

WONDERY  
KIDS

# EVERLASTING VOLCANO

WOW-TO  
GUIDE



WOW  
IN THE  
WORLD

THAMES & KOSMOS



# SAFETY INFORMATION



**WARNING:**  
**CHOKING HAZARD** — Small parts. Toy contains a small ball. Not for children under 3 yrs.

Warning! Not suitable for children under 3 years. Choking hazard — small parts may be swallowed or inhaled.

Keep the packaging and instructions as they contain important information.

When you are done with the slime, dispose of it in the household trash.

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

---

Thames & Kosmos US  
Email: [support@thamesandkosmos.com](mailto:support@thamesandkosmos.com)  
Web: [thamesandkosmos.com](http://thamesandkosmos.com)  
Phone: 1-800-587-2872

---

©2024 Thames & Kosmos, LLC, Providence, RI, USA  
Thames & Kosmos® is a registered trademark of Thames & Kosmos, LLC. All rights reserved.

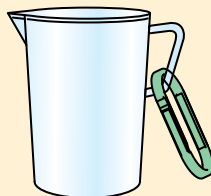
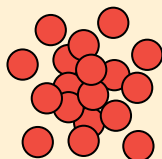
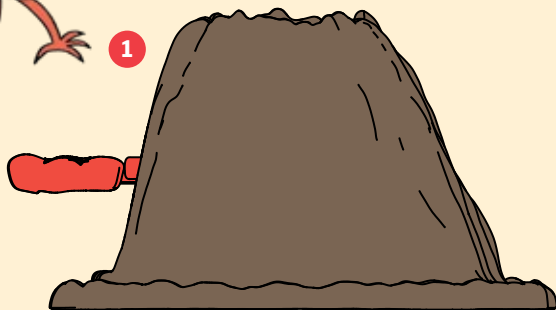
© 2024 Wondery LLC and Tinkercast, LLC  
This work, including all its parts, is copyright protected.  
Image credits: p. 6 (slime) Vector Juice, p. 9 (lapilli) Shooter, p. 9 (bombs) grahammoore999 (all previous: © stock.adobe.com); p. 6 (LCD) Chris Rongione, public domain (all previous: Flickr); p. 9 (lava) Ralf Lehmann, p. 9 (gases) Peder Digre, p. 9 (ash) Deni\_Sugandi, p. 9 (Mars) Sebastian Kaulitzk (all previous: © shutterstock.com)  
Distributed in North America by Thames & Kosmos, LLC, Providence, RI 02903

Phone: 800-587-2872; Web: [thamesandkosmos.com](http://thamesandkosmos.com)  
The right to technical alterations is reserved.  
Printed in China/ Imprimé en Chine

The Wondery+ subscription offer is exclusively available to new, first-time Wondery+ subscribers who signed up via the QR code in this guide. Such new subscribers receive their first 3 months of Wondery+ at no cost, after which your subscription will automatically renew at the then-current price. The discount cannot be added retrospectively by you or our Customer Service team. Discounts are not valid for gift card purchases. Offer good while supplies last or until terminated by Wondery. Discounts cannot be combined. Taxes may apply to the full value of discounted subscription. If you violate any of these terms, the offer will be invalid. Wondery reserves the right to modify or cancel the offer at any time. Offer is non-transferable and may not be resold.

Android, Google Play and the Google Play logo are trademarks of Google Inc. Apple and the Apple Logo are trademarks of Apple Inc., registered in the USA and other countries. App Store is a service mark of Apple Inc.

# KIT CONTENTS



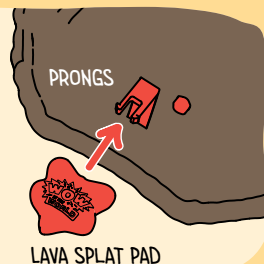
DECORATE YOUR VOLCANO WITH THE STICKERS!

Part No.	Description	Quantity
1	Volcano model with pop-up crater	1
2	Bag of small rubber balls (approx. 20)	1
3	Container of thermocolor slime	1
4	Measuring beaker with clip	1
5	Sticker sheet	1

YOU WILL ALSO NEED: VINEGAR, BAKING SODA, RED FOOD COLORING, PAPER TOWELS

## Assembling the lava lever

Before first use, snap the **lava splat pad** onto the **prongs** sticking out of the volcano to complete the **lava lever** assembly.



