

# *The Human Tongue*



*Do we experience the sense of taste, or is there more to the story?*

Many years ago, in a small village, lived two devout shepherds. One morning, after they finished milking their sheep and pouring the milk into a large, wooden pot, the older shepherd asked his friend to watch the herd as he took a nap. The old shepherd placed his pipe carefully on the rim of the pot of milk, lay down in the grassy field and fell asleep.

As the old shepherd snoozed, the young shepherd noticed a fly emerging from his friend's nose. The fly hovered over to the rim of the wooden pot, drifted through the shepherd's pipe sitting on the rim, and then disappeared into a hole under a nearby bush.

Moments later, the fly came out of the bush, went through the pipe again and entered the sleeping shepherd's nose once more, stirring him.

Startled, the older shepherd sat up and proclaimed, "I had the most extraordinary dream!"

"May God make good come of it!" asked his friend, "What was it?"

"I saw a strange bridge stretching over a sea of milk. The upper part of the bridge appeared to be covered with a timber frame of some kind that had many windows. I walked across the bridge to find a jungle overgrown with huge, jagged-looking trees. Underneath the trees was a cave. When I entered the cave, I found a treasure chest overflowing with gold. I wonder... what does all this mean?"

"It makes sense to me," replied the younger shepherd, nodding thoughtfully. "The sea of milk you saw in your dream represents this milk of ours." He gestured towards the wooden pot. "The bridge represents your pipe, and the tree- that bush over there. If you hand me the pickaxe, I'll show you where the treasure is."

The older shepherd hurriedly brought over the pickaxe. The shepherds then took turns digging under the bush until they found enough gold to make them prosperous for the rest of their lives.

**W**hat do you think the difference is between the shepherd's dream and reality? The shepherd could not obviously interpret his dream while he was dreaming. He could only make connections between what occurred in his dream and reality when he became fully conscious. The shepherd was unable to distinguish between the material world and the non-material world in his unconscious, sleeping state.

Our five senses are designed to provide us with many experiences in this world. However, we need to learn how to interpret these experiences correctly. Otherwise, our perception of truth and reality may be corrupted.

In this chapter, we will learn about the experience of taste and see if we can interpret this worldly experience correctly.

We will study the structure of our tongue and understand its many roles that include tasting, swallowing and speaking.



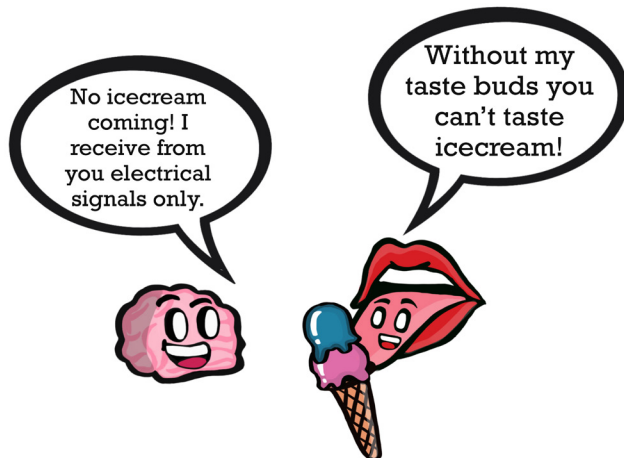
# First Dimension : Analytical Thinking

## SCIENTIFIC UNDERSTANDING OF THE HUMAN TONGUE

Your tongue is a muscle. In fact, it is made of lots small muscles; each of which runs in a different direction. This way your tongue can move in many directions to do its various jobs.

What is more, the tongue is the only muscle in the human body that works without the use of the skeleton. It is also the strongest and most sensitive muscle in the human body.

The tongue has three main functions: eating, tasting and speaking.



### Eating

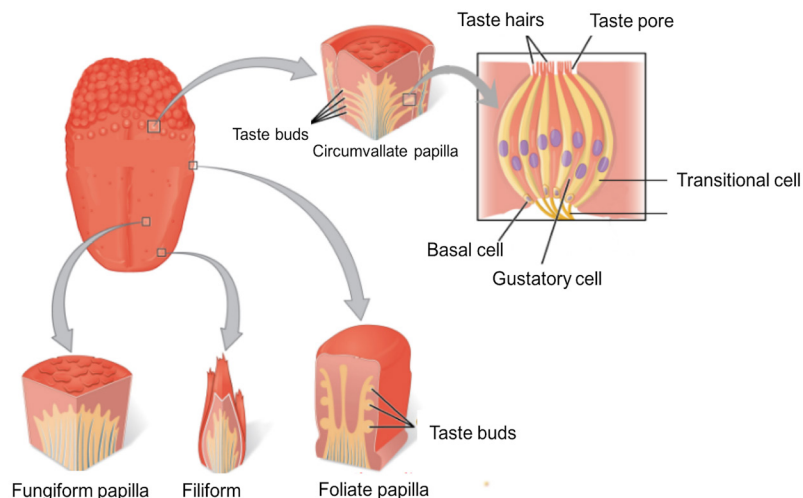
Your tongue is designed to work with your cheeks to move your food around your mouth when you are eating and chewing. It also moves saliva around your mouth to help start the digestion of your food.

When you swallow, your tongue makes it easier for your food to move to the back

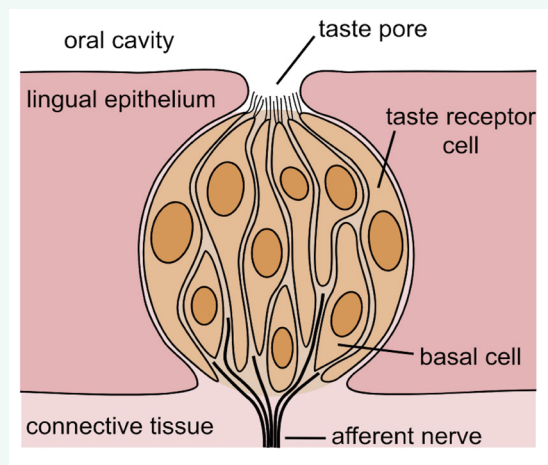
of your throat. In fact, the muscles at the back of the tongue push the food and saliva into the oesophagus, the tube that goes from the throat to the stomach. It also works like a toothbrush helping you to clean the food stuck between your teeth.

