Depth perception
Depth perception takes place with

• Monocular cues
  Retinal size
  Motion parallax
  Linear perspective
  Aerial perspective
  Object overlap
  Texture perspective
  Shading

• Binocular cues
  We will not be treating this subject.
As an object approaches us, its image on our retina gets bigger. So if distance is halved, the image doubles in size.
Size constancy

Size constancy refers to the fact that our perceptions of the size of objects are relatively constant despite the fact that the size of objects on the retina vary greatly with distance.
Depth perception: Motion parallax

Motion parallax is a depth cue that results from our motion. As we move, objects that are closer to us move farther across our field of view than do objects that are in the distance.

http://psych.hanover.edu/krantz/motionparallax/motionparallax.html
Depth perception: Object overlap

An object that is partially covered by another object is perceived to be farther away.

Figure 2. Interposition. The blue circle is reported to be closer since it overlaps the red circle.
Depth perception: Linear perspective

The presence of converging lines add depth to an image

No depth illusion

Impression of depth
Depth perception: Linear perspective

Linear perspective is often used by artists to create the perception of depth.
Some illusions created by linear perspective

1. Ponzo illusion
2. Muller Lyer illusion
The Ponzo illusion
The Muller Lyer illusion
The Muller-Lyer illusion

[Diagram of the Muller-Lyer illusion with accompanying photos of real-world examples]
In the three-dimensional world, depth perception concerns judging distance. The closer an object is to the retina, the larger it is on the retina. However, in the two-dimensional world of the Muller-Lyer illusion, our brain makes assumptions about the relative depths of the two shafts based on monocular (pictorial) cues. We are used to seeing outside corners of buildings as near to us with the top and bottom of the corner sloping out and away (like the outward slanting fins of the Muller-Lyer illusion). We are used to seeing inside corners of buildings as farther from us with the top and bottom of the corner sloping in somewhat towards us (like the inward slanting fins of the Muller-Lyer illusion).

The retina is saying that the two shafts are the same length but the brain is interpreting the Muller-Lyer as a depth issue, with the shaft that looks like an outside corner being closer and the shaft that looks like an inside corner being farther away. In other words, the retina is saying "two shafts equal" and the brain is saying "outside shaft shorter than inside shaft". The brain usually wins differences like this. Thus, the brain sees as longer than .

Psychologists have attempted to support this theory that the Muller-Lyer illusion is caused by our experiences with outside and inside corners, by showing the illusion to an African tribe that lived in circular huts and therefore had no perceptual experiences with corners. People in this tribe didn't seem to be fooled by the illusion thus supporting the "experience with corners" explanation of the illusion.
Aerial perspective
Depth perception: Aerial perspective

Due to light scattering by the atmosphere, objects that are a great distance away have lower luminance contrast and lower color saturation. In computer graphics, this is often called «distance fog". The foreground has high contrast; the background has low contrast. Objects differing only in their contrast with a background appear to be at different depths. The color of distant objects are also shifted toward the blue end of the spectrum (e.g., distance mountains)
The Virgin of the Rocks
Leonardo da Vinci
Landscape in the style of Yan Wengui
Shading

- Uses light falling on an object from a certain angle to give form and depth to an object.
- Cast shadows aid in locating an object.
A vivid sensation of depth can be provided by small objects such as pebbles, markings on a road, corn in a field i.e. textures. As these objects become smaller and smaller, they give the impression of depth.
How many depth cues do you perceive in this image?
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