

THE CHEMISTRY OF CHOCOLATE PHASE CHANGES & CHARACTERISTICS

6TH, 7TH, 8TH GRADE READING

Improve students'
literacy skills

Science Applicability

Sub Plan



Reading Comment



★★★★★ Extremely satisfied - Great resource to work on student reading comprehension and it tied into the topic I was teaching. My students have been struggling with reading and I've been incorporating more reading into my lessons. Thank you for the resource.



SCROLL
to take a look inside!

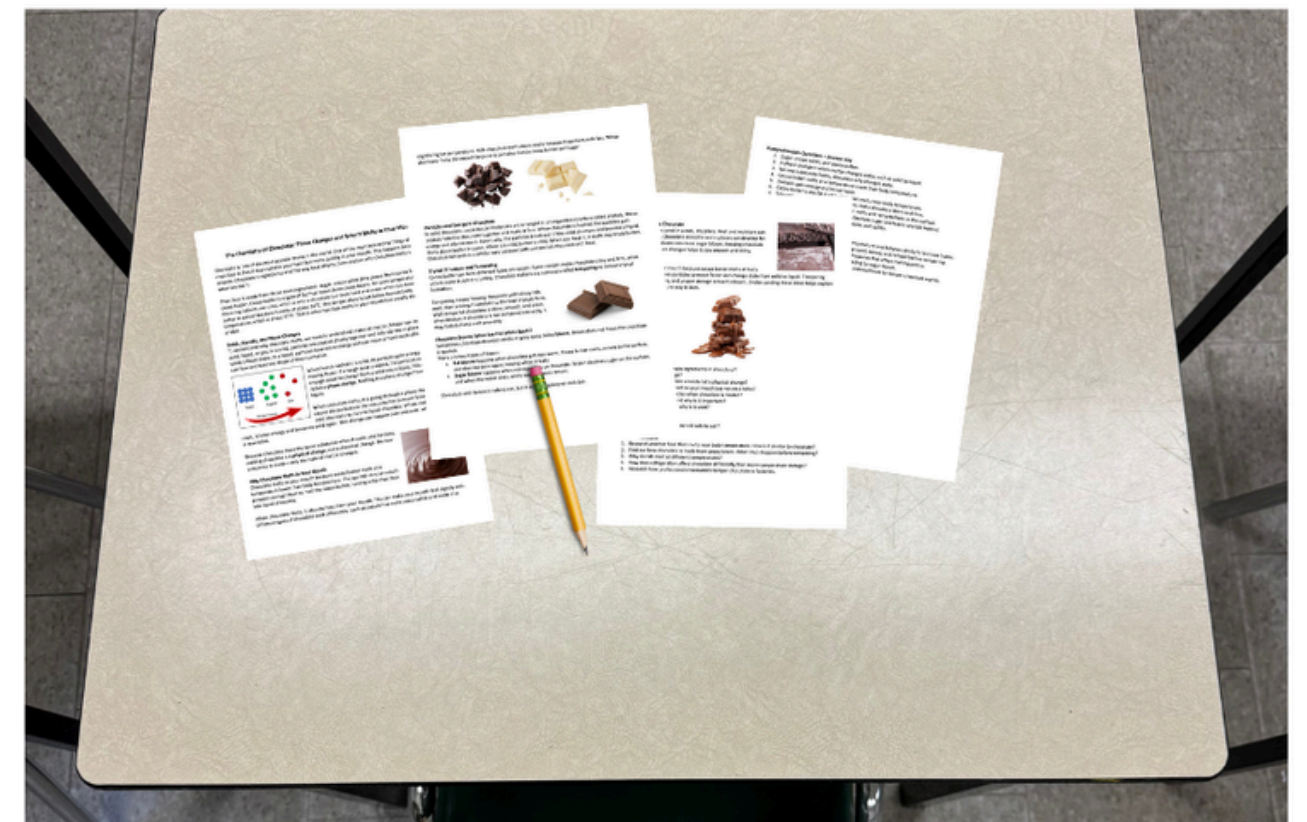


THE PROBLEMS YOU FACE

- Limited time to teach scientific literacy and strengthen students' reading and analysis skills.
- Need meaningful extension activities to engage fast-moving learners.
- Difficulty creating effective last-minute sub plans that still support student learning.

NO-PREP - PRINT/UPLOAD

- Questions and Answer Key
- **No Prep, Ready-to-Use:** Print or assign digitally with Google Docs, Microsoft Word, and PDF formats for flexible classroom use
- **Includes Varied Question Types:** Knowledge, thinking, connecting, application, and open-ended questions.



