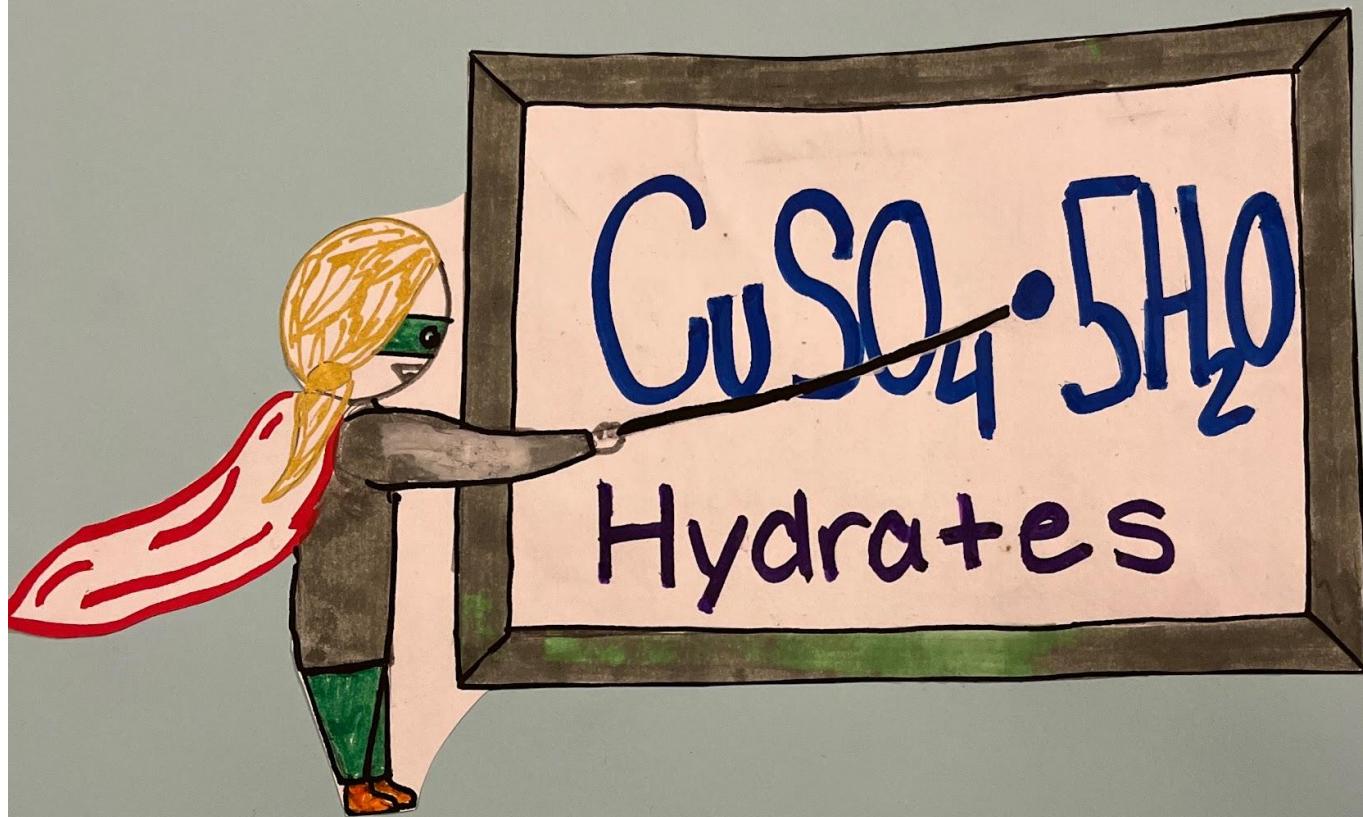
9



Now that Hydrogen has learned how to identify and name acids using the rules it is really happy. But when it was reading a chemistry textbook it came across another compound with itself in it that it doesn't know how to name. Super Scientist Sally is there to help Hydrogen!



Hydrogen shows Super Scientist Sally the compound, it is $CuSO_4 \cdot 5 H_2O$. Hydrogen knows that the first part of the compound is copper (II) sulfate but it doesn't know what the rest means. Super Scientist Sally informs it that this compound is called a hydrate.



"But what does '· nH₂O' mean?" asks Hydrogen.

Super Scientist Sally explains to Hydrogen that the dot represents the fact that water is loosely bonded to the ionic compound and the 'n' is a variable that represents the number of water molecules in the compound.

