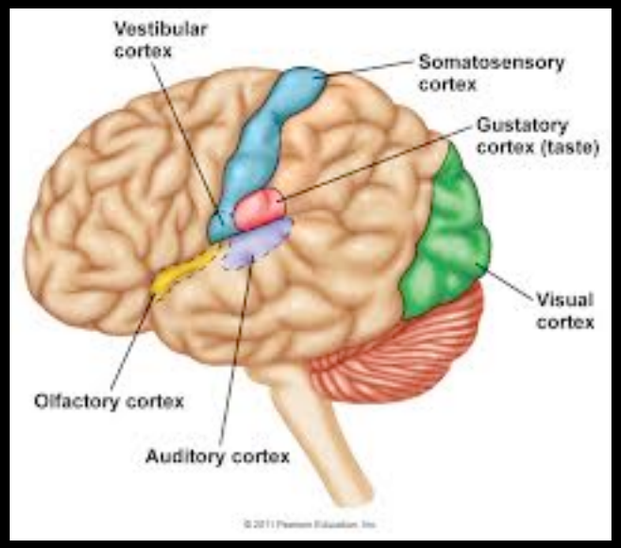


movement with a brain

considering how & why we move the way we do

1. Sensory Before Motor
2. External vs. Internal Cues
3. Why Eye Direction Matters
4. Breathing Mechanics: what matters most
5. Shape Continuum
6. Strength & External Loading
7. How To Holistically Train Balance
8. How and Why To Train Vision (distinguishing between eyesight and vision)
9. Varying Rhythm, Pace & Direction
10. Why/How To Mobilize Feet & Ankles
11. The Amazing Vestibular System
12. The Power of Play
13. SAID principle
14. Cerebellum
15. Why/When/How To Assess
16. Clarifying Your Brain's Body Maps
17. Mobilizing Areas With Complex Joints
18. Deconstructing & Demystifying Common Fitness Buzzwords/Myths/ Assumptions/Oversimplifications
19. Exploring The Movement Hierarchy & Foundational Skills

Primary roles of the brain?