What Will Your Students Learn?

READING COMPREHENSION ARTICLE & QUESTIONS

- States of Matter (Solids and Liquids)
- Phase Changes (Melting and Cooling)
- Particle Motion and Thermal Energy
- Physical vs. Chemical Changes
- Cocoa Butter and Melting Point
- Why Chocolate Melts in Your Mouth
- Crystal Structure in Chocolate
- Tempering and Crystal Stability
- Fat Bloom vs. Sugar Bloom
- Effects of Heat, Moisture, and Storage

Comprehension Questions

1. What are the three main ingredients in chocolate?
2. What is a phase change?
3. Why is melting chocolate considered a physical change?
4. Why does chocolate melt in your mouth but not on a table?
5. What happens when chocolate melts?
6. What is the melting point of chocolate?
7. What is the difference between a physical and chemical change?
8. What is the crystal structure of chocolate?
9. What is the effect of heat on chocolate?
10. Why is chocolate so popular?

Extension Questions

1. Research the history of chocolate.
2. Find out how chocolate is made.
3. Why is chocolate so popular?
4. How does chocolate affect your health?
5. Research the different types of chocolate.

Article with Comprehension Questions

6th, 7th, 8th Grade

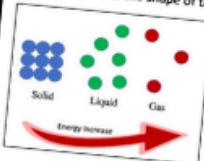
Print & Digital

The Chemistry of Chocolate: Phase Changes and Why It Melts in Your Mouth

Chocolate is one of the most popular treats in the world. One of the most interesting things about chocolate is that it stays solid in your hand but melts quickly in your mouth. This happens because of science. Chocolate's ingredients and the way heat affects them explain why chocolate melts so easily when we eat it.

Chocolate is made from three main ingredients: sugar, cocoa solids (tiny pieces from cocoa beans), and cocoa butter. Cocoa butter is a type of fat that comes from cocoa beans. At room temperature, all these ingredients are solid, which is why a chocolate bar feels hard and snaps when you break it. Cocoa butter is special because it melts at about 34°C. This temperature is just below human body temperature, which is about 37°C. That is why chocolate melts in your mouth but usually stays solid on a table.

Solids, Liquids, and Phase Changes
To understand why chocolate melts, we need to understand states of matter. Matter can exist as a solid, liquid, or gas. In a solid, particles are packed closely together and only vibrate in place. This gives solids a fixed shape. In a liquid, particles have more energy and can move around each other, so liquids can flow and take the shape of their container.



When heat is added to a solid, its particles gain energy and start moving faster. If enough heat is added, the particles move far enough apart to change from a solid into a liquid. This change is called a **phase change**. Melting is a phase change from solid to liquid.

When chocolate melts, it is going through a phase change. Heat causes the particles in the cocoa butter to move faster until the solid chocolate turns into liquid chocolate. When melted chocolate cools, it loses energy and becomes solid again. This change can happen over and over, which means it is reversible.

Because chocolate stays the same substance when it melts and hardens, melting chocolate is a **physical change**, not a chemical change. No new substance is made—only the state of matter changes.

Why Chocolate Melts in Your Mouth

Chocolate melts in your mouth because cocoa butter melts at a temperature lower than body temperature. The warmth in your mouth provides enough heat to melt the cocoa butter.

When you eat chocolate, the heat from your mouth melts the cocoa solids.

Google Access

Thank you for your purchase. Clicking the link below will take you to the Google Drive link where you can find the article and questions. Please click the link and save the file to your Google Drive. If you are not signed in to your Google account, you will be prompted to sign in. Once signed in, click the link to download the file to your Google Drive.

Click here to place a copy directly into your Google Drive Account.

PDF



Your Reading

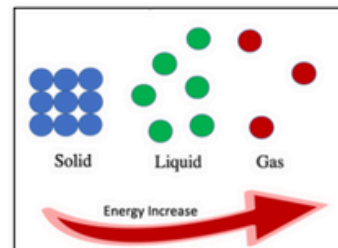
The Chemistry of Chocolate: Phase Changes and Why It Melts in

Chocolate is one of the most popular treats in the world. One of the most interesting things about chocolate is that it stays solid in your hand but melts quickly in your mouth. This happens because of the science of chocolate's ingredients and the way heat affects them. We'll explain why chocolate melts when we eat it.

Chocolate is made from three main ingredients: sugar, cocoa solids (tiny pieces of cocoa butter). Cocoa butter is a type of fat that comes from cocoa beans. At room temperature, these ingredients are solid, which is why a chocolate bar feels hard and snaps when you break it. But when you eat it, the cocoa butter melts at about 34°C. This temperature is just below human body temperature, which is about 37°C. That is why chocolate melts in your mouth but not on a table.

