Name: _____ Date: _____

A Pinhole Makes a Picture on the Wall

Circle group

Long ago, people saw a strange thing. A dark room had one tiny hole in a wall. A picture of the outdoors showed up on the far wall. It had color, but it was upside down.

This is called a camera obscura. That means "dark room" in Latin. It works because light goes in straight lines. Light from the top of a tree goes through the hole and down. It lands low on the wall. Light from the bottom goes up and lands high. So the picture is flipped.

The hole must be very small. A big hole lets in light from too many ways. Then the picture is a blurry glow. A tiny hole keeps it sharp. But the picture is dim, so the room must be dark.

Artists and scientists used a camera obscura for hundreds of years. Some artists traced the picture to draw buildings. Later, inventors added a lens to make it brighter. They found a way to catch the picture on special paper. That led to photography.

Every camera today uses the same idea.

Questions

1. What did people see on the wall of a dark room with one tiny hole?

_____

_____

2. What does camera obscura mean?

_____

_____

3. What happens if the hole is too big?

_____

_____

4. What did inventors add to make the picture brighter?

_____

_____

5. Why is the picture upside down?

_____

_____

6. Why would an artist like a camera obscura?

_____

_____

Words to know

blurry: not clear or sharp

lens: a curved piece of glass that bends light

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 Pinhole Makes a Picture on the Wall

Triangle group

Long before cameras with film or screens, people noticed a strange thing. If a dark room had one tiny hole in a wall, a picture of the outdoors could appear on the opposite wall. The picture glowed in color, but it was upside down.

This effect is called a camera obscura, which means "dark room" in Latin. It works because light travels in straight lines. Light from the top of a tree passes through the hole and keeps going downward, so it lands low on the far wall. Light from the bottom of the tree travels upward and lands high. That is why the image is flipped.

The hole must be very small. A big opening lets in light from too many directions, and the picture turns into a blurry glow. A tiny hole keeps the picture sharp, but the image is dim, so the room must be quite dark.

Artists and scientists used the camera obscura for hundreds of years. Some artists traced the image to help them draw buildings and landscapes. Later, inventors added a lens to make the picture brighter, and they found a way to catch the image on special paper. That step led to photography.

You can find the same idea inside every camera today.

Questions

1. What did people see on the wall of a dark room with one tiny hole?

_____

_____

2. What does camera obscura mean?

_____

_____

3. What happens if the hole is too big?

_____

_____

4. What did inventors add to make the picture brighter?

_____

_____

5. Why is the picture upside down?

_____

_____

6. Why would an artist find a camera obscura helpful?

_____

_____

Words to know

opposite: on the other side, facing the first thing
image: a picture of something
blurry: not clear or sharp
lens: a curved piece of glass that bends light
landscape: a view of land and scenery

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 Pinhole Makes a Picture on the Wall

Square group

Long before cameras with film or screens existed, people noticed something curious. If a dark room had a single tiny hole in one wall, a picture of the outdoors could appear on the opposite wall. The scene glowed in full color, but it was upside down.

This effect is called a camera obscura, which means "dark room" in Latin. It works because light travels in straight lines. Light from the top of a tree passes through the hole and continues downward, so it lands low on the far wall. Light from the bottom of the tree travels upward and lands high. That is precisely why the image appears flipped.

The hole must be extremely small. A large opening admits light from too many directions, and the picture dissolves into a blurry glow. A tiny hole keeps the picture sharp, although the image becomes dim, which means the room must be thoroughly dark.

Artists and scientists relied on the camera obscura for hundreds of years. Some artists traced the image to help them draw buildings and landscapes accurately. Eventually, inventors added a lens to brighten the picture, and they discovered a way to capture the image on specially treated paper. That step led directly to photography.

The same basic idea can be found inside every camera today.

Questions

1. What appeared on the wall of a dark room with one tiny hole?

_____

_____

2. What does the Latin name camera obscura mean?

_____

_____

3. What happens to the picture if the hole is too large?

_____

_____

4. What did inventors add so that the picture would be brighter?

_____

_____

5. Why does the image appear upside down?

_____

_____

6. Why would an artist find a camera obscura helpful?

_____

_____

Words to know

opposite: on the other side, facing the first thing
image: a picture of something
blurry: not clear or sharp
lens: a curved piece of glass that bends light
landscape: a view of land and scenery

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 Pinhole Makes a Picture on the Wall

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

Circle: A Pinhole Makes a Picture on the Wall

Easier · 179 words · Flesch-Kincaid grade 3

1. An upside-down picture of the outdoors.
2. Dark room.
3. The picture turns into a blurry glow.
4. A lens.
5. Light goes in straight lines, so light from the top lands low and light from the bottom lands high.
6. The artist could trace the picture to draw buildings.

Triangle: A Pinhole Makes a Picture on the Wall

This passage · 210 words · Flesch-Kincaid grade 5.6

1. An upside-down picture of the outdoors.
2. Dark room.
3. The picture turns into a blurry glow.
4. A lens.
5. Light travels in straight lines, so light from the top of a scene lands low and light from the bottom lands high.
6. The artist could trace the image to draw buildings and landscapes accurately.

Square: A Pinhole Makes a Picture on the Wall

Harder · 216 words · Flesch-Kincaid grade 7.6

1. An upside-down picture of the outdoors.
2. Dark room.
3. It dissolves into a blurry glow.
4. A lens.
5. Light travels in straight lines, so light from the top of a scene lands low and light from the bottom lands high.
6. The artist could trace the image to draw buildings and landscapes accurately.