# INTRODUCTION

WELCOME TO YOUR EVERLASTING VOLCANO WOW-TO GUIDE!



GUY RAZ  
(WOW IN THE WORLD HOST)



MINDY THOMAS  
(WOW IN THE WORLD HOST)

THE EVERLASTING VOLCANO IS A MODEL OF A REAL VOLCANO, TO HELP US SEE HOW REAL VOLCANOES ERUPT.

AND IN THIS GUIDE, YOU'LL LEARN ABOUT EVERYTHING YOU NEED TO CREATE THREE DIFFERENT TYPES OF ERUPTIONS!

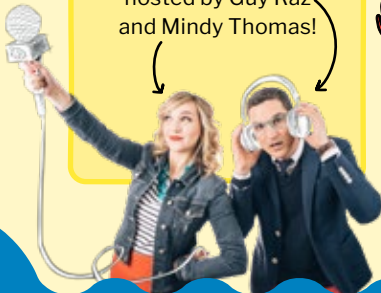


AND BE SURE TO USE THE QR CODE BELOW TO HEAR VOLCANO FACTS FROM US!

GET READY TO RUMBLE AND WOW! THE VOLCANIC ERUPTION BEGINS NOW!



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



Start here!



- 1 Grown-ups! Scan this QR code to start your **audio journey**.
- 2 Listen to **Track 1**, a *Wow in the World* Bonus Episode!
- 3 Unlock exclusive **Wow Facts** from Guy & Mindy when you see this symbol in the guide!



Listen ad-free to many premium podcasts & family-friendly shows with a **WONDERY+** subscription! New subscribers can enjoy 3 months free using the QR code above!

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

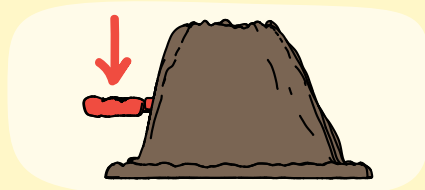
# COLOR-CHANGING SLIME ERUPTION



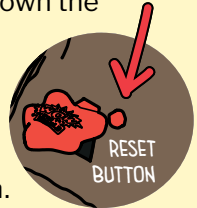
- 1 Place the **volcano model** on a flat surface with some **newspaper** or **paper towels** under it.



- 2 Remove the lid from the container of **slime**. Fill the **crater** of the volcano to the brim with slime.



- 3 Press the **lava lever** down. The crater will bulge upward a little. Press the lava lever down a few more times until the **crater pops up** and the lava erupts down the sides of the volcano! Press the **reset button** and **push the crater back down** to reset the crater after the eruption.

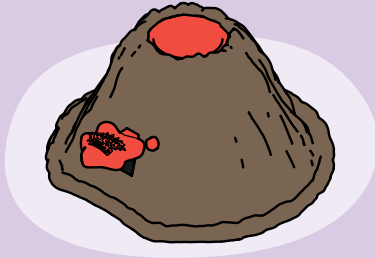


- 4 Hold the slime in your hand for a couple of minutes. Do you see it **change colors** from reddish orange to yellow? Also try warming up or cooling down a metal spoon under a faucet and touching it to the slime.

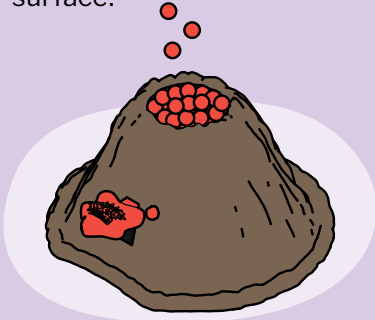
**What's going on here?**

The volcano pops up because there is a **MACHINE** inside of it that pushes the crater upward a little bit with each push of the lava lever. You can see how this machine works on page 7. This **MODELS** how **PRESSURE BUILDS UP INSIDE A REAL VOLCANO**, causing lava to **ERUPT** out. The slime changes color because it contains a **SPECIAL PIGMENT** that changes color based on its **TEMPERATURE**. Read about this on page 6.