Solids, Liquids, and Phase Changes

To understand why chocolate melts, we need to understand states of matter. Matter can be a solid, liquid, or gas. In a solid, particles are packed closely together and only vibrate in place. In a liquid, particles have more energy and can move around. In a gas, particles have even more energy and can move freely. When a substance changes from one state to another, it's called a phase change.



When heat is added to a solid, its particles gain energy and move faster. If enough heat is added, the particles move far enough apart to change from a solid into a liquid. This is called a **phase change**. Melting is a phase change from solid to liquid.

When chocolate melts, it is going through a phase change. The heat from your mouth causes the particles in the cocoa butter to move faster and farther apart, turning solid chocolate into liquid chocolate.

When chocolate cools, it loses energy and becomes solid again. This change can happen over and over again, and it is reversible.

Because chocolate is the same substance when it melts and hardens, melting chocolate is a **physical change**, not a chemical change. No new substance is made—only the state of matter changes.

Why Chocolate Melts in Your Mouth

Chocolate melts in your mouth because cocoa butter melts at a temperature lower than body temperature. The warmth in your mouth provides enough heat to melt the cocoa butter, turning solid chocolate into liquid chocolate.

When chocolate melts, it absorbs heat from your mouth. This can make your mouth feel cooler. Different types of chocolate melt differently. Dark chocolate has more cocoa solid.

Dark chocolate melts at a slightly higher temperature. Milk chocolate melts more easily because it contains milk fat. White chocolate melts the easiest because it contains mostly cocoa butter and sugar.



Particles and Energy in Chocolate

In solid chocolate, cocoa butter molecules are arranged in an organized structure called a crystal. These crystals hold the chocolate together and make it firm. When chocolate is heated, the particles gain energy and vibrate more. Eventually, the particles break out of the solid structure and become a liquid. Think about butter in a pan. When it is cold, butter is solid. When you heat it, it melts into a liquid. Chocolate behaves in a similar way because both contain fats that melt with heat.

Crystal Structure and Tempering

Cocoa butter can form different types of crystals. Some crystals make chocolate shiny and smooth, while others make it dull or crumbly. Chocolate makers use a process called **tempering** to control the crystal formation.

Tempering means heating chocolate until all crystals melt, then cooling it carefully so the best crystals form. Well-tempered chocolate is shiny, smooth, and snaps when broken. If chocolate is not tempered correctly, it may look dull and melt unevenly.



Chocolate Bloom: What Are the White Spots?

Sometimes chocolate develops white or gray spots called **bloom**. Bloom does not mean the chocolate is spoiled.

There are two types of bloom:

1. **Fat bloom** happens when chocolate gets too warm. Cocoa butter melts, moves to the surface, and then hardens again, leaving white streaks.
2. **Sugar bloom** happens when moisture gets on chocolate. Water dissolves sugar on the surface, and when the water dries, white sugar crystals remain.

Chocolate with bloom is safe to eat, but it may feel grainy or look dull.

How Storage Affects Chocolate

Chocolate should be stored in a cool, dry place. Heat and moisture can damage its structure. Chocolate stored in warm places can develop fat bloom, while humid places can cause sugar bloom. Keeping chocolate away from temperature changes helps it stay smooth and shiny.



Conclusion

Chocolate melts in your mouth because cocoa butter melts at body temperature. Heat causes particles to move faster and change state from solid to liquid. Tempering controls crystal structure, and proper storage prevents bloom. Understanding these ideas helps explain why chocolate behaves the way it does.



Comprehension Questions

1. What are the three main ingredients in chocolate?
2. What is a phase change?
3. Why is melting chocolate considered a physical change?
4. Why does chocolate melt in your mouth but not on a table?
5. What happens to particles when chocolate is heated?
6. What is cocoa butter and why is it important?
7. What is tempering and why is it used?
8. What is fat bloom?
9. What is sugar bloom?
10. Why is bloomed chocolate still safe to eat?

Extension Questions

1. Research another food that melts near body temperature. How is it similar to chocolate?
2. Find out how chocolate is made from cocoa beans. What steps happen before tempering?
3. Why do different types of chocolate melt at different temperatures?
4. How does refrigeration affect chocolate differently than room-temperature storage?
5. Research how professional chocolatiers temper chocolate in factories.

