

Carbon Dioxide

'Ōwehe Laulā:

Ma kēia ha'awina e ho'ohana ana nā haumāna i ka wīneka (vinegar) a me ka pauka koka (baking soda) e ho'okumu i carbon dioxide (CO₂), o ia nō kekahi kinoea mai ka lua pele. E ninini ana nā haumāna i carbon dioxide (CO₂) i loko o kekahi pā halihali no ka ho'opio 'ana i nā kukui. Pohupani ka CO₂ i oxygen ma muli o kona kaumaha.

Nā Pahuhopu:

E a'o ana ka haumana:

- e ho'okumu i carbon dioxide e ka ho'ohui 'ana o ka wīneka (vinegar) a me ka pauka koka (baking soda);
- e ho'opio i nā kukui me carbon dioxide;
- e maopopo i ka ho'okumu 'ana o carbon dioxide e ka lua pele; a me
- 'oi aku ke kaumaha o carbon dioxide ma mua o nā kinoea 'ē a'e (oxygen).

Nā Pono Ha'awina:

- Ka pauka koka (baking soda)
- Wīneka (white vinegar)
- 1 hano kānuku (1 liter) a i 'ole ke kī'aha
- Nā ihoiho kī (tea lights) a i 'ole ihoiho lā hānau (birthday candles)
- Nā ahi (matches)
- Ka pepa pahu a i 'ole ke pā halihali
- Nā puke me nā ākea like 'ole
- Ka Pepa Ha'awina Haumana: "Carbon Dioxide"
- Ka Pepa 'Ike Haumana: "Ka Pō'ino O Carbon Dioxide"
- Ke kalē (clay) (inā loa'a)

Nā Pane I Ka Pepa Ha'awina Haumana:

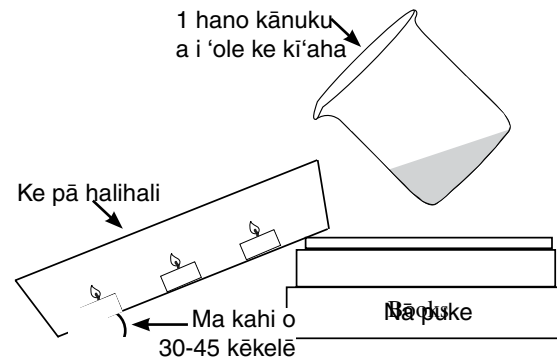
1. Pa'apū nui
2. Pololei
3. Pololei

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Ke Ka'ina Hana Ha'awina:

Note: Practice this activity prior to class demonstration to figure out the best angle for the tray, and how to gradually pour the vinegar using a gentle tipping action.

1. E wehewehe i nā haumāna e ho'okumu ana lākou i carbon dioxide, kekahi o nā kinoea i ho'okumu 'ia e nā lua pele. E heluhelu i ka Pepa 'Ike Haumana: "Ka Pō'ino O Carbon Dioxide" i ka papa.
2. E ho'oka'awale i nā haumāna i mau pakanā a i 'ole i mau hui. E kāka'ahi i nā pono ha'awina. Pono nā hui pākahi i 1 hano kānuku (liter), 1/4 ki'aha pauka koka (baking soda), 1/4 ki'aha wīneka (vinegar), 3 ihoiho kī (tea light candles), kekahi pā halihali a i 'ole ka pepa pahu, kekahi mau puke, a me ke ahi e hō'ā i nā ihoiho. (E aho paha inā hō'ā 'oe i nā ihoiho.)
3. E kāka'ahi i ka Pepa Ha'awina Haumana: "Carbon Dioxide" i nā haumāna pākahi. E noi i nā haumāna e hahai i nā kuhikuhi ma ka pepa ha'awina no ka ho'okō 'ana i kēia pāhana. Hiki paha iā 'oe ke hō'ike i ke ka'ina hana i nā haumāna.
4. E hā'awi aku a kōkua.
5. Ma hope o ka ho'okō 'ana o ia pāhana, e kūkākūkā i nā hopena. E nīnau i nā haumāna i ka hana ke ninini lākou i carbon dioxide i ke pā halihali. Pono lākou e pane, ua pio nā ihoiho.
6. E nīnau i nā haumāna inā ua pio nā ihoiho ma ka māhele i lalo a o ka māhele i luna, a i 'ole mai ka māhele i luna a i ka māhele i lalo. E wehewehe, 'oi aku ke kaumaha o carbon dioxide ma mua o nā kinoea 'ē a'e. Ua ho'okumu nā haumāna i carbon dioxide a ua pio mua ka ihoiho mai ka māhele i luna a i ka māhele i waena a me ka māhele i lalo o ke pā halihali. I ka hō'ā 'ana o ke ahi, 'ai 'ia ke ahi i oxygen. Iā lākou e ninini i carbon dioxide i loko o ke pā halihali, ua pau ka oxygen. 'A'ohe oxygen no ke ahi no laila ua pio nō ke ahi.
7. E wehewehe, ho'okumu nā lua pele i carbon dioxide a noho ia i kekahi manawa i nā awāwa a i 'ole kekahi pā wahi. Inā komo kekahi kanaka a i 'ole kekahi holoholona i kēia wahi, hiki ke make ma muli o ka oxygen 'ole.
8. E noi i nā haumāna e ho'okō i ka Pepa Ha'awina Haumana: "Carbon Dioxide." E wehewehe pono nā kōkua a me ke ahi mai ka ihoiho i oxygen e ola. 'Umi ka hanu o nā kōkua ma muli o ka oxygen 'ole i pau 'ia e ka CO₂.



