Day 2

COMMONLIT

Name: _____ Class: _____

A Matter of Taste

By Jeanne Miller
2018

When you think about taste, you probably think about your tongue, but taste involves a lot more than just the buds on your tongue. In this informational text, Jeanne Miller explains how taste works. As you read, take notes on the different parts of your body that allow you to taste.

The tongue, the nose, and the brain all work together to notice flavors.

"Untitled" by Khamkhor is licensed under CC0

[1] Have you ever tried the jelly bean test? It's an experiment that proves the importance of the nose in the sense we call "taste." Hold your nose closed and put a jelly bean or some other fruit-flavored candy in your mouth. Chew the candy. You'll taste sweetness and maybe a little sourness but not much else. Then open your nose. Suddenly, you'll get the full force of the fruit flavor. Chewing releases molecules, which are groups of atoms stuck together, in the candy. In the mouth, these molecules trigger basic tastes: sweet, salty, sour, and bitter. Odor molecules also float from the back of the mouth up into the nose.

The Chemical Senses

The little bumps on your tongue are called papillae. They hide tiny taste buds. Inside the taste buds are even smaller structures called receptors.[1] When a sweet food molecule reaches a sweet receptor, it fits into it like the last piece of a jigsaw puzzle. The same is true for a bitter food molecule—it has a different shape that matches a different receptor. When a molecule locks into a matching receptor, a chemical signal goes to the brain that says, "Sweet!" or "Bitter!"

With salty and sour tastes, the process is a little different; it's not shape-based. Still, these taste molecules stimulate[2] receptors on the tongue, causing a signal to travel to the brain. The signal reveals there's something salty or sour in the mouth.

Meanwhile, in the nose, odor molecules bind to some of the many receptors there and send their own signals to the brain. These pathways to the brain are separate from the taste buds' paths. When the brain combines the signals from the tongue and the nose, it figures out the food's identity from its flavor. It might announce, "Strawberry!" or "Broccoli!" or "Dill pickle!"

1. cells that respond to molecules
2. **Stimulate** *(verb):* to activate

[5] What we think of as taste is really a combination of input from our taste buds and input from the aroma detectors in our nose. Scientists call taste and smell the chemical senses. The job of our taste buds and the odor receptors in our noses is to detect chemicals—in our food or in the environment.

The End of the Tongue Map

Psychologist Linda Bartoshuk of the University of Florida has been studying taste and smell most of her life. She remembers, "When I was in college, my father developed lung cancer, and one of the things that really bothered him was that food didn't taste right." This can result from cancer treatments, but at the time she didn't understand the cause. Bartoshuk thinks it may have been this experience that, in graduate school, drew her to study taste.

At the time, a diagram appeared in many textbooks and articles showing that receptors for sweet taste are in the front of the tongue, bitter in the back, and salty and sour on the sides of the tongue. Bartoshuk knew this was wrong, as did many others. She wondered where the mistaken map had come from. It turns out that an American psychologist had misunderstood a table published by a German researcher decades earlier. The table showed sensitivities to sweet, salty, sour and bitter tastes relative to areas of the tongue. The American published his mistaken interpretation of the table in 1942, and the tongue map was born. It still shows up in some books and articles. In fact, taste buds on all parts of the tongue have receptors for all tastes. You can test this by dipping a Q-tip in saltwater or lemon juice or a sugar solution and touching the front, sides, and back of your tongue with it.

Bartoshuk once visited an elementary school class where the students had tested the tongue map they saw in their textbook. She asked if they'd gotten the same answers as the book. They admitted they hadn't. The students thought they must have messed up. Bartoshuk assured[3] them that the book was wrong and they were right.

Beyond the Tongue

The four basic tastes are hardwired in humans. Bartoshuk says, "If you take a newborn baby and put a drop of sugar on its tongue the baby will look happy. The love of sweet is hardwired in the brain, present from birth." Something bitter might make a baby cry, sour causes a baby's mouth to pucker, and a mild salt taste is appealing to a baby. All these reactions make sense.

[10] Sweet tastes, like those of ripe fruits, suggest a food that provides needed energy. Every calorie (a measure of food energy) was important to our ancient hunting and gathering ancestors. Bitter tastes, on the other hand, could indicate poison. Many plants produce bitter toxins to keep from being eaten. Sourness might mean a fruit is unripe and indigestible or even spoiled, or it could point out a dangerous acid. Salt is something we need (in moderation) for our muscles and nerves to work properly.

3. **Assure** ***(verb):*** to tell someone something confidently

The nose and tongue are the first stops for the detection of chemicals in our food. But we actually have taste receptors throughout our digestive system. In addition to taste receptors for sweet, salty, sour, and bitter, our tongues also have receptors for umami, which is the savory flavor associated with cooked meat. The taste receptors for umami detect glutamate, an element naturally found in proteins. Protein molecules are too large to stimulate the taste or odor receptors in the mouth and nose. But in the stomach, digestion breaks them into their parts. Glutamate slips into the receptors there, and a signal goes to the brain that says, "Protein!" Our bodies need protein. We learn to associate the smell of glutamate-containing food with something good. The aroma molecules from roast chicken or grilled steak tell us we're getting protein even before the glutamate receptors in the stomach know it.