### Tasting

Have you ever noticed the bumpy surface of your tongue? The bumps on the surface of your tongue are called **papillae**. Each of these papillae contains taste buds. You have lots of tiny **taste buds** inside the papillae; thousands of them. Each taste bud contains banana-like clusters of taste receptor cells. The **taste receptor cells** are bundled in such a way that their tips form a **taste pore** at the surface of the tongue. Out of each taste pore extends tiny hairs called **microvilli**. The



microvilli send messages about the food that you eat via the **cranial nerves** to your brain where the signals are processed and each taste is identified. There are two cranial nerves, one at the back of the tongue and one at the front. As shown in the diagram below, what you feel as taste is the outcome of electrical signals sent to your brain.



## You Taste with Your Brain, not with Your Tongue

The moment you take a bite of delicious food, your mouth is filled with flavour. You feel a pleasant sensation on your tongue. In reality, you do not taste with your tongue you taste with your brain! In other words, it is in the brain that the different flavours we taste are experienced. In fact, the process of tasting involves smelling as well. Your tongue and nose work together, smelling and tasting what you eat and drink. That is why when you have a cold and can't smell well, food has not taste.

As food dissolves in your mouth, food molecules bind to taste receptors that are connected to the cranial nerves on

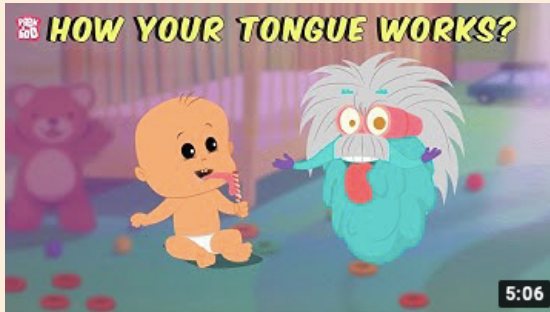
your tongue. Food molecules (in the form of odours) also pass into the nose and bind to the olfactory receptors, which are connected to the olfactory nerve. In combination, the cranial nerves and olfactory nerve send electrical signals (messages) about the food molecules to the brain. There, the brain processes the received messages to produce the sensation of a particular flavour.

As your brain processes the signals it receives from the cranial nerves, you can identify the type of food you are eating. You are also able to determine whether the food that you are eating is safe to eat or drink. The microvilli are also designed to protect you from ingesting harmful substances by being sensitive to bad tastes or toxic smells. Your brain's response to the signals sent by the microvilli ensures that you do not swallow these hazardous substances. Have you ever tasted milk gone past its expiration date? What stopped you from taking another sip? The milk's sour taste is very unpleasant.





## YOUTUBE CORNER



<https://youtu.be/4rJpmqYgfoxo?t=1>

Your tongue is designed to help you identify the five primary tastes which are sweet, sour, salty, bitter and umami (a pleasant, savoury flavour). Some researchers have proposed that there is a sixth primary taste as well- the taste of fat. "Spicy" is not considered a taste despite common belief. In fact, it is just a pain signal sent by the nerves that transmit touch and temperature sensations. The pleasant feeling associated with them does not come through the circuitry of taste.

It was once thought that the tongue has specialised regions that detect the five primary tastes. It is now known that many regions of the tongue can detect sweet, sour, bitter, salty and umami tastes. This is because the 8000 taste buds on our tongue each have different types of receptor cells that detect the five different tastes. Taste buds are also found in the roof of the mouth and the throat. Did you know that some animals have taste buds on their skin as well?

Scientists have found that flavor also relies primarily on other essential factors such as smell and texture. The odour of the food we eat as well as its colour both influence the way we experience taste. Did you know that adding a deep red colour to a drink can make it seem 12 per cent sweeter than it really is?

### **Scientists have discovered the process that turns tastes on and off**

Science is still far from fully understanding how we taste. However, in recent years, scientists have made some good progress. In the lab, they were able to turn the sense of taste on and off in mice by activating or silencing certain brain cells (neurons) without providing any food. For instance, when they stimulated neurons associated with "bitter", mice made crumpling expressions.



In another experiment, when scientists turned on the “sweet” circuit, mice drank the water greedily but when they turned on the “bitter” circuit, they avoided drinking altogether. This research confirms that the brain is hardwired to allow us to experience specific tastes when we eat or drink.

This is how it works: for each taste, there are related receptors on our tongue through which specific signals are sent to the brain. These signals activate particular brain cells that provide us with the sensation of ‘tasting’. Indeed, the basic sensations of pleasure or disgust are related to the hardwiring of the brain rather than the quality of taste. In other words, our brain is programmed to identify certain tastes as attractive and others as distasteful or even disgusting.

## YOUTUBE CORNER



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## Tasting Limitless Flavors

Even though the number of our taste buds are limited, the number of flavors we can taste are virtually limitless. This is because flavor is a combination of varying levels of sensitivity to the different basic tastes along with the senses of touch, smell, and temperature. Nearly half of the taste receptor cells in our mouth react to all five tastes (with different degrees of sensitivity) while the other half only react to one kind of taste. The experienced flavor is determined by the combination of various sensory information. By virtue of the great number of possible combinations, we have practically infinite possibilities of flavors to taste.

## Speaking

We do not use our tongue just for taste. We also use it to make sounds. Indeed, most of the sounds we make when we speak are shaped by our tongue. There are some sounds that can only be made when your tongue is pressed onto the back of your front teeth (like th- or t-), and others that are made when your tongue is pressed at the back of your throat (like g-). The sound (n-) is made when you press your tongue onto the roof of your mouth. Although we are born with a tongue that enables us to speak any language, as we grow up we lose our ability to develop the correct pronunciation of foreign languages.



