

# THE SCIENCE OF SLEEP

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right before bedtime like video games and computer use.

(8) Though all mammals sleep, some do it very differently than we do. Aquatic mammals like whales and dolphins need to breathe air so they must make sure that they go to the surface even if they are asleep. When asleep, only one half of their brain (one hemisphere) sleeps at a time, while the other half remains conscious. This is called unihemispheric slow wave sleep. Both halves take turns being the one at rest and the one that is active. The active side is responsible for directing the sleeper to the surface to breathe. Cows,

horses, giraffes and camels can sleep while standing up but have to lie down during short periods of REM sleep when their muscles become paralyzed and unable to hold them up.

(9) Sleep researchers are not exactly sure why sleep is needed, but there are a few likely reasons. Sleeping gives the mind time to process the information learned during the day and assign this information to the correct parts of the brain. During sleep the body repairs itself. Even if you workout in the day, it is when you're asleep that your muscles repair and grow the fastest. When asleep, your brain has a chance to clean out waste material faster and your immune system can restore itself.

## Article Questions

- 1) REM stands for rapid eye movement (2) sleep and NREM stands for non-rapid eye movement (2) sleep. When only one hemisphere of a brain is asleep at a time, this is called unihemispheric slow wave sleep (8). An insomniac (7) is someone who has difficulty falling and staying asleep.
- 2) What are three differences between REM sleep and NREM sleep?
  - 1) REM has rapid eye movements and NREM does not. (Any three of these.)
  - 2) Dreams occur more in REM than NREM.
  - 3) REM dreams are often vivid and bizarre while NREM dreams are more organized.
  - 4) REM has elevated heart rate and breathing while NREM has regular heart rate and breathing.
  - 5) During REM, muscles are paralyzed but during NREM they are not.
  - 6) Nightmares occur in REM and night terrors occur in NREM. (3 and 4)
- 3) What is the difference between monophasic sleep and biphasic sleep? Are you a monophasic sleeper or a biphasic sleeper?
 

Monophasic sleep means you sleep once a day and biphasic sleep means you sleep twice.(5)
- 4) How much sleep do you need for your age group? How much sleep do you usually get a day? If you are not getting enough sleep, calculate how much sleep debt you've accumulated this week?
 

Preteens and teens need 8-11 hours of sleep. Various answers. (6)
- 5) Why can't both halves of a dolphin's brain sleep at the same time?
 

Since dolphins need to breathe even when asleep, one half of the brain must always be conscious to bring the dolphin to the surface to breathe when necessary.(8)
- 6) Even though cows can sleep standing up, they still lie down for short periods of time during sleep. Why is this necessary?
 

Cows can only stand during NREM sleep. When they go into REM sleep, they lose all muscle tone and become paralyzed and unable to stand. It's therefore necessary to lie down first to prevent injury.(8)
- 7) If you go to the gym and lift weights all day, you should make sure you get enough sleep. Why?
 

It is during sleep that your muscles will repair and grow the fastest.(9)