Name: _____ Date: _____

Why Soup Stays Hot in a Vacuum Bottle

Circle group

Pour hot soup in a thermos in the morning. At lunch, it is still warm. Pour in a cold drink. It stays cold. How does one bottle do both?

Heat likes to move from warm places to cool ones. It moves through metal and glass. It moves through air. A thermos slows this down.

A thermos has two walls. One is inside the other. There is a gap between them. Most of the air is pumped out of the gap. A space with almost no air is a vacuum. Heat has a hard time crossing a vacuum. There is hardly anything to carry it.

The walls are often shiny. A shiny wall bounces some heat back.

There is also a tight lid. It stops warm air from leaving the top.

All these parts keep hot drinks hot and cold drinks cold for hours.

Questions

1. What can a thermos keep both hot and cold?

_____

_____

2. Which way does heat like to move?

_____

_____

3. How many walls does a thermos have?

_____

_____

4. What is a space with almost no air called?

_____

_____

5. What does the tight lid do?

_____

_____

6. Why does the gap between the walls keep soup hot?

_____

_____

Words to know

thermos: a bottle that keeps drinks hot or cold
vacuum: a space with almost no air in it
gap: an empty space between two things
slow: to make something move more gently or less quickly

Talk together (every group has these)

1. Find one fact that every group read. How did your sheet say it?
2. What did your sheet tell you that you think another group's did not? Ask them.
3. What is one question about this topic that none of the sheets answered?

Name: _____ Date: _____

Why Soup Stays Hot in a Vacuum Bottle

Triangle group

Pour hot soup into a thermos in the morning, and it can still be warm at lunch. Pour in a cold drink, and it can still be cold. How does one bottle do both?

Heat likes to move from warm places to cooler ones. It moves through metal and glass, and it moves through air. A thermos is made to slow that down.

A thermos has two walls, one inside the other, with a gap between them. Nearly all the air has been pumped out of that gap. A space with almost no air in it is called a vacuum. Heat has a very hard time crossing a vacuum, because there is hardly anything to carry it.

The walls are often shiny, too. A shiny surface bounces some of the heat back instead of letting it pass.

Last of all, there is a tight lid. It stops warm air from leaving the top of the bottle.

Together, these parts keep hot drinks hot and cold drinks cold for hours.

Questions

1. What can a thermos keep both hot and cold?

_____

_____

2. Which way does heat like to move?

_____

_____

3. How many walls does a thermos have?

_____

_____

4. What is a space with almost no air in it called?

_____

_____

5. What job does the tight lid do?

_____

_____

6. Why does the gap between the walls help keep soup hot?

_____

_____

Words to know

thermos: a bottle that keeps drinks hot or cold
vacuum: a space with almost no air in it
gap: an empty space between two things
surface: the outside or top layer of something
slow: to make something move more gently or less quickly

Talk together (every group has these)

1. Find one fact that every group read. How did your sheet say it?
2. What did your sheet tell you that you think another group's did not? Ask them.
3. What is one question about this topic that none of the sheets answered?

Name: _____ Date: _____

Why Soup Stays Hot in a Vacuum Bottle

Square group

Pour steaming soup into a thermos in the morning, and it may still be warm when lunchtime arrives. Fill it with a cold drink, and that drink can stay chilly just as long. How can a single bottle manage both?

Heat has a natural tendency to travel from warm places toward cooler ones. It passes through metal and glass, and it also drifts through air. A thermos is designed to slow that movement down.

A thermos is built with two walls, one nested inside the other, and a gap between them. Nearly all of the air has been pumped out of that gap. A space containing almost no air is called a vacuum, and heat struggles to cross a vacuum because there is hardly anything there to carry it.

The walls are frequently shiny as well. A shiny surface reflects some of the heat back instead of letting it escape.

Finally, a tight lid prevents warm air from leaking out of the top of the bottle.

Working together, these features keep hot drinks hot and cold drinks cold for hours.

Questions

1. What can a thermos keep both hot and cold?

_____

_____

2. Which way does heat tend to travel?

_____

_____

3. How many walls does a thermos have?

_____

_____

4. What is a space containing almost no air called?

_____

_____

5. What does the tight lid prevent?

_____

_____

6. Why does the gap between the walls help keep soup hot?

_____

_____

Words to know

thermos: a bottle that keeps drinks hot or cold
vacuum: a space with almost no air in it
gap: an empty space between two things
surface: the outside or top layer of something
slow: to make something move more gently or less quickly

Talk together (every group has these)

1. Find one fact that every group read. How did your sheet say it?
2. What did your sheet tell you that you think another group's did not? Ask them.
3. What is one question about this topic that none of the sheets answered?

For the teacher: Why Soup Stays Hot in a Vacuum Bottle

Each student sheet carries a shape, not a level. The same topic and facts, written three ways.

Circle: Why Soup Stays Hot in a Vacuum Bottle

Easier · 143 words · Flesch-Kincaid grade 0.9

1. Drinks, like soup or a cold drink.
2. From warm places to cool ones.
3. Two, one inside the other.
4. A vacuum.
5. It stops warm air from leaving the top.
6. Heat has a hard time crossing a vacuum, so less heat gets out of the soup.

Triangle: Why Soup Stays Hot in a Vacuum Bottle

This passage · 169 words · Flesch-Kincaid grade 3

1. Drinks, such as soup or a cold drink.
2. From warm places to cooler ones.
3. Two, one inside the other.
4. A vacuum.
5. It stops warm air from leaving the top of the bottle.
6. Heat has a hard time crossing a vacuum, so less heat escapes from the soup.

Square: Why Soup Stays Hot in a Vacuum Bottle

Harder · 180 words · Flesch-Kincaid grade 5.5

1. Drinks, such as soup or a cold drink.
2. From warm places toward cooler ones.
3. Two, one nested inside the other.
4. A vacuum.
5. It prevents warm air from leaking out of the top of the bottle.
6. Heat struggles to cross a vacuum, so less heat escapes from the soup.