

Are you a toxicant?

To introduce this activity, the instructor should first introduce the idea of what a toxicant is.

Each student receives a card with a chemical, description, and picture. Provide students several minutes to read over their card and think critically about whether they are a toxicant or not. Ask students that believe they are a toxicant to move to one side of the room and students that think they are not a toxicant to the other side of the room.

After the students have separated themselves give them the chance to describe why they believe they are a toxicant. Guiding topics and questions to guide the conversation for this activity include:

- Why do you [or do you not] think you are a toxicant?
- Discussing how medications can have positive effects at low doses, but lethal if over-dosed. (Motrin and Tylenol are easily understood examples of this.)
- Understanding that even things necessary for life can be toxic at high doses, such as water.
 - What happens if you drink too much water? Can that be lethal? Does that make water a toxicant?
 - At this point students will generally start to question whether they are a toxicant or begin to change their definition.

Next, reveal to the students that all of them can be toxicants, in the right dose. Talk about Paracelsus, the father of modern toxicology, and explain that “The dose makes the poison”.

Rank the toxicants

After the students have discovered they are all toxicants and understand dose-response concepts, have them order themselves from least to most toxic based on what they know about the toxicant they are and what is on each toxicant card. Give them plenty of time. If there is a disagreement, put it to a vote.

After the students have decided upon an order, reveal the correct order. Call out the least toxic (e.g. Start with water) and give the LD50 provided below. Continue until you have ordered all the toxicants. Compare this order to the order the students gave. Discuss with the students anything interesting they found out.

Upon completion, also ask the students what assumptions were made when they order the toxicants from least to most toxic. For example, they assumed the same model organism (in this case, all LD50s came from rats and/or mice), the same route of exposure (in this case it was oral), the same time of exposure (time of day, time during development), etc.

Compound	LD50 (orally administered to rats and mice), g /kg body weight	Rank (most toxic to least toxic)
Water	>90	24
Sugar	29.7	23
Vitamin C	11.9	22
Lactose	10	21
Alcohol	7.06	20
Table Salt	3	19
Poly chlorinated biphenyls (PCBs)	2	18
Acetaminophen	1.944	17
Arsenic	0.763	16
Ibuprofen	0.636	15
Aspirin	0.2	14
Caffeine	0.192	13
DDT	0.135	12
Uranium	0.114	11
Thiopental sodium	0.064	10
Capsaicin	0.0472	9
Vitamin D3	0.037	8
Chlorotoxin	0.0043	7
Nicotine	0.0034	6
Dioxin	0.001	5
Aflatoxin B1	0.00048	4
Agent Orange	0.00002	3
Batrachotoxin	0.000002	2
Shiga Toxin	0.00000002	1