1. SURVIVAL

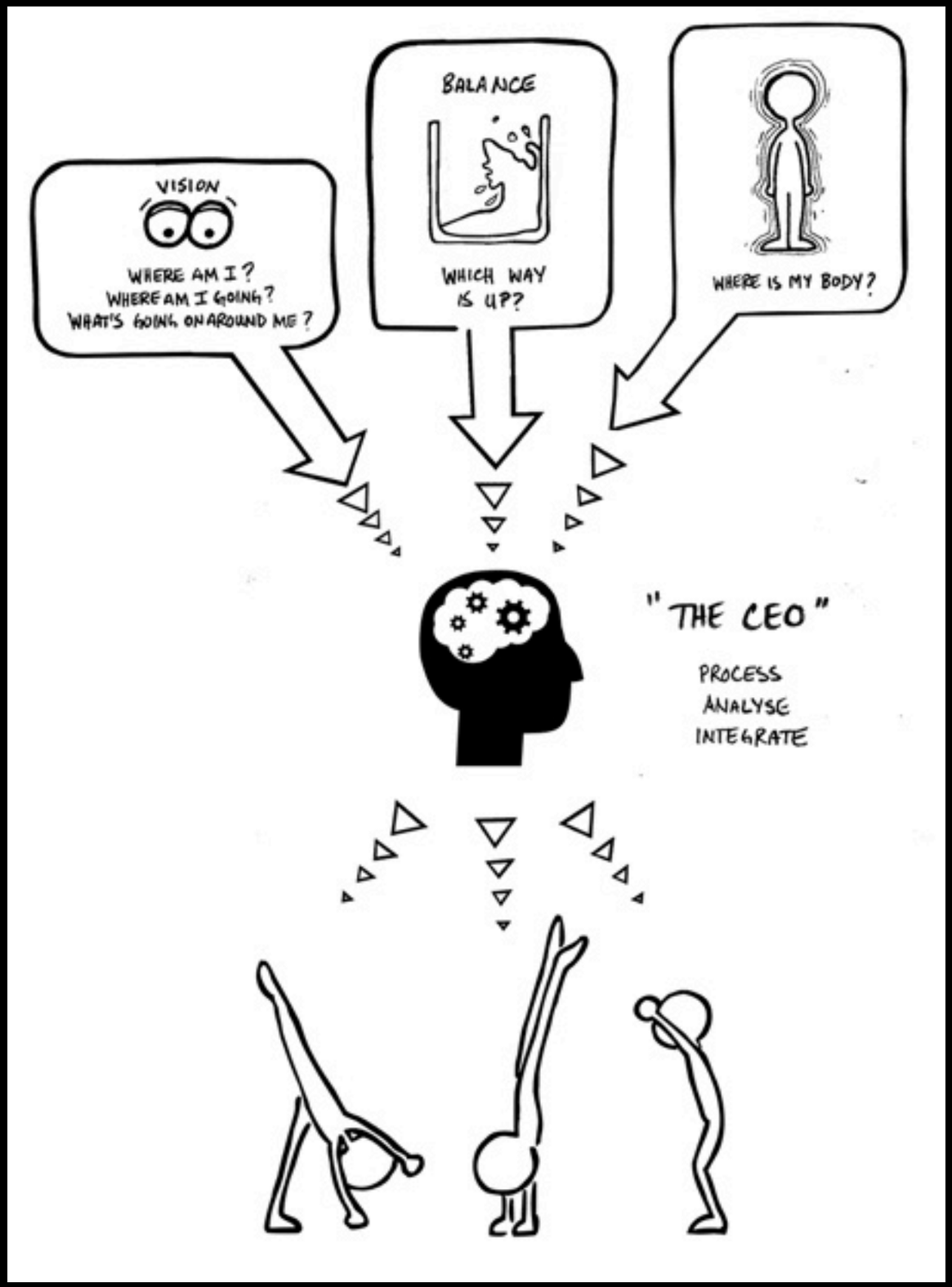
   PATTERN RECOGNITION

   PREDICTION

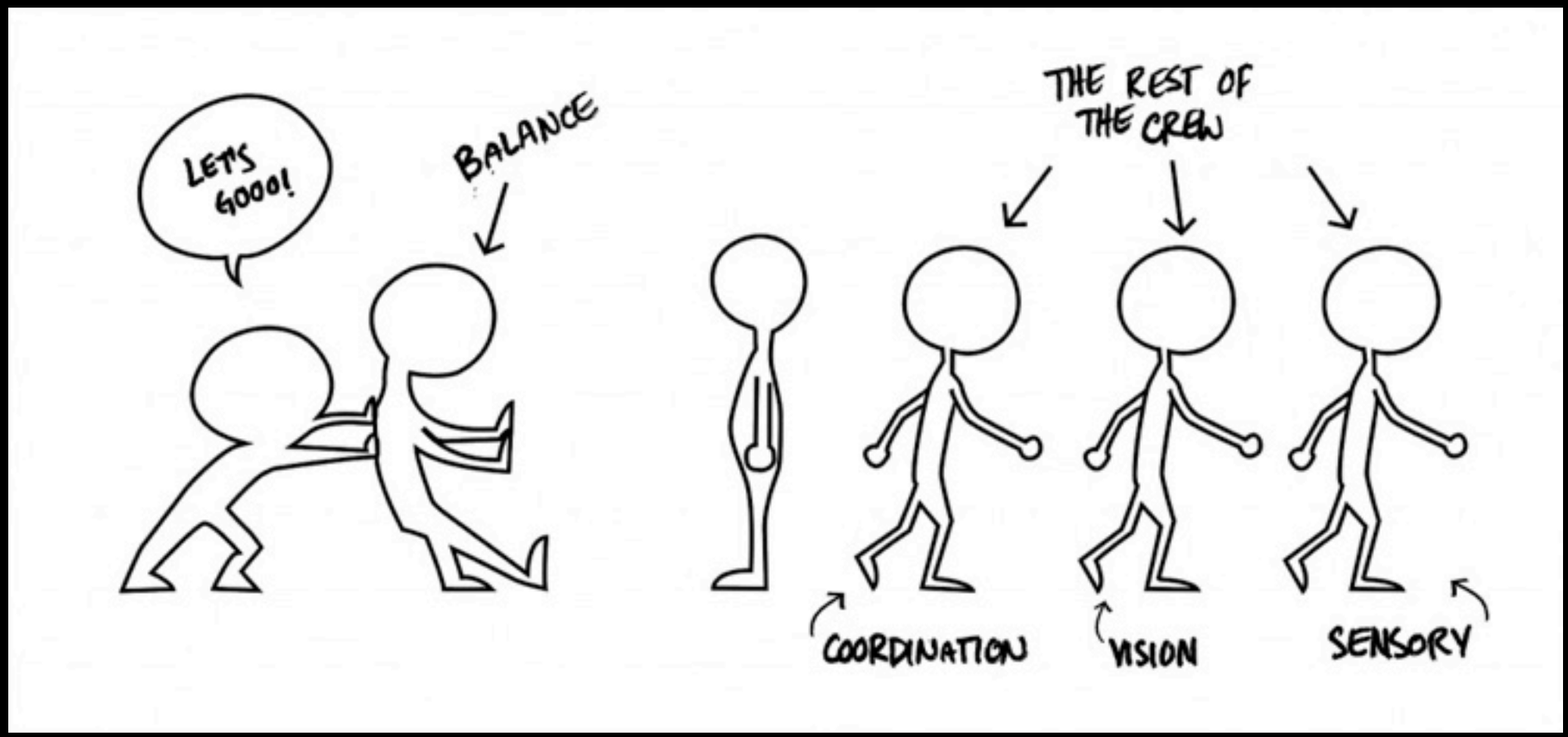
2. MOVEMENT

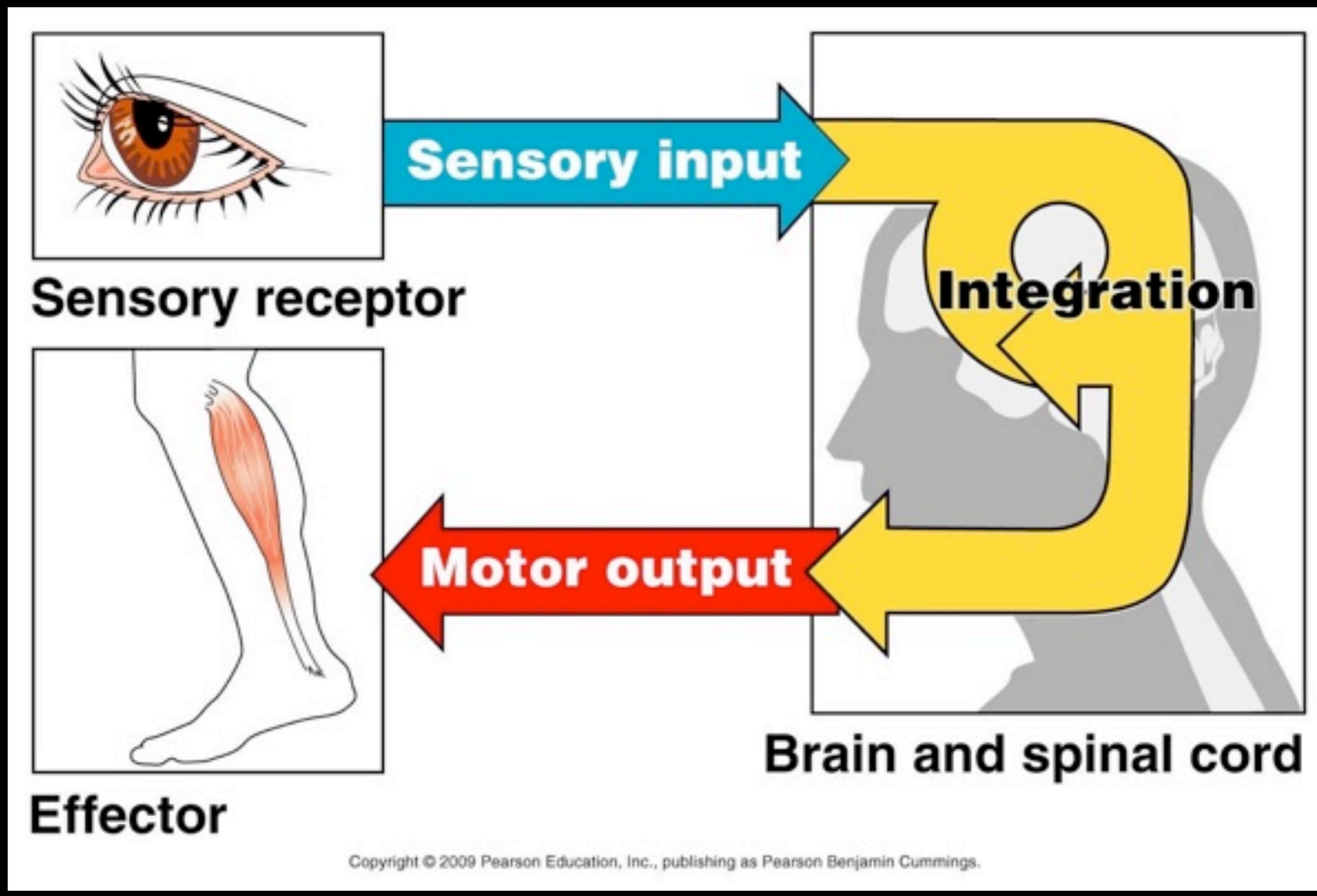
The Brain Needs:

1. Fuel (glucose and oxygen)
2. Activation (movement)


VISION
WHERE AM I?
WHERE AM I GOING?
WHAT'S GOING ON AROUND ME?
BALANCE
WHICH WAY IS UP?
WHERE IS MY BODY?
"THE CEO"
PROCESS
ANALYSE
INTEGRATE

assessing/considering/training input





Types of strabismus

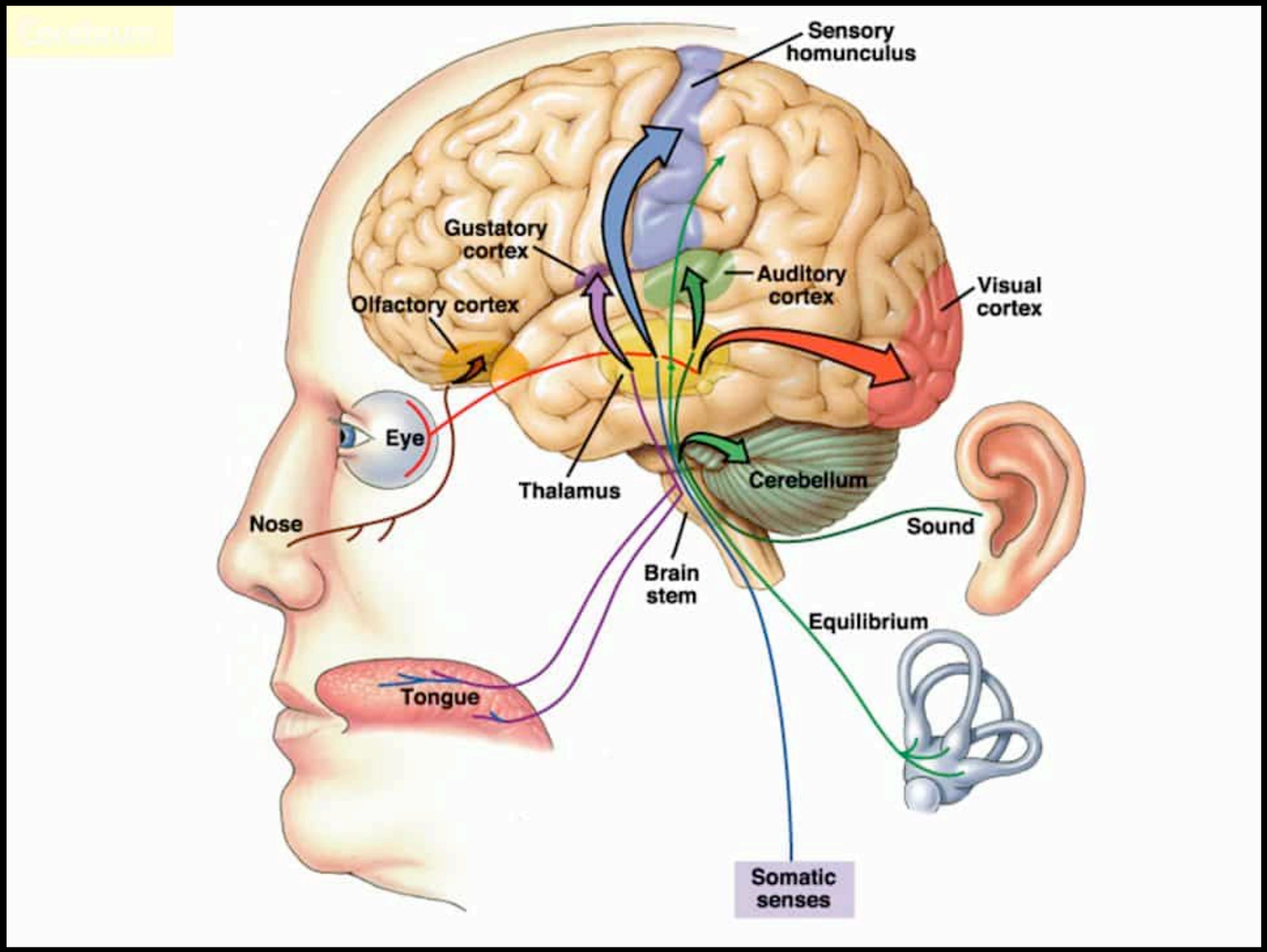
Normal

Esotropia
(convergent strabismus)

Exotropia
(divergent strabismus)

Hypertropia
(vertically displaced upwards)

Hypotropia
(vertically displaced downwards)


Sensory homunculus
Gustatory cortex
Auditory cortex
Visual cortex
Olfactory cortex
Eye
Thalamus
Cerebellum
Nose
Sound
Brain stem
Equilibrium
Tongue
Somatic senses

