

WONDERY
KIDS

LIGHT-UP TERRARIUM

WOW-TO
GUIDE



GLOW!

WARNING — Science Education Set. This set contains chemicals and/or parts that may be harmful if misused. Read cautions on individual containers and in manual carefully. Not to be used by children except under adult supervision.

WOW
IN THE
WORLD

THAMES & KOSMOS





SAFETY INFORMATION



WARNING! Not suitable for children under 3 years. Choking hazard — small parts may be swallowed or inhaled.
Strangulation hazard — long cord may become wrapped around the neck.

Keep the packaging and instructions as they contain important information.
Clean all equipment and utensils thoroughly after use.

⚠ WARNING: This product contains a button cell or coin cell battery. A swallowed button cell or coin cell battery can cause internal chemical burns in as little as two hours and lead to death. Dispose of used batteries immediately. Keep new and used batteries away from children. If you think batteries might have been swallowed or placed inside any part of the body, seek immediate medical attention.

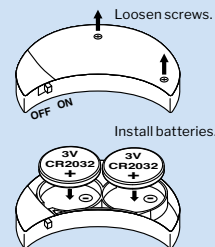
Safety and disposal instructions for the device and batteries:

- To operate the device, you will need two CR2032 coin cell batteries (3-volt), which are included. Remove the protective cover from around the switch before first use.
- An adult should insert and change the batteries.
- Avoid a short circuit of the batteries. A short circuit can cause the wires to overheat and the batteries to explode.
- Different types of batteries or new and used batteries are not to be mixed.
- Do not mix old and new batteries.
- Do not mix alkaline, standard (carbon-zinc), or rechargeable (nickel-cadmium) batteries
- Batteries are to be inserted with the correct polarity (+ and -). Press them gently into the battery compartment. See the diagram to the right. Always close the battery compartment with the cover after changing the batteries.
- Non-rechargeable batteries are not to be recharged. They could explode!

- Rechargeable batteries are only to be charged under adult supervision.
- Rechargeable batteries are to be removed from the toy before being charged.
- Exhausted batteries are to be removed from the toy.
- The supply terminals are not to be short-circuited.
- Dispose of used batteries in accordance with environmental provisions, not in the household trash.
- Avoid deforming the batteries.

Notes on disposal of electrical and electronic components

The electronic components of this product are recyclable. For the sake of the environment, do not throw them into the household trash at the end of their lifespan. They must be delivered to a collection location for electronic waste, as indicated by the following symbol:
Please contact your local authorities for the appropriate disposal location.



Have any questions? Missing any parts? Want to send us donuts?
Our tech support team will be glad to help you!

Thames & Kosmos US
Email: support@thamesandkosmos.com
Web: thamesandkosmos.com
Phone: 1-800-587-2872

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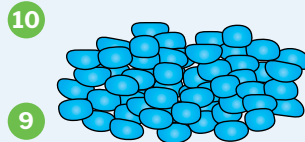
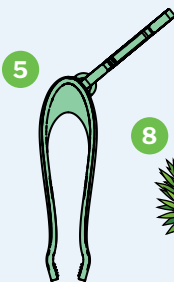
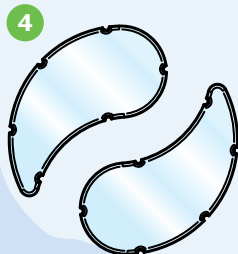
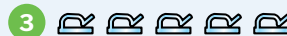
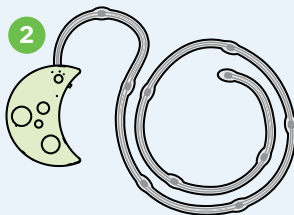
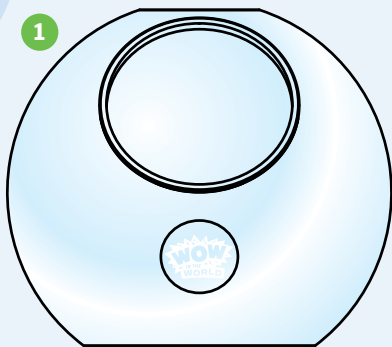
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KIT CONTENTS



Part No.	Description	Quantity
1	Terrarium sphere	1
2	UV LED string lights	1
3	Small clear hooks	5
4	Planters	2
5	Tweezers with clip	1
6	Growing medium pellet (coconut coir)	1

Part No.	Description	Quantity
7	Packet of cress seeds	1
8	Faux plants	2
9	Bag of glowing pebbles (approx. 60)	1
10	Glow-in-the-dark stars sticker sheet	1

YOU WILL ALSO NEED: BOWL, SPOON, WATER



INTRODUCTION

WELCOME TO YOUR LIGHT-UP TERRARIUM WOW-TO GUIDE!



