

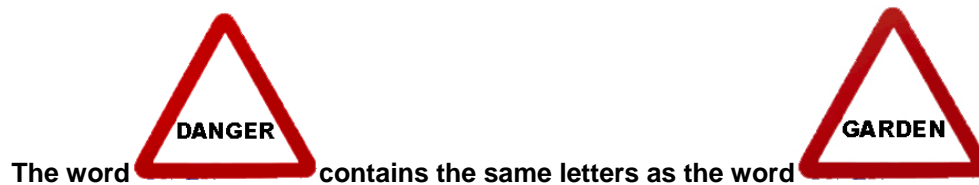
Plants that poison, plants that cure

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Introduction

The aim of this poster is to highlight the fact that many medicinal plants are also poisonous - many of these plants are reasonably common in our botanic gardens (e.g. *Digitalis* spp., *Ricinus* spp., *Atropa belladonna*, *Taxus* spp., *Papaver somniferum*). It also provides a number of teaching ideas on this subject – visually and with text.



A poison in a small dose is a medicine, and a medicine in a large dose is a poison.
— **Alfred Swaine Taylor, 19th-Century toxicologist.**

Curriculum links

1. Literature/literacy/etymology

Poison *n.*

1. A substance that causes injury, illness, or death, especially by chemical means.
2. Something destructive or fatal.

The word 'Poison' is linked to 'Potion' The source for both words is Latin *Pōtiōnem*, which means "the act of drinking, a drink, or a draft, as of a medicine or poison."

Cure *n.*

1. Restoration of health; recovery from disease.
2. A method or course of medical treatment used to restore health.
3. An agent, such as a drug, that restores health; a remedy.

The word comes from the Latin *Cûra* meaning "care, concern, trouble, attention"

The words **toxic** and **toxin** originate from *Taxus*, the Yew tree whose strong, flexible branches were made into archery bows and the arrows dipped into the tree's poisonous sap: from the Latin *toxicum* "poison," and from Gk. *toxikon* "(poison) for use on arrows," and thus to a bow, from *toxon* "bow," probably from a Scythian word that also was borrowed into Latin as *taxus* "yew."

- Shakespeare, *Romeo & Juliet* – “Within the infant rind of this small flower, poison hath residence and medicine power.”
- Shakespeare, *Henry IV* – “In poison there is physic.”
- Common names of plants can be misleading and dangerous (since more than one plant may have the same name), hence the need for scientific names which are Latin. Grigson lists many regional common names for plants which often give an indication of their properties, uses and effects: e.g. *Conium maculatum* (hemlock) is also known as ‘break-your-mother’s-heart’ in Dorset; *Atropa belladonna* (deadly nightshade) is also known as ‘Satan’s cherries’ in Yorkshire.
- J.K Rowling’s ‘*Harry Potter and the chamber of secrets*’ mentions the harvesting of mandrake (*Mandragora* spp.) roots and the precautions one must take to avoid ill effect.

2. History

- In 399 B.C. Socrates was found guilty of “refusing to recognize the gods recognized by the state” and “of corrupting the youth.” His penalty was self-induced execution by drinking hemlock (*Conium maculatum*).
- Origins of plants – dates of arrival in Britain: (e.g. *Papaver somniferum* arrived in Britain before 1000 A.D.) – this also links with geography (plant travel routes)
- Ricin in the news Georgi Markov (1978) and Al Qaeda (2005), Headline: “*Ricin terror gang 'planned to unleash terror on the Heathrow Express'*” – Daily Telegraph, 17.4.05
- Ancient doctors were called ‘Poisoners’
- Opium wars in China (1839-42 and 1856-60) – during which 25% of the Chinese population became addicted to opium.

3. Botany

Why do plants contain these chemicals in the first place? – one of the reasons is plant self-defence against herbivores. Certain plant parts are more associated with these potent secondary compounds than others. Roots tend to have higher concentrations of these than other plant parts (Greek purveyors of medicinal herbs were known as ‘Root diggers’).

“As potential human medicines, the diverse secondary compounds that contributed to angiosperm survival long before the start of human evolution may now secure our future as well.” – Judith Sumner, 2000.

4. Medicine

- Herbal, homoeopathic and pharmaceutical medicines all feature plants which have the poison/cure duality. But how did we find out that certain plants heal and also what the correct dose was in the first place?
 - Through trial and error

- Finding a cure using divination as in the case of the Tarahumara ‘Indians’ of Northern Mexico
- Approximately 120 prescription drugs are derived from plants, and these drugs come from only 95 plant species.
- A major turning point away from herbal medicine and a step towards pharmacology was the discovery of the powerful action of chemicals in *Digitalis* spp. By William Withering in the 1780’s (although it was mentioned in herbals as early as 1250 A.D.).

A brief history of medicine

2000 B.C. - Here, eat this root.

1000 A.D. - That root is heathen. Here, say this prayer.

1850 A.D. - That prayer is superstition. Here, drink this potion.

1940 A.D. - That potion is snake oil. Here, swallow this pill.

1985 A.D. - That pill is ineffective. Here, take this antibiotic.

2000 A.D. - That antibiotic is artificial. Here, eat this root

Author unknown

5. Folklore

Whoever spread the rumour that you would die of fright if you heard the Mandrake root scream when pulled from the ground was possibly responsible for the survival of that species to this day, since it was a sought after commodity due to its powerful anaesthetic properties and over-harvesting may have caused extinction. (Conservation propaganda, based upon a gullible society?) Species including *Hydrastis Canadensis* (Goldenseal) are being over-harvested in the wild – highlighting the need for sustainable herb farms.

6. Taxonomy

To introduce taxonomic skills, a good plant family to focus on is Solanaceae, since students will already be familiar with many of its members (tomato, potato, chilli, aubergine, capsicum), but might not know so much about their poisonous cousins (belladonna, henbane, woody nightshade, tobacco, *Datura*).