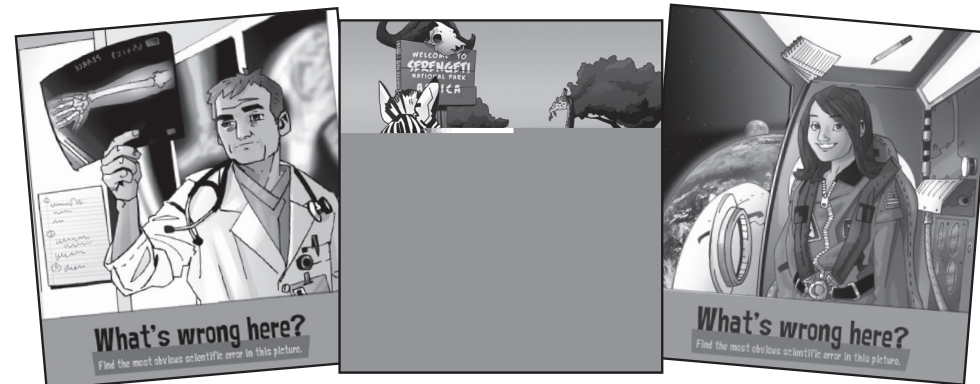


SCIENCE CHALLENGE of the Week

31. **ERROR:** Three of the gears are connected in a way that will not turn. **EXPLANATION:** In the configuration shown, one of the gears would be forced to turn clockwise and counterclockwise at the same time. This is impossible.
32. **ERROR:** People and dinosaurs are living at the same time. **EXPLANATION:** All dinosaurs were extinct about 65 million years before the first humans appeared on Earth. Cave people did not exist at the time of dinosaurs.
33. **ERROR:** The two water balloons are falling (accelerating) at different rates. **EXPLANATION:** The acceleration due to gravity is the same for everything on Earth, regardless of the weight of the object. Two balloons of different weights that are released at the same time should fall (accelerate downward) at the same rate. Since they were released at the same time, they should hit the people below at the same time.
34. **ERROR:** There is only one bone connecting the elbow to the wrist. **EXPLANATION:** There are two bones between the elbow and the wrist—the radius and the ulna.
35. **ERROR:** The middle pylon (tower in the middle of the bridge) does not have a foundation extending into the water. **EXPLANATION:** In order to provide support, the middle pylon must extend all the way to the ground, below the water level.
36. **ERROR:** The astronaut's hair is resting on her shoulders as if being pulled down by gravity. **EXPLANATION:** When orbiting Earth in space, people and objects float as if there were no gravity. The astronaut's hair should be floating off her shoulders.
37. **ERROR:** The bubbles are cube-shaped. **EXPLANATION:** Single bubbles always form the shape of a sphere, regardless of the shape of the bubble wand. A sphere is the shape with the smallest surface area which causes the least amount of stretching on the bubble's surface.
38. **ERROR:** Polar bears and penguins are living together in the same habitat. **EXPLANATION:** Polar bears live in the northern hemisphere. Penguins live in the southern hemisphere. These animals do not interact in the wild because they live on opposite sides of our planet.
39. **ERROR:** Our solar system is shown with seven planets. Mars is missing. **EXPLANATION:** Our solar system has eight planets: Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, and Neptune.
40. **ERROR:** Air-filled balloons are floating. **EXPLANATION:** Balloons filled with air sink to the floor because the weight of the balloon combined with the weight of the air inside it is heavier than air. Helium-filled balloons float because helium is lighter (less dense) than air.



USING SCIENCE CHALLENGE OF THE WEEK

Designate a place on your classroom wall for Science Challenge of the Week. Select a puzzle and place it in the top pocket. Place the remaining puzzles in the pocket on the back of the chart.

The first week of school, point out Science Challenge of the Week. Explain to your students that during the week, they should study the picture to find the scientific error. Ask students to write down the error (or redraw the picture without the error) and give it to you by Thursday. On Friday, display the best answer in the pocket below the puzzle. Discuss the answer with your class.

The answers are listed inside this guide. Students may find other "errors" in addition to the most obvious scientific error listed in this guide. Recognize and praise students for finding other errors. Students may also produce different drawings that are correct. For example, for #25, one student might redraw the picture without the tiger. Another student might redraw the picture but replace the tiger with an African animal. Both answers are valid.

