

## **ADA Twist Scientist STEAM Lesson**

**Grade level: 3-12**

### **Summary**

Ada Twist Scientist is the charming tale of a curious girl named Ada. Her curiosity sets her on fact finding missions which result in experiments that lead to more questions and a bit of chaos! Students of all ages will truly enjoy diving into this instant classic as well as engaging in an exciting day learning about the scientific method as they conduct their own investigations.

Teachers help students ask questions, predict, explore, observe, investigate, and reflect during STEAM activities. Teachers facilitate learning by asking open-ended questions and then allow students to use a variety of materials to answer those questions in multiple ways. Early exposure to STEAM activities helps students develop important critical thinking and problem solving skills.

Read the book Ada Twist Scientist to the Students-Discuss the details of the book.

### **Engineering Connection**

Students will investigate in making a gas fill a balloon.

### **Materials:**

Balloons, 8 oz. water bottle, Small funnel, Vinegar, Baking Soda

### **Procedure**

1. Stretch out a small balloon and fill it halfway with baking soda using a small funnel.
2. Slowly pour a half cup of vinegar into the balloon.
3. Put the opening of the balloon over the opening of the water bottle carefully. Do not let any baking soda fall into the bottle yet.
4. When the balloon is on the bottle, lift the balloon so that the baking soda falls into the vinegar and mixes. Hold the lip of the balloon to keep it secure.
5. The combination of baking soda and vinegar creates a chemical reaction that produces a gas called carbon dioxide. This gas expands, filling the bottle and then inflating the balloon.

### **Follow-Up:**

Explain the chemical reaction and discuss how mixing the liquid (vinegar) and solid (baking soda) created a gas (carbon dioxide). Have students complete their journal/recording page to summarize their conclusion.

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### **Directions**

Gummy worms into halves or quarters length-wise, using

Students will investigate, observe, and participate in creating a chemical reaction that makes nonliving objects move.

### **Materials**

-Gummy worms,-Baking soda, vinegar,-Water

-2 clear cups or glasses

Plastic Knife/Adults help with this part.

### **Procedures**

1. Get a wet knife. This helps them rise easier.
2. Fill one glass with 1 cup of water and mix in 3 tablespoons of baking soda. Place the worms in the cup for 15 minutes to soak in the baking soda.
3. Fish 3-4 worms out of the baking soda/water mixture and place them into a cup full of vinegar.
4. Bubbles will form on the worms causing them to rise and “dance” as the bubbles rise to the top.

**Follow-Up:** Explain the chemical reaction and discuss the gas that is formed when mixing baking soda and vinegar creates bubbles that stick to the gummy worm and make it appear to rise and dance. Have students complete their journal/recording page to summarize their conclusion. 6-12 grade students can research more on Chemical Reactions.

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*Read the book Ada Twist Scientist to the Students-Discuss the details of the book.*

*Start this experiment early in the day to allow the students a chance to watch the plant throughout the day.*

Students will investigate and observe how plants absorb water.

### Materials

-1 clear cup or glass

-1 white flower (ex. carnation)

-Food coloring (blue works well)

-Water

1. Cut the stem of a white flower (I use carnations).
2. Fill glass about 1/2 way with water.
3. Place 10-20 drops of food coloring in the water (make sure the water is dark).
4. Check your carnations every couple of hours to observe the change. Provide time for students to journal observations.

### Follow-Up

Explain that the colored water allows us to see how water travels up the stem of the plant to the petals. Have students complete their journal/recording page to summarize their conclusion.

## DISCUSSION QUESTIONS: Use these questions as whole-class discussions, reading check-ins, or as writing

Writing and reading prompts with Ada Twist, Scientist

On the second spread, Ada has labeled all the animals with different numbers. What do these numbers represent? Are any wrong? Why did Ada get it wrong?

They label the animals' legs; however, she writes that the elephant has five because of its trunk.

Similar to Ada Twist, Albert Einstein didn't talk until he was four years old, and he wreaked some havoc at school. What does this tell you about these two thinkers? Does behavior at school always equal intelligence? Why might they have caused problems at school? How did the book pay homage to Einstein?

When Ada is holding the turtle, what is similar between the turtle and the eggs all around Ada? Why should the turtle be scared? What question is Ada trying to answer?

**Extension:** Have students answer Ada's questions: Why do turtles have an outside shell? What's on the inside of a turtle's shell?

What are some ways the author and illustrator showed that time was passing throughout the book? It never says that Ada grew to age seven or eight as indicated by the final spread; however, there were clues showing that time was passing.

How did Ada follow the Scientific Method to determine the mystery smell? What was her question? Her research? Her hypotheses? Her experiments?

Did she draw a conclusion?

"[Ada Twist] had all the traits of a great scientist." What character traits does she possess that makes her a perfect scientist?

Ada's parents send her to the thinking chair for experimenting on the cat. How could Ada have stayed out of trouble? What could Ada's parents have done instead of automatically sending her away?

On the final spread in the book, there are three students who have something the other students don't. See if your students can figure it out.

Rosie Revere, Iggy Peck, and Ada Twist all have pencils.

Theme is a lesson that the reader takes away from a text. What did this text teach you?

## **EXTRA ACTIVITY SODA GEYSER EXPERIMENT**

Ada uses diet soda, mint Mentos, and food coloring to do a quite colorful and fun, yet messy, experiment. With your students, complete this activity, but then turn it into an experiment. Have students brainstorm ways to change and measure the geysers (cold vs. room temperature, flat vs. new, regular vs. diet).

Also, use this time to use the scientific method:

1. Ask a question
2. Do background research
3. Make a hypothesis
4. Test your hypothesis by doing an experiment
5. Analyze your data and draw a conclusion
6. Communicate your results

The “why” behind the geysers is a physical reaction called nucleation. The carbon dioxide grabs on top of the textured Mentos’s nucleation sites and as the Mentos drop to the bottom of the soda, more and more gas is built up and BOOM!

Materials

Diet Soda

Regular Soda

Food Coloring

Mint flavored Mentos

Make sure you protect your eyes and face. Please complete with an adult outside.

### **Procedures.**

Use clear color soda such as 7-Up or Sprite.

Add food coloring to each bottle (use different colors).

Carefully add Mentos to the each bottle. Watch the volcano of beautiful colors!

**Follow-Up:** The “why” behind the geysers is a physical reaction called nucleation. The carbon dioxide grabs on top of the textured Mentos’s nucleation sites and as the Mentos drop to the bottom of the soda, more and more gas is built up and BOOM!

## **ADA Twist Scientist STEAM Lesson**

### **Grade level: K-6**

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Read the book Ada Twist Scientist to the Students-Discuss the details of the book.

Students will investigate, observe, and participate in transferring water from one cup to another.

### **Materials**

-2 clear glasses or jars

-Water

-Food coloring

-Paper towels

Start this experiment early in the day to allow time for water transfer.

### **Procedures**

1. Fill one clear cup with water to the top.
2. Add 10-20 drops of food coloring.
3. Cut a paper towel in half and fold it lengthwise into quarters.
4. Place one end of the paper towel into the colored water and the other end into the empty jar.
5. Water will slowly soak into the paper towel and transfer over to the empty glass until the water levels are about equal.

### **Follow-Up**

Explain that water is made up of elements that stick together and stick to other things. This allows it to adhere to the paper towel and transfer to the other cup. Have students complete their journal/recording page to summarize their conclusion. Students can also do research to learn more about water transfer.