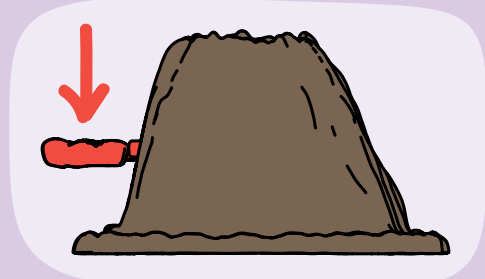
# RUBBER BALLS ERUPTION



- 1 Place the **volcano** on a flat surface.



- 2 Place all of the **rubber balls** into the **crater**.



- 3 Press the **lava lever** down. The crater will bulge upward a little. Press the lava lever down a few more times until the **crater pops up** and the rubber balls burst out of the volcano and rain down. Press the **reset button** to reset the crater after the eruption.

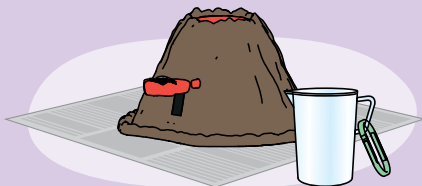


"A gigantic Earth pimple"

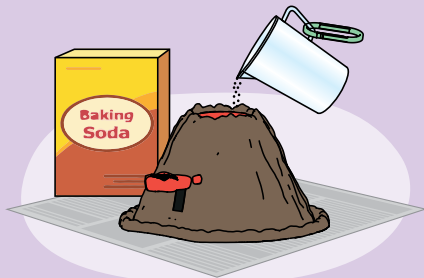
**What's going on here?**

The **MECHANISM** inside the volcano caused the crater to pop up and eject the balls. This models how rock fragments called **TEPHRA** are sometimes **EJECTED DURING THE ERUPTION OF A REAL VOLCANO**. Large tephra pieces are called **VOLCANIC BOMBS**. When these fragments are airborne, they are called **PYROCLASTS**. Read about the different things that can come out of a volcano during an eruption on page 9.

# VINEGAR AND BAKING SODA ERUPTION



- 1 Place the **volcano** on a flat surface that can get messy. Put **newspaper** or **paper towels** under it.

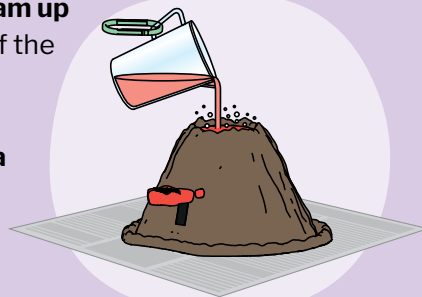


- 2 With the **beaker**, measure **10 ml of baking soda**. Pour it into the **crater**.

- 3 Fill the beaker as follows: first, to the **10-ml mark** with **dishwashing detergent**; second, to the **30-ml mark** with **water**; third, to the **90-ml mark** with **white vinegar**; and finally, add **20 drops** of **red food coloring**.



- 4 Pour the liquid from the beaker onto the baking soda in the crater. The mixture will immediately **foam up** and **erupt** out of the crater.  
**Note: You do not use the lava lever with this eruption.**



## What's going on here?

The **MIXTURE** foams up vigorously because **THE VINEGAR IS AN ACID AND THE BAKING SODA IS A BASE**. When acids and bases combine, a **CHEMICAL REACTION** that releases **CARBON DIOXIDE** gas occurs. The dishwashing detergent surrounds the bubbles with a protective layer, making the bubbles last longer, resulting in the foam. These bubbles don't contain normal air, but rather carbon dioxide formed from the reaction.

# COLOR-CHANGING SLIME

**WOW FACT**

#3

“Orange you glad it’s lava?”

