Bust of Benjamin Franklin

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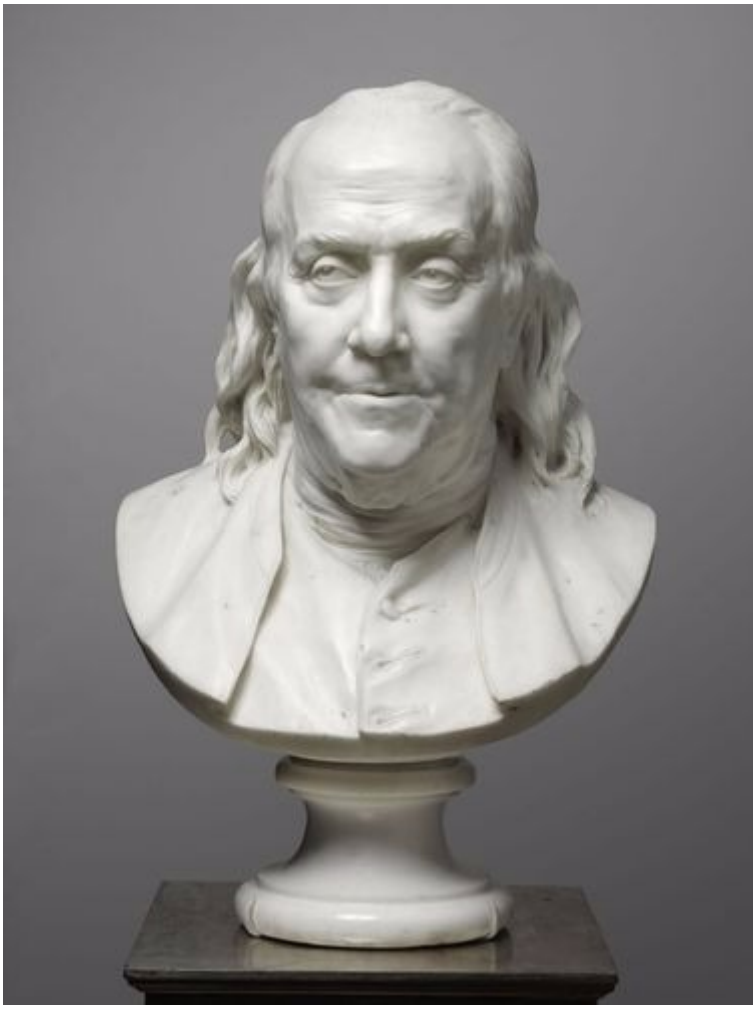

1779MarbleHeight with socle: 20 1 /2 inches (52.1 cm)JEAN-ANTOINE HOUDONFrench, 1741-1828

Benjamin Franklin was seventy-two years old when the French sculptor Jean-Antoine Houdon (jahn ahn-twahn oo-dawn) made this **portrait bust** of him. At the time, Franklin was a representative of the American colonies, negotiating with the French government for support of the revolt against England. He was already a popular celebrity due to his experiments with electricity; his many inventions, such as the lightning rod, the Franklin stove, and the armonica (a musical instrument); founding Pennsylvania Hospital and the University of Pennsylvania; and publishing the *Pennsylvania Gazette* and *Poor Richard's Almanac*.

With incredible skill, Houdon carved away pieces of the hard, white marble, giving it the **realistic** appearance of Franklin's skin, hair, and facial features. What parts seem especially real to you? Although the two men may have seen each other at Masonic lodge meetings, Houdon created this amazing sculpture without ever making a mold or taking measurements of Franklin's face, or even asking the statesman to **pose** for him. The artist captured Franklin's keen intelligence in the **highlights** and shadows of his eyes, his slightly parted lips, and the subtle tilt of his head.

When Houdon created this piece, Franklin was so famous that many people wanted to own images of him. Houdon made the first version of this sculpture in **terracotta**, then two in marble, followed by many reproductions in plaster. Today, this work can be seen in the Philadelphia Museum of Art, at the end of the Benjamin Franklin Parkway, in the city where Franklin co-wrote and signed the Declaration of

Independence and the United States Constitution!

