

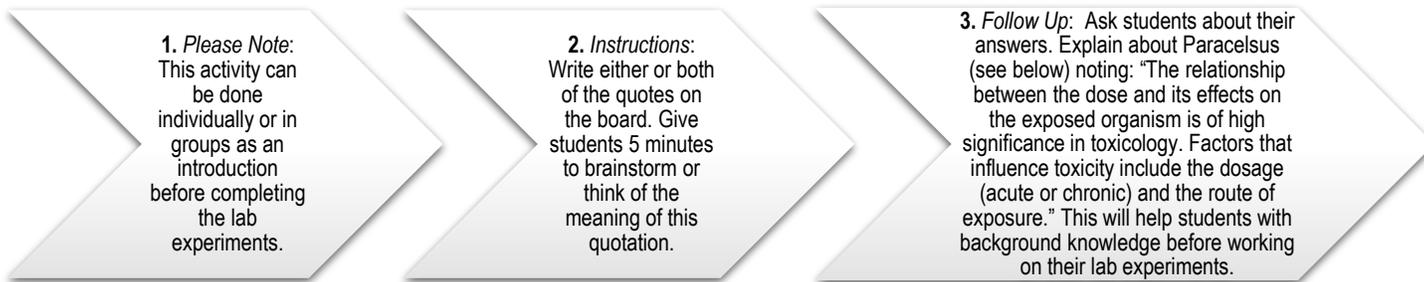


Purpose: To introduce to students to the key quotation that led to the development of Toxicology and its meaning.

Timeline:
20 Minutes

Learning Goal 1

Educators Instructions:



Quotations:

Original Quote

- *"All things are poison, and nothing is without poison; only the dose permits something not to be poisonous."*
--- Paracelsus (1493-1541)

Shortened Quote

- *"The dose makes the poison."*
--- Paracelsus (1493-1541)

Reference Information – Biography of Paracelsus

Use the information below to help your explanation to students about toxicology and its relationship with dose as well as exposure.

Source: Borzelleca, Joseph F. (2000-01-01). "Paracelsus: Herald of Modern Toxicology". *Toxicological Sciences* 53 (1): 2–4.

Full Name: Philippus Theophrastus Aureolus Bombastus von Hohenheim

A contemporary of Leonardo da Vinci, Martin Luther, and Nicholas Copernicus, Paracelsus was born in 1493 and died in 1541. He became an expert in occupation medicine thanks to the influence of his father, who was a chemist. He grew up in a home environment where chemistry and biology were paramount.

Paracelsus espoused the position that "a poison in the body would be cured by a similar poison, but the dosage is very important." Although he wrote that "nature hints at cures," there was a lack of knowledge and he felt that many herbal preparations lacked sufficient potency to treat current diseases.

Paracelsus extended his interest in chemistry and biology to what we now consider toxicology. He very clearly expounded the concept of dose response in his Third Defense, where he stated that "Solely the dose determines that a thing is not a poison." This was used to defend his use of inorganic substances in medicine. Paracelsus also encouraged the use of experimental animals to study the effects of chemicals for both beneficial effects and to identify toxic effects. As in medicine, the influence of Paracelsus on toxicology was enormous.

Learning Activity: Meaning of a Quotation

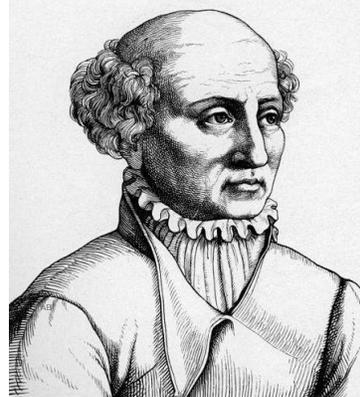


Environmental Toxicology is a part of the broader discipline of Toxicology. Before we delve deeper into Environmental Toxicology, it is important to understand the origins and meaning of Toxicology.

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The father of Toxicology, Philippus Theophrastus Aureolus Bombastus von Hohenheim, better known as Paracelsus.

Instructions: In front of the class will be a quote or quotes that Paracelsus wrote. Take five minutes and think about the meaning behind the quote in relation to Toxicology.

Follow Up: Your educator will facilitate a class discussion. Think about some of the thoughts in class that you hear and make your notes below. It is important to understand the meaning of Paracelsus because it will guide your thoughts while completing the lab experiments.