Bartoshuk says, "It's one thing to detect chemicals in the mouth. That's very useful for taste. But there are a lot of other potential uses of chemical detectors in the body. Sometimes Nature just uses the same receptors." Sweet receptors in the gut can tell the pancreas to release insulin, a hormone that keeps blood sugar levels healthy. Bitter receptors in the gut can tell the body not to absorb molecules that might be toxic.

A Volatile Situation

In 2005 Bartoshuk accepted a position at the University of Florida. She says, "I started hanging out with colleagues in horticulture[4] who wanted Florida fruits and vegetables to taste better." One colleague wanted to make tomatoes taste better. She explains that the food industry has a standard way of approaching a problem like this. She says, "Let's say you want to make a new chocolate cake mix. Well, you find out everything that goes into it, and you make every different chocolate cake possible with those ingredients." Then volunteers taste the cake and report what they like. Comparing people's likes with the various ingredients in the cakes they tasted, she says, helps you see how to put together the best chocolate cake ever.

She adds, "That's exactly what we wanted to do with tomatoes. And we did it." Tomatoes don't have separate ingredients like cakes, but they do have a number of chemical components.[5] To make a better tomato, growers may focus on breeding varieties with lots of the chemical components people like best. For this experiment, they measured the sugars, acids, and aroma molecules of 80 varieties of tomatoes. Volunteers tasted the tomatoes and rated flavor intensity, sweetness, and sourness, and how much they liked them. Researchers could see which chemical components made people like tomatoes more.

Making Fruit More Appealing

[15] Aroma molecules are known in taste research as volatiles. Those are the odor molecules that travel from the back of the mouth to the nose. When the brain puts taste signals and aroma signals together, they can affect each other. For example, some volatiles can make a sweet taste.

Bartoshuk says, "It turns out that fruits have many, many such compounds in them... Take a fruit like a strawberry. You bite into it and it tastes sweet, and you think you're tasting sugar. To some extent you are, but the volatiles in the strawberry can also make that sugar message two to three times as intense. We know about 100 volatiles that will enhance sweet."

4. agriculture
5. mixtures

Try the jelly bean experiment again, but this time bite into a strawberry or an orange or another sweet fruit with your nose closed. After you've chewed it, open your nose and see if the fruit tastes sweeter to you than it did with your nose closed. If it does, you're sensing the sweet-enhancing volatiles.

Fruit growers have bred crops for larger yields[6]—more apples or peaches per tree, for example. It takes energy for plants to make more fruit. That leaves less energy for increasing sugar content. However, it costs a plant little energy to produce volatile compounds that make a fruit seem sweeter. Bartoshuk and her colleagues found that some varieties of fruits have more sweet-enhancing volatiles than others. This is especially true of older varieties, ones that weren't bred to have higher yields.

The scientists plan to cross varieties with lots of sweet-enhancing volatiles with varieties that produce a lot of fruit. A resulting peach might taste super sweet while being low in sugar. Bartoshuk hopes that what they're doing will result in a wider variety of healthy and delicious choices in the grocery store.

[20] Her enthusiasm for this project is obvious. "We have a whole new world to explore. We don't know what the rules are yet," she says. "The thing that gets me up in the morning to go to work is: how does this work?"

Spoken like a true scientist.

"A Matter of Taste" by Jeanne Miller, Muse, © by Carus Publishing Company. Reproduced with permission. All Cricket Media material is copyrighted by Carus Publishing Company, d/b/a Cricket Media, and/or various authors and illustrators. Any commercial use or distribution of material without permission is strictly prohibited.

6. the amount of a product produced

Text-Dependent Questions

Directions: For the following questions, choose the best answer or respond in complete sentences.

1. PART A: Which of the following describes the central idea of the text?
   A. The nose and tongue often send conflicting messages to the brain that can make food taste bad.
   B. Humans have taste receptors that are unique to them and will likely taste different things in food.
   C. The nose and tongue send messages to the brain to give humans information about what they've eaten.
   D. Humans often eat without breathing through their nose and miss out on the full experience of taste.

2. PART B: Which quote from the text best supports the answer to Part A?
   A. "Hold your nose closed and put a jelly bean or some other fruit-flavored candy in your mouth. Chew the candy." (Paragraph 1)
   B. "When the brain combines the signals from the tongue and the nose, it figures out the food's identity from its flavor." (Paragraph 4)
   C. "the students had tested the tongue map they saw in their textbook. She asked if they'd gotten the same answers as the book. They admitted they hadn't." (Paragraph 8)
   D. "Sourness might mean a fruit is unripe and indigestible or even spoiled, or it could point out a dangerous acid." (Paragraph 10)

3. Which of the following describes why the author most likely discusses the jelly bean experiment in paragraph 1?
   A. to prove that all humans naturally crave the taste of sugar
   B. to provide an example of an experiment that engages the four main tastes
   C. to provide an example of a taste experiment that readers can try themselves
   D. to prove that the nose is more important than the tongue when it comes to taste

4. How does the section "The end of the tongue map" contribute to the development of ideas in the text? (Paragraphs 6-8)
   A. It shows that there was false information about the tongue for a long time.
   B. It shows that no two people have the same taste receptors on their tongue.
   C. It shows that most people don't believe that all part of the tongue can taste.
   D. It shows that some people only have taste receptors on certain parts of their tongue.

