



All About Wicking Beds

Greenplanet Energy Analytics

What is a Wicking Bed?

A wicking bed is a type of raised garden bed that sits above ground and is “self watering”. It has a built in water reservoir at the bottom that provides all the water that the plants need for 3-4 weeks.

How it Works

- In a wicking bed, water travels or “wicks” up from a water reservoir to where the plant roots are.
- Some wicking beds have a reservoir full of gravel or other media which acts in the same way that a sponge works when soaking up water; the bottom of a sponge “pulls” water up from the counter top.

This is known as “capillary action”.

- Some wicking beds don’t use media, they just have a way to hold the soil above the water reservoir and some form of wick (soil, fabric, etc.) to pull the water up.



stock.adobe.com/ca/free

Basic Design

A wicking bed is made up of:

- A container - often made of wood but other containers are possible (like food grade plastic bins or buckets.)
- Waterproof liner, if needed.
- PVC pipe that extends from the surface of the soil and down into the water reservoir. (You can also use flexible perforated pipe.)
- Washed gravel to fill the water reservoir - 4” or more depending on the size of the bed. You can also use plastic containers instead of gravel to suspend the soil.
- Landscape fabric laid over the gravel.
- Above the fabric goes 20-35 cm of soil.
 - The layer of soil should not be too deep otherwise the water may not wick far enough from the reservoir.
 - Use a balanced soil mixture; 66% peat moss/vermiculite mix (seedling starter) and 33% compost (if using indoors, purchase the compost to avoid insects.)
- A bulkhead fitting (drainage hole) inserted into the side of the box, level with the top of the water reservoir to keep the water at the correct level just below the soil.

Capillary Action - the ability of a liquid to flow in narrow spaces even against gravity. It is caused by the attraction between the molecules of the liquid and the solid. These forces are weak so the space has to be small.



shutterstock_755638363

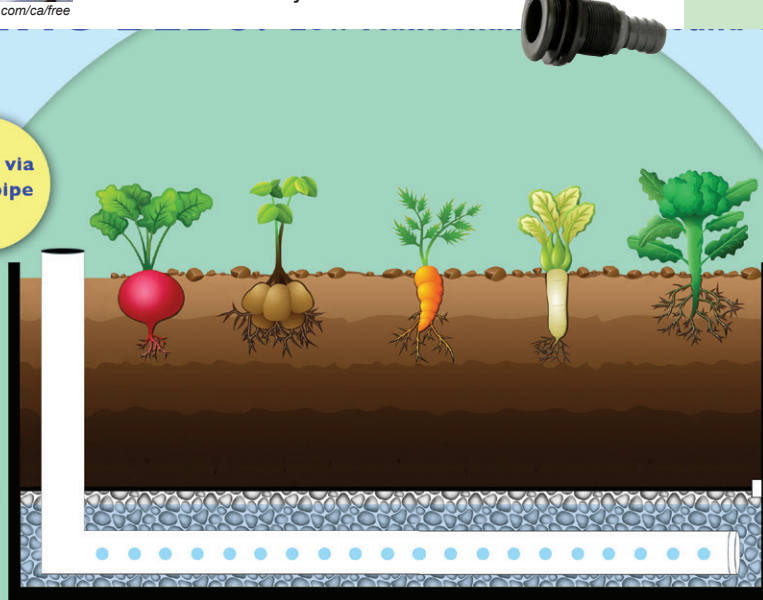
The effect can be seen when water is pulled up into a paper towel.

This is also how living cells can move liquids like plants pulling water up from their roots.

- Easy to use
- Low cost
- Conserves water
- Low maintenance
- Water every 2-3 weeks
- Use outdoors or indoors

Water via standpipe

Water wicks up from the gravel reservoir and into the soil via capillary action



Water exits via bulkhead when reservoir is full (stop filling!)

Greenplanet Energy Analytics

Benefits

- Ease of Use
 - To fill the reservoir, simply pour water down the pipe.
 - Stop filling the reservoir when water begins to exit from the bulkhead/drain fitting.
 - You will only need to fill the reservoir once every few weeks depending on the size - "Vacation safe".
- Low maintenance, add mulch so no weeding
- Uses less water than traditional gardening
- No electrical parts



Greenplanet Energy Analytics



Sea to Sky Botanics

and one tablespoon of all purpose slow release organic fertilizer per square foot should do. (Avoid using synthetic fertilizers - they harden the grow mix over time.)

