

graphic artist

A graphic artist is someone who makes art by putting lines or images onto a flat surface.

dimensions

Dimensions are the spaces that a thing can exist in.

orientation

Orientation is the location and position of something in relation to other objects.

visual

Visual means relating to the sense of sight.

When someone hands you a picture, how can you tell which edge of the picture goes on top? You likely look for clues based on your experience. You have experienced **gravity** and have seen sunlight come from above and form shadows. Artists **take advantage** of this common **knowledge** all the time. They shade and highlight their pictures to show a figure's shape and **orientation**. They **size** and **position** figures to show distance.

The **graphic artist** M. C. Escher used the same **visual** clues to confuse viewers. He drew **optical illusions** and scenes that don't make sense in our world. "It is . . . great fun," he said, "to **deliberately** confuse two and three **dimensions** . . . or to poke fun at gravity. Are you sure that a floor cannot also be a ceiling? Are you absolutely certain that you go up when you walk up a staircase?"

Escher's 1953 **print** *Relativity* is one of his puzzling works. It is hard to know which way to view the scene. The print shows three worlds **intersecting** each other. Figures move along staircases, sit on chairs, or walk through doorways. Whichever way you turn the print, some figures seem to **defy** gravity. Yet each of the figures obeys the laws of gravity in its own world.

To **convincingly depict** such **mind-boggling** scenes, Escher needed to understand laws of nature and mathematics. He had been a weak student in school, but he was an **astute** student of life, with a sharp eye and a sense of wonder about the world. Escher described his

work as "exploring with lines" and "thinking in images."

The **geometric properties** of objects always interested Escher. In his early years, he made detailed drawings of real places and structures. By his late 30s, though, he said it was more important to draw what he imagined. His art explored mathematical **relationships** among figures and shapes. By exploring, he gained new **insights** into laws of nature and mathematics. He started working with well-known mathematicians who admired and found **inspiration** in his art.

In Escher's 73 years, he created a large body of work that became a rich source of inspiration for mathematicians and art lovers alike. Even so, it may show only a portion of his **genius**. Escher once said, "What I give form to in daylight is only one percent of what I see in darkness."



words read _____

- errors _____ = _____
cold score

words read _____

- errors _____ = _____ goal _____
hot score expression date passed

Math Meets Art

Identifying the main idea

1. What is the main idea of this story?
 - a. Escher's figures often seemed to defy gravity.
 - b. Escher's work inspired mathematicians and art lovers alike.
 - c. Escher's work demonstrates only a portion of his genius.

Recalling a fact

2. What did Escher draw in his early years?
 - a. mathematical relationships
 - b. real places
 - c. what he imagined

Getting meaning from the context

3. What does **intersecting** mean in this story?
 - a. imitating
 - b. defying
 - c. crossing

Making connections within the text

4. How did Escher learn the laws of mathematics?
 - a. in the classroom
 - b. from a well-known mathematician
 - c. through his art

Connecting author's ideas with reader's ideas

5. Why is Escher's print *Relativity* puzzling?

Summarizing information

9. Write three facts from the story that support this statement: Escher's work used optical illusions.

Developing vocabulary

6. An antonym is a word that has the opposite meaning of another word. Match each word with its antonym.

1. defy	a. ___ ordinary
2. deliberately	b. ___ realities
3. illusions	c. ___ obey
4. mind-boggling	d. ___ confusions
5. insights	e. ___ accidentally

Attending to details

7. Fill in each blank with a bold-faced word from the story.

The _____ properties of objects always interested Escher. In his work as a _____, he made detailed drawings of real structures. He also drew optical _____ and scenes that don't make sense in the world. In one picture, whichever way you turn it, some figures seem to _____ gravity. Escher's insights and art became a source of _____ for mathematicians and art lovers alike.

Processing information

8. What kinds of visual clues did Escher use to confuse viewers?

Enrichment Activity

Find a copy of *Relativity*, the Escher print described in the story. As you count the number of human figures in the picture, notice the optical illusions Escher used. Count how many human figures you can find, and explain what makes it hard for you to count them.