Answer Key

1. cocoa butter, sugar, cocoa solids
2. matter changes state, such as solid to liquid.
3. chocolate only changes state.
4. temperature lower than body temperature.
5. particles move faster.
6. cocoa butter
7. chocolate that melts near body temperature.
8. crystal formation to make chocolate shiny and firm.
9. cocoa butter melts and recrystallizes on the surface.
10. when moisture dissolves sugar and leaves crystals behind.
Bloom affects appearance and texture, not safety.

Answer Key

1. It melts near body temperature and behaves similarly to cocoa butter.
2. It is not dried, roasted, ground, mixed, and refined before tempering.
3. Different molecular structures that affect melting points.

Answer Key Included Office, Google, and PDF Versions

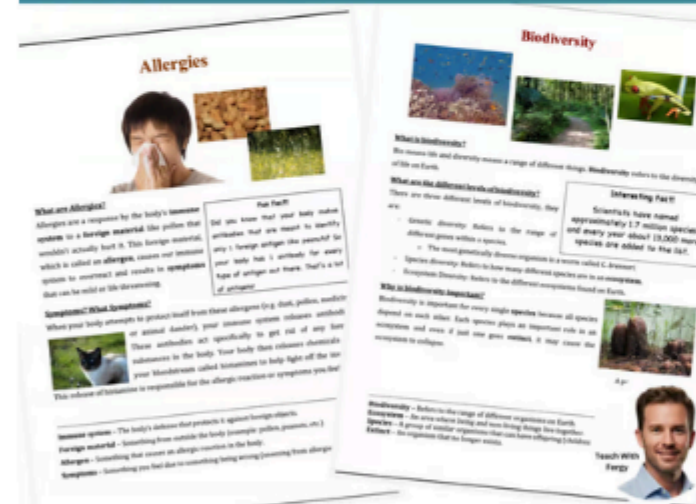


Comprehension and Extension Questions

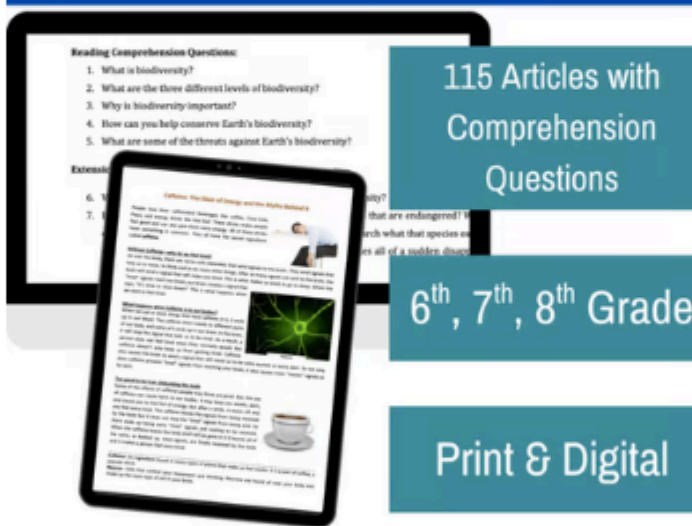
Upgrade to the 6th, 7th, and 8th Grade Reading Mega Bundle

Includes over 115 readings for students in grades 6, 7, and 8. The bundle covers all science topics and will save you over 75%.

READING COMPREHENSION ARTICLE & QUESTION MEGA BUNDLE 6TH, 7TH, 8TH GRADE



READING COMPREHENSION ARTICLE & QUESTION MEGA BUNDLE



CLASSROOM READY

- Questions and Answer Key
- **No Prep, Ready-to-Use:** Print or assign digitally with Google Docs, Microsoft Word, and PDF formats for flexible classroom use
- **Includes Varied Question Types:** Knowledge, thinking, connecting, application, and open-ended questions.



115 Articles with
Comprehension
Questions

6th, 7th, 8th Grade

Print & Digital



★★★★★ Extremely satisfied - So many comprehensive readings for all science fields. PDF and DOCX versions included so they can be edited if needed. Each one includes short answer questions at the end, the first set are easy to find the answers to in the readings, the second set require a bit more critical thinking. Includes an answer key. Great to use to fill in time or for sub plans.

6th, 7th, 8th Grade Reading Mega Bundle

Reading Comprehension Passage & Questions

- ✓ Over 115 Readings! Covers all Science Topics
- ✓ No Prep, Ready-to-Use Resource in Google and Office Format
- ✓ Includes Comprehension and Extension Questions



**Click to
learn more!**

As a special bonus, I want to send you a few resources that you can use in your classroom tomorrow. Completely free and geared towards what you teach!



Just



and then choose what you teach!

thanks
**for your interest
in this resource!**



devon@teachwithfergy.com