- Bugs can become a problem with any form of gardening, especially indoors, so you will need to frequently inspect your plants for pests such as aphids.

More Ideas

A DIY Guide to Wicking Beds - Permaculture Research Institute
<https://www.permaculturenews.org/2011/06/20/from-the-bottom-up-a-diy-guide-to-wicking-beds/>



How to Make DIY Water-Efficient, Wicking Beds With Upcycled Materials - One Green Planet

<https://www.onegreenplanet.org/lifestyle/diy-water-efficient-wicking-bed-upcycled-materials/>



Build Your Own Self Watering Containers - Grow a Good Life

<https://growagoodlife.com/constructing-18-gal-self-watering-containers-swc/>



Video: Building a self watering container - BalconyGrow

<https://www.youtube.com/watch?v=3INoLKg555w&t=5s>



Video: How to make a Global Bucket

https://www.youtube.com/watch?v=AXEgJXec_Zk



What is Easy to Grow

- As with any form of growing, herbs and leafy greens are the easiest to grow in a wicking bed.
- Root crops and fruiting crops can also be grown.
- Beets and tomatoes are easy varieties to begin with.

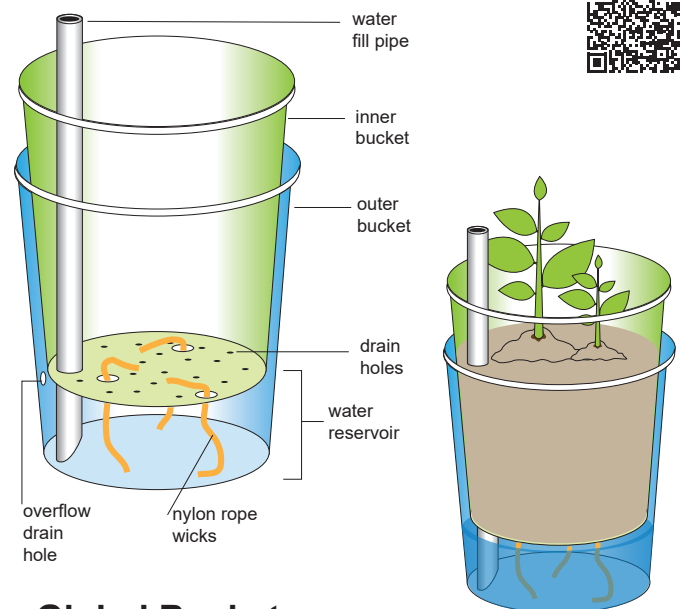
Indoor Wicking Beds

- Wicking beds can be used indoors during winter or all year round if you do not have access to an outdoor growing space.
- If you would like to make your wicking bed portable, you can add wheels or just use smaller containers.
- If you are using your wicking bed during the winter or do not have access to a bright window in summer, you will likely need a "full spectrum grow light".
 - Construct a framework to support the lights above the bed. Strip lighting is best.
 - Determine how many lights you need; low light plants generally refers to leafy greens and high light plants refers to fruiting crops (tomatoes, peppers).
 - LED grow lights give maximum light for minimal energy.