Answers to the Puzzles

- ERROR:** *The ice has sunk to the bottom of the glass.* **EXPLANATION:** Ice floats on water because ice is less dense than liquid water.
- ERROR:** *The pine trees are flowering.* **EXPLANATION:** Pine trees are non-flowering gymnosperms. Coniferous trees, such as pine trees, grow cones instead of flowers in order to make seeds.
- ERROR:** *A fire is burning on the moon.* **EXPLANATION:** There is no oxygen in the moon's minimal atmosphere. Because fires require oxygen to burn, a fire would not burn on the moon.
- ERROR:** *The second hill is taller than the first hill. The roller coaster cars will not have enough energy to make it to the top of the second hill.* **EXPLANATION:** The first hill of a roller coaster is always the highest. The potential energy gained from being pushed to the top of this first and highest hill powers the roller coaster cars all the way through the rest of the course.
- ERROR:** *The dolphin, a mammal, laid eggs.* **EXPLANATION:** Dolphins do not lay eggs. Like almost all mammals, dolphins give birth to live young.
- ERROR:** *The shadows are in the direction of the sun.* **EXPLANATION:** A shadow is created when something blocks the sun (or blocks a source of light). Shadows therefore appear on the side of the object facing away from the sun.
- ERROR:** *The ants and bees have two body segments.* **EXPLANATION:** As insects, ants and bees have three body segments—a head, a thorax, and an abdomen.
- ERROR:** *The astronauts are floating off of the moon.* **EXPLANATION:** Although the pull of gravity on the moon is weaker than on Earth, the moon does have gravity. People and other objects do not float off of it.
- ERROR:** *The farmer is harvesting carrots from a tree.* **EXPLANATION:** Carrots do not grow on trees. Carrots are root vegetables that grow underground. A carrot is a taproot, part of a plant's root system.
- ERROR:** *The flags are flying in different directions.* **EXPLANATION:** At any given time, the wind blows in only one direction. All the flags should be blowing in the same direction.
- ERROR:** *The spider has six legs.* **EXPLANATION:** A spider has eight legs.
- ERROR:** *The rainbow spectrum is in the wrong order.* **EXPLANATION:** A rainbow spectrum is always in the same order: red, orange, yellow, green, blue, indigo, violet.
- ERROR:** *Chickens are swimming like ducks.* **EXPLANATION:** Chickens do not swim. They do not have webbed feet.
- ERROR:** *It is snowing in 60-degree Fahrenheit (16° C) weather.* **EXPLANATION:** Sixty degrees Fahrenheit (16° C) is too warm for snow to fall.
- ERROR:** *A hippopotamus is eating a fish.* **EXPLANATION:** Hippos are herbivorous and do not eat fish.
- ERROR:** *Yellow and blue paint are combining to form red paint.* **EXPLANATION:** When mixed, yellow and blue make green paint.
- ERROR:** *The bee is stinging with its mouth.* **EXPLANATION:** A bee's stinger is in its abdomen, not its mouth.
- ERROR:** *The car has been rear-ended and all the items in the car have been thrown forward.* **EXPLANATION:** In a rear-end collision, the car is pushed forward. The items inside the car have inertia so they do not move forward with the car. The items should appear to be thrown to the back.
- ERROR:** *Ostriches are flying.* **EXPLANATION:** Ostriches are flightless birds.
- ERROR:** *The higher leak is squirting farther than the lower leak.* **EXPLANATION:** The water pressure at the bottom of a pool is greater than the pressure at the top so the lower leak should be squirting farther.
- ERROR:** *The newborn baby has developed muscles like the parents.* **EXPLANATION:** Babies do not inherit acquired characteristics, such as well-developed muscles. Even though the mother may have exercised while pregnant, the baby would not be born with especially developed muscles.
- ERROR:** *The words on the child's shirt can be read properly both on the shirt and in the mirror image.* **EXPLANATION:** The words in the mirror should appear backward—opposite the way they do on the shirt.
- ERROR:** *The people are surviving by drinking ocean water.* **EXPLANATION:** Human beings cannot survive on salty ocean water. Humans must drink fresh water in order to survive.
- ERROR:** *Two 100-kg items are not balancing on the scale.* **EXPLANATION:** If both items weigh 100 kilograms, then the scale should be balanced. It does not matter what the items are.
- ERROR:** *A tiger is living in Africa.* **EXPLANATION:** Tigers are native to Asia, not Africa.
- ERROR:** *One of the straws in the glass of water looks normal.* **EXPLANATION:** Due to the differing refractive index between air and water, a straw should look bent or broken at the surface of the water.
- ERROR:** *There is a hurricane in the Midwest.* **EXPLANATION:** Hurricanes form over the ocean and do not last long once they hit land. The Midwest is too far inland to be hit by a hurricane.
- ERROR:** *The girl's hair is blowing the same direction as she is swinging.* **EXPLANATION:** Wind resistance should be pushing the girl's hair back as she swings forward.
- ERROR:** *A butterfly is hatching from an egg.* **EXPLANATION:** A butterfly emerges from a chrysalis, not an egg. The caterpillar is the stage in a butterfly's life cycle that hatches from an egg.
- ERROR:** *Stars can be seen through part of the moon.* **EXPLANATION:** Although the moon sometimes appears to be a crescent, it is always a solid sphere. Over the course of a month, part of the moon cannot be seen because that part is not being lit by the sun. However, the unlit part of the moon is not transparent. It is not possible to see stars through any part of the moon.