## Second Dimension : Analogical Thinking

### HUMAN TONGUE VS. ELECTRONIC TONGUE

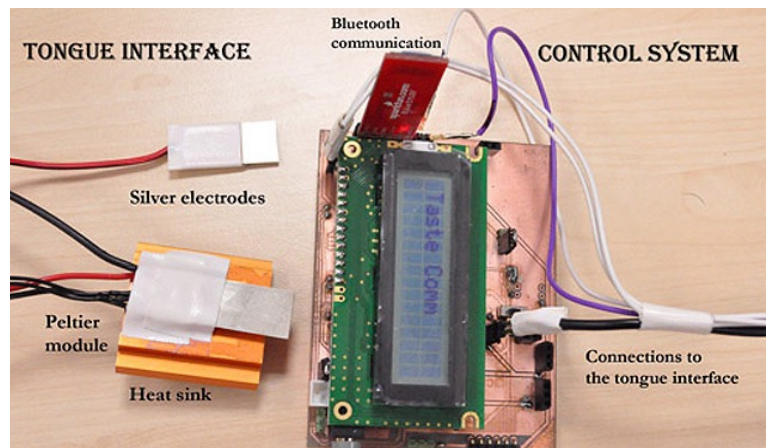
Let us compare our tongue to a taste simulator, also called the 'electronic tongue'. For years, scientists tried to find a way to simulate the process of taste. Their aim was to design a type of technology that could allow people to electronically sample tastes.

After many years of research, scientists at the National University of Singapore developed a device that uses electrodes to stimulate the tongue's taste buds. The device allows users to electronically experience specific salt, bitter, sweet and sour tastes. The scientists named their device the Digital Flavor Synthesizer.

The device was designed to cause salty, sour and bitter sensations through a process controlling current, frequency and temperature. Potentially, this device could be used to allow diabetic patients to experience sweet tastes wi-

thout raising their blood sugar levels or allow children to taste sweets without the harmful effects of sugar. In addition, this technology could also be used as a reward system in computer games, by giving a sweet reward for completing a level for example. What kind of 'reward' would you give a player who loses a level? A bitter one, perhaps.

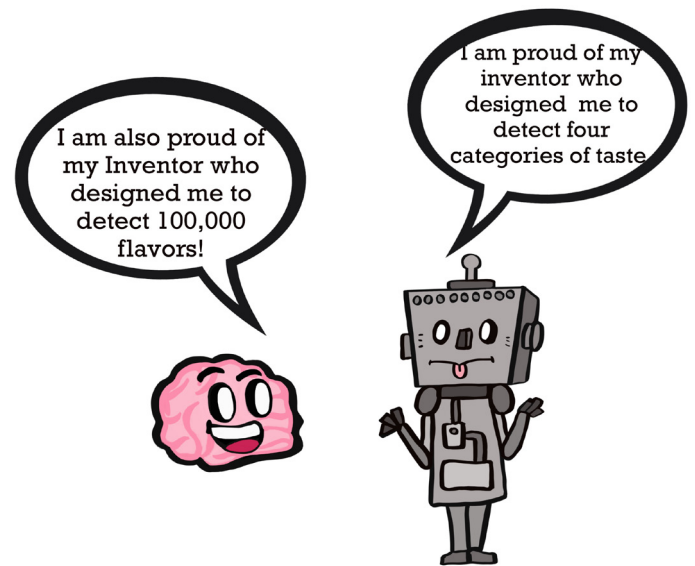
### Digital Flavor Synthesizer





In comparison to our tongue, a DFS is extremely primitive. While our taste buds can detect the tastes of different foods based on their chemical components, the DFS relies on an electric current with a specific frequency that mimics the taste of a particular food. This device is an attempt to simulate a basic human function that we often take for granted. It is a poor and rough imitation at best. The device gives the sensation that the tongue is tasting something sweet, sour, bitter or salty.

However, a DFS cannot tell anything about what is being tasted. It does not capture the endless variations in flavors. It can only capture basic taste categories. It does not consider smell, color, shape, touch and other aspects that have an impact on how the food tastes when we use our tongue. Experimental results from the device show that the users were effectively able to identify different flavors such as minty, spicy, and lemony. This research constitutes only one tiny step towards mimicking the sense of taste in its complexity.



If successful, this device has great potential to ignite our taste circuitry without consuming calories. Imagine if digital restaurant menus could offer you virtual tastes of their dishes to sample before you order! Wouldn't that be amazing?

When we study the tongue, containing about 8000 taste receptor cells with the ability to harmoniously detect the five primary tastes resulting in virtually infinite flavour combinations, we realise that the DFS is simply not comparable. A DFS is too rudimentary compared with the human tongue. In reality, the sense of taste with its entire circuitry is a thousand times more complex and beneficial than the electronic tongue. It is important to note that the DFS is just a stimulator that sends electrical signals to the already existing taste circuitry in the brain. Scientists are still far from fully understanding how the taste circuitry within the brain actually works. It took thousands of years of accumulated knowledge and experience to come up with an artificial tongue (that is still a far cry from the human tongue).

**YOUTUBE CORNER**

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# Third Dimension : Critical Thinking



## Reflection Questions:

- *Imagine if you were born without the sensation of taste and the ability to speak?*
- *Think about how this would affect the quality of your life.*
- *How miserable would you feel?*
- *Would you even be able to survive without a functional tongue?*

## EXPLORING THE MAKER OF THE HUMAN TONGUE

**H**ow is an electronic tongue made? Like other electronic devices, it is made of raw materials such as metals, magnets and copper wire.

Do you think these materials could randomly come together and form an electronic tongue out of thin air? Without any external intervention?

The raw materials of an electronic tongue first need to form the basic components of an electronic circuit that include resistors, transistors and inductors.. Then, these components need to come together in a specific way (according to a purposeful blueprint) to form an electronic tongue. Since the raw materials and their ingredients (such as atoms and molecules) have neither knowledge nor consciousness, they could not possibly come together on their own to form such a complex device. Indeed, the first electronic tongue was designed by a team of experts coming from many fields of science, such as engineering, medicine, computer science, psychology, and industrial design.