GUY RAZ
(WOW IN THE WORLD HOST)



MINDY THOMAS
(WOW IN THE WORLD HOST)

A TERRARIUM IS SORT OF LIKE AN AQUARIUM, ONLY IT'S FOR PLANTS, NOT FISH.

THIS GUIDE HAS ALL THE INFO YOU NEED TO CREATE YOUR TERRARIUM, BY GROWING PLANTS FROM SEEDS!



AND ALSO HOW TO GIVE IT A GLOW-UP BY ADDING THE LED LIGHTS WE'VE INCLUDED!

AND FOR EVEN MORE WOW, USE THE QR CODE BELOW TO HEAR WOW FACTS FROM US!



SO WHAT ARE WE WAITING FOR?! LET THE GROWING AND GLOWING BEGIN!



Wow in the World is the #1 kids science podcast, hosted by Guy Raz and Mindy Thomas!



Start here!



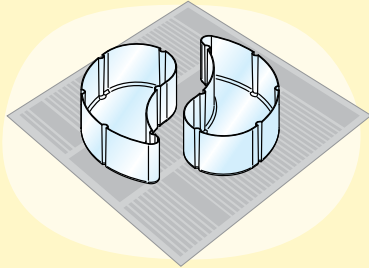
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- 3 Unlock exclusive **Wow Facts** from Guy & Mindy when you see this symbol in the guide!



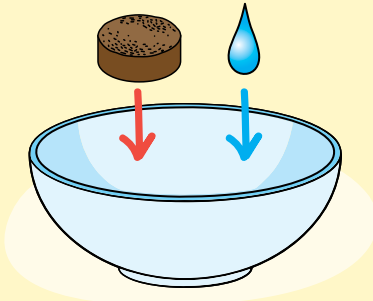
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(Terms and conditions apply. See back of front cover for more details.)

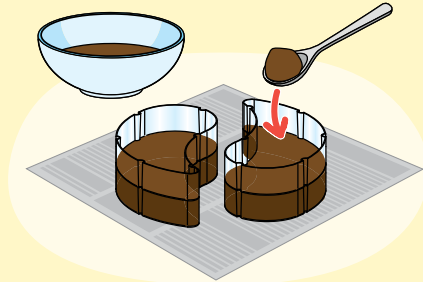
SETTING UP YOUR TERRARIUM



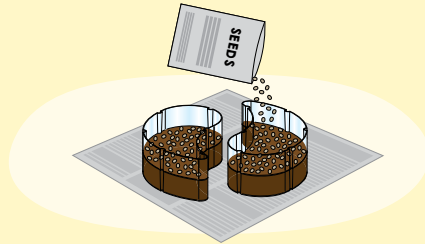
- 1** Place the **two planters** on a level surface with some **newspaper** or **paper towels** under them.



- 2** Place the **coir pellet** in a **bowl**. (Coir is a clean growing medium made from coconut husks that replaces soil.) Fill one of the planters about **half full of tap water**. Pour the water on the coir pellet and watch it start to expand. Add **water** little by little until the coir pellet has **completely expanded**.

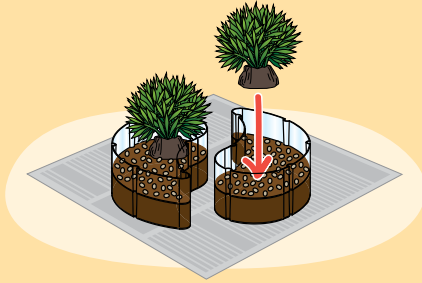


- 3** With a **spoon**, carefully divide the coir growing medium evenly between the **two planters**. It should fill each of them a little less than halfway.

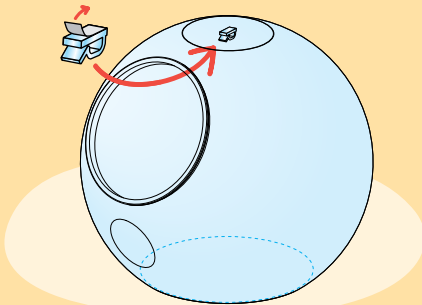


- 4** Cut open the **seed packet**. Sprinkle the **seeds** evenly on the surface of the **wet coir**, pressing them into it. Don't pile the seeds up on top of each other or they will not grow well. You might not need the entire packet of seeds. Add a little more **water** if the coir is not wet.

