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## Bitter Taste Gene

# What makes people say “yuck” or “yum” to the same food?

BEST FOR GRADES

2-6

ESTIMATED TIME

5-10 Minutes

## You Will Need

- PTC paper (phenylthiocarbamide paper)  
You can find it online
- If you don't have access to PTC paper, you can also experiment with tasting broccoli or cilantro.
- A tissue or paper towel
- A mint or hard candy

## Directions

Watch the Bitter Taste Video from <https://science-u.org/> and then let the investigation begin.

1. Write your hypothesis based on the question, “What makes people say ‘yuck’ or ‘yum’ to the same food?”
2. Wash your hands before beginning.
3. Place the entire strip of PTC paper in your mouth and wait 5 seconds.
4. Spit out the paper onto the tissue.
5. Make your observations.





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## Bitter Taste Gene Discovery Questions & Keywords

### Discovery Questions

#### Beginning the Experiment

How do we taste things?

What makes food taste different to each of us?

#### During the Experiment

How would you describe the taste of the PTC paper?

How would you describe the taste of broccoli?

How would you describe the taste of cilantro?

How do your perceptions differ from your family and/or friends?

#### After the Experiment

Compare your results with your classmates or family.

What can you conclude about the genetics of taste?

### Keywords

#### Phenylthiocarbamide

An organic compound that can be either bitter or tasteless depending upon the genetics of the taster.

#### Gene

A unit of heredity passed down from parent to offspring.

#### Allele

Different versions of a gene. For example, one allele might code for blue eyes and another might code for brown eyes.

#### Taste Bud

Tiny nerve endings on the tongue that transmit signals to the brain providing us with a sense of taste.

#### Cruciferous Vegetables

A family of vegetables that have a four-petaled flower that is shaped like a cross. Common cruciferous vegetables include broccoli, Brussels sprouts, cabbage, cauliflower, and kale.

#### Dominant

When an allele is more likely to be expressed, it is the dominant gene.

#### Recessive

When an allele is less likely to be expressed, it is considered to be the recessive gene.



## Bitter Taste Gene

# What makes people say “yuck” or “yum” to the same food?

## How does it work?

Discovered in 1931, Phenylthiocarbamide (PTC) Test Paper is used to test if people are ‘tasters’ or ‘non-tasters’. About 75% of the population can taste PTC. That means the genetic ability to taste PTC is dominant. Some people have stronger reactions than others. We call these people ‘supertasters.’ These supertasters are more sensitive to bitter tastes. Broccoli is perceived as bitter to about 20% of the population.

Other cruciferous vegetables (such as Brussels sprouts, or cauliflower) have similar bitter tastes. There are about 25 “bitterness” genes that we know of so far. However, scientists don’t think a single gene is responsible for how we perceive bitterness. Scientists think there is also an environmental factor that impacts how foods taste.

Cilantro contains a chemical known as citronellol which is also used in making Ivory soap. People who perceive the taste of cilantro as soap-like are sensitive to this chemical. Researchers at Cornell University found that there was one specific gene that makes between 4-20% of the population dislike cilantro because they are citronellol “supertasters!”





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## Bitter Taste Gene

# Discovery question answer key for parents and teachers.

### Beginning the Experiment

How do we taste things?

*Our sense of taste comes from the taste buds on our tongue. There are thousands of small bumps, called papillae on our tongues that contain the taste buds. Taste buds send signals to the brain when they come in contact with food or any substance in our mouth.*

What makes food taste different to each of us?

*We are born with 10,000 taste buds which are replaced every two weeks or so. As we age, the number of taste buds diminishes leaving us less sensitive to taste. This is why children tend to be sensitive to stronger tastes. Unsurprisingly, smokers have a diminished sense of taste and sometimes people lose their sense of taste because of illness.*

### During the Experiment

How would you describe the taste of the PTC paper?

*Answers will vary based on what the scientist observes.*

How would you describe the taste of broccoli?

*Answers will vary based on what the scientist observes.*

How would you describe the taste of cilantro?

*Answers will vary based on what the scientist observes.*

How do your perceptions differ from your family and/or friends?

*Answers will vary based on what the scientist observes.*

### After the Experiment

Compare your results with your classmates or family.

*Most people should be able to taste PTC and less than 20% should have an adverse reaction to cilantro. However, if you are only comparing yourself with relatives, you might find that you have more in common than not.*

What can you conclude about the genetics of taste?

*Answers will vary based on what the scientist observes.*