This indicates that the invention of such a device is only possible through the efforts of people who

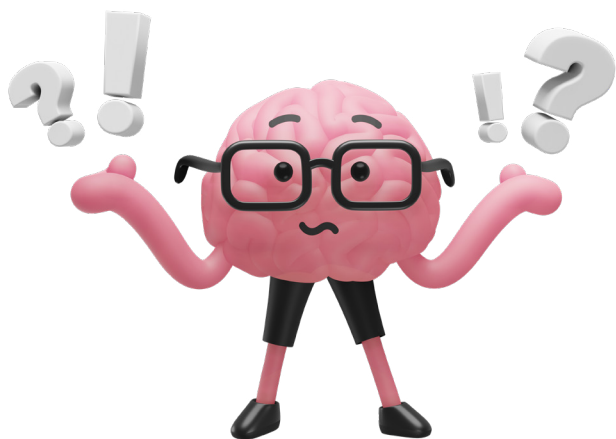
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***“Imagine if you were born without the sensation of taste and the ability to speak?”***

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have deep knowledge of multiple disciplines. In addition, the inventors of such a device, need to have the will and power to convert their knowledge into actions. In conclusion, the existence of an electronic tongue is only possible with a certain amount of will, knowledge, and power.

In comparison, consider the structure and function of your tongue. As we discussed in the previous dimension, your tongue is a thousand times more complex and beneficial than the electronic tongue. Imagine if you were born without the sensation of taste and the ability to speak? Think about how this would affect the quality of your life: you would be unable to speak to others, to taste or to even eat properly. How miserable would you feel? Would you even be able to survive without a functional tongue?



## **FOOD FOR THOUGHT: ILLUSION VERSUS REALITY**

***Do you remember the award-winning movie, the Matrix? Neo, a software developer by day and a computer hacker by night, is recruited by an underground rebel called Morpheus. Neo enters an illusory world called the Matrix that is generated by a massive computer. The Matrix is so lifelike that it is hard to distinguish it from reality. Once Neo escapes from the Matrix, Morpheus enlightens him:***

***“What is real? How do you define ‘real’? If you’re talking about what you can feel, what you can smell, what you can taste and see, then ‘real’ is simply electrical signals interpreted by your brain. This is the world that you know...”***

***The movie argues that everything is just an illusion created by the brain (or the Matrix). In a meeting with rival Agent Smith, a member of Morpheus’s crew, Cypher, makes the following remark while eating a steak: “You know, I know this steak doesn’t exist. I know that when I put it in my mouth, the Matrix is telling my brain that it is juicy and delicious...”***

***During breakfast, another member of Morpheus’ crew, Mouse, makes the following comment about appearance versus reality regarding taste:***

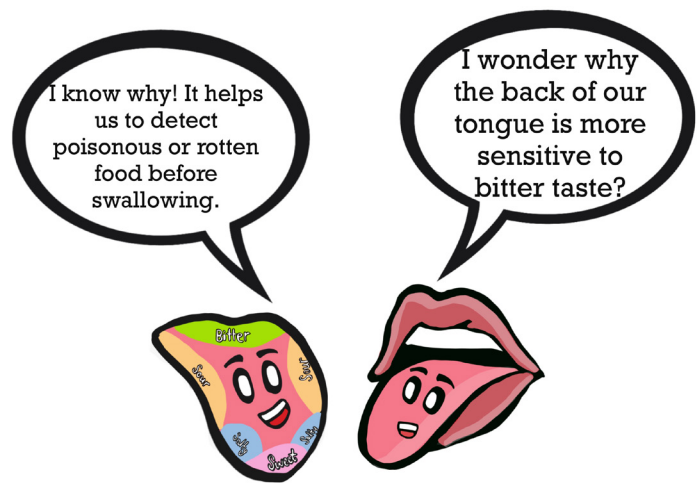
***“How did the machines know what Tasty Wheat tasted like, huh? Maybe they got it wrong. Maybe what I think Tasty Wheat actually tasted like was oatmeal or tuna fish. That makes you wonder about a lot of things...”***

***Perhaps we live in a Matrix programmed by God to have particular taste (and other sensory) experiences.***

## Questions to ponder

*How did we get such a useful and beneficial tool?*

*Can it be the work of specialized cells? Where did those cells get their education and training to do work that our human experts (scientists) could not get at top medical schools?*



**O**ur taste buds are designed to keep us alive. Sweet and salty tastes let us recognise food that is rich in nutrients. The Umami taste helps us seek protein-rich food. On the other hand, strongly bitter or sour tastes warn us in advance that the food might be poisonous or rotten, and therefore harmful. Interestingly, the back of our tongue is more sensitive to bitter tastes so that we can spit out poisonous or rotten foods before swallowing them. Indeed, there are many bitter species of plants. Though most of them are beneficial, some are poisonous. It is very important that we recognize these plants for our survival.

But how did we get such a useful and beneficial tool? Can it be the work of specialized cells? Where did those cells get their education and training to do work that our human experts (scientists) could not get at top medical schools? As it does not make sense to think that the electronic tongue is the product of its components, it is also not reasonable to

think that the human tongue is the work of its cells. This is because cells do not have a mind to reason. Indeed, they do not have consciousness. Furthermore, those cells are mostly made of the water molecules that we drink. They are just an arrangement of the food and drink molecules that we ingest. It is hard to believe that parts of food and drink could come together to become experts performing better than thousands

### YOUTUBE CORNER



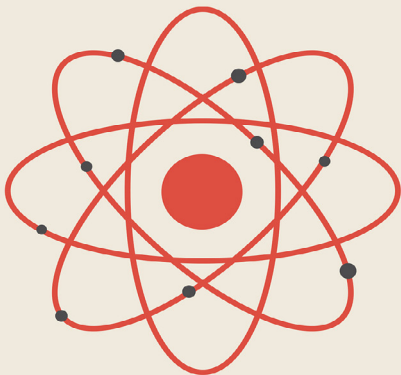
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of scientists. If we further study the molecules of living cells, we will find out they are just made of atoms consisting of electrons and a nucleus with small subatomic particles.