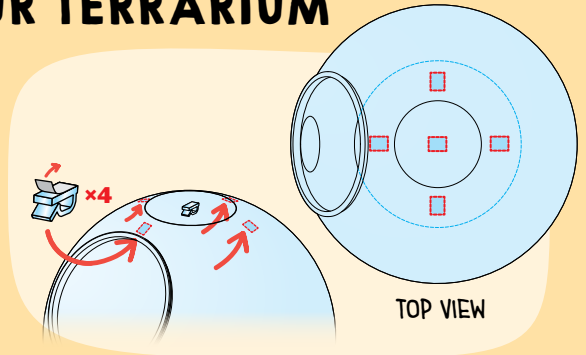
SETTING UP YOUR TERRARIUM



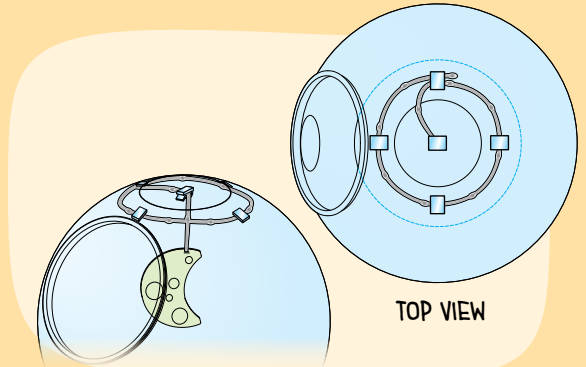
- 5** Place one of the **faux plants** on top of the **coir** in each of the planters. It's okay if they cover some of the seeds. The seeds will grow up around them.



- 6** Peel the **backing** off of the **adhesive** on one of the **plastic hooks** and stick it to the inner surface of the top of the clear **terrarium sphere**, in the very middle, as shown.

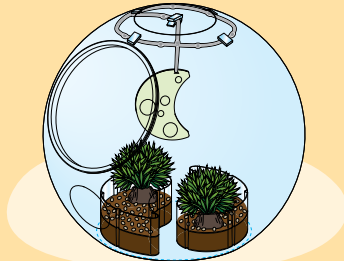


- 7** Stick the remaining **four hooks** evenly spaced in a ring around the inner surface near the top of the terrarium sphere, as shown.



- 8** Hang the **UV LED string lights** on the **hooks**, starting with hanging the **moon** from the **middle hook** and working your way around each clip as shown. The moon should hang down a little from the middle hook.

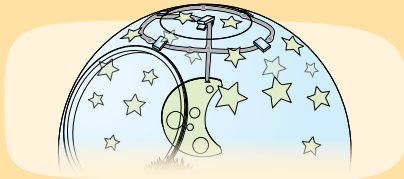
SETTING UP YOUR TERRARIUM



- 9 Place the **terrarium sphere** on a level surface. Carefully place the **two filled planters** inside the terrarium. They will fit nicely in the **circular base**.

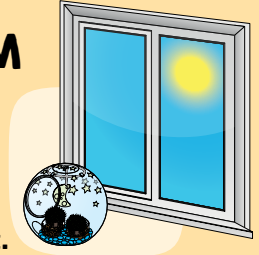


- 10 Arrange the **glowing pebbles** in the spaces around the **planters** in the base of the **terrarium**.



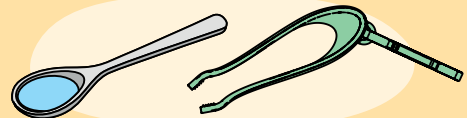
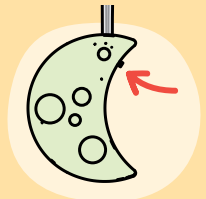
- 11 Stick the **glow-in-the-dark stickers** around the inner and outer surfaces of your **terrarium**.

- 12 Place the **terrarium** near a **window** that gets some **natural light**.



Observe the seeds **daily**. They will likely **germinate** (or sprout and start to grow) in a **day or two**.

- 13 To **turn on the UV LED lights**, remove the **protective cover** from around the **switch** on the side of the moon and slide it to the “on” position. Then read page 8.



- 14 Keep the **soil** in the planters **moist** but not overly wet. You can water it with a **couple of spoonfuls of water every few days**. Use the **tweezers** to adjust things inside the terrarium as needed.

HOW PLANTS GROW



WOW FACT



“Ready, set, grow!”

As long as the **CRESS SEEDS** are dry, they will not **GERMINATE**, or **START TO GROW**. When they come in contact with water, the seeds swell and begin to grow.

