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Common Core State Standards 8

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Answer Key 60



A Nose of Gold

“I have found Tycho Brahe’s lab notes,” Professor Con said. “If you give me more money for research, I am sure that I can turn copper into gold. Your investment will **benefit** us both.”

“Who is Tycho Brahe?” asked Susannah’s father.

“Tycho Brahe was an astronomer and an alchemist. He was born in 1546 and died in 1601. He was from Denmark. He had an observatory and lab in Denmark’s capital. That’s where he made observations about the planets and tried to turn copper into gold,” Professor Con answered.



Tycho Brahe

“Isn’t Oslo the capital of Denmark?” asked Susannah.

Nodding at Susannah, Professor Con said, “That’s right. Denmark’s capital is Oslo. The capital borders the strait that separates Denmark from Sweden.

“It was the King of Denmark himself who provided Brahe’s research funds. You see, Brahe lost his nose in a duel so he had to wear a replacement one. He had a replacement made of copper, but there was a problem with it. Copper melts at 1,083° Celsius, and so when Brahe would stand in direct sun too long or stand close to a hot fire, his nose would begin to melt! Brahe wanted a gold nose because a gold nose wouldn’t melt. The problem was the expense. It cost too much to make a nose out of gold. That’s when Brahe began to work on turning copper into gold. The king funded Brahe’s work because if Brahe could find a way to turn copper into gold, then it would benefit the king. He could become rich.”

“Is changing copper into gold really a possibility,” asked Susannah’s father. “If Brahe couldn’t do it, what makes you think you can?”

“I can,” Professor Con said with confidence. “Brahe left a chemical formula and instructions. The problem was that he didn’t have the lab equipment that we have today.” Holding out a piece of old, yellowed paper Professor Con said, “Take a look.”

Both Susannah and her father leaned over the page the professor was showing them and read, “1 Cu + 4 Ir + 6 H (melted) = Go.”

Professor Con explained, “Every element has a symbol. ‘Cu’ is the symbol for copper, ‘Ir’ is the symbol for iron, ‘H’ is the symbol for hydrogen, and ‘Go’ is the symbol for gold. Hydrogen is a gas, and Brahe didn’t have the equipment to melt it. That’s because hydrogen’s melting point is -259° Celsius.”

Susannah’s father said slowly, “Being able to turn copper into gold would be to my benefit, but I’m having a hard time believing any of this. Your tale of a nose cut off in a duel and replaced with a copper one is pretty far-fetched.”

Susannah said, “Dad, that part is believable, but trust me, you will not benefit if you invest in Professor Con’s research. He doesn’t know what he is talking about.”

A Nose of Gold *(cont.)*

What does Susannah know that her father doesn't? It is time to check facts.



Dictionary

1. If something benefits you, it _____.
2. Why might a school hold a benefit spaghetti dinner? _____

Atlas



Find a map of Denmark. Write **True** or **False**. If your answer is **False**, cross out the incorrect word(s) and write the correct word(s) on the line.

1. Denmark's capital is Oslo. _____
2. The capital borders the strait that separates Denmark and Sweden. _____



Image Search

Key Words:  *Tycho Brache nose*

Can you tell if Brache found a replacement for his nose? **Yes** **No**

Temperature Converter



Find the melting points of copper and hydrogen in degrees Fahrenheit. Then tell how these temperatures compare to the temperature on a hot day.

		Celsius	Fahrenheit	How compares?
1.	Copper	1,083°		
2.	Hydrogen	-259°		

Search Engine/Encyclopedia



Look up the chemical symbols for the following:

1. Copper _____
2. Iron _____
3. Hydrogen _____
4. Gold _____

In Your Own Words

On a separate piece of paper, write one or two paragraphs in which you explain why someone should or should not invest in Professor Con's research. When you write, try to use the word *benefit* at least one time.