5. What does "hardwired" most closely mean in paragraph 9?
   A. built-in
   B. added on
   C. upgraded
   D. downgraded

6. What is the relationship between crops bred for greater yields and sweet-enhancing volatiles?

   A. Farmers have discovered they cannot control the sweet-enhancing volatiles in crops bred for greater yields.
   B. Crops that are bred to have greater yields often have more sweet-enhancing volatiles.
   C. Farmers are more concerned with the quality of crops' sweet-enhancing volatiles than yields.
   D. Crops that are bred to have greater yields naturally have fewer sweet-enhancing volatiles.

7. How does the discussion of Bartoshuk contribute to the text?

   A. It provides information about one scientist who is learning about taste and educating others.
   B. It shows how she was able to solve the mystery about why her father's taste receptors changed.
   C. It shows how her own tastes have altered as she has aged and her taste receptors changed.
   D. It provides information about the scientist who got the tongue map removed from textbooks.

8. Based on the information in paragraphs 9-12, how do you think receptors in the nose and on the tongue might have helped our ancient ancestors survive? Use evidence from the text to support your answer.

Discussion Questions

Directions: Brainstorm your answers to the following questions in the space provided. Be prepared to share your original ideas in a class discussion.

1. In the text, the author describes how scientists are working to make certain foods taste better. Do you think this could help people eat in a healthier manner? Why or why not? If you could make one food tastier, what would it be and why?

2. Have you ever tasted food while plugging your nose? Did you notice any differences in taste? If so, describe them. If you've never tried this experiment, try it the next time you eat.

newsela

Day 2

Forget tough love; treating yourself with kindness is the way to go

By Washington Post, adapted by Newsela staff on 11.19.19
Word Count **862**
Level **830L**

Image 1. Doing something that you enjoy, whether it's going for a hike or cozying up with a novel, is one way of practicing self-compassion. Photo: ClickAlps/REDA&CO/UIG via Getty Images.

If you think you need to yell at yourself to force yourself to finish your homework, think again. If you get angry at yourself because you didn't eat a healthy lunch or dinner, give yourself a break. Research shows there is a more effective way to improve your habits. Practicing self-compassion leads to more positive results. It also helps us live healthier, happier lives.

Self-compassion means being kind and supportive to ourselves. It includes learning to let go of harsh self-criticism. Many studies have shown that self-compassion improves our mental and emotional well-being. Newer research also finds that it plays a key role in physical health.

Be Patient With Yourself

Kristin Neff is a self-compassion researcher and the author of the book "Self-Compassion: The Proven Power of Being Kind to Yourself." According to Neff, there are three elements to self-compassion.

The first is mindfulness, which is being aware of thoughts, feelings and experiences. When you practice mindfulness, you experience your feelings and thoughts without judging or obsessing about them.

The second element is a sense of common humanity. That is the understanding that no one is perfect. We all experience personal struggles.

The third element is self-kindness. That includes being understanding and patient with ourselves when we make mistakes.

The opposite of self-compassion is being self-critical and mean to ourselves when we make a mistake. But this approach does not make us feel or perform better. These negative reactions can even make us sick; they are linked to depression and other health problems.

A study from 2017 found positive outcomes for people who practice self-compassion. These people tend to handle stress better. Their bodies have less of a stress response when, for example, they get into an argument with someone, or make a mistake at work or school.

Constantly feeling stress is unpleasant. Studies show it also directly harms our health. Stress contributes to high blood pressure and weakens the immune system. This is the system that helps our bodies fight off illness and disease. When we cope well with stress, we're also less likely to form other unhealthy habits, like smoking or overeating.

Self-Compassion Leads To Generosity

Some people may assume that self-compassion is selfish or lazy. The truth is quite the opposite. Self-compassion allows people to be more honest and caring. We are less likely to overreact and be mean to others if we are caring and supportive toward ourselves. It allows people to be more generous and more active in the long run.

Are you a perfectionist? If so, you may think you have to be hard on yourself to perform up to your abilities. Research shows that the opposite is true. Self-compassion leads to more long-term success. We're less likely to give up if we treat ourselves with kindness. Self-compassion is a form of self-support that helps us to keep trying and even try harder.

Self-compassion can also give us confidence to look for areas where we can improve. It is easier to make changes when we are not weighed down by self-criticism. Lets say you do poorly on a geometry test. Self-compassion can help you use that experience to make a change, like seeking out a math tutor. In contrast, self-criticism can paralyze you. If you are very critical of yourself, you may end up feeling so bad that all you are able to do is ignore the problem. Meanwhile, you keep falling behind in class. This makes you feel worse, and the cycle continues.

Do Things That Make You Happy

This article is available at 5 reading levels at https://newsela.com.

How do we practice self-compassion, instead? We can start with mindfulness. Being mindful means paying attention to what is going on with our thoughts and feelings, as well as what's happening around us. First, we can practice observing our thoughts. We can decide whether they are compassionate or critical. Next, we can make an effort not to judge ourselves harshly. Criticizing ourselves only makes us feel worse.

It is helpful to be patient and forgiving toward ourselves when we are trying to improve a habit or behavior. Try treating yourself as you would treat a good friend. This will allow you to be honest and clear about what you want to change, while remaining respectful, supportive and kind to yourself.

Finally, we can show kindness to ourselves in ways that help nurture the mind, body and spirit, too. Make time for something that makes you happy, whether it is going for a walk or playing a game. Doing activities that bring us joy is a way of showing respect and caring for ourselves. These activities might include reading a good book, playing a musical instrument or getting together with friends to kick around a soccer ball. Such enjoyable activities strengthen our connections with the people we love. They also contribute to positive feelings about ourselves. This leaves us feeling stronger and braver. With practice, we can learn to treat ourselves with kindness and unconditional love — not tough love.