GARDEN CRESS is an **ANNUAL FLOWERING PLANT** that is related to watercress and mustard. It is a **FAST-GROWING, EDIBLE HERB** that people use in salads, soups, and sandwiches for its peppery, tangy flavor. People also eat garden cress **SPROUTS**.



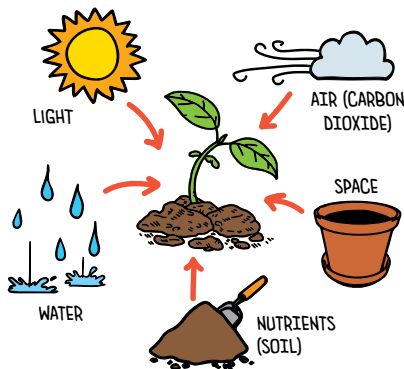
GARDEN CRESS PLANT

It's easy to observe **GERMINATION** and growth with garden cress plants because they **SPROUT QUICKLY**. Seeds contain all of the food, or **NUTRIENTS**, that young plants need for their early growth, so they can even germinate on a damp paper towel. But in order to grow big and strong, plants need the nutrients in **SOIL**.



GARDEN CRESS SPROUTS

What plants need to grow



PLANTS ARE AMAZING LIVING THINGS! They can turn **LIGHT ENERGY** from the sun into **CHEMICAL ENERGY**, in the form of sugars (plant food). In addition to light, they need **WATER, NUTRIENTS FROM SOIL, CARBON DIOXIDE FROM THE AIR, AND ROOM TO GROW**. Oh and by the way, in the process of growing they make **OXYGEN** for us to breathe. Wow, thanks plants!

WOW FACT



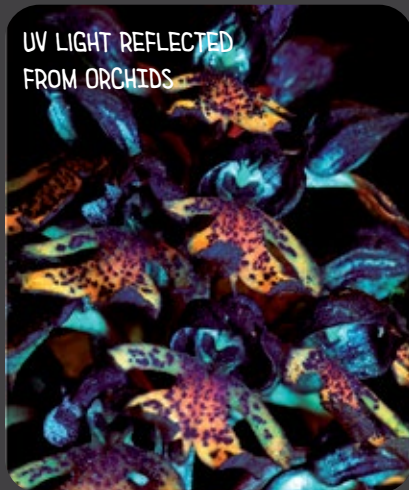
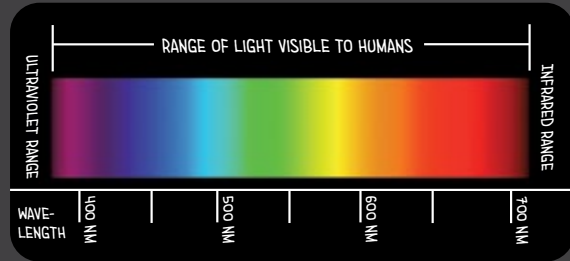
“Solar-powered plants”



SUPER STRONG INVISIBLE LIGHT

WOW FACT #4
"You, me, and UV!"

The **SUN** emits **INVISIBLE LIGHT** in addition to visible light. In a **RAINBOW**, you see the colors that are visible to the naked eye. Each end of the rainbow is **BORDERED BY LIGHT THAT OUR EYES CANNOT SEE!** There is an **INFRARED** range that borders **RED LIGHT** as well as an **ULTRAVIOLET** range that borders **VIOLET LIGHT**.



ULTRAVIOLET LIGHT (or **UV LIGHT** for short) has some astonishing properties. It has a **HIGHER ENERGY** and a **SHORTER WAVELENGTH** than visible light, which means it behaves differently than visible light in many ways. For example, it has a much **STRONGER EFFECT ON PHOTOGRAPHIC FILM** than visible light (which is how it was discovered in the first place), it **TANS THE SKIN**, and it produces **FLUORESCENCE** (A **GLOWING EFFECT**) in many things.

Strong ultraviolet light from the sun is very useful in nature. Unlike humans, **MANY BIRD SPECIES, HONEYBEES, AND BUMBLEBEES CAN SEE UV LIGHT**. That is why a lot of flowers (such as dandelions and orchids) have patterns that are only visible to humans under UV light, and that are **INVISIBLE** to the human eye normally.

The string lights in this kit are **LEDS (LIGHT-EMITTING DIODES)** that emit a **WEAK UV LIGHT**, which causes some of the materials in the terrarium to glow. Continue reading on the next page to learn more.