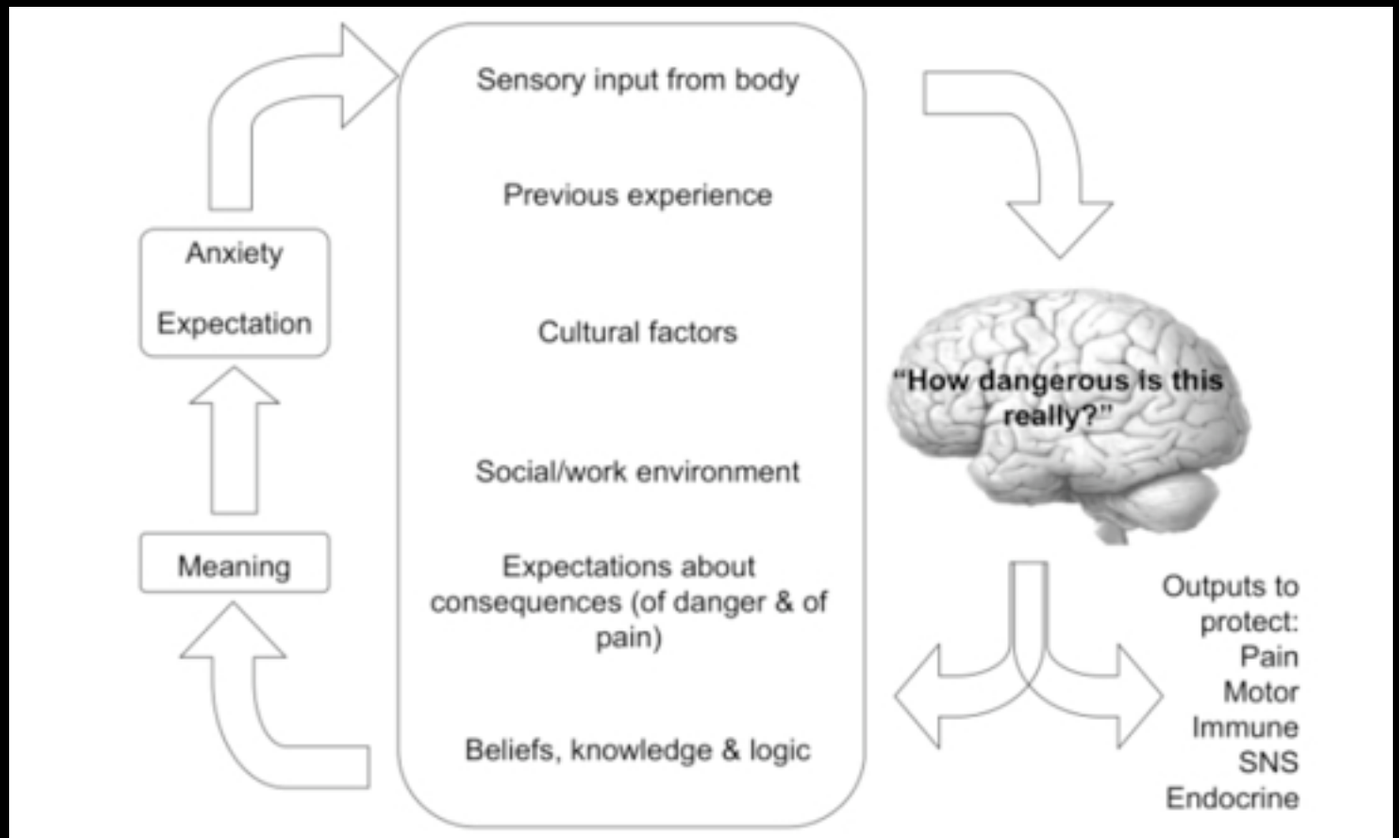
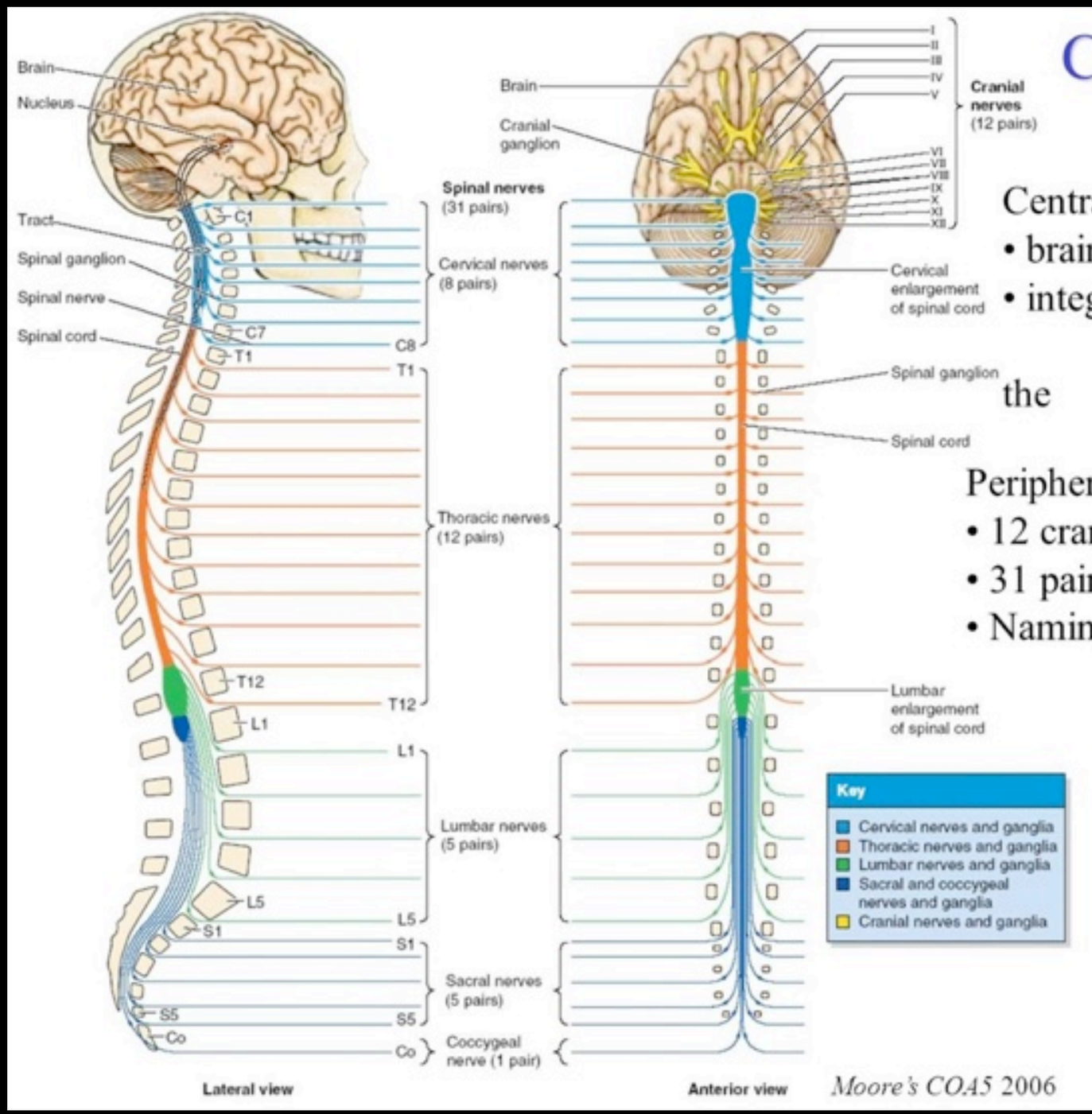


Fig. 1. Many inputs affect the implicit perception of threat to body tissues, labelled here as 'How dangerous is this really?' Those inputs have wider meaning effects, which in turn seems to affect anxiety, attention and expectation. The implicit perception of threat to body tissues determines pain and in turn influences other inputs.

CNS vs. PNS

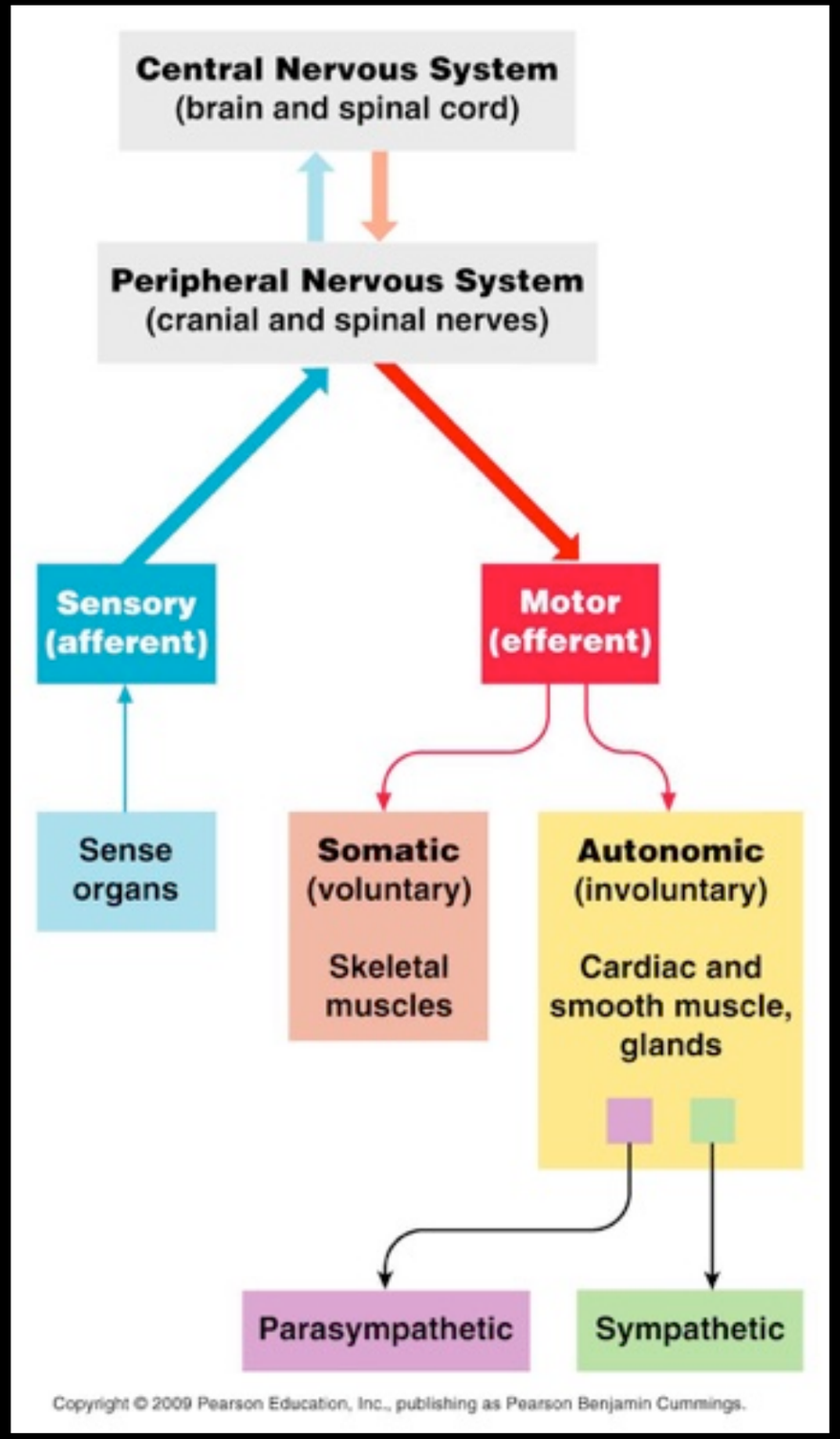


Central Nervous System
- brain & spinal cord
- integration of info passing to & from the periphery

Peripheral Nervous System
- 12 cranial nerves
- 31 pairs of spinal nerves
- Naming convention changes at C7/T1