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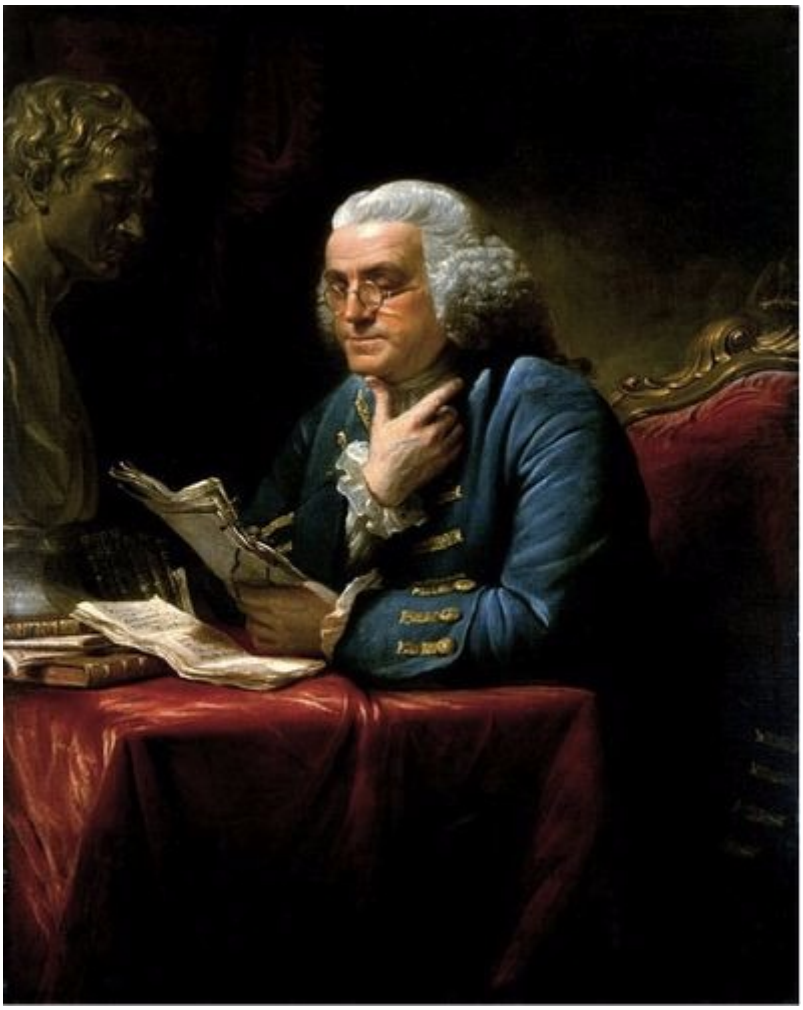
Benjamin Franklin: The Ultimate Solution Creator

by ReadWorks



Benjamin Franklin is credited with an array of inventions and accomplishments. Among these are the repeal of Britain's Stamp Act, bifocals, the lightning rod, the Franklin stove, the reform, and creation of the original U.S. postal system. All are notable for being solutions, in the 1700s, to everyday problems faced by Franklin's peers or to bigger social and political issues (like the American colonies' lack of representation during Britain's rule).

When faced with some kind of roadblock or trouble, Franklin was particularly adept at finding a way around it. Beyond his keen intuition that facilitated his discoveries and solutions, Franklin had an exceptional intelligence. This was evident in the way he approached problems-the man was famous for being economical, community-driven, and supportive of education and hard work. He didn't come from a wealthy family and was well known for living simply, yet smartly. Partly because of this straightforward, but thorough approach to daily life, he was better able to invent and create or improve solutions to some of the era's problems.

Take, for example, the trouble of having two different kinds of poor eyesight. Most people have only one vision problem, at most, and during Franklin's time, eyeglasses to help nearsightedness or farsightedness already existed. Some people, however, experience both kinds of vision deficiencies, whose scientific names are presbyopia (nearsightedness) and myopia (farsightedness). To address both at the same time, Franklin created dual-lens eyeglasses, which offered a bottom half to correct one's vision of close-by objects and words, and a top half enabling the same viewer to see far away. He did this by cutting the two different necessary lenses in half and combining them. This solution also made it

possible to tailor the prescription of each lens to accurately correct the vision of the wearer.

It's not a perfect system; to this day, even if bifocals have improved, new users can experience headaches or dizziness when first wearing them. However, those in need of bifocals typically acclimate to the two-lens system (and in 1955, an optician named Irving Rips further refined the solution, by creating seamless bifocals from one lens, improving upon the original design). The glasses meet their wearer's vision needs.

Franklin also addressed common problems. During his lifetime (1706-1790), fireplaces and stoves were the only way to heat one's home. Burning wood or scrap produces smoke-not always what you want filling your house! To combat the issues of much smoke filling homes and inefficient heating, Franklin created a new system, called the Franklin stove. Essentially, it was an improved fireplace, meant to offer more heat and less smoke than the fireplaces that came before it. To do this, Franklin put something called a baffle (a hollow duct through which cold air entered and hot air exited, warming the room) at the back of his stove. The baffle was open at the bottom and had two holes at the top. Cold air sinks and hot air rises, so the underside of the baffle was meant to take in cold air from the room, heat it with the fire's flames, and release the heated air back into the room. Franklin's other adjustment was the attachment of an inverted siphon to the baffle. This inverted siphon was a U-shaped duct that he thought would carry smoke away from the room and up a chimney.

Interestingly, Franklin's stove wasn't particularly successful. It addressed two of the main heating problems of the day-inefficiency and an excess of smoke-but it didn't actually work that well. The inverted siphon only functioned correctly if the fire burned consistently, a factor that couldn't be guaranteed. However, given the problems and the way people built their homes in 1741, when Franklin invented his stove, the equipment he came up with is viewed as a solution that addressed the problems he was concerned with.