For instance, the only difference between lifeless stone and living cells at an atomic level, is the number of electrons within their elements. Thus, it is obvious that the more we dig in, the more we will realize that neither cells nor their molecular or atomic components are capable doing what they appear to do. If so, how do they do what they do? Could they each have a mind or a consciousness to learn? Even if they do, where did they get their education and training? How do they gain life from the ingredients of food and drink? Can lifeless matter create itself? How can ingredients act like conscious beings? Can unconscious matter give itself consciousness? Obviously, this is not possible since “no one can give what they do not

have.” The answers to these questions are simple. It does not make sense to think that we get the sense of taste from cells, molecules, or atoms.

In short, we have seen how the existence of an electronic tongue is the product of inventor(s) who possess will, knowledge, and power. In the same way, if we engage in deep critical thinking, we should understand the existence of the tongue and its taste circuitry also require a Maker with will, knowledge and power. There is one crucial difference though. Since the tongue is alive and infinitely more complex than the electronic tongue, the knowledge and power that The Maker possesses is far beyond that of the team that invented the electronic tongue. Let us continue our journey to learn about the attributes of the Maker of our tongue and taste circuitry.



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- ***How do atoms do what they do?***
  - ***Can lifeless matter create itself?***
  - ***How can ingredients act like conscious beings?***
  - ***Do they have a mind to learn?***





# Fourth Dimension : Meditative Thinking

## REFLECTING ON THE ATTRIBUTES OF THE MAKER

**W**hat can you say about the Maker of the tongue by learning how it functions? Who is the Maker of the tongue and our taste circuitry? How much can we know Him? Why did He give us such a system? How are we supposed to make the best use of our sense of taste? Let us explore these questions. To do that, we need to consider how we experience the sense of taste in our life in order to get an idea of how it functions in relation to the rest of the world.

So, what do we need to experience taste? We need to be alive. We need a living body in order to be able to enjoy sensory pleasures through eating and drinking. It is fascinating that the taste buds on our

tongue in their complex perfection, are designed to differentiate between thousands of different tastes of food and liquids that exist out there in the world. However, our tongue does NOT work in isolation. It is embedded within the entire body and human soul. For our tongue to function properly, we need to be alive and conscious. Therefore, when a person falls into a coma, although the body is alive, the person cannot taste anything. In other words, our sense of taste depends on the functioning of many organs and systems within our body along with our consciousness. We cannot taste without a pumping heart, breathing lungs, blood-filtering kidneys, and a functioning brain. The sense of taste relies on a well-connected circuitry as well as a functioning, healthy body.

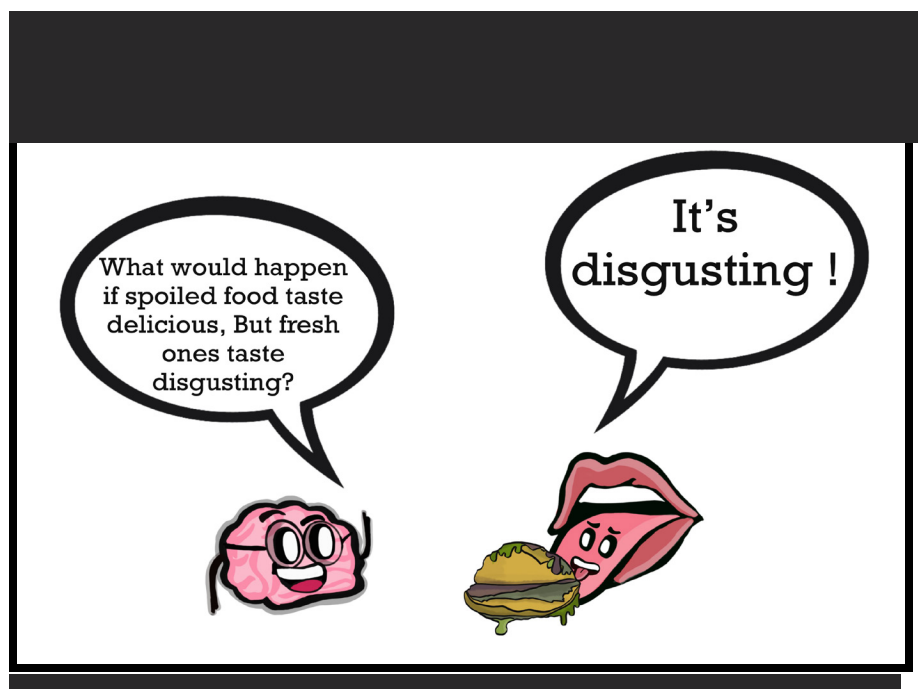
In addition, our psychological state influences our sense of taste. If we are served the most delicious food after receiving news of the unexpected death of a loved one, we would not enjoy it. In fact, we may even lose our appetite completely. From this state of affairs, we can conclude that, the Maker of the sense of taste can only be the Maker of our entire body. He must also be the Maker of our appetite without which we cannot even eat, let alone enjoy our food.

It is important to remember that the sense of taste depends on the interaction between many different components within the body and outside of it too. It depends on the saliva produced by the salivary glands. It also depends on the taste receptors on the tongue and on the neurons in the brain. It depends on the sense of smell. It also depends on the chemicals in the food that grow independently of the body.

The sense of taste is connected to stimulators in food. Indeed, we experience taste only if the food we are eating has the right stimulators. Otherwise, our tongue and the whole complex taste circuitry would be useless. Each taste is connected to certain food ingredients. For instance, the perception of a "sweet" taste is ignited by sugars. "Sour" is triggered by the hydrogen ions in acetic acid and citric acid. "Bitter" is linked to chemicals such as quinine and caffeine, which are detected through magnesium chloride. "Salty" is related to sodium chloride. Finally, "Umami" is typically ignited by Monosodium Glutamate (MSG).