Main Idea:

This article is available at 5 reading levels at https://newsela.com.

Quiz

use SRP for full credit

1 What are two main ideas of the article?

(A) To be self-compassionate, treat yourself like you treat your friends.

Being harsh toward yourself won't get your homework done.

(B) Self-compassion means taking care of yourself.

There are many benefits to self-compassion.

(C) Everyone makes mistakes.

If you are kind to yourself you will feel less stress.

(D) Kristin Neff has identified three elements of self-compassion.

Research shows that people who are kind to themselves are less stressed.

2 Read the summary of some important details of the article below.

1. *Self-compassion is being kind to ourselves.*
2. *There are three components to self-compassion: mindfulness, common humanity, and self-kindness.*
3. *Kristen Neff is the most important researcher about self-compassion.*
4. *To practice self-compassion, take care of yourself by doing things that make you happy and avoid judging yourself.*

Which is a detail you would NOT include in a summary of key details?

(A) 1.

(B) 2.

(C) 3.

(D) 4.

3 Read the introduction [paragraphs 1-2] and the final section, "Do Things That Make You Happy."

What is the connection between these two sections?

(A) The introduction explains the benefits of mindfulness and the final section talks about the physical health benefits of self-compassion.

(B) The introduction explains why getting angry at yourself is bad and the final section explains why it's good to forgive yourself.

(C) The introduction explains the research about self-compassion and the final section explains the ways self-compassion can give us confidence.

(D) The introduction explains what self-compassion is and the final section explains ways to practice self-compassion.

4 Read the section "Be Patient With Yourself."

How does this section contribute to the article's main idea?

(A) It shares the benefits of being kind to yourself, which supports the idea that self-compassion is healthy.

(B) It shares examples of how to be self-compassionate, which supports the idea that self-compassion is a way to take care of yourself.

(C) It focuses on how unhealthy stress is and gives ideas on how to relax and be OK making mistakes.

(D) It focuses on all the parts of self-compassion to explain how Kristin Neff identified the different parts of self-compassion.

Number Correct: _____

Improvement: _____

Multiplication of Fractions I—Round 2

Directions: Determine the product of the fractions.

1.	$\frac{5}{6} \times \frac{1}{4}$	
2.	$\frac{2}{3} \times \frac{5}{7}$	
3.	$\frac{1}{3} \times \frac{2}{5}$	
4.	$\frac{5}{7} \times \frac{5}{8}$	
5.	$\frac{3}{8} \times \frac{7}{9}$	
6.	$\frac{3}{4} \times \frac{5}{6}$	
7.	$\frac{2}{7} \times \frac{3}{8}$	
8.	$\frac{1}{4} \times \frac{3}{4}$	
9.	$\frac{5}{8} \times \frac{3}{10}$	
10.	$\frac{6}{11} \times \frac{1}{2}$	
11.	$\frac{6}{7} \times \frac{5}{8}$	
12.	$\frac{1}{6} \times \frac{9}{10}$	
13.	$\frac{3}{4} \times \frac{8}{9}$	
14.	$\frac{5}{6} \times \frac{2}{3}$	
15.	$\frac{1}{4} \times \frac{8}{11}$	

16.	$\frac{3}{7} \times \frac{2}{9}$	
17.	$\frac{4}{5} \times \frac{10}{13}$	
18.	$\frac{2}{9} \times \frac{3}{8}$	
19.	$\frac{1}{8} \times \frac{4}{5}$	
20.	$\frac{3}{7} \times \frac{2}{15}$	
21.	$1\frac{1}{2} \times 4\frac{3}{4}$	
22.	$2\frac{5}{6} \times 3\frac{3}{8}$	
23.	$1\frac{7}{8} \times 5\frac{1}{5}$	
24.	$6\frac{2}{3} \times 2\frac{3}{8}$	
25.	$7\frac{1}{2} \times 3\frac{6}{7}$	
26.	$3 \times 4\frac{1}{3}$	
27.	$2\frac{3}{5} \times 5\frac{1}{6}$	
28.	$4\frac{2}{5} \times 7$	
29.	$1\frac{4}{7} \times 2\frac{1}{2}$	
30.	$3\frac{5}{6} \times \frac{3}{10}$	

© 2014 Common Core, Inc. Some rights reserved. commoncore.org

BY-NC-SA This work is licensed under a Creative Commons Attribution-NonCommercial-ShareAlike 3.0 Unported License.