Collection of nerve cell bodies:
- CNS: nucleus
- PNS: ganglion

Moore's COA5 2006



Central and Peripheral Nervous System

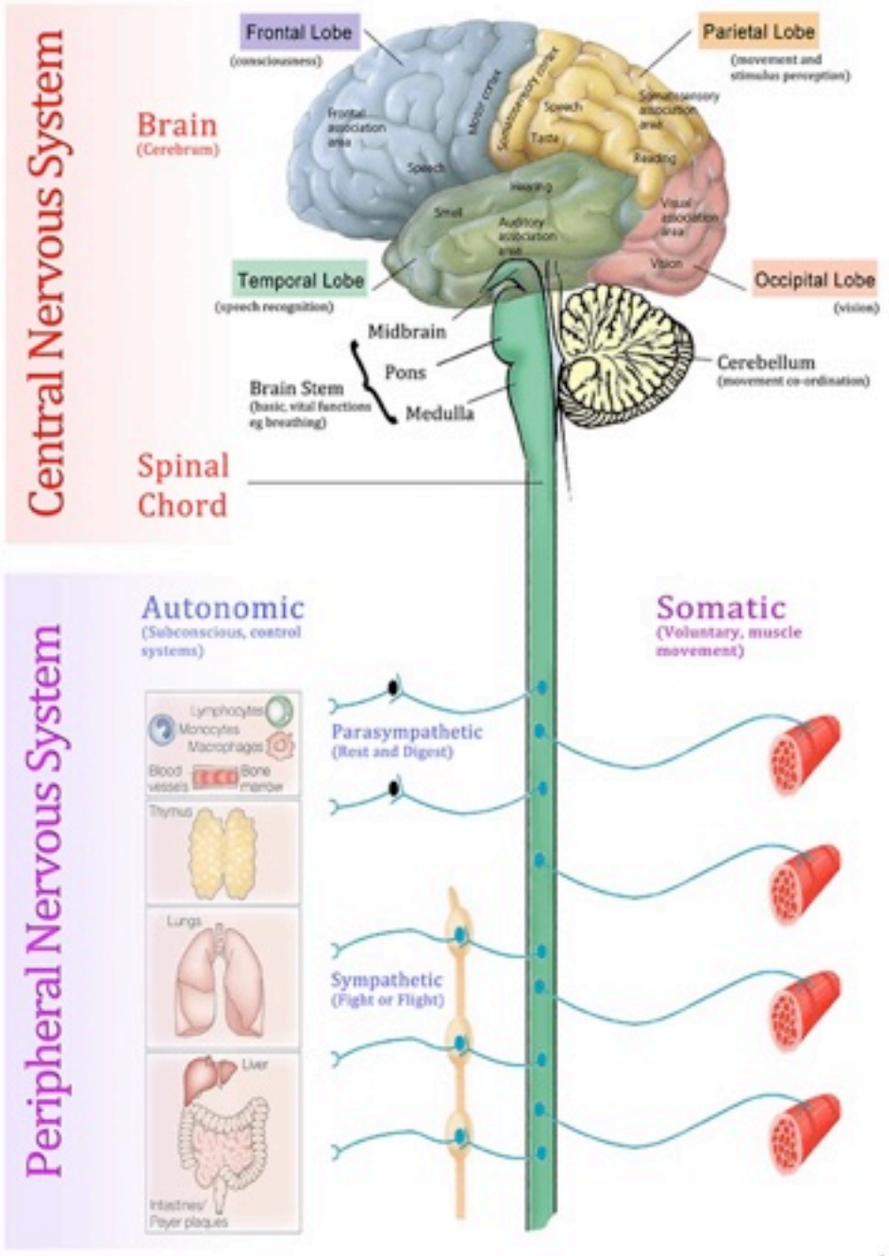
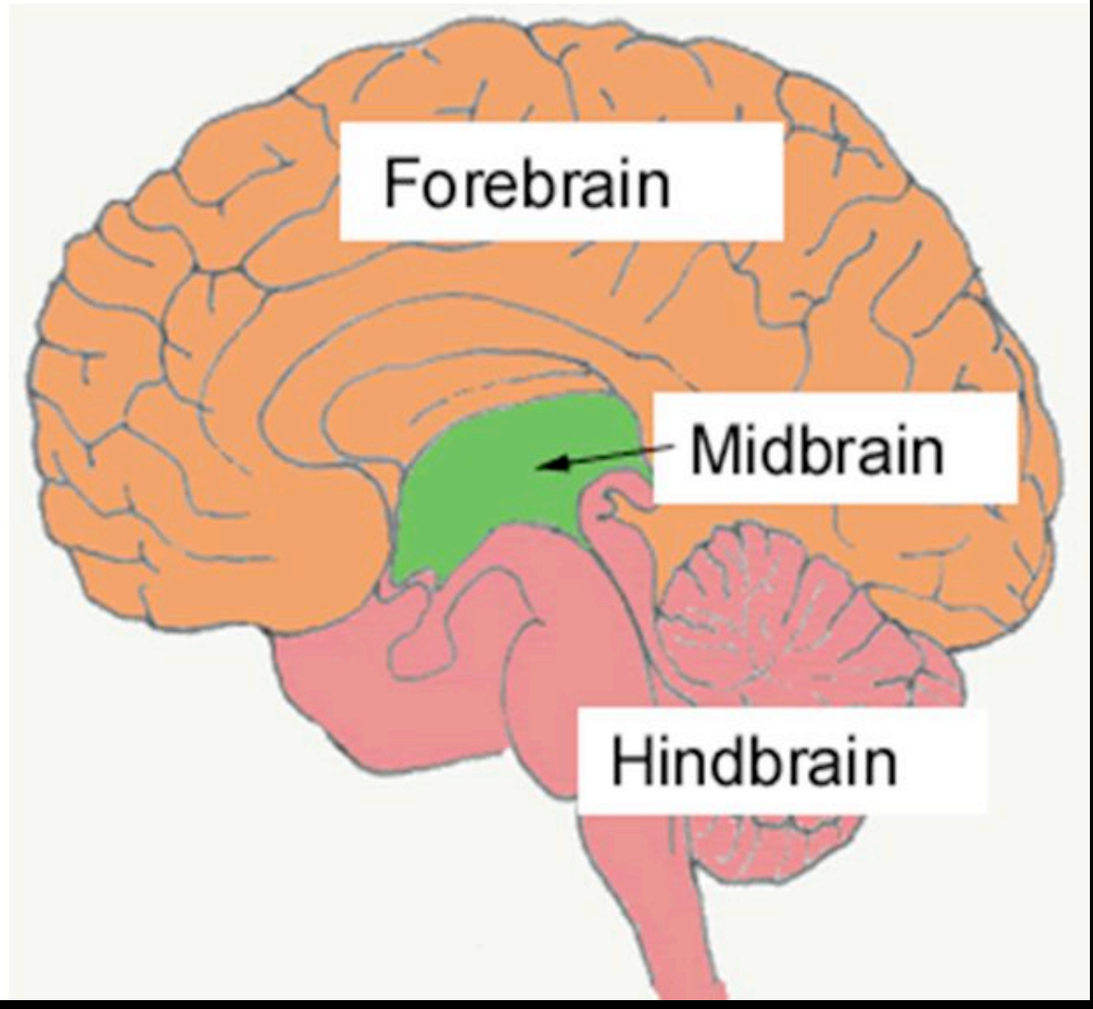


image via: http://climatereview.net/

3 Parts of the Brain:

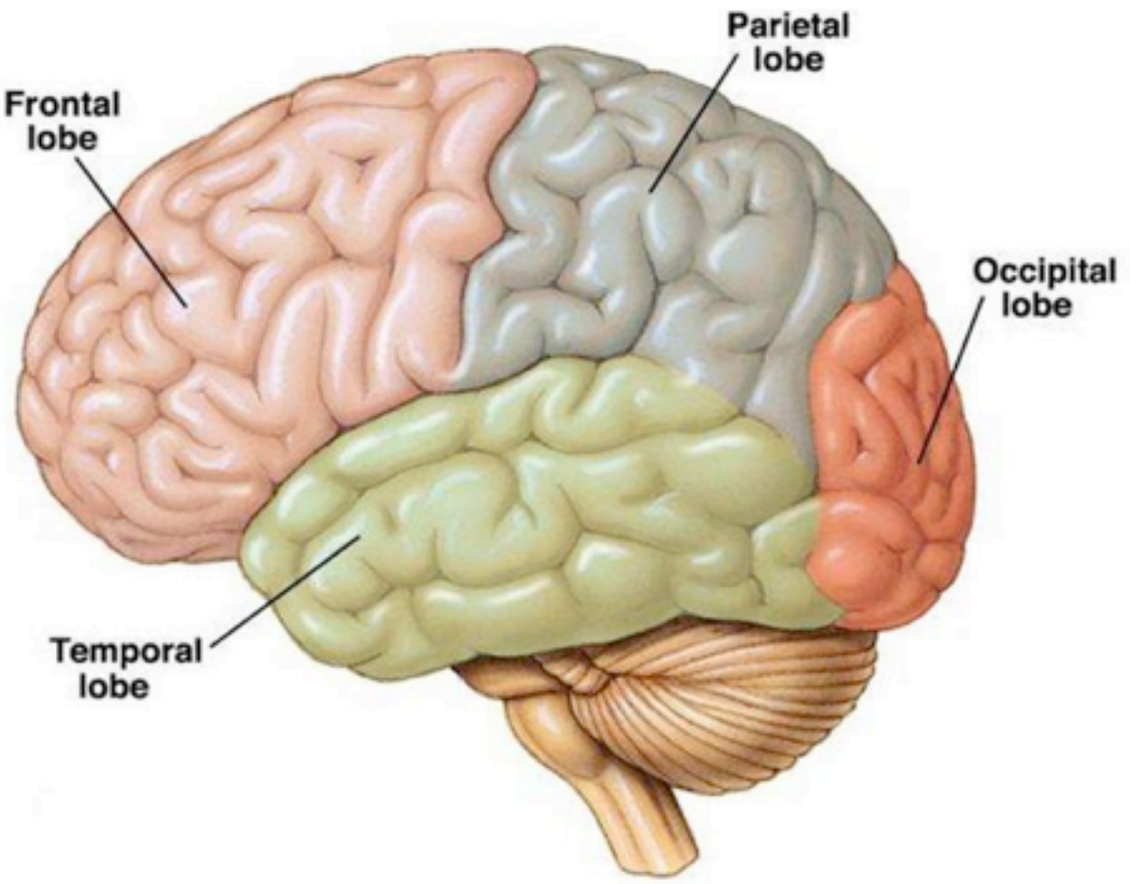
1. Forebrain
2. Midbrain
3. Hindbrain



Cerebrum -The largest division of the brain. It is divided into two hemispheres, each of which is divided into four lobes.

