

ACTIVITY!

Inquire & Investigate

 The scientific method is the way that scientists ask questions and find answers.

Scientific Method Worksheet

Questions: What are we trying to find out? What problem are we trying to solve?

Equipment: What did we use?

Methods: What did we do?

Predictions: What do we think will happen?

Results: What happened and why?

WARBLING WINEGLASSES

Ben Franklin was an inventor, composer, and musician who lived from 1706 to 1790. He created the glass armonica, which was a popular musical instrument of the time made of glasses mounted on a revolving spindle, played with a moistened fingertip. Where did Franklin find the inspiration for the glass armonica? At a musical performance in London, the performer's instruments were wineglasses of different sizes filled with water. With a wet fingertip, the musician circled the glasses' rims. The glasses responded to the friction in a variety of pitches, and the resulting vibrations produced ethereal, haunting sounds.

Work with your classmates, friends, or family members to create warbling wineglasses. Experiment with varying water levels to create different pitches.

- **Start a scientific method worksheet to organize your questions and predictions.** How will the amount of water in each glass impact pitch? How much friction will be required to produce vibrations and sounds? State your hypothesis. This is an unproven idea or prediction that tries to explain certain facts or observations.
- **Experiment by pouring different amounts of water into the different wineglasses to create an octave, or set of notes from A to A.** You can use the keyboard to establish the appropriate pitch for each note. Gently tap each glass with the spoon to test for a matching pitch. Is it easy to determine if the sounds are the same? How carefully do you need to listen? Does it help to have several people listen at the same time? How can you adjust the pitch in each glass so it matches?

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- **Practice playing tunes on the glasses.** Start with something simple, such as “Happy Birthday.” Don’t get frustrated if it doesn’t work right away. Make sure your finger is wet enough. Then, mix it up! Play more complicated but familiar pieces. See if others can identify them.
- **Work together to write a fantastical poem or story, and compose a musical piece that reflects the literary work’s mood.** Ben Franklin penned a dramatic literary work to be performed with an accompanist on the glass armonica. Perform the work as someone accompanies you on the warbling wineglasses.
- **How accurate were your predictions?** How would you adjust your hypothesis? How did the musical accompaniment engage emotions or activate moods during the literary piece? Why do you think the glasses produce such otherworldly sounds?

Ideas for Supplies ▼

- science journal and pencil
- stemmed wineglasses of different sizes
- water
- metal spoon
- keyboard



To investigate more, search for an online performance of a street musician playing wineglasses. You might be lucky enough to watch one in person! What do you notice about their playing technique? Explore musician William Zeitler’s glass armonica pieces with a family member or friend. What emotional responses do they ignite? Listen to Mozart’s “Adagio and Rondo.” These are delicate pieces he composed for the glass armonica. How do the pieces suit the instrument?