Using a Wicking Bed

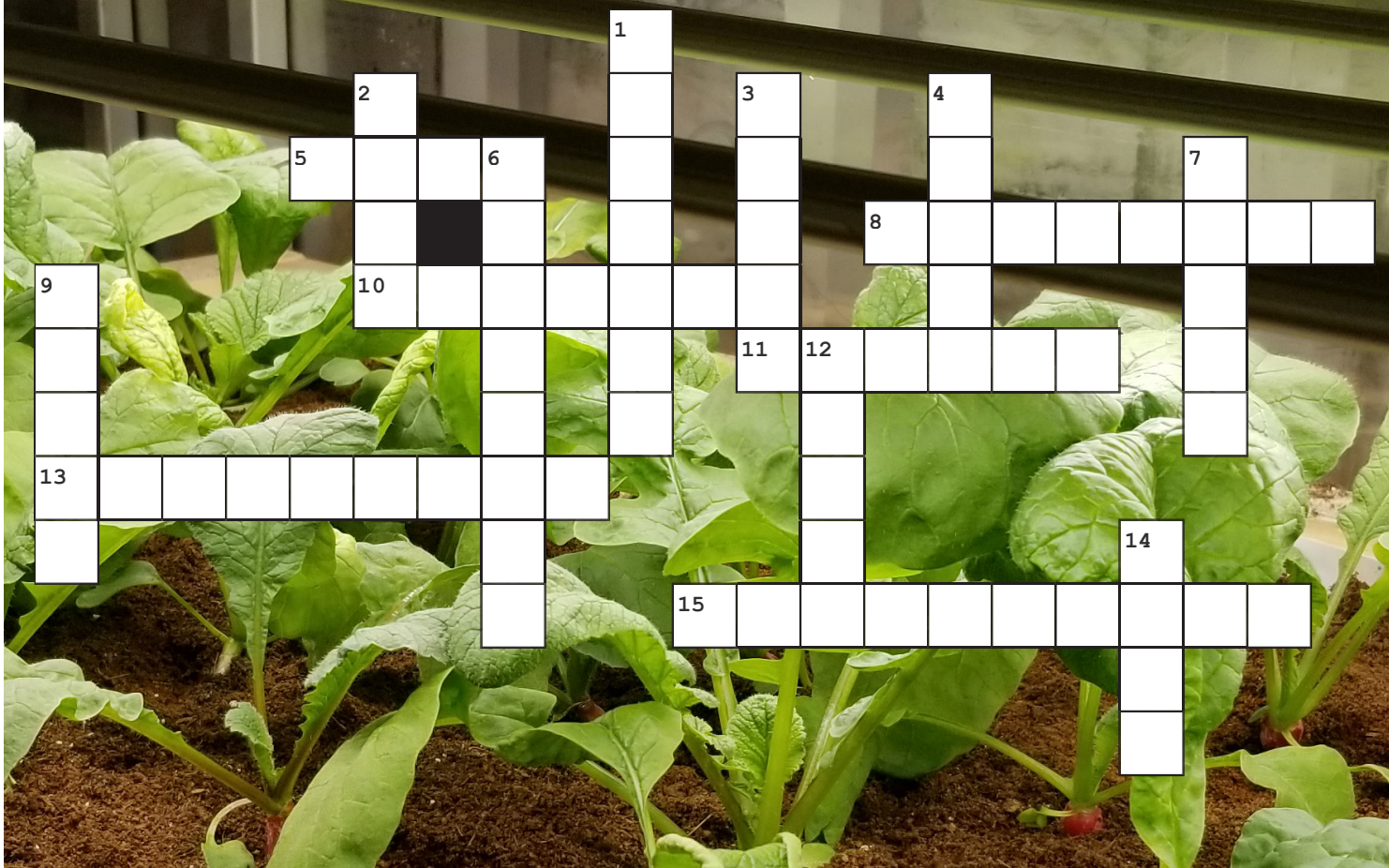
- In order to "activate" wicking action you will need to pre-soak your soil before filling the water reservoir.
- Add fertilizer to your wicking bed approximately every 2-3 months (after each harvest of crops). Generally speaking, a handful of organic compost per square foot



Global Bucket using wicks

Greenplanet Energy Analytics

All About Wicking Beds



Across

5. Wicking beds use __ water than traditional gardening
8. A wicking bed is self __
10. You will need to __ your potting mix before filling the water reservoir
11. Potting mix pulls water up from the bottom like a __
13. Water being pulled up in a sponge is called __ action
15. Wicking beds have built in water __

Word Bank

capillary • deep • drain • indoors • less • liner • mulch • pests • pipe • presoak • reservoirs • spectrum • sponge • watering • weeks

Down

1. Wicking beds can be used __ during winter
2. The potting mix should not be too __ otherwise the water may not wick far enough
3. Wicking beds have enough water for 3 to 4 __
4. This is put through the side of the container to keep the water at just the right level below the potting mix
6. If you do not have a bright window for the wicking bed, you will likely need a full __ grow light
7. If a wicking bed is not waterproof, it will need a __
9. This is layered across the top to prevent weeds growing and moisture escaping
12. Frequently inspect your plants for __
14. Water is added to wicking beds through a __

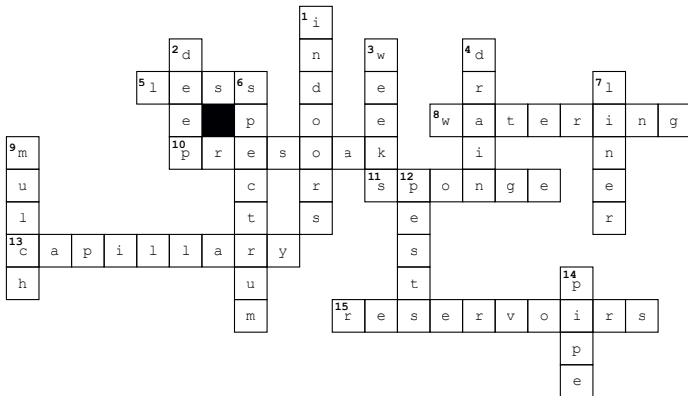
Teacher Notes: ALL ABOUT WICKING BEDS

Included in this package:

