

# 6 Exciting STEM Activities Book 2



#### Book 1 focused on the Science in STEM. With Book 2, we mix things up a bit with more

Engineering activities. Experience amazing chemical reactions in volcano, making your own

rocky candy, slime, lipsticks, building your own tower and catapult. These STEM activities are

fun, exciting and educational.

HTTPS://9IJAKIDS.COM

### What's Inside:



1

Rocky Candy: Make your own rocky candy and enjoy the taste.

Erupting Volcano: Experience and learn the magic of volcano eruptions .

3

Make Fluffy Slime: Learning about states of matter can be fun with Slime.

Making Lipstick from Crayon: Turn your old crayons into fun lipstick/lip gloss.





be fun.

Build a Catapult: An awesome STEM activity for the kids is building their own catapult.

STEM stands for Science, Technology, Engineering, and Math. You can make

STEM exciting, fun and educational. Truth be told, learning needs to and should opinion (either positive or negative) about science by the time they reach the age of

7." Parents can help their young learners enjoy science by setting up exciting science

According to Steve Spangler, "Research shows that most children have formed an

With these fun STEM experiments, your child will be experimenting, building,

observing, exploring, problem-solving, and creating. These experiments will

open their minds, get them thinking and thinking critically.

experiments at home. With STEM occupations growing, sparking your child's

interest in science may give him a head start for a future career.

So let the fun beginning with our next round of 6 fun and exciting STEM activities.

Check out https://9ijakids/stem-kits for our STEM resources to keep the children learning and playing.







# //01 The Rocky Candy



Most kids love sweets, so lets start off with a sweet STEM experiments. The rock candy requires a bit of patience as it takes a few days. But with a sweet treat at the end, its worth the wait.

#### WHAT YOU NEED

Pot

- Spoon to stir
- 4 cups granulated sugar
- 1 cup water
- Lollipop sticks or skewers sticks
- Cups
- Clothes pins
- Food coloring (optional)

#### THE HYPOTHESIS

Ask the following questions to get them to predict the results (its always fun to hear their hypotheses)

- What is happening to the sugar as we pour it into the water?
- Do we need to boil the water? What we happen if we use cold water?
- What do you think would happen when the solution cools?
- What can we do to speed up the process of the rocky candy?

Let the fun begin. Follow the instructions below:

## Instructions:

Step 1: Boil 1 cup of water in a pot and stir in 3 cups of sugar till all the sugar is fully dissolved. Let is cool for about 20 minutes

Step 2: While the solution is cooling, dip one end of each stick into the solution and then roll it in a little bit of granular sugar (the

new crystals need an existing crystal to form on, called a seed.). Allow the sticks to fully dry.

Step 3: Pour cooled solution into four cups (about 2/3 full) and add different food colouring into three of the cups. Leave the last glass clear so you can see the crystallization process.

Step 4: Gently place the coated end of your sticks into the sugar solution and use a clothes pin to secure it at the top of the jar/glass. Make sure the sticks aren't touching the bottom or sides of the glass. If it is touching anything, crystals will form between the two surfaces making it very difficult to remove the lollipop.

Place your cups in a location where they won't get bumped and let them sit still for several days (usually 3-7days). IT IS IMPORTANT THAT THE CUPS ARE NOT DISTURBED. Observe your rock candy every day to see how it is changing. When your crystals are big enough, gently remove the lollipops from the glass. Allow to dry and enjoy your sweet science treat!

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![](_page_4_Picture_1.jpeg)

![](_page_4_Picture_2.jpeg)

![](_page_4_Picture_3.jpeg)

### The Science Explained:

As the sugar solution cools it becomes supersaturated, so it starts to changed from a liquid back to a solid. It does this because the supersaturated solution has too much sugar (solute). This means there are far more dissolved particles of solute (the sugar) than the solvent (the water) can normally dissolve. It must let go of the extra sugar. The sugar falls out of the solution as a precipitate (particles). These connect with other sugar particles, and a crystal begins to grow. The sugar on the stick (seed) will attract the molecules in the solution to the stick and start crystallizing on the stick. Also, as the water evaporates, it gives us more precipitate (the rock candy).

The slower the super saturated solution cools, the larger the crystals that are formed.

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# //02 Erupting Volcano

![](_page_5_Picture_1.jpeg)

A fun activity but requires a bit of patience and waiting. Its an exciting experience for young children as they watch and learn about the amazing power of these geological formations.

#### WHAT YOU NEED

- Bottle (small plastic bottle)
- Newspaper/coloured paper
  - PVA glue
- Bicarbonate soda 2 tablespoons
- Vinegar 2 cups
- Funnel.
- Food colouring

#### HYPOTHESIS

Science is about prediction, hypothesis, experimenting and analysis. So you must always ask questions:

- What combination of vinegar and baking soda creates the biggest eruption?
- Does the shape of the volcano affect the direction the eruption travels?
- Does vinegar temperature affect how fast lacksquarethe volcano erupts?
- What happens if you change the amount of baking soda or vinegar?
- Can you think of ways to change the volcano to make the eruption go higher or last longer?

