

## How the Brain Grows

### Neurons and Synapses

The brain is made of specialized nerve cells called neurons. These neurons are designed to communicate with other neurons. Each neuron has an output fiber (called an axon) that *sends* signals to other neurons and input fibers (dendrites) that *receive* signals from other neurons. When the axon of one neuron hooks up with the dendrites of another neuron, a connection between two brain cells is formed; this is called a *synapse*.

### Use It or Lose It

At birth, a child is born with 100 billion neurons that are not yet connected to other neurons. The brain develops as these neuronal connections are formed and reinforced. Thus, brain development is a process of pruning. Synapses that have been stimulated and used will become permanent. Synapses that have not been activated will be removed. It is a use it or lose it process.

### Declining Synaptic Connections

By the age of three, a child's brain has a 1,000 trillion synapses. This is twice as many synaptic connections as an adult brain. This number remains high for the first ten years of life and then begins to gradually decline. By late adolescence, about 500 trillion or half of the synapses remain.

### Reinforced Synapses Dependent on Experiences

Brain development is dependent on the life experiences of a child. The synapses that have been reinforced by repeated experience become permanent. Synapses that have not been stimulated and reinforced will be eliminated. Thus, experiences play a critical role in how the brain is wired.

### References:

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