

CHEMISTRY “PROPORTIONALITIES” ACTIVITY

Have you heard the terms *directly proportional* and *indirectly (inversely) proportional* before? In everyday life we deal with these *relationships* all the time, without noticing it. It's not difficult... it's really an easy way to express *trends*.

Directly proportional means that each variable (term, thing) *increases* at the *same time* or *decreases* at the *same time*. Here are some examples.

- 1) Let M = “money” and let S = “soda you can buy.”
(The *more* money you have, the *more* sodas you can buy).
(The *less* money you have, the *less* sodas you can buy).
As M increases, S increases. As M decreases, S decreases.
M and S are ***directly proportional***. **M α S**
(Remember the α sign means “proportional.”)
- 2) Let G = “gasoline in the car's tank” and P = “places you can go.”
(The *more* gas that's in the car, the *more* places you can go without worrying you're on empty).
(The *less* gas that's in the car, the *less* places you can go).
As G increases, P increases. As G decreases, P decreases.
G and P are ***directly proportional***. **G α P**

The second type of proportionality is the opposite of the first. It is possible for two variables (terms, things) to differ. As one *increases*, the other *decreases* at the *same time*, and vice versa. This is called ***indirectly proportional*** or ***inversely proportional***. Here are some examples.

- 3) Let O = “oversleep” and T = “time to get ready for school.”
(The *more* you oversleep, the *less* time you have to get ready for school).
(The *less* you oversleep, the *more* time you have to get ready for school).
As O increases, T decreases. As O decreases, T increases.
O and T are ***indirectly (inversely) proportional***. **O α 1/T**
- 4) Let R = “rain” and D = “dry ground area.”
(The *more* it rains, the *less* dry ground area exists).
(The *less* it rains, the *more* dry ground area exists).
As R increases, D decreases. As R decreases, D increases.
R and D are ***indirectly (inversely) proportional***. **R α 1/D**

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YOUR ASSIGNMENT

Procedure

- 1) On your own paper, write out **FIVE directly proportional relationships** and **FIVE indirectly proportional relationships**. Keep them in separate categories; don't mix them up.
- 2) Five of the relationships have to be about science and five can be about any topic, as long as they are in good taste!
- 3) Follow this format:
 - a. Write what the two variables are, assigning them letters
 - b. For the science relationships, define each variable
 - c. Write how they change
 - d. Is the relationship directly or indirectly proportional?
 - e. Write the relationship in symbols

SCIENCE EXAMPLE SETUP:

- a. W = wavelength and F = frequency
- b. wavelength—the distance between two equivalent points in a wave
frequency—the speed of a wave, measured in cycles per second or Hertz
- c. If W increases, F decreases ($W\uparrow, F\downarrow$). If W decreases, F increases ($W\downarrow, F\uparrow$).
- d. indirectly proportional
- e. $W \propto 1/F$