Number Correct: _____

Improvement: _____

Sprint Title – Round 2

Directions: Evaluate each expression. Place the final answer in the last column in each section

1.	12 ones ÷ 2 ones	
2.	12 ÷ 2	
3.	12 tens ÷ 2 tens	
4.	120 ÷ 20	
5.	12 hundreds ÷ 2 hundreds	
6.	1,200 ÷ 200	
7.	12 halves ÷ 2 halves	
8.	$\frac{12}{2} \div \frac{2}{2}$	
9.	12 fourths ÷ 3 fourths	
10.	$\frac{12}{4} \div \frac{3}{4}$	
11.	$\frac{12}{8} \div \frac{3}{8}$	
12.	$\frac{2}{4} \div \frac{1}{4}$	
13.	$\frac{1}{4} \div \frac{2}{4}$	
14.	$\frac{4}{5} \div \frac{2}{5}$	
15.	$\frac{2}{5} \div \frac{4}{5}$	
16.	$\frac{3}{5} \div \frac{4}{5}$	
17.	$\frac{6}{8} \div \frac{2}{8}$	
18.	$\frac{6}{8} \div \frac{4}{8}$	
19.	$\frac{6}{8} \div \frac{5}{8}$	
20.	$\frac{6}{10} \div \frac{2}{10}$	
21.	$\frac{7}{10} \div \frac{8}{10}$	
22.	$\frac{4}{10} \div \frac{7}{10}$	

23.	$\frac{6}{12} \div \frac{4}{12}$	
24.	$\frac{6}{12} \div \frac{2}{6} = \frac{6}{12} \div \frac{\quad}{12}$	
25.	$\frac{8}{14} \div \frac{7}{14}$	
26.	$\frac{8}{14} \div \frac{1}{2} = \frac{8}{14} \div \frac{\quad}{14}$	
27.	$\frac{11}{14} \div \frac{2}{14}$	
28.	$\frac{11}{14} \div \frac{1}{7} = \frac{11}{14} \div \frac{\quad}{14}$	
29.	$\frac{1}{7} \div \frac{6}{14} = \frac{\quad}{14} \div \frac{6}{14}$	
30.	$\frac{7}{18} \div \frac{3}{18}$	
31.	$\frac{7}{18} \div \frac{1}{6} = \frac{7}{18} \div \frac{\quad}{18}$	
32.	$\frac{1}{3} \div \frac{12}{18} = \frac{\quad}{18} \div \frac{12}{18}$	
33.	$\frac{1}{6} \div \frac{4}{18}$	
34.	$\frac{4}{12} \div \frac{8}{6}$	
35.	$\frac{1}{3} \div \frac{3}{15}$	
36.	$\frac{2}{6} \div \frac{1}{9} = \frac{\quad}{18} \div \frac{\quad}{18}$	
37.	$\frac{1}{6} \div \frac{4}{9}$	
38.	$\frac{2}{3} \div \frac{3}{4}$	
39.	$\frac{1}{3} \div \frac{3}{5}$	
40.	$\frac{1}{7} \div \frac{1}{2}$	
41.	$\frac{5}{6} \div \frac{2}{9}$	
42.	$\frac{5}{9} \div \frac{2}{6}$	
43.	$\frac{5}{6} \div \frac{4}{9}$	
44.	$\frac{1}{2} \div \frac{4}{5}$	

© 2014 Common Core, Inc. Some rights reserved. commoncore.org

BY-NC-SA This work is licensed under a Creative Commons Attribution-NonCommercial-ShareAlike 3.0 Unported License.

Name : _____ Score : _____

Teacher : _____ Date : _____

Word Problems

1) At a local department store, jeans typically cost $16. However, due to a special, the jeans are reduced to $4. What percent of the original price has the jeans been reduced to? Round your answer to the nearest whole number if necessary. _____

2) In one particular suburb, there are 13 families that own a maltese. If these owners make up 65% of all dog owners in this suburb, then how many dog owners are there in this neighborhood? Round your answer to the nearest whole number if necessary. _____

3) Keith receives a $32000 salary for working as an engineer. If Keith spends 75% of his salary on expenses each year, then how much money does Keith have to spend on expenses? Round your answer to the nearest whole number if necessary. _____

4) One baseball team played 32 games throughout their entire season. If this baseball team won 75% of those games, then how many games did they win? Round your answer to the nearest whole number if necessary. _____

5) Jason decided to look at new and used trucks. Jason found a used truck for $5000. Jason found that he paid 20% of the price of a new truck. How much would a new truck cost? Round your answer to the nearest whole number if necessary. _____

6) While mining, Jess found a large metal bar that weighed 24 ounces. Jess was also able to determine that the bar had 12 ounces of nickel. What percent of the weight of the bar was nickel? Round your answer to the nearest whole number if necessary. _____

7) For one Chemistry test, Sally had to answer 35 questions. Of these questions, Sally answered 80% of them correctly. How many questions did Sally correctly answer on her test? Round your answer to the nearest whole number if necessary. _____

8) There are 24 students in a class and 18 of these students passed their Geometry test. What percentage of these students passed their test? Round your answer to the nearest whole number if necessary. _____

9) Joan went to her local zoo that featured 36 bird exhibits. If the zoo features 40 exhibits in total, then what percent of the zoo's exhibits feature birds? Round your answer to the nearest whole number if necessary. _____

10) At a construction job for a mall there are 35 painters. Of these painters, 80% of them paint the interior of the mall. How many painters are painting the interior? Round your answer to the nearest whole number if necessary. _____

Name: _____ Date: _____

Lesson 4.1: Comparing Air Temperature: Past and Present

Congratulations on working out why Christchurch's air temperature is cooler during El Niño years! You have helped Dr. Parata and the farmers understand El Niño so they can prepare for future El Niño events. Because of your great work with the New Zealand Farm Council, a paleontologist named Dr. Xi Yang has reached out to you for help with a new question about South China during the late Carboniferous period—about 300 million years ago! By analyzing evidence, you will make an argument to support a claim about the climate of South China during that time.