Thus, the Maker of the taste sensory system must be the Maker of all those ingredients. He must be the One who places these ingredients into the right type of food, providing us with vital nutrition as well as pleasant taste sensations.

***"Our sense of taste experiences taste, when there are certain stimulators in food. Thus, the Maker of the taste sensory system must be the maker of those stimulators found in food."***





Imagine what would happen if fresh food tasted rotten while spoiled food tasted delicious. Placing the right taste into the right food is a clear sign of wisdom and care working within the integrated system of taste granted to us.

If we further reflect using scientific knowledge, we will realize that it is impossible to have a sense of taste without the entire universe since the sense of taste required that we're alive- breathing clean air, drinking water, and eating food. This means that we need air, water, earth, sunlight, and the entire universe to experience taste. In other words, the sense of taste functions in tandem with the entire universe. Indeed, the One who creates a single living cell is the One who places many cells together to form tissues, organs and systems in the body including the tongue and taste circuitry.

The human body could not survive without the Sun and its planets. The Sun is connected to other stars in the Milky Way while the Milky Way is connected to other galaxies. Similarly, at a microscopic level, the particles in our taste buds are connected to the

particles in the universe. Thus, a functioning tongue is connected to the entire universe. And the Maker of one part of this interconnected whole, can only be the Maker of the whole and vice versa.

Furthermore, the sense of taste is not limited to human beings. Animals also have a sense of taste. They enjoy different types of food. For instance, carnivores enjoy eating meat while herbivores enjoy plants. On the other hand, like humans, some animals enjoy both meat and plants. Within each of those categories, different animals have different diets. For instance, fungivores enjoy fungi, osteophages eat bones; bacterivores enjoy bacteria; palynivores enjoy pollen, and so on. Can you imagine that some animals actually enjoy eating faeces? This practice is called coprophagy. There are literally hundreds of categories classifying animals based on their dietary preferences. Given the fact that the taste sensory system in animals is similar to ours, the Maker of our taste sensory system must also be the Maker of similar sensory systems in all living beings.

## YOUTUBE CORNER



<https://youtu.be/C4rdqXXzPGU?t=1>





## The Universe and Tongue

The human body could not survive without the Sun and its planets. The Sun is connected to other stars in the Milky Way while the Milky Way is connected to other galaxies. Thus, a functioning tongue is connected to the entire universe.

**A**s we discussed before, all matter, living and non-living, is made up of unique patterns of atoms and molecules. Likewise, our sense of taste is connected to our external environment, which includes animate and inanimate objects. Living and non-living elements become a source of sustenance and nourishment that feed our physical bodies, so that we may survive and thrive here on earth. Living products grown in inanimate soil are used to nourish, grow and repair the cells, tissues and organs of our bodies. However, our bodies are not immortal. When it is time for our souls to depart this world, the same bodies that were nourished from the soil, return to it. New vegetation springs forth from the soil, to nourish other living beings and so on.

What does this interconnectivity- this harmonious choreography between plants, animals and humans- indicate? It points to the fact that the sense of taste comes directly from the

Maker of the universe. Like the light switch, electrical cable and bulb, we have certain instruments through which we receive taste. Just as the light comes through those instruments, but not from them, the numerous tastes we receive come through our food, tongue and brain, but not from them. As we have already learned, a molecule of food works like a stimulus igniting a taste receptor that sends electrical signals to a certain part of brain. Thus, it is clear that taste does not come from food. Rather, it is experienced in the brain. However, the brain could not be the source of taste either.

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***“What does this interconnectivity between plants, animals, and humans indicate?”***

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**MOST  
MERCIFUL**

**ALL  
LOVING**

**ALL  
KNOWING**

**ALL  
POWERFUL**

**ALL-WISE**

**ALL  
COMPASSIONATE**

**ALL  
GENEROUS**

**MOST-KIND**

**A**fter all, brain cells are nothing but molecules and atoms. They could not be the source of the amazing experience of taste. They are just a platform through which we receive taste. It is now clear that the tongue and food are not the sources of actual taste. They are just the means through which we receive the taste. Indeed, the conscious soul is the ultimate recipient of the sense of taste.

Thus, it is now evident that there must be a Maker, a source of this consciousness and interconnectedness between living beings and non-living matter. It is evident that the Maker of our tongue has to be the Maker of our bodies. Also, the Maker of our bodies can only be the Maker of the world around us, and the Maker of the entire universe. Following this reasoning, we can conclude that the Maker of our tongues can only be the giver of life and of experience. What's more, the Maker of our tongues, the Bestower of our sense of taste and ability to speak must have the wisdom, ability and

power to create it and sustain its existence and functioning. Indeed, the Maker of our tongues must have comprehensive knowledge and power. We understand that He must be very kind and generous in giving us such a precious gift at no charge. Indeed, our ability to eat, speak and taste are clear indications of His infinite kindness and generosity. Clearly, He creates tongues for living beings purely out of His mercy, just as He provides us with all the things we need for life. In addition, we can conclude that He is very wise because we can see how He uses an extremely elegant system to allow us to communicate and receive nourishment from our environment.

In short, the way your tongue is made speaks about its Maker and reveals His beautiful attributes such as being The All-Loving, All-Compassionate, All-Generous, All-Knowing, All-Powerful, All-Wise, Most-Merciful and Most-Kind.

# Fifth Dimension : Moral Thinking

## RESPONDING WITH BETTER CHARACTER

**W**e are often unaware of the importance of our tongue. And in our state of unawareness, we may assume that we can live without such a complex organ. True, the tongue is not as vital as our heart or lungs. However, it is easy to imagine how difficult life would be without a tongue. It does not only help us taste food but also helps to talk, swallow, spit and clean our mouth. Science is just beginning to understand the complexity of observed tasks that are by the tongue. Here are some fascinating facts about the tongue and sense of taste:

1.