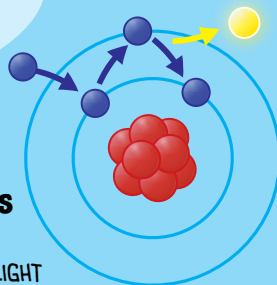




WHAT MAKES IT GLOW?

To see the **terrarium's glowing effects** in action, put the terrarium in a **darkened room** and turn on the UV LED lights. The UV LEDs will cause the **phosphorescent** and **fluorescent** materials to glow.

WOW FACT #5
"What is fos-
for-essence?"



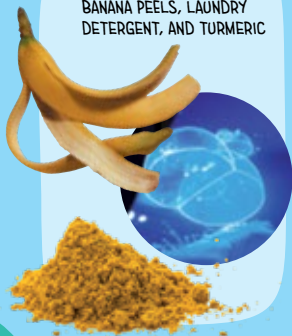
Phosphors make things glow

A **SOLID SUBSTANCE** that **LIGHTS UP** WHEN EXPOSED TO **ENERGY**, like light or electricity, is called a **PHOSPHOR**. A phosphor can be **PHOSPHORESCENT**, which **STAYS GLOWING** after the energy source is removed, or **FLUORESCENT**, which **ONLY GLOWS WHILE THE ENERGY IS PRESENT** and for a brief moment after. Conventional glow sticks and glow-in-the-dark stars are made using phosphors. In this kit, the stars, moon, and pebbles are phosphorescent, while some of the other materials exhibit fluorescence.

Why do phosphors light up?

The **ENERGY** from the **UV LIGHT** causes the **ELECTRONS** in the atoms of phosphors to jump up to a **HIGHER ENERGY LEVEL**. When they **FALL BACK DOWN**, they **RELEASE LIGHT ENERGY**, or **PHOTONS**, which we can see. When the UV lights are on, they provide a continuous cycle of energy to excite the electrons and make the phosphors in fluorescent materials glow steadily. When the lights are turned off, these phosphors stop glowing. In phosphorescent materials, some of the electrons are able to remain in a heightened energy level for some length of time before dropping down to their original level, allowing these materials to glow for a while after the UV light is turned off.

FLUORESCENT:
BANANA PEELS, LAUNDRY
DETERGENT, AND TURMERIC



PHOSPHORESCENT:
GLOW-IN-THE-DARK PLASTICS
AND GLOW STICKS



WOW FACT #6

"It's glow
time!"

Can plants grow with just UV light? No. Plants need **blue and red light** in order to grow. However, some UV light can help plants grow bigger and stronger. We usually see plants as **green** because they reflect green light, absorbing red and blue light as energy for **photosynthesis**.

ALL THE WORLD'S AGLOW



WOW FACT #7
“Animal kingdom glow-up”

BIOLUMINESCENCE is the **EMISSION OF LIGHT FROM LIVING THINGS**. It is caused by a **CHEMICAL REACTION** involving a **LIGHT-EMITTING MOLECULE** and an **ENZYME** called **LUCIFERIN**. It works similarly to fluorescence and phosphorescence, except that the excited state of the atoms that give off the photons of light is caused by a chemical reaction rather than by the absorption of UV light or electrical energy.

WOW FACT #8 “Glowing in the deep”

Bioluminescence is found in a **WIDE VARIETY OF LIVING ORGANISMS**, including **ANIMALS, PLANTS, FUNGI, PROTISTS, AND BACTERIA**. The less light from the sun there is in a habitat, the more bioluminescence tends to be found there. For example, about 76% of life in the deep sea, where it can be pitch black, share this trait. Some bioluminescent organisms are pictured here.

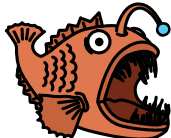


FIREFLIES

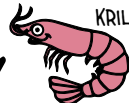
JELLYFISH



MUSHROOMS



ANGLERFISH



KRILL



DINO-FLAGELLATES



SQUID

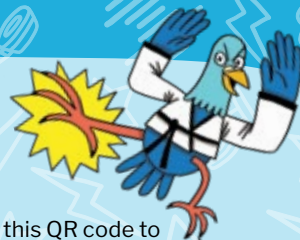
NEXT-LEVEL CHALLENGES

Try these experiments on your own!

1. Collect seeds from your kitchen and grow them in the terrarium.
2. Take the UV LED string lights around your home and find other fluorescent materials.
3. Look up and draw a diagram of a plant, and label its parts.



Scan this QR code to **KEEP THE WOW ROLLING** with additional **educational resources** related to this item.



THIS KIT WAS COMPLETED BY:

Write your name(s) in the spaces below.

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