Name: _____ Date: _____

A Glass Thread That Carries Light Around Corners

Circle group

Light moves in straight lines. So it seems odd that light could follow a curve. But very thin threads of glass can carry light around bends. They can do it over long distances. These threads are called optical fibers.

How do they work? Each fiber has a center, called the core. The core is made of very clear glass. Around the core is a layer of a different glass. Light moves down the core and hits the edge of the outer layer at a shallow angle. It does not escape. It bounces back inside, like a ball bouncing off the walls of a hallway. The light zigzags along the fiber until it reaches the far end.

Why is this useful? A flash of light can carry a message. Light that blinks on and off very fast can stand for letters, pictures and sounds. Glass fibers can carry a lot of information and lose very little. Many phone and internet lines use fibers for this reason.

Some bundles of fibers carry plain light. They let people shine a beam into narrow places and see what is inside. In both jobs, a strand of glass as thin as a hair guides light where it needs to go.

Questions

1. What are the thin glass threads called?

_____

_____

2. What is the core of a fiber made of?

_____

_____

3. What happens when light hits the edge of the outer layer at a shallow angle?

_____

_____

4. Why is light compared to a ball in a hallway?

_____

_____

5. What can fast blinks of light stand for?

_____

_____

6. Why are fibers good for internet lines?

_____

_____

Words to know

optical: having to do with light and seeing
core: the center part of something
shallow: not steep, a very slight slant
zigzag: to move in sharp turns from side to side
bundle: a group of things tied or held together

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: _____

A Glass Thread That Carries Light Around Corners

Triangle group

Light usually travels in straight lines, so it seems strange that it could follow a curve. Yet very thin threads of glass can carry light around bends, even over long distances. These threads are called optical fibers.

How do they work? Each fiber has a center, or core, made of very clear glass. Around the core is a layer of a different kind of glass. When light moves down the core and strikes the edge of that outer layer at a shallow angle, it does not escape. Instead, it bounces back inside, a little like a ball bouncing off the walls of a hallway. The light zigzags along the fiber again and again until it reaches the far end.

Why is this useful? A flash of light can carry a message. Light that blinks on and off very quickly can stand for letters, pictures, and sounds. Signals in glass fibers can carry a huge amount of information and lose very little along the way. Many telephone and internet lines now use fibers for this reason.

Some bundles of fibers carry plain light instead. They let people shine a beam into narrow places and see what is inside. In both jobs, a hair-thin strand of glass guides light wherever it needs to go.

Questions

1. What are the thin glass threads called?

_____

_____

2. What is the core of a fiber made of?

_____

_____

3. What happens when light hits the edge of the outer layer at a shallow angle?

_____

_____

4. Why does the passage compare light to a ball in a hallway?

_____

_____

5. What can quick blinks of light stand for?

_____

_____

6. Why are fibers a good choice for internet lines?

_____

_____

Words to know

optical: having to do with light and seeing
core: the center part of something
shallow: not steep, a very slight slant
zigzag: to move in sharp turns from side to side
bundle: a group of things tied or held together

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: _____

A Glass Thread That Carries Light Around Corners

Square group

Light ordinarily travels in straight lines, so the notion that it could follow a curve seems almost absurd. Nevertheless, extremely thin threads of glass can guide light around bends, even across enormous distances. These threads are known as optical fibers.

The mechanism is surprisingly simple. Each fiber has a center, or core, made of exceptionally clear glass, and surrounding the core is a layer of a different kind of glass. When light moves along the core and strikes the boundary of that outer layer at a shallow angle, it cannot escape. Instead, it reflects back into the core, much like a ball rebounding off the walls of a long hallway. The light zigzags along the fiber over and over until it arrives at the far end.

The usefulness of this arrangement is considerable. A flash of light is able to carry a message, because light that blinks on and off at tremendous speed can represent letters, pictures, and sounds. Signals traveling through glass fibers can convey a vast amount of information while losing very little strength along the way. For this reason, many telephone and internet lines now rely on them.

Certain bundles of fibers carry ordinary light instead, allowing people to direct a beam into narrow places and observe what lies inside. In either job, a strand of glass as thin as a hair guides light wherever it needs to go.

Questions

1. What name is given to the very thin glass threads?

_____

_____

2. What is the core of each fiber made of?

_____

_____

3. What does light do when it strikes the boundary of the outer layer at a shallow angle?

_____

_____

4. What does the comparison to a ball in a hallway help you picture?

_____

_____

5. What can light that blinks on and off at tremendous speed represent?

_____

_____

6. Why do many telephone and internet lines rely on fibers?

_____

_____

Words to know

optical: having to do with light and seeing
core: the center part of something
shallow: not steep, a very slight slant
zigzag: to move in sharp turns from side to side
bundle: a group of things tied or held together

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: A Glass Thread That Carries Light Around Corners

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

Circle: A Glass Thread That Carries Light Around Corners

Easier · 205 words · Flesch-Kincaid grade 3.3

1. Optical fibers.
2. Very clear glass.
3. It bounces back inside the core.
4. Light bounces from side to side as it goes along the fiber.
5. Letters, pictures and sounds.
6. They carry a lot of information and lose very little.

Triangle: A Glass Thread That Carries Light Around Corners

This passage · 213 words · Flesch-Kincaid grade 5.3

1. Optical fibers.
2. Very clear glass.
3. It bounces back inside the core.
4. Light bounces from side to side as it moves along the fiber.
5. Letters, pictures, and sounds.
6. They carry a huge amount of information and lose very little along the way.

Square: A Glass Thread That Carries Light Around Corners

Harder · 232 words · Flesch-Kincaid grade 9

1. Optical fibers.
2. Exceptionally clear glass.
3. It reflects back into the core.
4. Light rebounding from side to side as it moves along the fiber.
5. Letters, pictures, and sounds.
6. They convey a vast amount of information and lose very little strength.