Where Pen Ink Freezes

Daniel and Rebecca wanted an adventure. They decided to spin a globe and move a finger in circles on the globe. When the globe stopped spinning, they would visit the place their finger was on. Using this method, they found their travel destination: Oymyakon.

Daniel and Rebecca could see from the globe that Oymyakon was located in Russia, but beyond that, they knew nothing about it. Deciding it would be wise to use a guide, they called a tour guide agency for the name of someone they might hire. They were given two phone numbers, and when they called the first one, a man named Mr. Zimin answered the phone.

“Yes, I know Oymyakon well,” Mr. Zimin said. “Oymyakon is a small village above the Arctic Circle. It is directly north of Russia’s capital, Moscow. Oymyakon is known for its cold and **frigid** temperatures. In fact, Oymyakon is the coldest permanently inhabited place on Earth. How frigid is it? Throw boiling water into the air, and it instantly freezes. The average winter temperature is -45 degrees Celsius. The lowest temperature ever recorded for any permanently inhabited location on Earth was measured here. What did the temperature measure on that record-breaking day? It measured a frigid -71.2 degrees Celsius!”

Mr. Zimin continued, “I speak Russian, so of course I can translate everything for you. I can also help you find lodging. It’s such a small village that there aren’t a lot of lodging options, and most likely you’ll have to stay with a local family.”

“But how can anyone survive in such a frigid environment?” asked Rebecca.

“People learn to adapt,” Mr. Zimin explained. “People live in larch wood houses and burn coal and wood for heat. They breed reindeer, hunt, and ice-fish. People eat reindeer and horsemeat, and they wear fur to stay warm. Reindeer fur is particularly good at keeping you warm because the shaft of each hair is hollow, and the air in the shafts has an insulating effect.”

“Do children there use cell phones and go to school the same as they do in warmer places?” asked Daniel.

“There’s a single school, and it only closes when temperatures fall below -52 degrees Celsius. 2008 was the year that the school got an indoor toilet. Cell phones don’t work in such frigid environments, and metal sticks to skin. Even ink in pens freezes solid!”

Daniel was silent for a minute, and then he asked, “If we hire you, can you find us reindeer clothes to wear?”

“Definitely,” replied Mr. Zimin. “I’ll even teach you how to say the word *reindeer* and *cold* in Russian. First, though, you need to send me some money.”

Daniel said to Rebecca, “I think we should go ahead and hire Mr. Zimin.

“I disagree,” Rebecca replied. “I’d rather call the second name on the list and see if that guide actually knows where Oymyakon is.”

Where Pen Ink Freezes (cont.)

What does Rebecca know that Daniel doesn't? It is time to check facts.

Thesaurus



1. List two synonyms for *frigid*. _____
2. Should a new student to your class be given a frigid welcome? Explain in one or two sentences. Use the word *frigid* at least once in your answer.

Atlas



- | | | |
|--|------------|-----------|
| 1. Is Moscow the capital city of Russia? | Yes | No |
| 2. Is Oymyakon directly north of Moscow? | Yes | No |
| 3. Is Oymyakon above the Arctic Circle? | Yes | No |

Temperature Converter



What are the temperatures in Oymyakon in Fahrenheit?

1. Average winter day: $-45^{\circ}\text{C} =$ _____ $^{\circ}\text{F}$
2. School closes: $-52^{\circ}\text{C} =$ _____ $^{\circ}\text{F}$
3. Record cold: $-71.2^{\circ}\text{C} =$ _____ $^{\circ}\text{F}$

Translator (from English to Russian)



Find out how these words are pronounced in Russian. Do your best to write this pronunciation out.

1. reindeer: _____
2. cold: _____

Search Engine/Encyclopedia



1. Are reindeer hairs hollow? **Yes** **No**
2. Name one other animal with hollow hairs. _____

In Your Own Words

Imagine you are trying to get yourself hired as a guide for your area. What could you tell someone about where you live? On a separate piece of paper, describe some places of interest you could take them.