

BRAINWAVE FREQUENCIES DURING WAKING, REM, AND NON-REM SLEEP

Slower ←

→ Faster

Delta Waves 0.5-3 Hz

Theta Waves 4-8 Hz

Alpha Waves 9-12 Hz

Beta Waves 13-30 Hz

Stage 3 & 4 NREM Sleep

- Minimal arousal level
- Slow, regular, high-voltage waves
- Sleeper is difficult to awaken
- "Synchronized" brain activity
- Occurs primarily in first half of night

Wake

- Full arousal
- Fast, irregular, low voltage brainwaves.
 - Faster beta waves in *active* waking
 - Slower alpha waves in *quiet* waking (eyes closed).

Stage 1 NREM Sleep

- Transition stage between wake and sleep
 - Reduced arousal
- Alternation between alpha and theta waves

REM Sleep

- Fast, irregular brainwaves as in waking
- Brain is highly activated
- Rapid Eye Movement
- Postural atonia
 - Dreaming
- Occurs primarily in second half of night

Stage 2 NREM Sleep

- "True" sleep
- Alpha disappears
- Theta waves predominate
- "Spindles" drive increasing brainwave synchronization.