*Do you ever feel your tongue getting tired? The tongue is one of the most active muscles in our body. For instance, it is constantly pushing saliva down your throat even when you are sleeping. The tongue is also one of the most sensitive and flexible muscles in the body as well.*

4.

*Did you know that, like your fingerprint, your tongue is unique? Yes, you have a tongue print and it is unique to you. The difference between your tongue print and others' is due to the different number of taste buds that we have.*

2.

*Did you know that you would not be able to taste anything if your tongue was completely dry? Indeed, if you placed a slice of lemon on a dry tongue, you would not be able to say it was sour. You need saliva to dissolve food molecules before tasting.*

5.

*Did you know that a single saliva drop has 1 million bacteria? Do not be afraid. They are there to help in the process of digestion- not harm you.*

3.

*Did you know that the color of your tongue can tell a lot about your health? Indeed, a pink tongue means good health, a white tongue indicates the presence of a fungal infection and a yellow tongue means fever.*

6.

*Did you know that some animal tongues are specially designed to catch prey? For instance- chameleons, frogs and anteaters have tongues that can extend out of their mouth to grab insects.*

# BORN WITHOUT A TONGUE

*Auristela Viana da Silva is a Brazilian woman who was born without a tongue.*

*She is one of three known cases around the world born with such a rare condition. Silva's doctor was amazed that she was still alive when he met her as a young child. When she opened her mouth, he had never seen anything like it. The girl only survived because her mother could feed her by squirting breast milk straight into her throat. From an early age, she consumed only blended foods or liquids.*

*Silva had to undergo numerous therapies, but they were all ineffective. After ten years of unsuccessful treatments, doctors decided to undergo two extraordinary surgeries where they widened Silva's chin and jaw to make more room in the inside of her mouth. They also fitted her with braces for her teeth.*

*After recovering from the surgery, Silva said her life improved dramatically. She is now able to speak, chew and communicate in a better way. As a result, Silva is able to study and lead a regular life.*

*Try to imagine yourself without a tongue: can you speak? Can you eat? Can you taste anything?*



**O**ur Maker created our tongue with absolute perfection and connected it to everything in our environment. Consider how your tongue is designed to connect you to other beings. When you speak and make comprehensible sounds, you can communicate with others and connect with them on a mental, psychological and emotional level. It is easy to take the value of speech for granted. Speaking is, after all, something you do every day. Have you ever had laryngitis? Laryngitis is an inflammation of the vocal cords or voice box found in

the larynx, in your neck. When we have laryngitis, we lose our voice as it becomes hoarse and raspy. If you've ever had a serious case of this illness, you probably remember how painful it was to speak and can probably appreciate how important it is to be able to speak so easily..

Let us reflect for a moment on the value of your tongue. What would you do if you were born without one?

Here is the story of Auristela Viana da Silva, a woman who was born without a tongue.

**1.** *Remembrance is to be mindful of the Creator of the tongue. It is to keep in mind that this amazing tongue is a gift from Him and therefore our gratitude is due to Him.*

**2.** *Reflection is contemplating how the tongue is a priceless and miraculous gift of our Creator's mercy.*

**3.** *Gratitude is being thankful to the Creator for giving us such a precious and amazing tongue that is capable of taste, eating and speaking;*

### **How can we express our appreciation and gratitude for our sense of taste and ability to speak?**

The Maker of the tongue does not need payment. In fact, everything in the universe belongs to Him. He grants everything out of His kindness and compassion. In return, we should offer our gratitude to Him through good words and actions. We should be aware that the One who grants us such an amazing tongue knows what we choose to eat, speak and taste with it.

As we learned, our brain is hardwired to receive virtually endless flavors. If we were not given the ability to recognize different flavors, everything would taste the same to us. Actually, everything would be tasteless. We would still eat since we have to eat and drink to receive the necessary nutrition. However, eating wouldn't be appealing or pleasurable. We enjoy eating and tasting delicious food so much that it is part of many of our social gatherings and celebrations. If we weren't able to taste delicious food, eating would be rather dull and burdensome; and we would certainly not associate it with happy events in our life.

Our ability to recognize different flavors is therefore a great blessing. That's why we need to give thanks to our Maker Who gave us such an amazing ability that we can receive pleasure even while filling our stomach with the necessary fuel to move around and replenish our energy. In addition to this, we are not just given a few pleasant foods- we are granted almost infinite possibilities of pleasure through eating and drinking. In all of this, there is a sign to His infinite mercy and kindness.



Indeed, like many animals, we could have been given just limited types of food with limited flavors. Instead, we have been granted with the ability to combine our given food ingredients in varieties of ways to make meals with countless flavors. Just think of how different the various cuisines in the world are. In addition, we have also been given the tools to taste such countless flavors. Perhaps, this is a way that our Creator- the Maker and Sustainer of our body- reveals to us His infinite mercy, kindness, and love. Indeed, if you were invited to a banquet and you were served thousands of delicious foods, it would be a clear sign of the great wealth and generosity of your host as well as his care and love for you. That is exactly how the Host of this guesthouse, called Planet Earth, is treating us. Thus, we should treat one another in a similar manner. We should love each other. We should

treat each other with kindness and care. We should be mindful of Him when we make our choices. We should offer sincere thanks to our Beloved Host for His splendid feasts with virtually infinite flavors. We are recipients of His Divine gifts. We should be mindful of Him in all of our chosen actions.

Just as our Maker nourishes our bodies with nutritious food, He also provides food for our minds, hearts, and spirits. The delicious tastes and the pleasure they incite within us speak to the heart. Indeed, the meanings, wisdom, kindness, generosity, love, and mercy related to the activities involved in our eating, tasting, and enjoying our food relate to the spirit. This is how our Maker teaches us about Himself and about the purpose of our life on Earth.