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$\frac{1}{2}$: hemi -

1: mono-

2: di -

3: tri -

4: tetra -

5: penta -

6: hexa -

7: hepta -

8: octa -

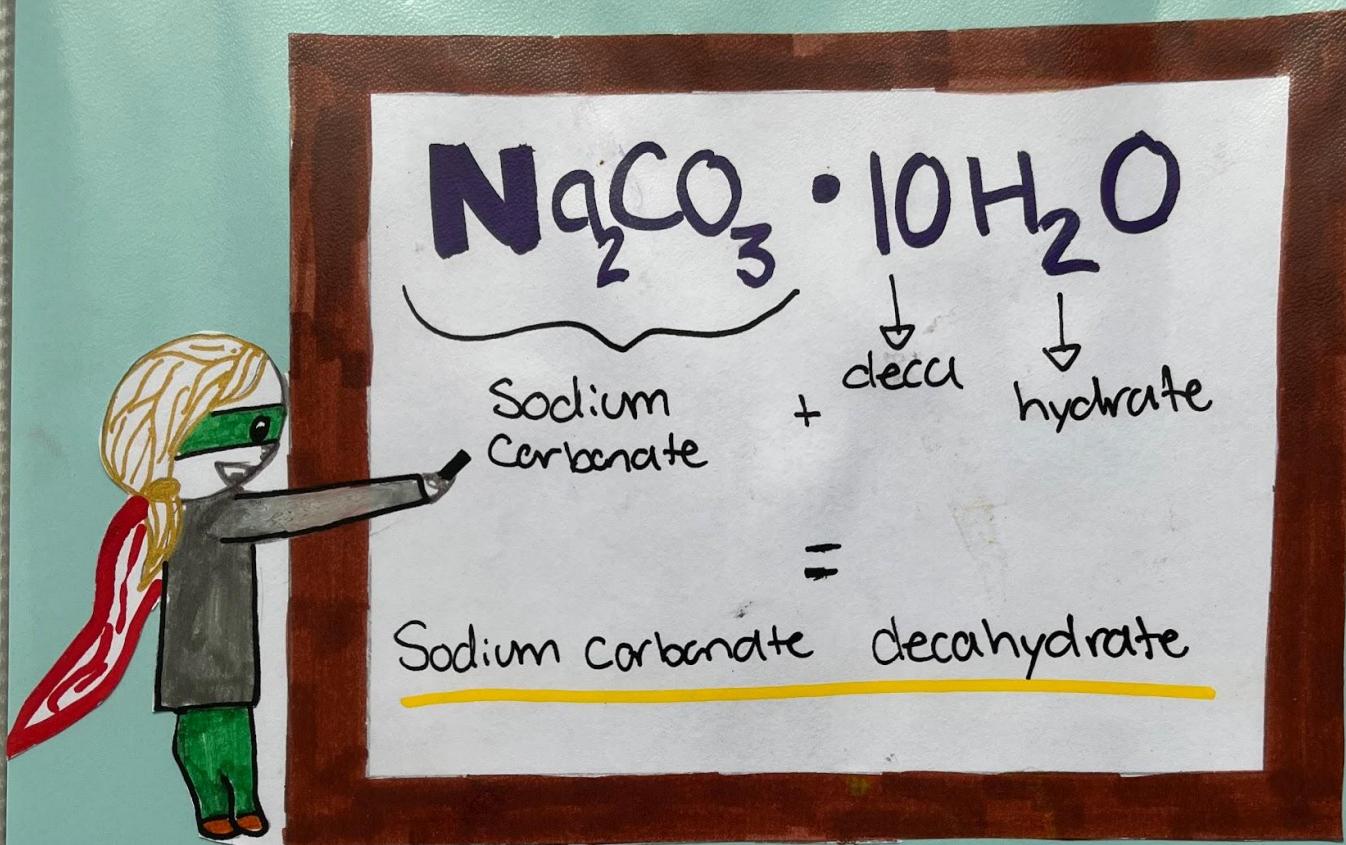
9: nona -

10: deca -

"The next step..." states the scientist.

Is to determine how to name hydrates. First, you need to name the ionic compound, then you need to identify the greek number prefix for the suffix; -hydrate.

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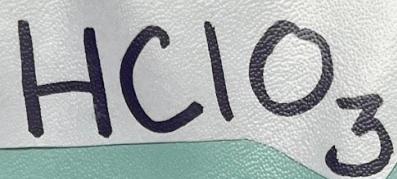


To put that all together, Super Scientist Sally writes on the chalkboard, $\text{Na}_2\text{CO}_3 \cdot 10\text{H}_2\text{O}$ is sodium carbonate decahydrate.