Besides dual-purpose eyeglasses and a less smoky fireplace, Franklin is also credited with inventing the lightning rod. This is perhaps his most famous invention, and with good reason. Before it, lightning striking one's home could have disastrous consequences, especially since houses were generally made from wood. The invention came about as a way for Franklin to test a hypothesis. He believed that lightning was related to electricity-a common piece of knowledge now, but new in 1750, when he invented the lightning rod.

By understanding that lightning tended to hit the highest, nearest point, Franklin determined that putting a rod on the top of a building meant lightning would be more likely to hit the rod than the house itself. Franklin's lightning rod connected to a wire that ran down through the house and into the ground, where it was attached to a ground rod. Both rods were made from metal, which Franklin theorized would conduct the electricity of the lightning. By moving from the first rod down the length of the wire, the lightning's energy could be safely transmitted into the ground, where it would no longer pose a threat to one's home or body.

Franklin didn't just deal with objects as solutions to problems. He was the first known creator of a "pros and cons" list, which is an invention to assist with decision-making. In a 1772 letter to a friend, he laid out how he made difficult decisions: he divided a piece of paper into two columns, with one headed "pros" and the other "cons." He would think about the pros and cons of a particular decision for several days, writing them down whenever they came to him. When no more occurred to him, he would go through each side of the list, assigning a weight to every point. Then he would strike out a pro for every con. At the end, he would see if the balance was on one side or the other, think about the problem for another day, and then make a decision.

This kind of systematic approach to decision-making was probably quite useful for Franklin's overall approach to making scientific inquiries, which he applied in his research too. For instance, he was very

interested in population growth, particularly in the American colonies. In the 1700s, the colonies' population was exploding, but no one knew by how much. After studying the growth for several decades, beginning in the 1730s, Franklin published "Observations on the Increase of Mankind" in 1755. This essay explained that rapid population growth usually accompanied an abundance of food supplies. At the time, the Americas had the fastest population growth anywhere in the world and also had a huge amount of farmland, which meant they could easily nurture a growing population. Besides enlightening his readers as to why the colonies were experiencing a surge in citizens, he was also able to explain how much their area was growing. At the time he published "Observations on the Increase of Mankind," based on his two decades of observation, Franklin theorized that the population of the Americas was set to double every 20 years.

During his lifetime, Franklin was also put in charge of systems affecting the population as a whole. He tended to improve them. In 1775, he was appointed the first Postmaster General of the American colonies. When he began the job, a letter traveling from New York to Philadelphia could take two weeks, even though the distance was only 109 miles. To get a letter safely overseas, a sender would send copies on several different ships, with the hope that at least one of them would make it to the recipient. Post offices were very informal-they could be anything from a town's inn to its local pub.

As Postmaster General, Franklin instituted several solutions that made sending and receiving mail faster and more reliable. First, he toured all the major post offices and the routes connecting them, so he could learn more about the system as a whole. Based on his observations, he dictated more direct routes between these post offices and had milestones set up on the roads used by mail carriers, so they could more easily follow the correct path. (Roads were very poorly marked in the 1700s.) Second, he specifically improved service between New York and Philadelphia, the colonies' two biggest, most important cities, by having the mail wagon travel between the cities during the night, as well as the day. Thus more mail was able to travel faster. Lastly, he instituted a standardized chart for mail that made clear what it should cost to mail a letter or package, based on its weight and how far it was traveling.

In an unusual move, Franklin never patented a single one of his designs or inventions, which meant other people were free to copy them, improve upon them, or re-create them. He resisted hoarding his ideas because he truly believed that people benefitted from one another's inventions. It gave society an advantage if new designs and inventions were available to all, because that way, more minds could work on them in order to make them better. By coming up with devices and systems that addressed certain problems, but refraining from trademarking his inventions, Franklin paved the way for others to continually improve on his initial solutions.

Name: _____ **Date:** _____

Use the article "Bust of Benjamin Franklin" to answer questions 1 to 2.

1. According to the article, the artist has captured Benjamin Franklin's intelligence "in the highlights and shadows of his eyes." In what other features has the artist captured Franklin's intelligence?

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2. Explain whether the artist has captured any of Franklin's characteristics besides intelligence. Support your answer with evidence from the image.

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Use the article "Benjamin Franklin: The Ultimate Solution Creator" to answer questions 3 to 4.

3. What "exceptional" characteristic was evident in the way Benjamin Franklin approached problems?

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4. The author characterizes Franklin as being supportive of hard work. What evidence in

the article shows that Franklin was hardworking?

Use the articles "Benjamin Franklin: The Ultimate Solution Creator" and "Bust of Benjamin Franklin" to answer questions 5 to 6.

5. What is one characteristic of Franklin that is captured in both the bust and the article? Support your answer with evidence from the texts.

6. What is one characteristic of Franklin that is captured in the article but not in the bust? Support your answer with evidence from the texts.