http://williamscalvin.com/BrainForAllSeasons/img/bonobo_LH-human_LH-viaTWD.gif

1. Cerebrum



Surface lobes of the cerebrum

- Frontal lobe
- Parietal lobe
- Occipital lobe
- Temporal lobe

Figure 7.13a

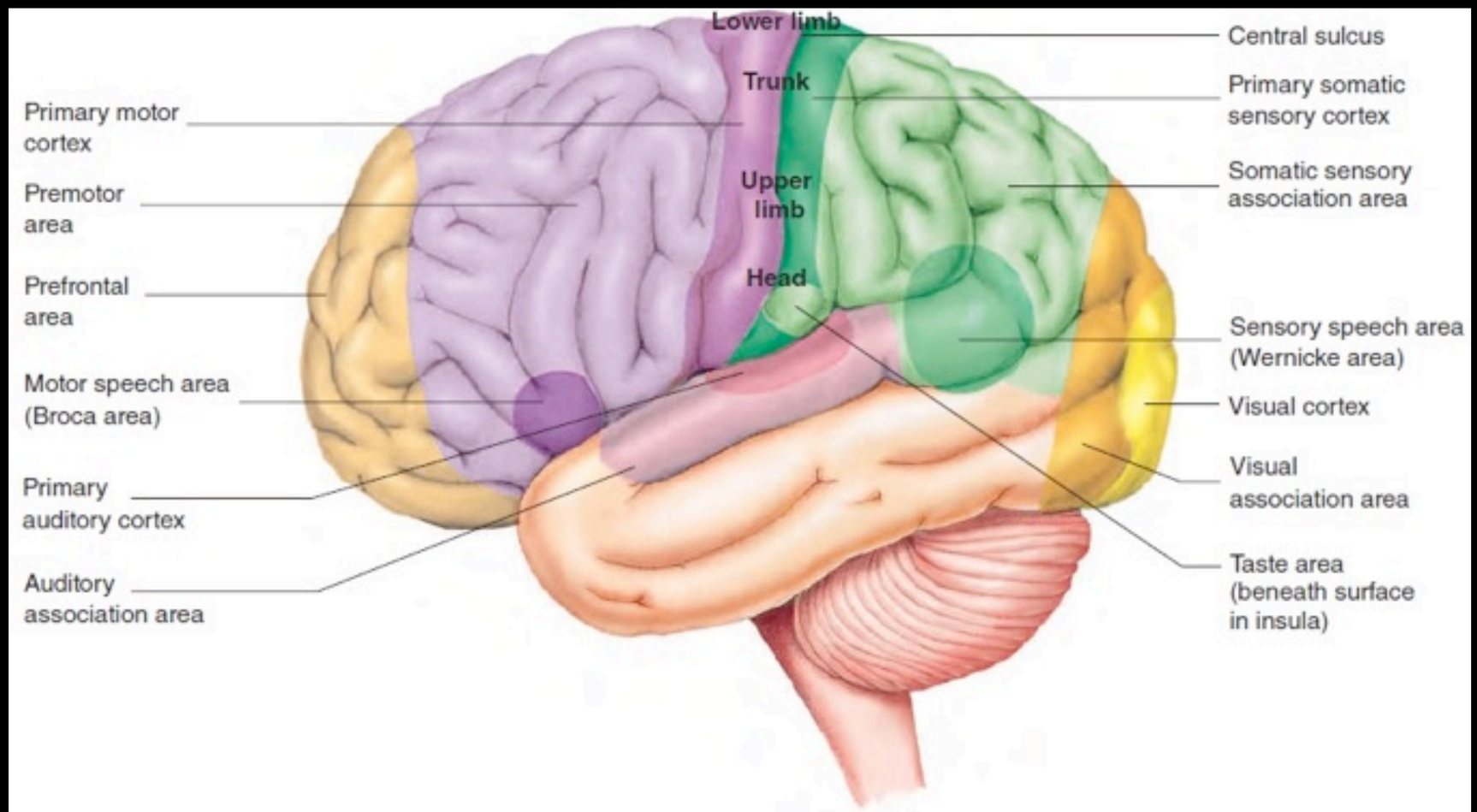
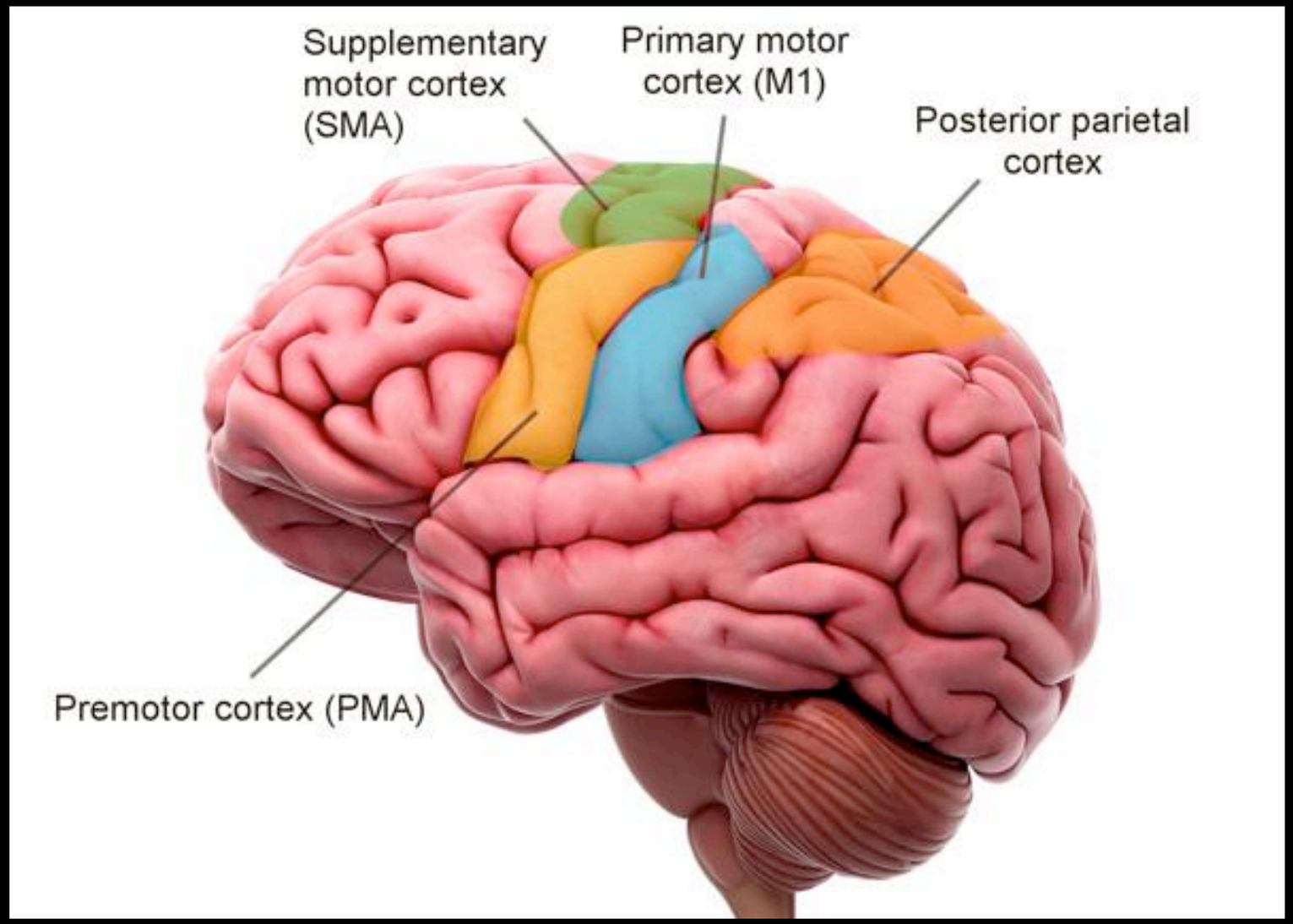


Figure 8.27 AP R Sensory and Motor Areas of the Lateral Side of the Left Cerebral Cortex

motor: frontal lobe

- Voluntary Movement
- Executive Function
- Decision Making
- Cognitive Thinking
- Inhibition