Unit Question

- What determines the air temperature of a location on Earth?

Chapter 4 Question

- In South China during the late Carboniferous period, was the air temperature warmer or cooler than the air temperature in that location today?

Key Concepts

- Energy from the sun is transferred to Earth's surface. Some of that energy is then transferred to the air above the surface.
- The closer a location is to the equator, the more energy it receives from the sun. Therefore, a location's air temperature is affected by its distance from the equator.
- An effect may have more than one cause; these may be linked into a chain of causes and effects.
- When an ocean current comes from the equator, it brings warmer-than-expected water to the places it passes, and that water is warmer than the nearby air. When an ocean current comes from a pole, it brings colder-than-expected water to the places it passes, and that water is colder than the nearby air.
- Energy transfers from warmer substances to colder substances. Warmer currents transfer energy to cooler air, and warmer air transfers energy to cooler currents.
- Prevailing winds and the position of continents determine the direction of ocean currents.
- Changes to prevailing winds affect ocean currents. Changes to ocean currents affect how much energy is brought to (or taken away from) a location.

Vocabulary

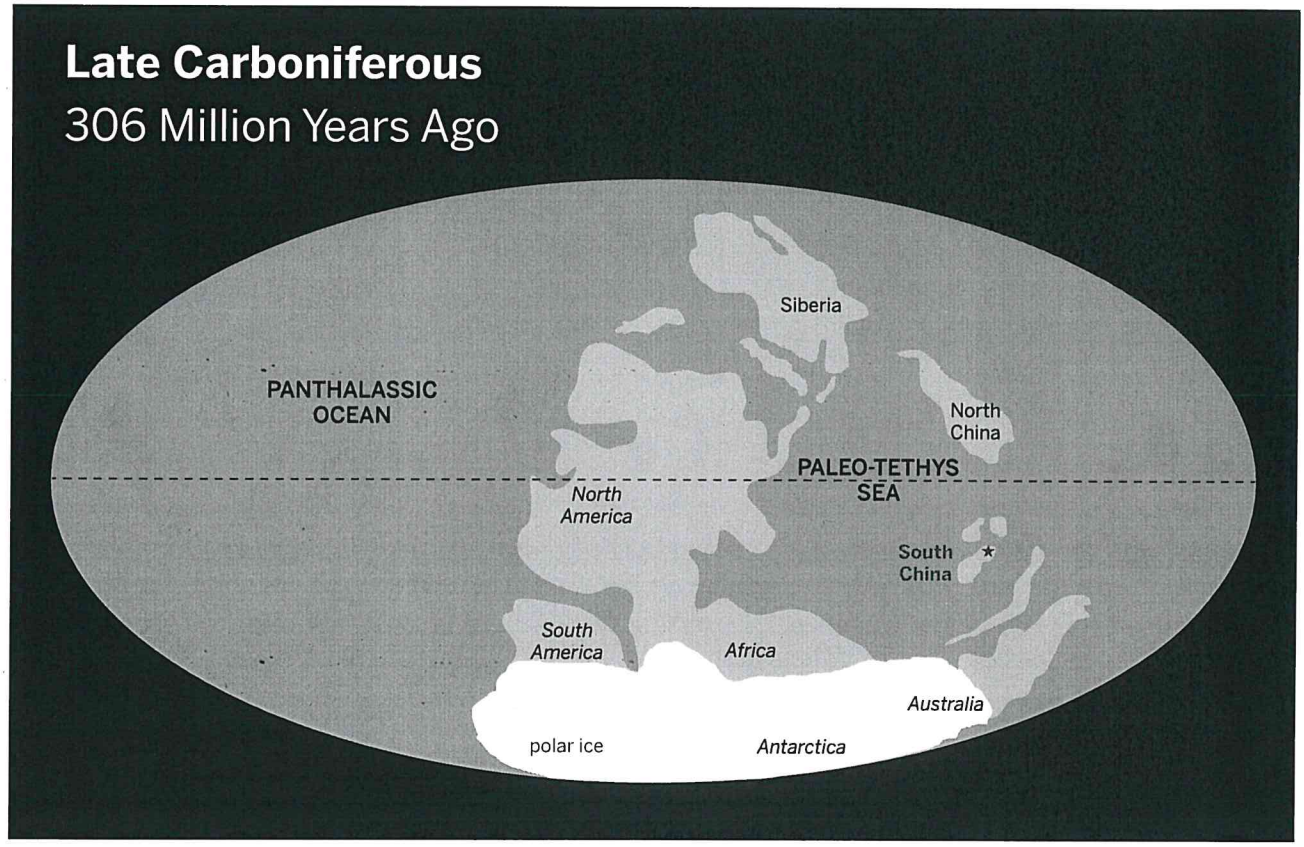
- cause
- claim
- effect
- energy
- evidence
- ocean current
- prevailing wind
- temperature
- transfer

© 2018 The Regents of the University of California. All rights reserved. Permission granted to photocopy for classroom use.

