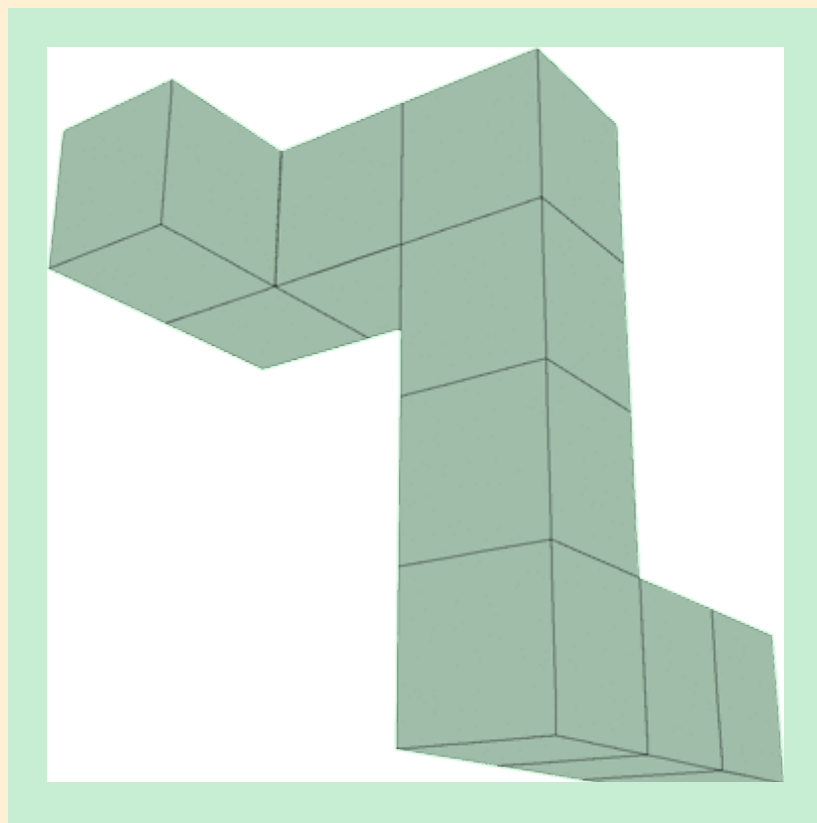


# Mental Rotation



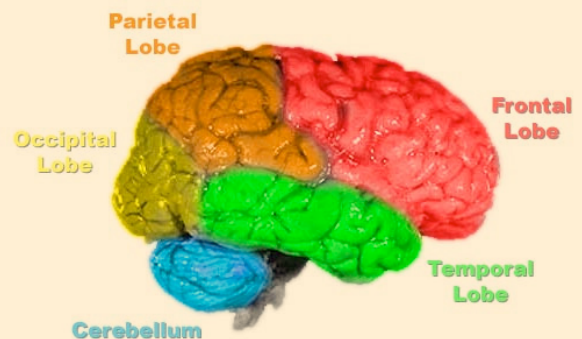
# Mental Rotation

**Do you need an idea for a scientific study?**

**Try out one of our ideas or make one of your own.**

**Start learning right now about differences in the brain that create better spatial awareness. Take the following brief quiz to see how much you already know about mental rotation. See the bottom of page 4 to check your answers.**

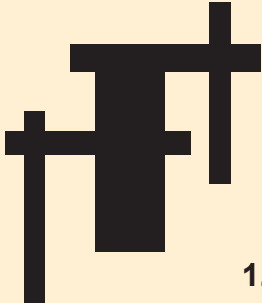
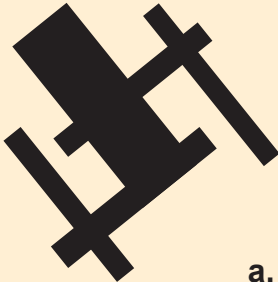
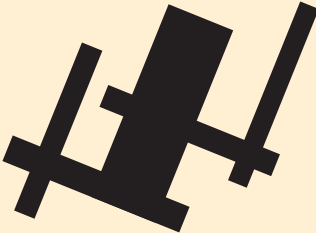
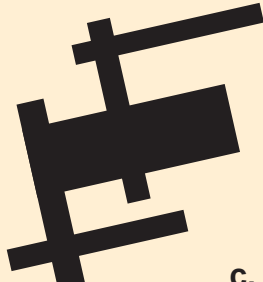
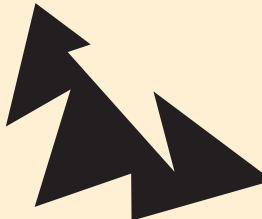
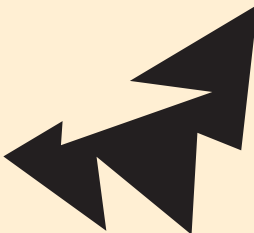