Let the fun begin. Follow the instructions below:

## Instructions:

Step 1: Wrap your open bottle, with newspaper. The shape of the bottle is important as the distance from the vinegar to the mouth of the "volcano" should not be too far.

Step 2: Paint your bottle with your desired colour of paint.

Step 3: Pour bicarbonate soda into the bottle using the funnel, then add colouring (optional).

Step 4: Slowly pour the vinegar into the volcano to watch it erupt. Step back and see your erupting volcano. You can give it a little shake.

You can get better "lava" by adding drops of washing up liquid to the bottle contents. The detergent helps trap the bubbles produced by the reaction so you get better lava.

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![](_page_6_Figure_1.jpeg)

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# STEP 3 STEP 4

### The Science Explained:

A volcanic eruption occurs when there is a rapid expansion of gas in a specific amount of space. When you add vinegar to bicarbonate of soda a chemical reaction occurs and there is a build up of gas (carbon dioxide). The gas formed builds up and fills the bottle, pressure builds up inside the plastic bottle, until the gas bubbles out of the 'volcano'.

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# **//03** Make Fluffy Slime

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Everyone wants to make slime these days and that's because it's just such a cool activity to try. Learning about states of matter can be fun with slime. Is slime liquid or solid?

#### WHAT YOU NEED

- 1/2 cup of PVA glue
- 3 cups of foaming shaving cream
- 1/4-1/2 tsp of baking soda
- Food coloring
- 1 tbsp of saline solution (which contains both sodium borate and boric acid as ingredients)
- Bowl, spoon and measuring cups

#### THE HYPOTHESIS

Slime is a neither a liquid or a solid. It can be picked up like a solid, but it also will ooze like a liquid. Slime takes the shape of its container but it can be bounced like a ball because of it's elasticity. Start by asking the children what they know about solids and liquids.

## Instructions:

Step 1: Pour ½ cup of PVA glue into a container.

Step 2: Pour 3 cups foaming shaving cream into a container.

- How far can we stretch our slime before it breaks?
- What should we change if we want our slime to be more sticky, less firm or less runny?
- What would happen if we change the amount of glue or baking soda?

Let the fun begin. Follow the instructions below:

Step 3: Pour <sup>1</sup>/<sub>4</sub> - <sup>1</sup>/<sub>2</sub> tsp of baking soda, 1 tsp of saline solution into a container.

Step 4: Stir with your spoon till it sticky.

You can make different colours of slime by adding colouring.

If the slime starts to get sticky, blend in a little more of the borax and water solution.

If the slime gets onto anyone, vinegar will get the slime out of clothes and mayo (yes, really) will take the slime out of hair.

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![](_page_9_Picture_2.jpeg)

STEP 2

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### The Science Explained:

Slimy science starts with the right ingredients including the right kind of glue and the right slime activators. Slime activators are usually from the boron family - saline solution, liquid starch, and borax powder.

Slime is about states of matter liquids and solids, and the way different their molecules are held together. When slime activators mix with the PVA (polyvinyl acetate) glue and they form this cool stretchy substance. The molecules in glue normally with flow past one another keeping the glue in a liquid state. When the slim activators are added chemical bonds are formed. So, instead of flowing freely, the glue molecules become tangled and mix until the substance is less like the liquid you started with and thicker and rubberier like slime!

# //04 Making Lipstick from Crayon

![](_page_10_Picture_1.jpeg)

Would you like to turn your old crayons into fun lipstick/lip gloss. This is a fun experiment that very girl will love. Imagine being able to make her own lipstick?

#### WHAT YOU NEED

- Crayons (dark and vibrant colours are better)
- Coconut/shea butter oil
- Olive oil/jojoba oil
- Empty lipstick case or contact lens case
- Pot
- Small glass bowl
- Wooden spoon or chopstick

#### THE HYPOTHESIS

A lot of materials are made from the same thing. Crayon is made from paraffin wax and non-toxic pigments. Wax is a major component in any lipstick or chapstick. So lets ask some questions?

## Instructions:

- What if we swap materials use shea butter instead of coconut oil? What will happen?
- Will adding more or less oil change the lipstick? How?
- Will adding other ingredient like such as lanolin, vitamin E or cocoa butter alters the lipstick? How?
- How can we make our lipstick more glossy?

Let the fun begin. Follow the instructions below:

Step 1: Remove paper from crayon. Cut one crayon into small pieces and add 1/2 teaspoon of coconut oil and ¼ teaspoon of olive oil.

Step 2: Pour water into pot and bring to boil. Place glass bowl with items into hot water

Step 3:. Stir till fully melted and smooth. Be careful not to spill any water into the mixture.