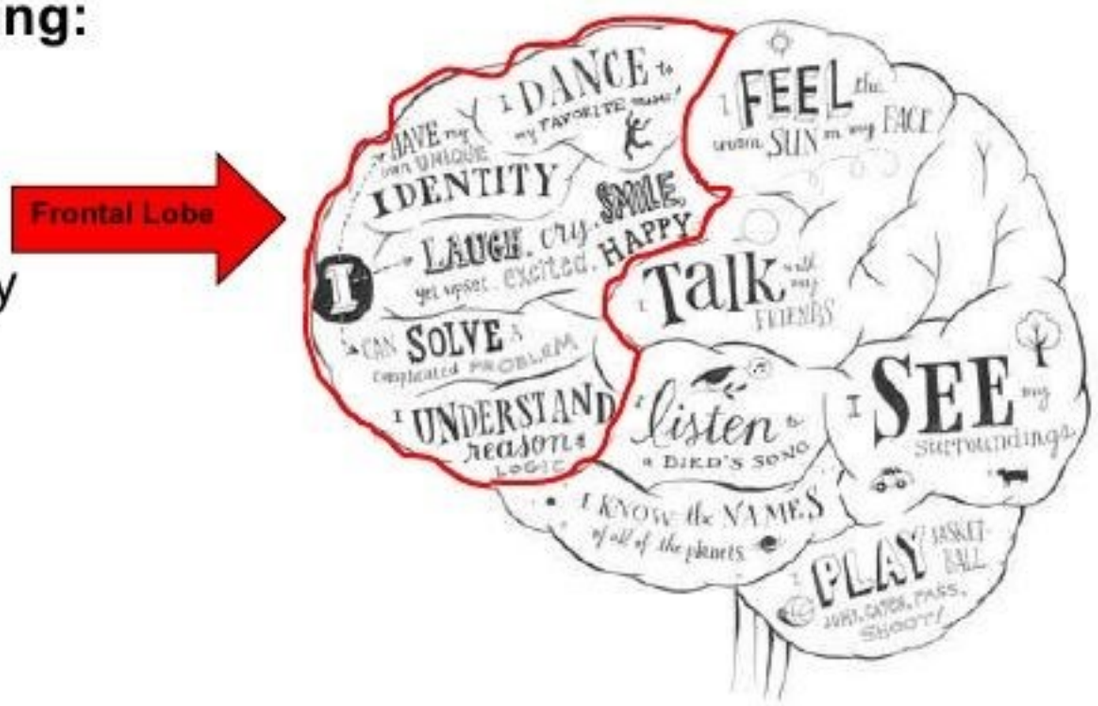


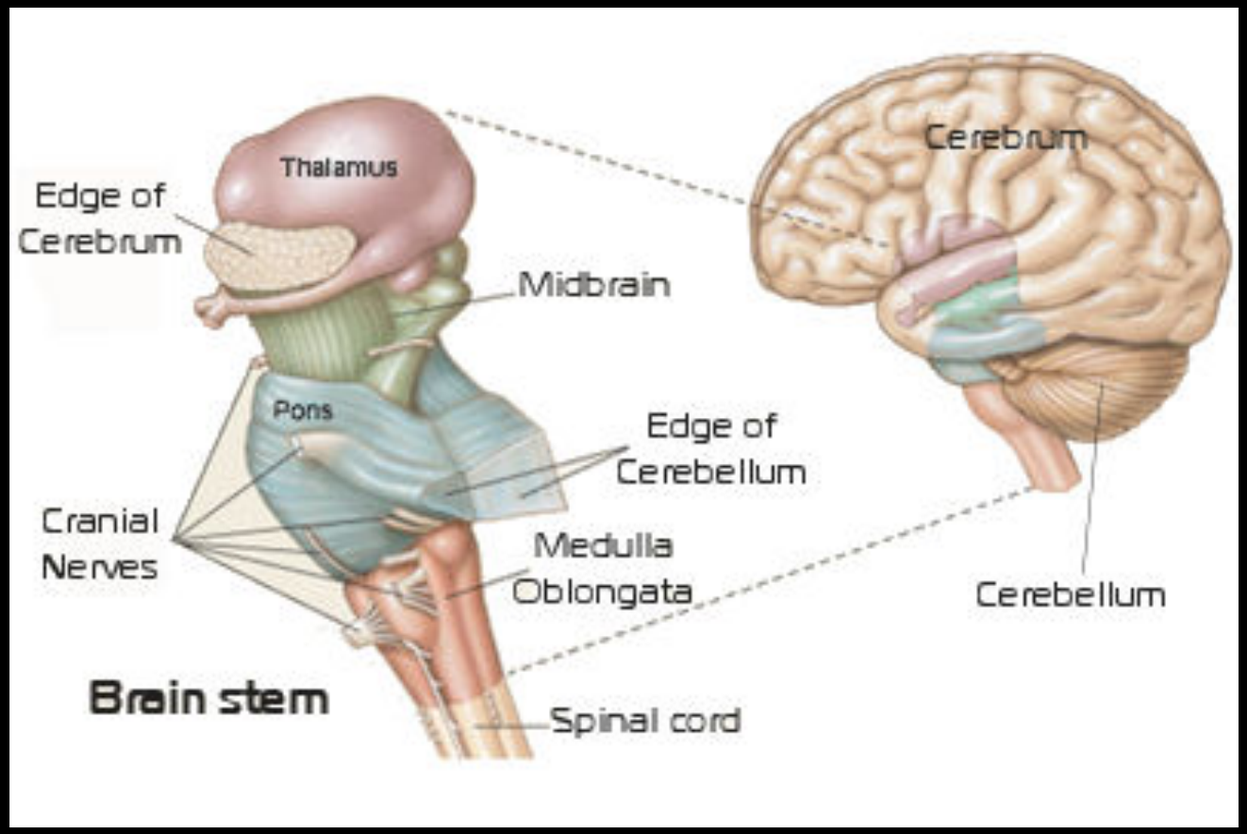
Functions

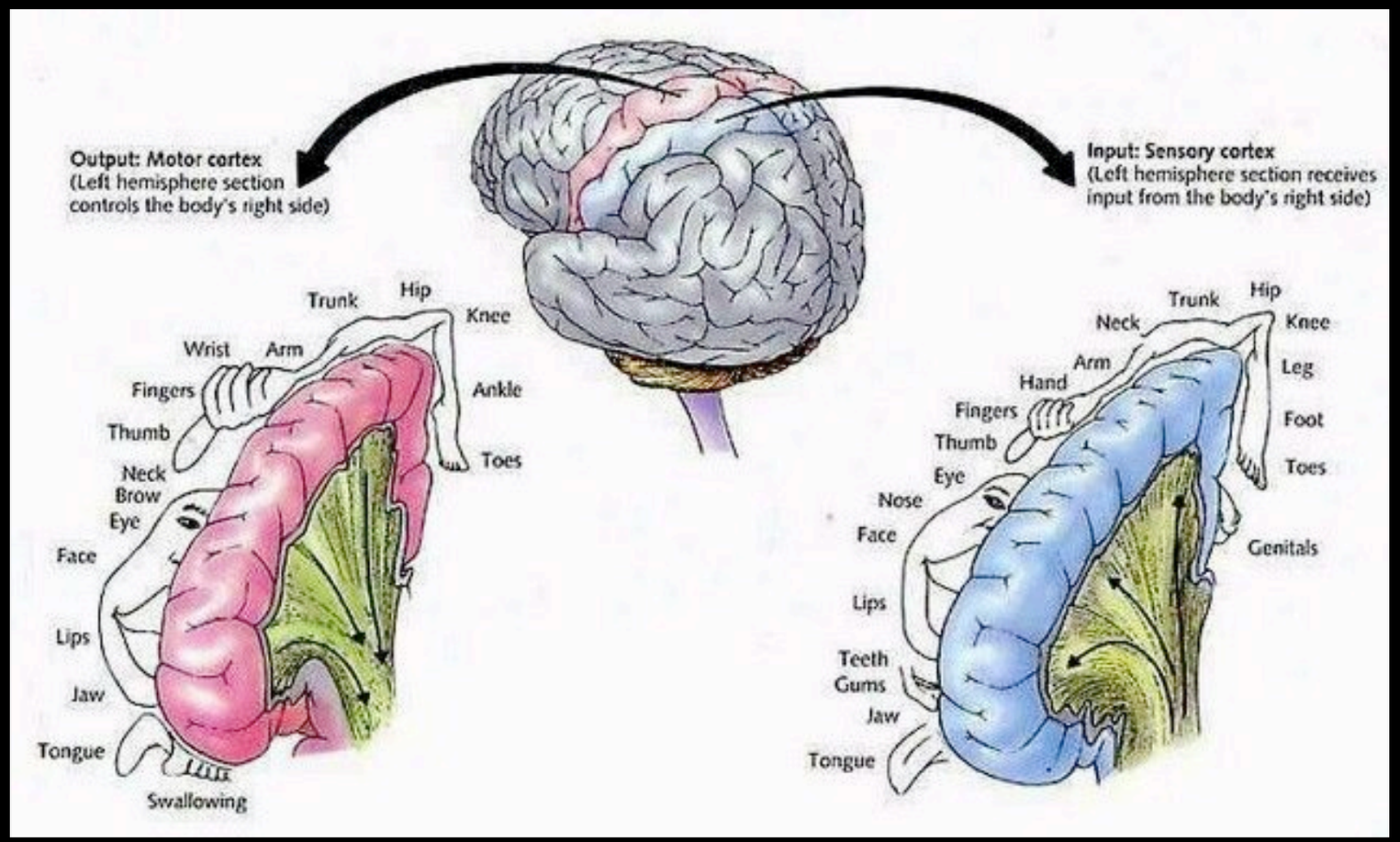
The Frontal lobe is considered the emotional control center and the home of our personality.

The frontal lobe controls higher level thinking:

