|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Sample Number** | **Name of substance(s) in the sample** | | **Chemical Formula** | **Check one description that fits each model.** | | | | |
| **Covalent network structure** | **Individual atoms** | **Individual molecules** | **Ionic crystal** | |
| 1 | diamond | | C |  |  |  |  | |
| 2 | graphite | | C |  |  |  |  | |
| 3 | natural gas contains | methane |  |  |  |  |  | |
| ethane |  |  |  |  |  | |
| 4 | table salt contains | sodium chloride | What is the repeating pattern? Show the simplest ratio of ions.\_\_\_\_\_\_\_\_\_\_\_  This is called a formula unit. |  |  |  |  | |
| 5 | propane | |  |  |  |  |  | |
| 6 | sand contains | silicon dioxide | SiO2 |  |  |  |  | |
| calcium carbonate | CaCO3 |  |  |  |  | |
| 7 | air contains | nitrogen |  |  |  |  |  | |
| oxygen |  |  |  |  |  | |
| water vapor |  |  |  |  |  | |
| carbon dioxide |  |  |  |  |  | |
| argon |  |  |  |  |  | |
| **Sample Number** | **Name of substance(s) in the sample** | | **Chemical Formula** | **Check one description that fits each model.** | | | | |
| **Covalent network structure** | **Individual atoms** | **Individual molecules** | | **Ionic crystal** |
| 8 | salt water contains | water |  |  |  |  | |  |
| sodium chloride |  |  |  |  | | ✔The crystal is broken up into ions. |
| 9 | oxygen | |  |  |  |  | |  |
| 10 | steel contains | iron |  |  |  |  | |  |
| chromium |  |  |  |  | |  |
| nickel |  |  |  |  | |  |
| 11 | ice | |  |  |  | ✔Ice makes a crystal with a repeating pattern of molecules held together by attractions called “hydrogen bonds.” | |  |
| 12 | rubbing alcohol contains | water |  |  |  |  | |  |
| isopropanol |  |  |  |  | |  |
| 13 | aluminum | |  |  |  |  | |  |
| 14 | gatorade contains | water |  |  |  |  | |  |
| glucose |  |  |  |  | |  |
| 15 | gasoline contains | octane |  |  |  |  | |  |
| heptane |  |  |  |  | |  |
| 16 | sand and water mixture contains | silicon dioxide |  |  |  |  | |  |
| calcium carbonate |  |  |  |  | |  |
| water |  |  |  |  | |  |

**Pre-activity Questions**

1. What is the difference between an atom and a molecule? Make a drawing to support your answer.
2. What is the difference between an atom and an ion? Make a drawing to support your answer.
3. What is an ionic crystal lattice? Make a drawing to support your answer.

**Procedure**

* Go to each station and observe the actual sample of matter and the corresponding model.
* Fill in any blanks in the column for chemical formula.
* For each substance listed, check one box that describes the model.
* Do the post-activity questions *after* completing the chart.

**Post-activity Questions**

1. a. Which samples are elements? (Hint: there are 4 of them.)
2. How can you tell by looking at the models?
3. Make a drawing to support your answer.
4. a. Which samples are compounds? (Hint: there are 3 of them.)
5. How can you tell by looking at the models?
6. Make a drawing to support your answer.
7. a. Which samples are mixtures? (Hint: there are 9 of them.)
8. How can you tell by looking at the models?
9. Make a drawing to support your answer.

4. Fill in the blanks.

a. Substances made of small molecules are usually in the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ phase. (solid, liquid, or gas?)

b. Substances made of giant covalent networks are usually in the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ phase.

c. Substances made of ionic crystals are usually in the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ phase.