Name: _____ Date: _____

Warm-Up

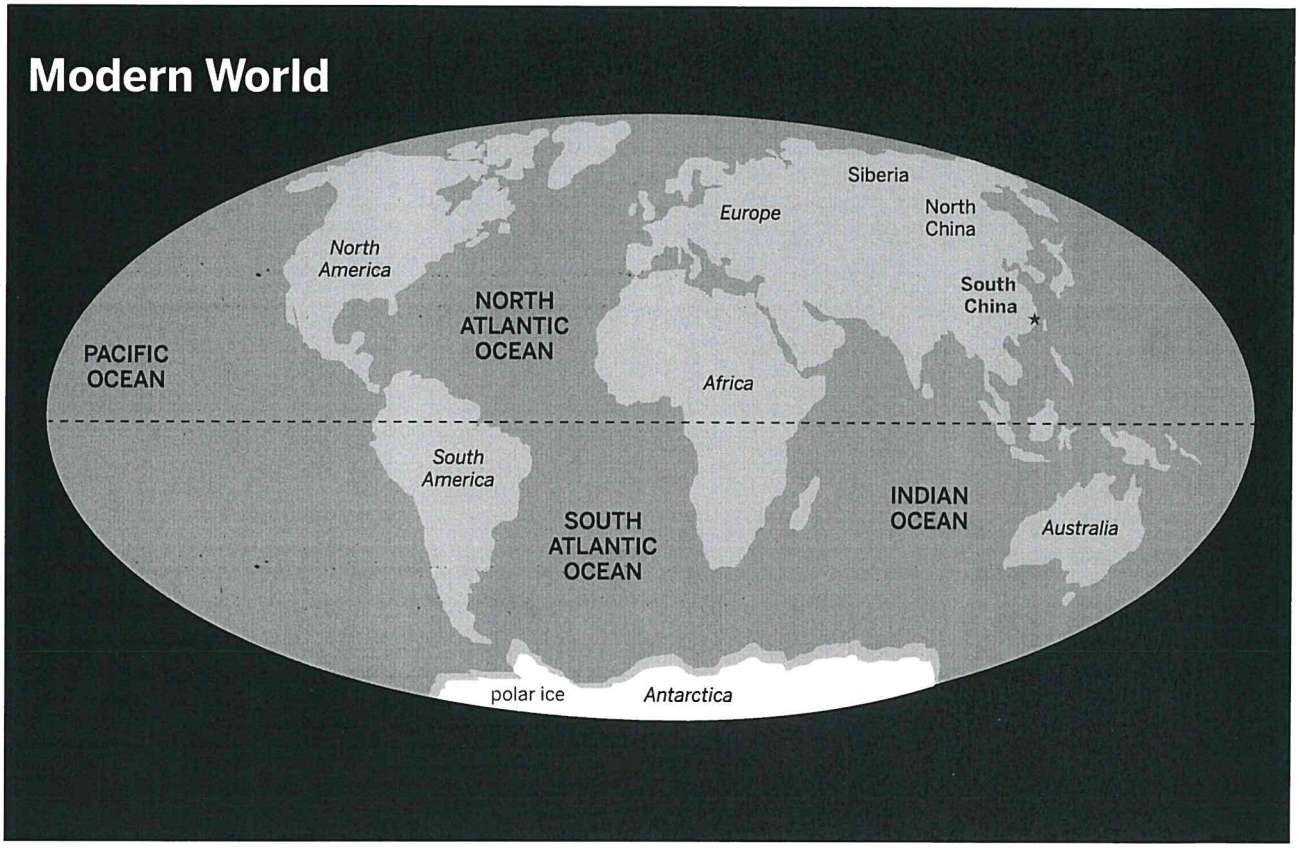
Over time, the continents on Earth are moving and changing their positions VERY slowly. This means that millions of years ago the continents were in different locations than they are today. Look closely at the two maps: observe where the region called South China was located 306 million years ago, and compare that to where it is located today. After you've made your observations, answer the question.



© 2018 The Regents of the University of California. All rights reserved. Permission granted to photocopy for classroom use.

Name: _____ Date: _____

Warm-Up (continued)



Do you think the changing position of South China has affected its air temperature? Why or why not?

© 2018 The Regents of the University of California. All rights reserved. Permission granted to photocopy for classroom use.

Name: _____ Date: _____

Introducing the Science Seminar

Xi Yang
To: Student Climatologists
Re: Temperature—Late Carboniferous vs. Present Day

廣西

I am a paleontologist at the South China Institute of Paleontology in Guangxi, China (廣西). I study the late Carboniferous period, which occurred about 300 million years ago. During that time, Earth's continents were in different positions.

We would like your help with analyzing some evidence. We're trying to determine if South China's air temperature during the late Carboniferous period was the same or different (warmer or cooler) than the air temperature in South China today.

I look forward to hearing from you.

Dr. Xi Yang, Paleoclimatology Department
South China Institute of Paleontology

© 2018 The Regents of the University of California. All rights reserved. Permission granted to photocopy for classroom use.

Name: _____ Date: _____

Annotating and Discussing Evidence

Science Seminar Question: *In South China during the late Carboniferous period, was the air temperature warmer or cooler than the air temperature in that location today?*

Individual Work

1. Read each evidence card carefully.
2. Annotate the cards, using these questions as you think about the information on each:
   - What questions do you have about the evidence?
   - How is the evidence connected to what you have been learning about the factors that affect air temperature?
   - How could the evidence help you make an explanation that answers the Science Seminar Question?

Partner Discussion

1. Talk about your questions about the evidence on the cards; see if you can help each other answer them.
2. Looking at the cards, are there any two pieces of evidence that could work together? How are those two cards connected?

© 2018 The Regents of the University of California. All rights reserved. Permission granted to photocopy for classroom use.