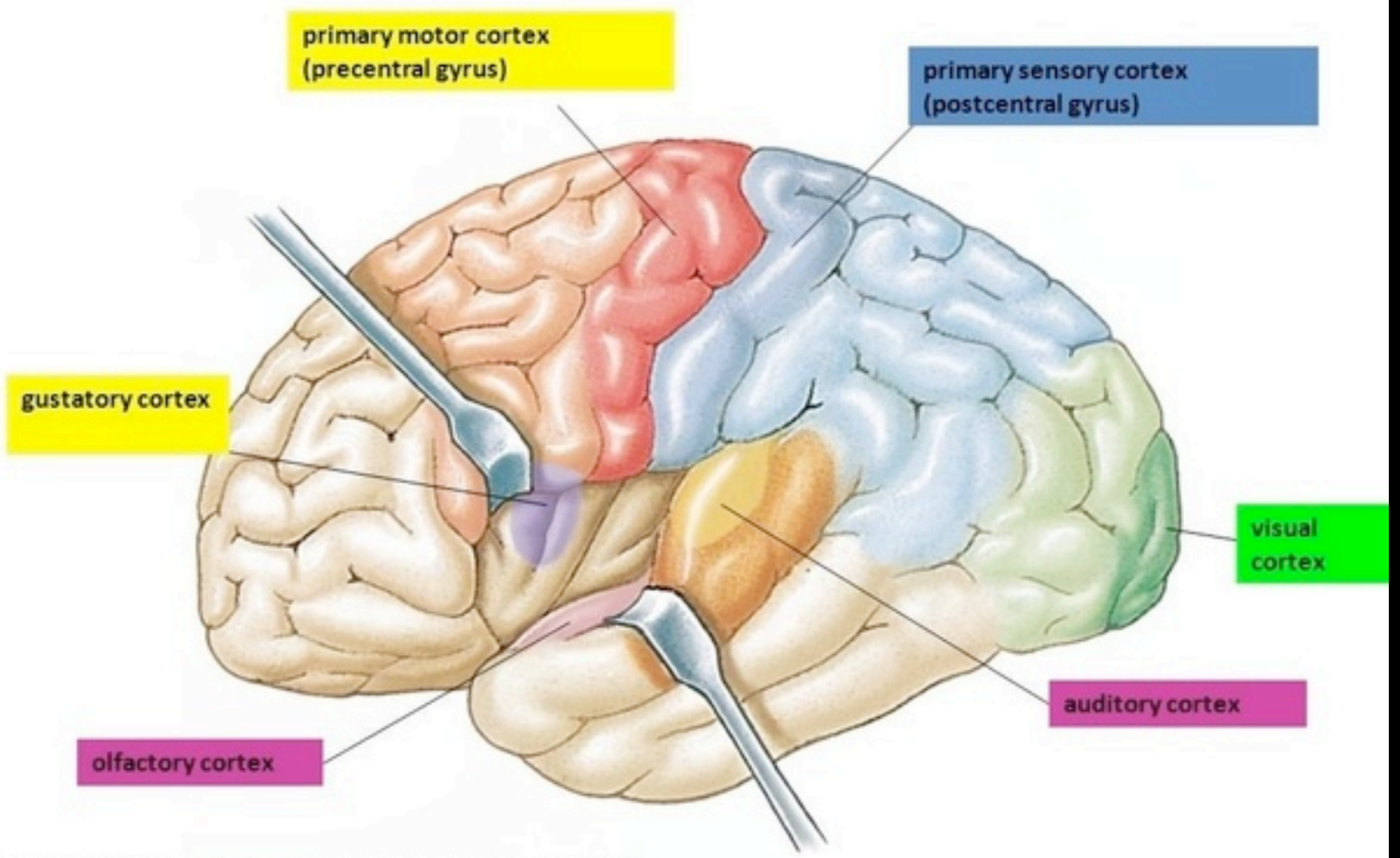
- Reasoning
- Planning
- Language
- Long-term Memory
- Impulse control
- Problem Solving
- Emotions
- Judgment
- Motor Function
- Initiation
- Social/ Sexual Behavior

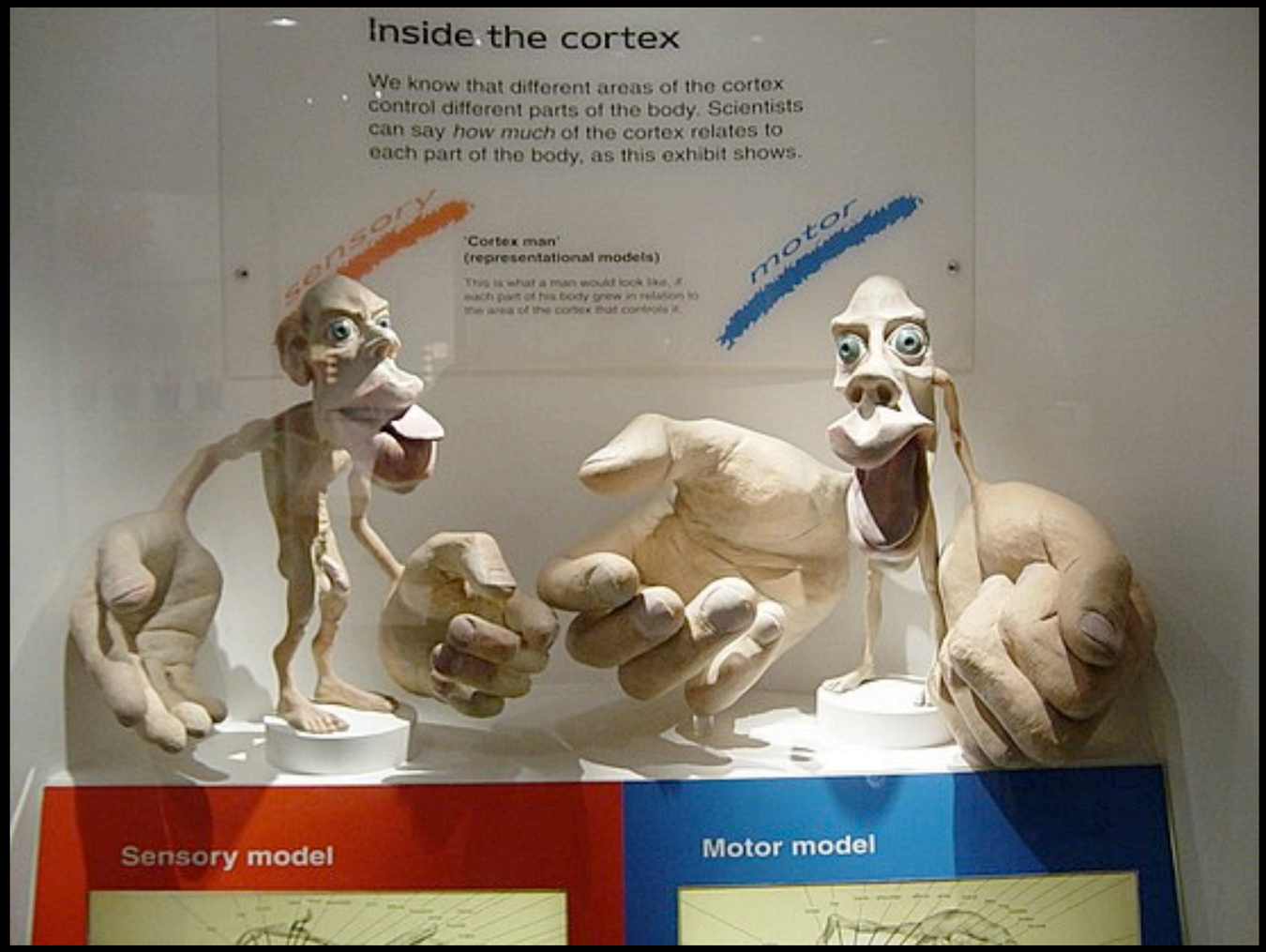



Thalamus
Edge of
Cerebrum
Midbrain
Pons
Edge of
Cerebellum
Cranial
Nerves
Medulla
Oblongata
Brain stem
Spinal cord
Cerebrum
Cerebellum

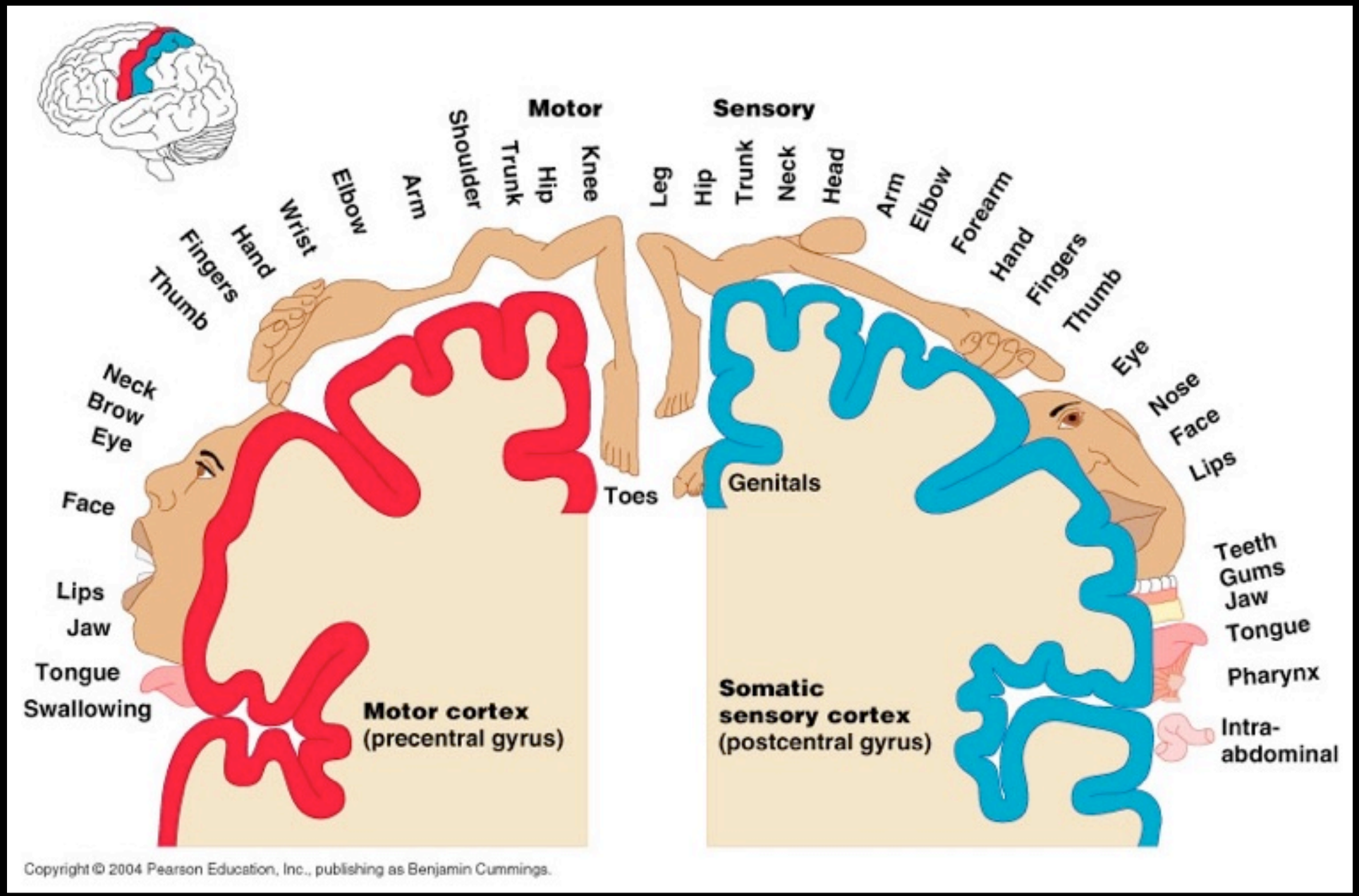

Output: Motor cortex
(Left hemisphere section controls the body's right side)
Input: Sensory cortex
(Left hemisphere section receives input from the body's right side)
Trunk
Hip
Knee
Wrist
Arm
Fingers
Ankle
Thumb
Toes
Neck
Brow
Eye
Face
Lips
Jaw
Tongue
Swallowing
Trunk
Hip
Neck
Knee
Arm
Leg
Hand
Fingers
Foot
Thumb
Toes
Eye
Nose
Face
Genitals
Lips
Teeth
Gums
Jaw
Tongue