The **SLIME** in this kit is **THERMOCHROMIC** which means **IT CHANGES COLOR DUE TO A CHANGE IN TEMPERATURE**. A thermochromic material changes color because when it is heated, its **MOLECULES ABSORB AND REFLECT LIGHT IN NEW WAYS**. This process is **REVERSIBLE** because it does not involve a change in the structure of the molecules in the material. This type of change is called a **PHYSICAL CHANGE**. There are two common groups of thermochromic materials: **LIQUID CRYSTALS** and **LEUCO DYES**.

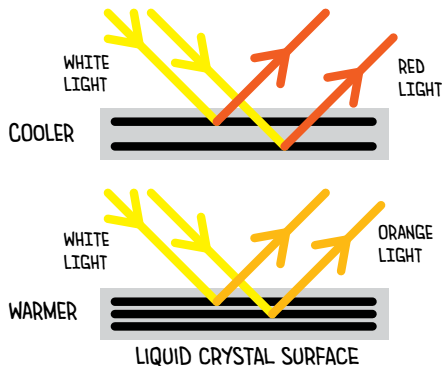
## Leuco dyes

Leuco dyes are chemicals that can **SWITCH BETWEEN TWO DIFFERENT FORMS**, one of which is **COLORLESS**, depending on exposure to **LIGHT, HEAT, OR PH**. These dyes can be mixed with other pigments to show one color when they are warmer and another color when they are cooler. The slime in this kit contains a leuco dye, as do **COLOR-CHANGING PLASTIC SPOONS**.

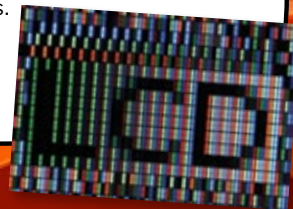


## Liquid crystals

As the name suggests, liquid crystals are materials that are in a state **BETWEEN A LIQUID AND A CRYSTAL SOLID**. When the crystals are **COOLER**, they are **FURTHER APART** and they reflect light in one color. When the crystals are **WARMER**, they **MOVE CLOSER TOGETHER** and they reflect light differently, thus appearing as a different color.



A classic example of a thermochromic liquid crystal is a **MOOD RING**, which changes color in response to the wearer’s body heat. Another common use for liquid crystals is in **LIQUID CRYSTAL DISPLAYS (LCDS)**, which are used in TVs and computer monitors.

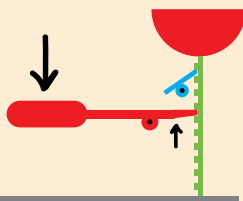
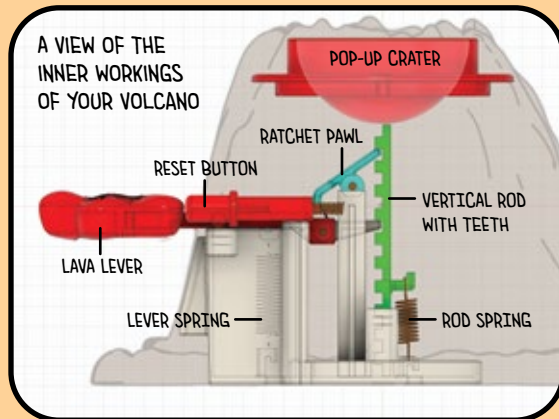




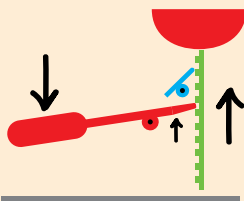
# THE AMAZING POP-UP VOLCANO MACHINE

**WOW FACT** #4  
"Too hot to handle"

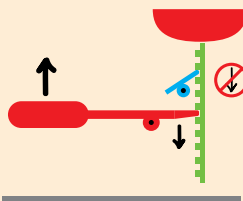
The volcano pops up because there is a **VERTICAL ROD** under the **FLEXIBLE POP-UP CRATER** that moves upward a little each time the **LAVA LEVER** is pushed down. This is because the other end of the lava lever presses upward on a **TOOTH** on the vertical rod. A device called a **RATCHET** keeps the rod from falling down again even though the lever resets each time. A **SPRING** pulls the vertical rod downward while a small bar called a **PAWL** prevents the rod from falling downward. The **RESET BUTTON** releases the pawl, letting the vertical bar fall back down again and resetting the crater.