Name: _____ Date: _____

Sorting the Evidence Cards

Sorting Evidence Cards by Claim

1. With a partner, discuss whether each piece of evidence supports or goes against a claim. Use the sentence starters to help you talk with your partner.
2. Make annotations on each card:
   - If the evidence supports a claim, write SUPPORTS CLAIM ___ on that card.
   - If the evidence goes against a claim, write GOES AGAINST CLAIM ___ on that card.
   - If the evidence connects with another evidence card, write CONNECTS WITH EVIDENCE CARD ___ on that card.
3. Sort the evidence by placing the cards underneath the claim they support.

Sentence Starters

I think this piece of information supports this claim because . . .

I don't think this piece of information supports this claim because . . .

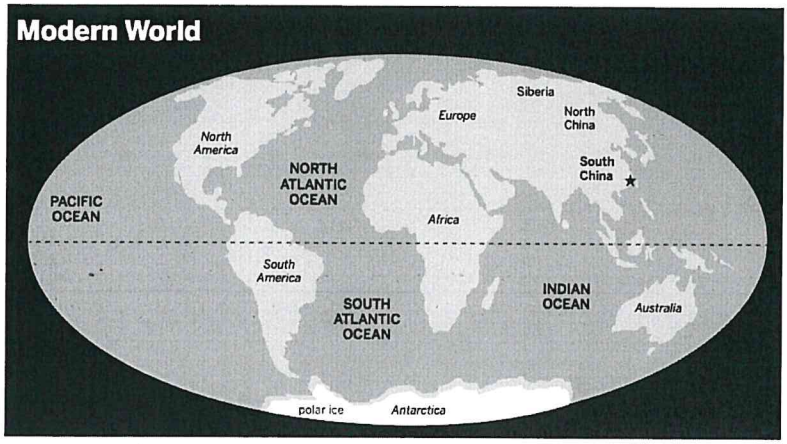
I agree because . . .

I disagree because . . .

Why do you think that?

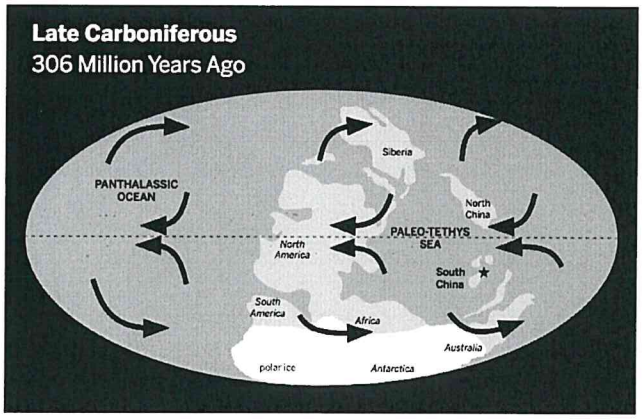
© 2018 The Regents of the University of California. All rights reserved. Permission granted to photocopy for classroom use.

Reference Card



Evidence Card A: Continents and Prevailing Winds in the Late Carboniferous

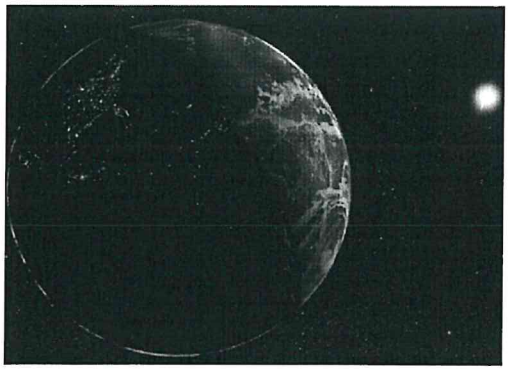
Draw in the most likely currents near South China. Use red for warm and blue for cold.



Evidence Card B: Energy from the Sun

The sun's energy during the late Carboniferous period was similar to what it is today:

- The pattern of distribution was the same.
- The amount of incoming energy was the same.



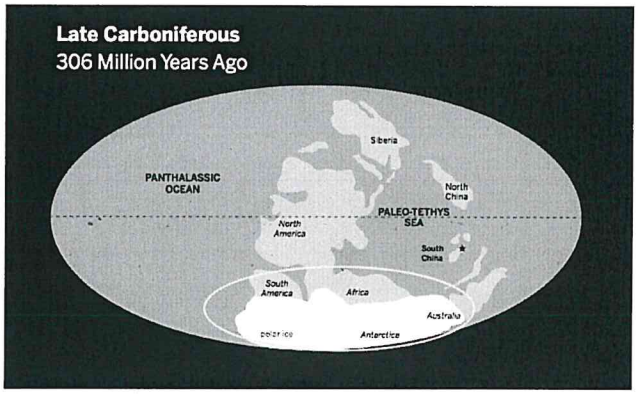
© 2016 The Regents of the University of California

Evidence Card C: Location of South China

Time Period	Latitude
Late Carboniferous	about 10°S
Today	about 20°N

Reference:
Equator = 0° latitude
North Pole = 90°N latitude
South Pole = 90°S latitude

Evidence Card D: Polar Ice



During the late Carboniferous period, the polar ice cap was larger than it is today.

Evidence Card E: Prevailing Wind Strength

During the late Carboniferous period, the prevailing winds were stronger than they are now.

© 2016 The Regents of the University of California