Step 4: Turn off stove. Pour hot mixture carefully into lipstick case or contact lens case. Put in fridge to cool for 15-20 mins

Repeat the process with different colour crayons. Instead of step 2 and 3, you can put items in the microwave to melt

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![](_page_11_Picture_2.jpeg)

![](_page_11_Picture_4.jpeg)

### The Science Explained:

Crayon is made from wax and wax is a major component of any lipstick/balm. Wax is a solid material that on contact and friction can transfer to another object. So when wax is melted, it becomes liquid. You can enhance its properties with other oils – like coconut oil and olive oil. When hot wax cools, it contracts and becomes solid again.

Different materials have different properties so if you can replace shea butter with cocoa butter, the lipstick will be slightly more firm. And if you replace jojoba oil with castor/olive oil, it will be more glossier lipstick. Adding lanolin improves the feel and color distribution.

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# //05 Build a Tower

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It's all about towers! Let the kids use provided supplies to build the tallest, most creative, freestanding tower they can. This project is a lot of fun promoting critical thinking, creativity, teamwork, problem solving and introducing basis engineering principles.

#### So tell me, how tall of a tower can you build?

#### WHAT YOU NEED

Option 1 Option 2 Option 3
 Play dough Straws Balloons

#### THE HYPOTHESIS

The Burj Khalifa in Dubai holds the current title as the world's tallest building at over 800 meters tall. Is there anything we can learn from this as we build our tower?

- What base would your tower have?
- Why did you select the materials you did for your tower?
- What would you do differently with your tower design next time?
- What were the challenges you faced as you built your tower?
- What challenges might there be in creating a building so tall?

Let the fun begin. Follow the instructions below:

## Instructions:

The tower challenge can be done using any of the material options provided. The instructions are simple – design the tallest free standing tower using the materials provided. Give each child the same supply e.g 10 toothpicks and 1 play dough or 10 sheets of newspaper and 18 inch of tape.

- No additional supplies should be given.
- Time given to design and construct the tower is 20 minutes.
- The tower must be free standing (without aid from the students).
- An item must be placed at the top of the tower to test for strength.

At the end of the allotted time, have the kids measure the constructed towers to determine which tower is the tallest!

May it even more interesting by trying to balance an item on each of the tower made

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# Option 1 Option 2

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### Option 3

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# **//06** Build a Catapult

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An awesome STEM activity for the kids is building their own catapult – angry bird in action. Its fun to see things fly, throw the air and reach their destination/ target. You can build a catapult from different items but lets start with something easy – popsicle (ice cream) sticks.

WHAT YOU NEED

- 10 popsicle sticks
- Rubber bands
- Cotton wool/
- Plastic spoon/bottle cap
- Measuring tape (optional)

#### THE HYPOTHESIS

How far will our items fly with our catapult. Can we aim accurately and reach the target?

- What will happen if we use more or less sticks to build our catapult?
- What happens if your catapult end is shorter?
- What happens if you make the arm of the catapult really, really long?
  Which item would fly the furthest?
  Why do you think one will fly farther than the other?
- How far can you get a ball to travel?
- What happens if you make the ball heavier?

## Instructions:

Let the fun begin. Follow the instructions below:

Step 1: Stack eight (8) sticks one on top of the other. Wind a rubber band tightly around each end of the stack.

Step 2: Push one of the remaining sticks through the stack under the top stick of the stack. Then flip the stick catapult over so that the stick you just pushed in is on the bottom of the stack.

Step 3: Lay the second notched stick on top of the stack and secure the two popsicle sticks together with a rubber band.

Step 4: Glue the bottle top on the top stick or if you are using a spoon use rubber band to secure the spoon in place.

You catapult is ready. Put different items on your catapult and measure how far they go. You can use a measuring tape to measure distance. Launch each material at least twice.

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![](_page_16_Picture_0.jpeg)

#### STEP 2

![](_page_16_Picture_3.jpeg)

![](_page_16_Picture_4.jpeg)

![](_page_16_Picture_5.jpeg)

### The Science Explained:

STEP 3

When you pull down the lever arm, that force is energy (potential energy) which is stored up. When you release it, the potential energy gradually changes over to kinetic energy which is what makes the object move/fly in the air. The object stops moving when it runs out of kinetic energy. Also, gravity plays a part in pulling the object back to the ground. The more you push down on the stick (lever), the more energy is stored (potential energy) and the more energy you will have to launch the material. The more force you apply to a catapult, the more force is applied to the object being launched – the faster and farther the object will go.

The trajectory is the path that the object takes as it flies through the air. This is influenced by the push force of the catapult, the angle of the release, the weight of the object, air resistance and gravity.

![](_page_16_Picture_9.jpeg)

![](_page_17_Picture_0.jpeg)

### Lets Take A Flight Into the World of Creativity and Fun Learning

Encourage your child's curiosity and real love for learning through fun STEM activities. Let the kids question, explore and play with this fun activities and many other STEM resources from 9ijakids. Watch out for rocky candy, erupting

volcanoes and lots more in our next series.

Don't let the fun end, check out https://9ijakids.com/stem-kits/ for our STEM resources to build your own metal

robot, crystal radio or make your own lipstick and perfume. The fun doesn't have to end.

![](_page_17_Picture_7.jpeg)