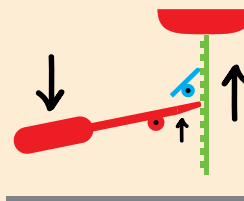
1 PUSHING DOWN ON ONE END OF THE LAVA LEVER RAISES THE OTHER END.



2 THE INNER END OF THE LAVA LEVER PUSHES THE VERTICAL ROD UP.



3 THE LEVER SPRINGS BACK UP. THE PAWL KEEPS THE ROD UP TOO.



4 THE PROCESS REPEATS, THIS TIME RAISING THE ROD EVEN HIGHER.

## What is a scientific model?

A **SCIENTIFIC MODEL** is a simplified representation of a more complex thing from the real world. The model is designed to help demonstrate and understand the real-world thing better. Models are never perfect recreations of the original.

# ALL ABOUT VOLCANOES

The pop-up mechanism in the volcano models how the **PRESSURE** inside a real volcano builds up until it erupts. Here's how a real volcano works.

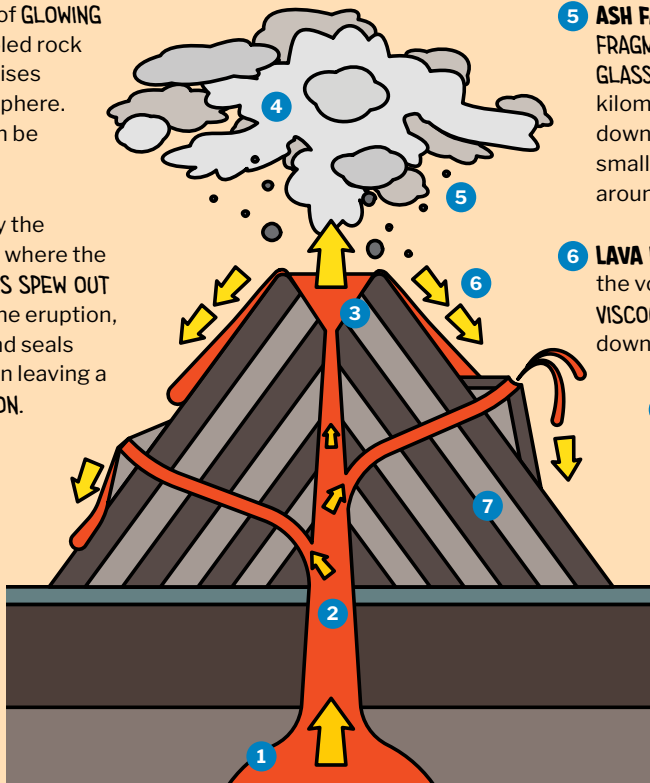


**"Where does the name 'volcano' come from?"**

**4 ASH CLOUD:** A mixture of **GLOWING HOT ROCK**, already-cooled rock **ASH**, and **WATER VAPOR** rises high up into the atmosphere. The eruption cloud can be many kilometers high.

**3 CRATER:** Blown open by the eruption, the **CRATER** is where the **RISING MAGMA AND GASES SPEW OUT** of the volcano. After the eruption, the lava cools down and seals the volcanic vent, often leaving a **BOWL-SHAPED DEPRESSION**.

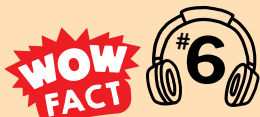
**2 CONDUIT:** Magma and gases rise through the **VOLCANIC CONDUIT, OR PIPE**, up to the vent. Some volcanoes also have **SIDE VENTS** branching off from the main conduit.



**5 ASH FALL:** **POWDERY ASH** and **SMALL FRAGMENTS OF ROCK AND VOLCANIC GLASS** are propelled many kilometers into the air, raining down around the volcano. The smallest particles can be carried around the entire planet.

**6 LAVA FLOW:** Magma that exits the volcano is called **LAVA**. This **VISCOUS MOLTEN ROCK** flows down the sides of the volcano.