- All About Wicking Beds - 2 page fact sheet
- Wicking Bed Crossword Puzzle
- This resource page with answer keys and ideas.
- Alberta curriculum ties

Answer Keys

Wicking Bed Crossword



More Ideas

A DIY Guide to Wicking Beds - Permaculture Research Institute

<https://www.permaculturenews.org/2011/06/20/from-the-bottom-up-a-diy-guide-to-wicking-beds/>

How to Make DIY Water-Efficient, Wicking Beds With Upcycled Materials - One Green Planet

<https://www.onegreenplanet.org/lifestyle/diy-water-efficient-wicking-bed-upcycled-materials/>

Build Your Own Self Watering Containers - Grow a Good Life

<https://growagoodlife.com/constructing-18-gal-self-watering-containers-swc/>

Videos to See

Video: Building a self watering container - BalconyGrow

<https://www.youtube.com/watch?v=3INoLKg555w&t=5s>

Video: How to make a Global Bucket

https://www.youtube.com/watch?v=AXEgJXec_Zk

Wicking Bed Diagram

- Top layer of potting mix where mulch goes
- Waterproof liner
- Fill pipe
- Drain (bulkhead fitting)
- Wick (using a SIP sub irrigation system)
- Water reservoir
- Wooden frame

For More Information

Visit www.3NE.ca/Learning



Wicking beds in the sea-can at the Fort Chipewyan Community High School, Alberta

Teacher Notes: Wicking Beds Curriculum Connections

7	Science	Unit A: Interactions and Ecosystems	- Illustrate how life-supporting environments meet the needs of living things for nutrients, energy sources, moisture, suitable habitat, and exchange of gases
		Unit B: Plants for Food and Fibre	-Investigate plant uses; and identify links among needs, technologies, products and impacts -Investigate life processes and structures of plants, and interpret related characteristics and needs of plants in a local environment -Analyze plant environments, and identify impacts of specific factors and controls - Describe methods used to increase yields, through modifying the environment
8	Science	Topic E: Freshwater and Saltwater Systems	- Recognize that fresh water and salt water contain varying amounts of dissolved materials, particulates and biological components; and interpret information on these component materials - Analyze human impacts on aquatic systems; and identify the roles of science and technology in addressing related questions, problems and issues
		Unit C: Environmental Chemistry	- Investigate and describe, in general terms, the role of different substances in the environment in supporting or harming humans and other living things
9	Science	Unit C: Cycling of Matter in Living Systems	- Analyze plants as an example of a multicellular organism with specialized structures at the cellular, tissue and system levels
		Unit D: Energy Flow in Global Systems	- Explain the response of humans to impacts on climate change
14	Science	Unit C: Investigating Matter and Energy in the Environment	- Describe the relationship between photosynthesis and cellular respiration in terms of biological energy storage - Identify life functions common to living systems
		Unit D: Investigating Matter and Energy in the Environment	-Assess the impact of modern agricultural technology on the natural pathways of recycling matter -Explain how various factors influence the size of populations -Describe the relationship between land use practices and altering ecosystems
20	Science	Unit D: Changes in Living Systems	General Outcome 3: Students will analyze and describe the adaptation of organisms to their environments, factors limiting natural populations, and evolutionary change in an ecological context.
30	Science	Unit D: Energy and the Environment	General Outcome 1: Students will explain the need for balancing the growth in global energy demands with maintaining a viable biosphere.

Gr. 10 - 12 CAREER AND TECHNOLOGY STUDIES Trades, Manufacturing & Transportation (TMT)

The focus of the TMT cluster is for students to develop and apply important knowledge, skills and attitudes relative to the manufacture and assembly of products from individual components and the processing of raw materials into products.

Introductory level courses help students build daily living skills and form the basis for further learning. Pathways permit students to:

- explore an occupation or an interest area
- gain an occupational or a specialized skill set required in the workplace
- apply relevant learning from academic courses to real-life situations
- focus their senior high school course plans into a career path.