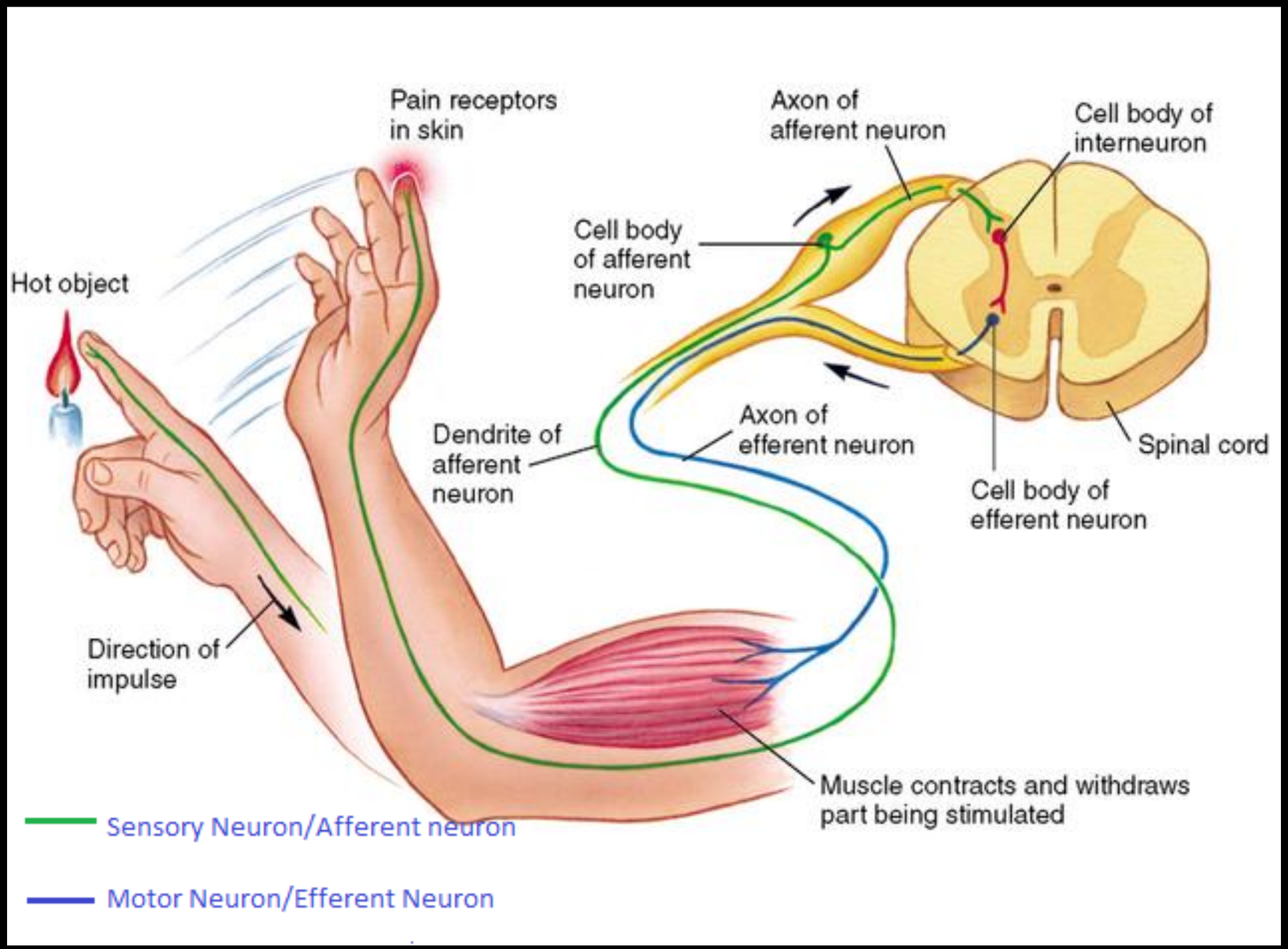
Motor & Sensory

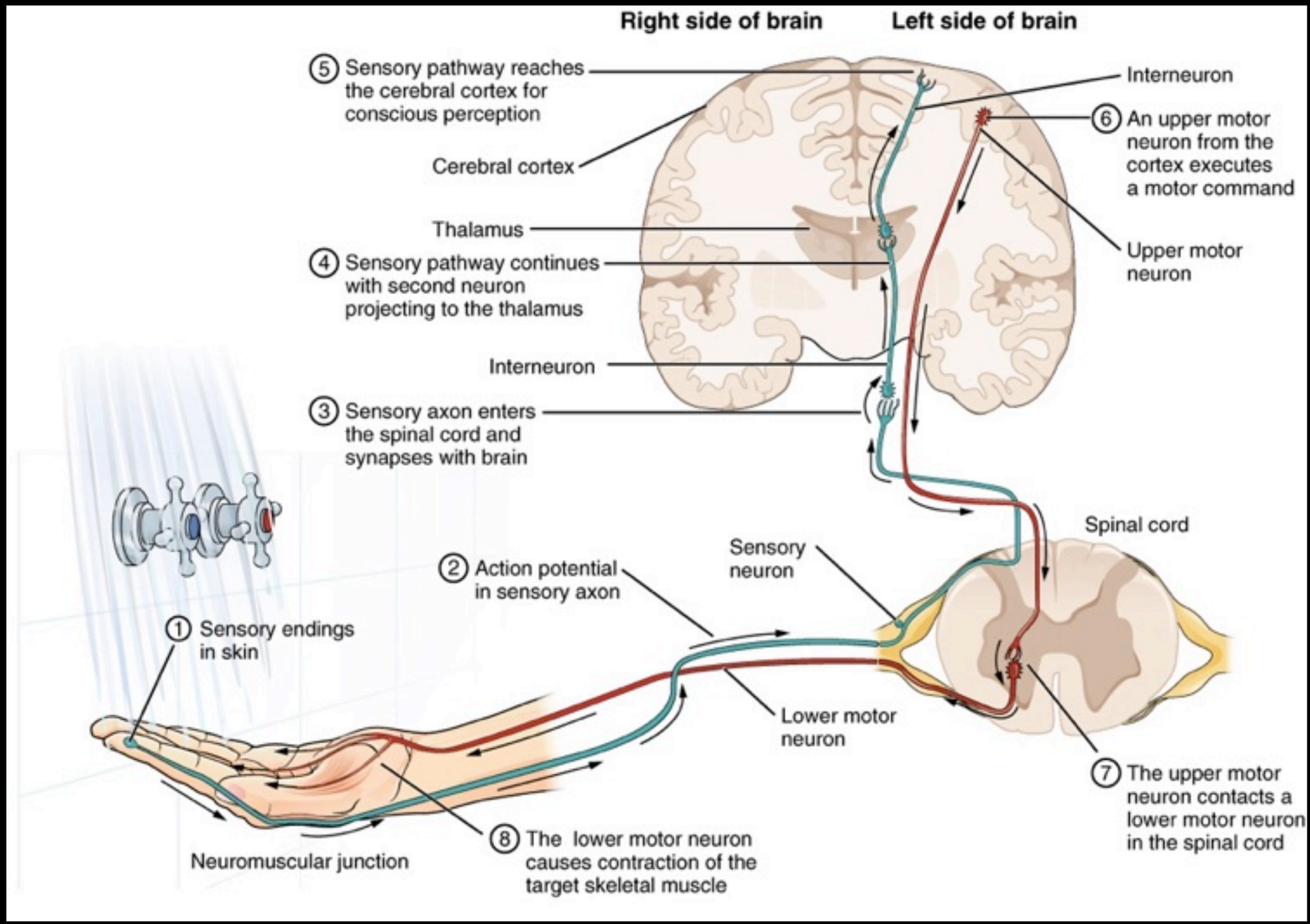



Inside the cortex
We know that different areas of the cortex control different parts of the body. Scientists can say how much of the cortex relates to each part of the body, as this exhibit shows.
sensory
'Cortex man' (representational models)
This is what a man would look like, if each part of his body grew in relation to the area of the cortex that controls it.
motor
Sensory model
Motor model

sensory & motor humunculi




Pain receptors in skin
Axon of afferent neuron
Cell body of interneuron
Hot object
Cell body of afferent neuron
Dendrite of afferent neuron
Axon of efferent neuron
Spinal cord
Cell body of efferent neuron
Direction of impulse
Muscle contracts and withdraws part being stimulated
Sensory Neuron/Afferent neuron
Motor Neuron/Efferent Neuron


Right side of brain
Left side of brain
5 Sensory pathway reaches the cerebral cortex for conscious perception
Cerebral cortex
Thalamus
4 Sensory pathway continues with second neuron projecting to the thalamus
Interneuron
3 Sensory axon enters the spinal cord and synapses with brain
Interneuron
6 An upper motor neuron from the cortex executes a motor command
Upper motor neuron
Spinal cord
Sensory neuron
2 Action potential in sensory axon
1 Sensory endings in skin
Lower motor neuron
7 The upper motor neuron contacts a lower motor neuron in the spinal cord
Neuromuscular junction
8 The lower motor neuron causes contraction of the target skeletal muscle