**7 VOLCANIC LAYERS:** During each eruption, lava flows out of the volcano and **COOLS DOWN**, and ash falls and settles on the ground. In this way, the **VOLCANIC MOUNTAIN BUILDS UP LAYER BY LAYER**, eruption after eruption.



**"Is it magma or lava?"**

**1 MAGMA CHAMBER:** **MAGMA** is **ROCK** that is under such **HUGE PRESSURE** that it is **SUPER HOT** and has **MELTED**. The **MAGMA CHAMBER** is kilometers below the surface. The **MOLTEN ROCK** and **VOLCANIC GASES** build up here over time. When it gets too full and the **PRESSURE GETS TOO GREAT**, its contents **RISE UP** through the volcanic conduit.

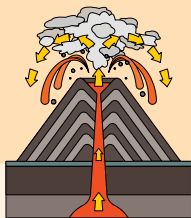


# TYPES OF VOLCANOES

**WOW FACT**

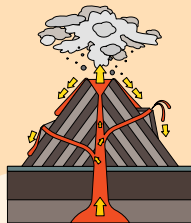
#7

“The four types of volcanoes”



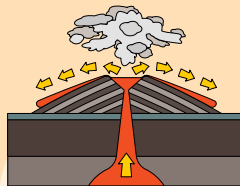
## Cinder cone

Cinder cone volcanoes are often **SMALLER** than other volcanoes — with heights of ten to a few hundred meters. To form these volcanoes, lava is **HURLED** into the air, cools, and breaks into individual fragments, called **CINDERS**. These rocks fall to the ground around the volcanic vent and build up over time, forming a **CONE**.



## Composite

Composite volcanoes (or **STRATOVOLCANO**) consist of **ALTERNATING LAYERS** of cooled fluid lava and cinders, which form the recognizable cone shape of the stereotypical volcano. Some of these are among the **HIGHEST** mountains on Earth.



## Shield

The shield volcano is **FLAT AND WIDE**, like a warrior's shield lying on the ground. It is created by fluid lava flowing very quickly from its vent and spreading out over a large area. Some of the **LARGEST** volcanoes in the world are shield volcanoes.



## Lava dome

The lava dome is a steep mountain created by very viscous lava, which cools down quickly and **PILES UP** around the vent. This seals the vent like a cork, often making the next eruption even more **DANGEROUS**.

LAVA: FLOWING  
MOLTEN ROCK



GASES: LIKE WATER  
VAPOR, CARBON DIOXIDE,  
AND SULFUR DIOXIDE



ASH: TEPHRA  
SMALLER  
THAN 2 MM



VOLCANIC BOMBS:  
TEPHRA LARGER  
THAN 64 MM



## WHAT COMES OUT OF A VOLCANO?

LAPILLI OR  
VOLCANIC CINDERS:  
TEPHRA BETWEEN 2  
AND 64 MM



## Olympus Mons

The **LARGEST KNOWN VOLCANO** in our solar system is **OLYMPUS MONS**, a shield volcano on Mars. It is 25 km tall and 624 km wide — about 100 times larger than Mauna Loa, the largest volcano on Earth. Olympus Mons appears to be inactive.



**WOW FACT**

#8

“Out-of-this-world volcanoes!”

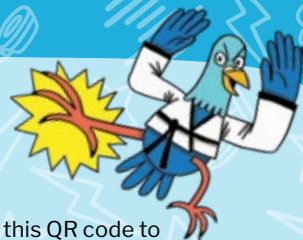
# NEXT-LEVEL CHALLENGES

Try these experiments on your own!

1. Build a larger volcano model out of paper mache and put the pop-up volcano on top of it.
2. Look up and mark the active volcanic areas on a world map.
3. Draw a diagram of a volcano and label its various 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.

X

X

X

X



**PLAY IT FORWARD!**

When you are done playing and learning with this toy, we encourage you to pass it on to another curious kid!

Grown-ups, elevate your audio experience by trying **WONDERY+**



- ◆ Discover exclusive podcasts made for the whole family.
- ◆ Enjoy early access to new episodes and skip the ads on many of your favorite shows.
- ◆ Have fun learning, spark conversations, and let imaginations soar!

**Don't miss out – subscribe now and let the adventure begin!**