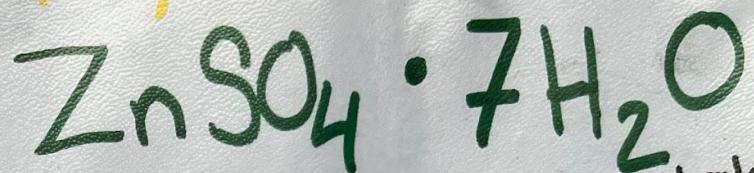
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Oxyacid

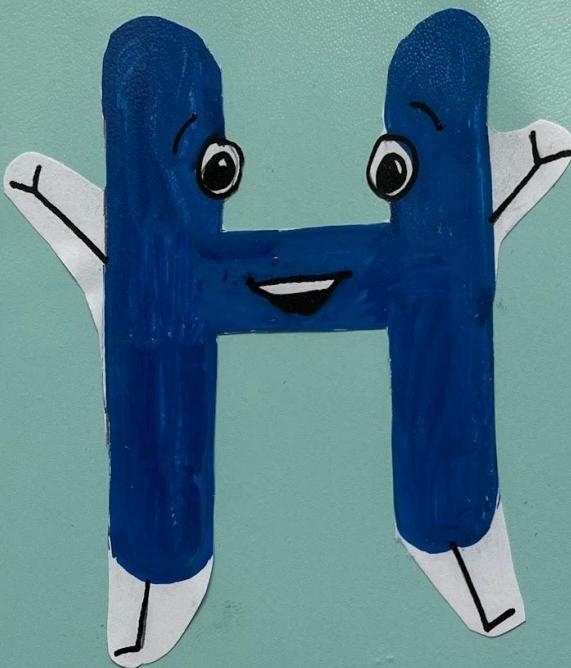
chloric acid



Hydrate



Zinc sulfate hepta hydrate



Binary acid



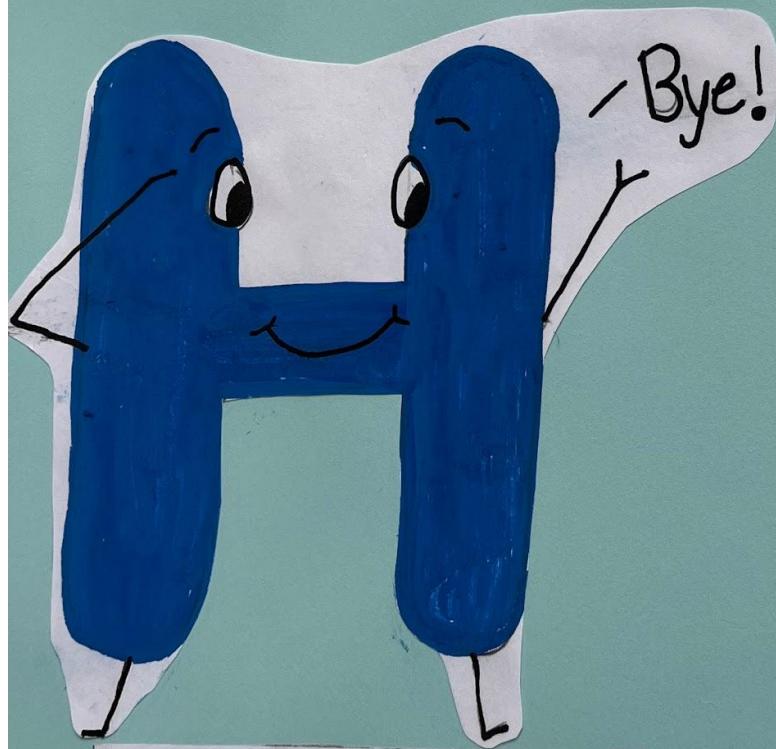
hydrosulfuric acid

Hydrogen is now absolutely elated to know know what its name is
when it bonds with other elements.

"I can be either an acid or a hydrate" states Hydrogen.

Hydrogen knows that an acid can either be a binary acid or an oxyacid, this is dependent on whether or not hydrogen is bonded to a single element or a polyatomic ion.

Also, it knows that a hydrate is when a compound is loosely bonded to a certain number of H_2O molecules.



Hydrogen thanks Super Scientist Sally for all of her help as she flies off into the sky to help other young scientists!