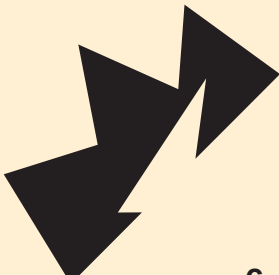
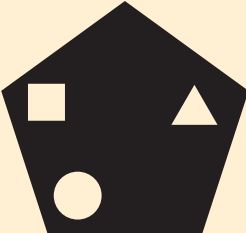
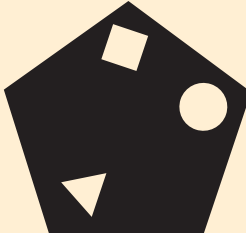
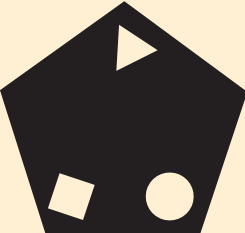
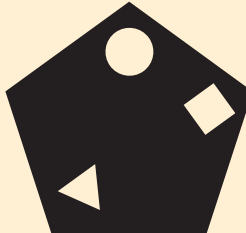
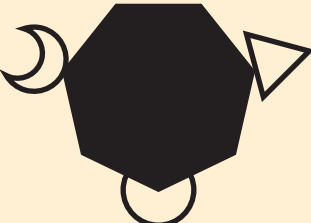
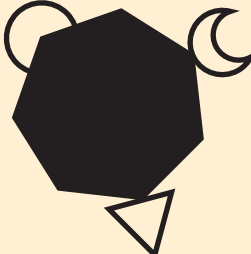
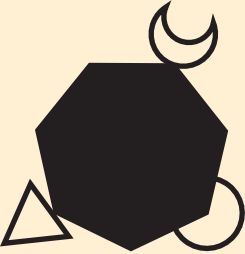
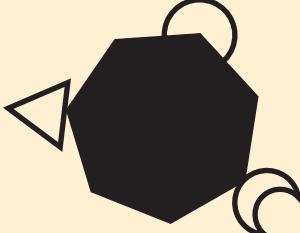
1. Which part of the brain is activated by mental rotation activities?
  - a. left occipital lobe
  - b. right parietal lobe
  - c. left frontal lobe
  - d. right temporal lobe
2. In mental rotation, an enantiomorph is:
  - a. a blind spot in the composition
  - b. a duplicate rotated exactly 90 degrees
  - c. a duplicate rotated exactly 180 degrees
  - d. the mirror image of the original
3. Which factor has the largest impact on response time in mental rotation?
  - a. the axis rotated
  - b. the color changed
  - c. the degree rotated
  - d. the scale changed
4. The phenomenon of mental rotation was first discovered in:
  - a. 1971 by Shepard and Metzler.
  - b. 1972 by Sekuler and Nash.
  - c. 1978 by Vandenberg and Kuse.
  - d. 1982 by Shepard and Cooper.
5. What is the world record for a person's fastest time to solve a Rubik's Cube® (as of 2013)?
  - a. 5.02 seconds
  - b. 5.27 seconds
  - c. 5.55 seconds
  - d. 5.66 seconds



## Mental Rotation Quiz

How fast can you complete this mental rotation quiz? For each set, identify which of the last three matches the first item. Time yourself and your friends and family and see how you do. (Extra Credit: Identify the enantiomorphs of the original image for each set.)

### Mental Rotations Quiz

 1.	 a.	 b.	 c.
 2.	 a.	 b.	 c.
 3.	 a.	 b.	 c.
 4.	 a.	 b.	 c.

# Mental Rotation

## Mental Rotation Skills

The ability to rotate objects in your mind has long been thought to be related to innate ability, and many studies found that males outperformed females. It was hypothesized that this was due to differences in brains or hormones. More recently, however, it has been shown that there is much more to it. Studies have shown, for example, that ten hours of playing video games showed dramatic gains in the females' scores as well as modest gains in the males' scores.

Another study showed that pilots scored significantly higher than non-pilots. In the non-pilot group, men outperformed women, but in the pilot group, there was no statistically significant difference in the performance of the men and women. More research is required to determine if there is in fact a link between solely gender and mental rotation abilities or if it is more complicated than that. It is possible that mental rotation is a skill that must be practiced, and the activities that boost mental rotation ability (e.g., playing video games, physical activities like running and jumping) happen to be more popular for males than females.



Another possible explanation for the differences in abilities of different genders may be psychological. Recent studies have been conducted on confidence in mental rotation abilities. One particular study had the participants take a mental rotation test, then the participants were told that one gender does better on mental rotation tasks, and then the participants took another mental rotation test. Members of the gender who were told that they did better on mental rotation tasks performed better on the second test than on their first test. Conversely, members of the opposite gender performed worse the second time around. This potentially suggests that mental rotation ability is based on perception of skills rather than innate ability.

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Answers: Page 2 Answers: 1) b. 2) d. 3) c. 4) a. 5) c (b is the current fastest for a robot). Page 3 Answers: 1) b. 2) a. 3) c. 4) c. Extra Credit: 1) c. 2) b. 3) a. 4) b.

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