Name: _____ Date: _____

Why Bridges Have Gaps in the Road

Circle group

Drive over a long bridge and you may feel a bump. The tires cross a strip of metal with teeth. The strip fills a gap in the road. It is called an expansion joint. It is there because of heat.

Most solid things grow a tiny bit bigger when they get warm. They shrink a tiny bit when they get cool. The atoms inside jiggle faster when it is warm, so they push a little farther apart. A bridge on a hot summer day is a bit longer than on a freezing winter night. On a long bridge, you could measure the change with a ruler.

If the road had no gap, it would have no room to grow. Its ends would push on each other hard. The slabs could bend up or crack. The gap gives the bridge room to stretch in summer and shrink in winter. Many bridges also rest one end on rollers, so the bridge can move a little.

Old train tracks did the same thing. They were made of short pieces with small spaces between them. The wheels went clickety-clack over each space. The spaces let the hot metal grow safely.

Questions

1. What are the metal strips in a bridge road called?

_____

_____

2. What happens to most solid things when they get warm?

_____

_____

3. Why do warm things grow?

_____

_____

4. When is a bridge a bit longer, on a hot day or a freezing night?

_____

_____

5. What would go wrong if a road had no gaps?

_____

_____

6. Why did old train tracks have small spaces between pieces?

_____

_____

Words to know

expansion: growing larger or taking up more room
atom: a tiny building block of all matter
slab: a flat, thick piece of hard material

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 Bridges Have Gaps in the Road

Triangle group

Drive across a long bridge and you may feel a bump as the tires cross a strip of metal with jagged teeth. Those strips fill gaps in the road, and they are called expansion joints. The reason for them is heat.

Nearly all solid materials grow a tiny bit larger when they warm up and shrink a tiny bit when they cool down. Inside the steel and concrete, the atoms jiggle faster when they are warm, so they push a little farther apart. A bridge on a hot summer afternoon is slightly longer than the same bridge on a freezing winter night. For a long bridge, the change is enough to measure with a ruler.

Without a gap, the road would have no room to grow. Its ends would shove against each other with great force, and the slabs could buckle or crack. The gap gives the bridge space to stretch in summer and shrink in winter. Many bridges also rest one end on rollers or sliding plates, so that the whole span can move a little without any strain.

An old railroad sound comes from the same idea. Tracks were once laid in short pieces with small spaces between them. The wheels went clickety-clack over each space, and the spaces let the hot metal grow safely.

Questions

1. What are the metal strips in a bridge road called?

_____

_____

2. What happens to most solid materials when they warm up?

_____

_____

3. Why do warm materials grow?

_____

_____

4. When is a bridge slightly longer, on a hot afternoon or a freezing night?

_____

_____

5. Why would a road with no gaps be in trouble on a hot day?

_____

_____

6. Why were old railroad tracks laid with small spaces between the pieces?

_____

_____

Words to know

expansion: growing larger or taking up more room
atom: a tiny building block of all matter
buckle: to bend or bulge out of shape
slab: a flat, thick piece of hard material
strain: a pressure that pulls or pushes too hard

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 Bridges Have Gaps in the Road

Square group

Drive across a long bridge and you may feel a distinct bump as the tires roll over a strip of metal with jagged teeth. Those strips fill deliberate gaps in the roadway, and engineers call them expansion joints. The reason behind them is heat.

Nearly all solid materials grow a tiny bit larger as they warm up and shrink a tiny bit as they cool down. Inside the steel and concrete, the atoms vibrate faster when they are warm, which pushes them slightly farther apart. Consequently, a bridge on a scorching summer afternoon is a little longer than the very same bridge on a freezing winter night. For a long bridge, the difference is large enough to measure with an ordinary ruler.

Without a gap, the roadway would have nowhere to expand. Its ends would shove against one another with tremendous force, and the concrete slabs could buckle or crack. The gap provides space for the bridge to stretch in summer and shrink in winter. Many bridges also rest one end on rollers or sliding plates, so that the entire span can shift a little without suffering any strain.

An old railroad sound comes from the same principle. Tracks were once laid in short pieces with small spaces between them. The wheels rattled clickety-clack over each space, and those spaces allowed the heated metal to grow safely.

Questions

1. What do engineers call the metal strips that fill the gaps in a bridge road?

_____

_____

2. What happens to nearly all solid materials as they warm up?

_____

_____

3. What do the atoms inside a material do when it is warm?

_____

_____

4. Is a bridge longer on a scorching summer afternoon or on a freezing winter night?

_____

_____

5. What could happen to a roadway that had no gaps for its ends to grow into?

_____

_____

6. What purpose did the small spaces in old railroad tracks serve?

_____

_____

Words to know

expansion: growing larger or taking up more room
atom: a tiny building block of all matter
buckle: to bend or bulge out of shape
slab: a flat, thick piece of hard material
strain: a pressure that pulls or pushes too hard

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 Bridges Have Gaps in the Road

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

Circle: Why Bridges Have Gaps in the Road

Easier · 197 words · Flesch-Kincaid grade 2.7

1. Expansion joints.
2. They grow a tiny bit bigger.
3. Their atoms jiggle faster and push a little farther apart.
4. On a hot summer day.
5. The ends would push on each other hard, and the slabs could bend up or crack.
6. The spaces gave the hot metal room to grow safely.

Triangle: Why Bridges Have Gaps in the Road

This passage · 218 words · Flesch-Kincaid grade 5.4

1. Expansion joints.
2. They grow a tiny bit larger.
3. Their atoms jiggle faster and push a little farther apart.
4. On a hot summer afternoon.
5. Its ends would shove together with great force, and the slabs could buckle or crack.
6. The spaces gave the hot metal room to grow safely.

Square: Why Bridges Have Gaps in the Road

Harder · 228 words · Flesch-Kincaid grade 7.3

1. Expansion joints.
2. They grow a tiny bit larger.
3. They vibrate faster and push slightly farther apart.
4. On a scorching summer afternoon.
5. Its ends would shove together with great force, and the slabs could buckle or crack.
6. They let the heated metal grow safely.