## YOUTUBE CORNER



<https://youtu.be/7hYkUGd2CWo>

***“The delicious tastes and the pleasure they incite within us speak to the heart.”***

Can you imagine being in a school in which you learn about different topics by tasting different flavors? The world in which we live is like a school of life. The Maker of the universe teaches us about His infinite mercy, kindness, compassion, knowledge, power, wisdom and art through the many varieties of food and endless flavors. As we experience and reflect on the incredible sense of taste and learn from these teachings, we will be increasingly thankful to Him.

At this point, you may wonder, why does life end then? Why do we have to leave this world if the Giver of life is so merciful and so loving? Think about it, is it possible that our Merciful and Generous Maker makes us experience His endless blessings and then just end our life without meaning or purpose? Why would He bother to make us enjoy countless tastes by means of our tongue if our life was destined to end?

Imagine that you were invited by a very kind, compassionate host as a special guest who treated you with feasts for a thousand days

to show you his love, care and kindness. Would you believe that you would be killed at the end of it all?? Clearly, you would not expect that to happen. Similarly, our Maker and Host shows us His infinite mercy and makes it known to us by allowing us to enjoy infinite flavors. He makes His infinite power, knowledge, and mercy known to us through infinite flavors.

The more we witness and experience His mercy, knowledge, power, compassion, and wisdom, the more we can be sure that He will not eradicate us permanently through death. Rather, He will continue to grant us with His bounties and blessings because their source is permanent. As we look for answers within ourselves, we will realise that we are not designed to like what vanishes. On the contrary, we are designed to long for eternity and understand that we can only be satisfied with permanence. We also understand that death may be the end of life in this world, but it is not the end of eternal life. Death is simply the passage to another lasting world.



# TEST YOUR KNOWLEDGE

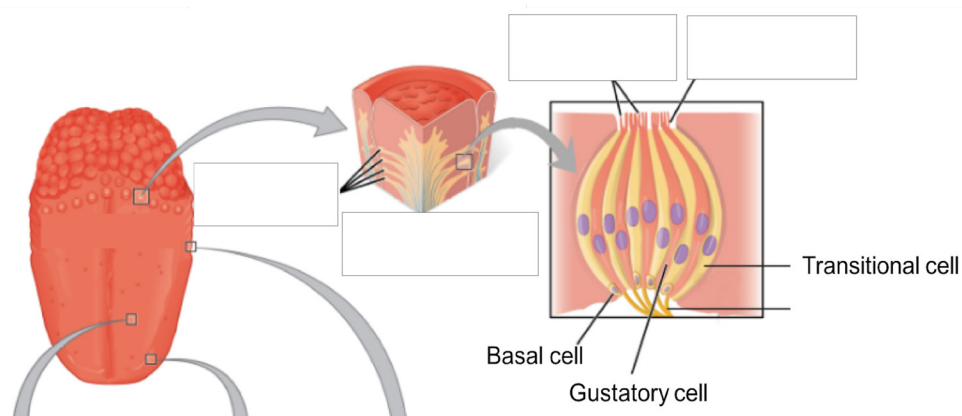
## I.UNDERSTANDING SCIENCE TERMS

Complete the following sentences with a word or words from the Science Terms that will make the sentence correct.

*Papillae*      *Texture*      *Odour*   *Taste buds*      *Umami*      *Microvilli*

1. \_\_\_\_\_ is a savoury taste like parmesan cheese or soy sauce.
2. Your tongue is made up of \_\_\_\_\_.
3. \_\_\_\_\_ send messages about the food that you eat to your brain.
4. The flavor of the food you eat relies on factors like \_\_\_\_\_ and \_\_\_\_\_.
5. The bumps on the surface of your tongue are called \_\_\_\_\_.

Label the following diagram:



## II.CHECKING FACTS

Determine whether each of the following is true or false.

1. The tongue is divided into regions which are designed to detect specific tastes.
2. Taste receptors emerged by chance through the random coming together of atoms and molecules.
3. The tongue controls speech.
4. Saliva is necessary for the sensation of taste.
5. Tongue cells are granted the ability to do what they do.
6. Taste is the sensation that emerges in the brain as a result of electrical signals sent by the tongue when you taste something.



### III.UNDERSTANDING CONCEPTS

Write a short answer for each question or statement.

1. What is the intended function of the microvilli?

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2. What is the intended function of our brain when it comes to detecting taste?

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3. List two things which make our tongue superior to a Digital Taste Interface (DTI)?

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4. List two things we learn about the Maker as we study the structure and function of our tongue.

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### IV.APPLYING CONCEPTS

Write a paragraph to answer each question.

1. Why do you think the ability to speak is a precious gift? Describe two things which make you appreciate the value of this gift.

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2. The One who creates our tongue must be the Creator of the universe. Why?

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3. What you learn about the attributes and names of the Maker of the tongue as you reflect on it?

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4. How can you show your gratitude to the One who granted you the gift of taste?

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5. What are the moral lessons we can learn from studying the human tongue?

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## V. THINK-THANK GAME

In this “think-thank” game, we want you to think about the tongue and give thanks to their Maker. We also call it the “play to praise” game. The goal of this game is to think of at least five things about the tongue that you are thankful for.

### **Number of players:**

At least two.

### **Directions:**

Player 1 repeats an appreciation phrase loudly and quickly. Player 2 responds, without pausing, with something to be thankful for. This is repeated five times.

### **To win:**

Player 2 needs to respond five times (without pausing) with different things about the tongue to be thankful for in order to win the game.

### **Here is an example of two rounds of this game:**

1. Player 1 repeats the appreciation phrase loudly and quickly. For example: “Thanks to the Maker of the tongue.”
2. Player 2 responds, without pausing, with something about the tongue to be thankful for. For example: “For making the tiny cells recognize countless flavors.”
3. Player 1 repeats the appreciation phrase again loudly and quickly. For example: “Thanks to the Maker of the tongue!”
4. Player 2 responds, without pausing, with another thing about the eyes to be thankful for. For example: “For making the tongue recognize harmful substances!”

This should be continued for another three rounds until Player 2 wins or loses.