Ka Ha'awina Hou A'e: E noi i nā haumāna e pua'i mana'o i nā ki'ina hana i hiki ke ho'ohana e pale i kekahi pō'ino e like me ka wahi 'o Lake Nyos, e wehewehe 'ia ma ka Pepa 'Ike Haumana. E kūkākūkā i nā mea maika'i a me nā mea maika'i 'ole o kēia mau mana'o a ho'oholo i nā mea kūpono. **One method being used to release carbon dioxide still residing at the bottom of Lake Nyos and Lake Monoun (ua make 37 mau kōkua i kēia loko) is to release the gas in small quantities. The plan involves sinking five-inch pipes from floating platforms deep into the lake, then pumping the carbon dioxide saturated water up to the surface, releasing the gas slowly, rather than all at one time.**

Ka Pō'ino O Carbon Dioxide

Ma ka lā 26 o 'Aukake i ka makahiki 1986, ua make 1,700 mau kānaka ma muli o carbon dioxide. Ua noho nā kānaka i kekahi awāwā ma lalo o ka loko 'o Nyos i Cameroon ma Africa. Aia ka loko 'o Nyos i loko o ka lua pele kahiko. Ua ho'oku'u ka pō'ino o carbon dioxide ma ka pele maka i loko loa o ka Honua a aia ka pō'ino o carbon dioxide i loko o ka wai. Waiho 'ia ka pō'ino o carbon dioxide ma ka lalo o ka loko 'o Nyos. 'O'i aku ka pa'apū o ka wai me ka pō'ino o carbon dioxide ma muli o ka wai me ka pō'ino o carbon dioxide 'ole.

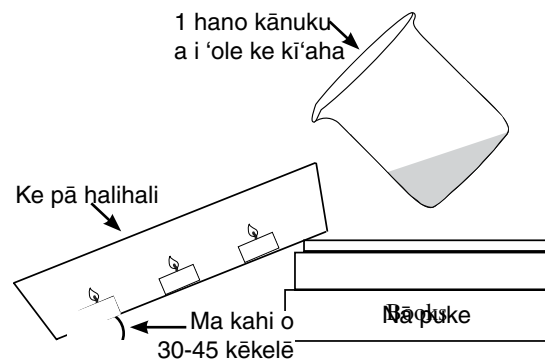
Ua mana'o nā kānaka, 'o nā hāne'e mauna ke kumu no ka pi'i a'e o carbon dioxide mai ka lalo o ka loko 'o Nyos i ka 'iliwai. Ua ho'oku'u o carbon dioxide mai ka wai o ka loko i ka pō. 'O'i aku ke kaumaha o carbon dioxide ma mua o oxygen, a ua holo ke kinoea make i ke awāwā kokoke i ka loko, ua 'umi nā kānaka a me nā holoholona a pau o ia wahi.



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Nā Kuhikuhi:

1. E kau i nā ihoiho 'ekolu i kekahi lālani i ke pā halihali. Pa'a i hola nā ihoiho me ke kalē. E ho'ā i nā ihoiho a laila e hene ana ke pā halihali ma luna o kekahi mau puke.
2. E ninini i ka pauka koka (baking soda) i loko o ka hano kōnuku, a laila ninini i ka wīneka (vinegar) i loko o ke pā halihali. Ua ho'okumu ka mea fizzing i carbon dioxide.
3. I ka fizzing o ke kinowai, e kāhuli i ka hano kōnuku me ke akahēle ma kahi o ka māhele ki'eki'e o ke pā halihali. E ninini ana ke kinoea carbon dioxide kūnalohia i ke pā halihali. Mai ninini i ke kinowai a i 'ole ka fizz i loko o ke pā.
4. E nānā pono i ka hana o nā ihoiho ke hiki mai o carbon dioxide i nā ihoiho.



Nā Nīnau Haumāna:

1. E kahalina i ka pane pololei: 'Oī aku ka (pa'apū nui / pa'apū li'ili'i) ma mua o oxygen.
2. Pololei a i 'ole Pololei 'ole: Puka mai ka pō'ino o carbon dioxide i loko o ka lua pele, he kinoea make.
3. Pololei a i 'ole Pololei 'ole: Hiki i nā kānaka ke 'umi i nā awāwa me carbon dioxide i ho'oku'u 'ia e ka lua pele.