

CRANIAL NERVES

Pure Motor	Pure Sensory	Mixed	Parasympathetic	Contain Taste Fibers
3, 4, 6, 11, 12	1, 2, 8	5, 7, 9, 10	3, 7, 9, 10	7, 9, 10

	1	2	3	4	5	6	7	8	9	10	11	12
Motor			✓	✓		✓					✓	✓
Sensory	✓	✓						✓				
Mixed					✓		✓		✓	✓		
Parasympathetic			✓				✓		✓	✓		
Taste fiber							✓		✓	✓		

FUNCTIONS

Cranial Nerve	Opening in skull	Functions
I Olfactory	Cribriform plate	<ul style="list-style-type: none"> Sensory to olfaction (smell)
II Optic	Optic canal	<ul style="list-style-type: none"> Sensory to vision
III Oculomotor	Superior orbital fissure	<ul style="list-style-type: none"> Motor to the superior, inferior, medial rectus muscles, the inferior oblique muscle, the levator palpebrae superioris muscle Parasympathetic innervation to constrict pupil and accommodate eye
IV Trochlear	Superior orbital fissure	<ul style="list-style-type: none"> Motor to the superior oblique muscle that turns the eye downward and laterally
V Trigeminal	V1: Superior orbital fissure V2: Foramen rotundum V3: Foramen ovale	V1 <ul style="list-style-type: none"> Sensory to cornea, skin of the forehead, scalp, eyelids, and nose; mucous membrane of the paranasal sinuses and nasal cavity
		V2 <ul style="list-style-type: none"> Sensory to skin of face over the maxilla and upper lip; teeth of upper jaw; mucous membrane of the nose; maxillary air sinus
		V3 <ul style="list-style-type: none"> Sensory to skin of the cheek, skin over the mandible, and side of head; teeth of lower jaw and TMJ; mucous membrane of the mouth and anterior two-thirds of the tongue Motor to muscles of mastication (temporalis, masseter, medial and lateral pterygoids), anterior belly of the digastric, mylohyoid, tensor tympani, and tensor veli palatini
VI Abducens	Superior orbital fissure	<ul style="list-style-type: none"> Motor to the lateral rectus muscle – turns eye laterally
VII Facial	Internal auditory meatus, facial canal, stylomastoid foramen	<ul style="list-style-type: none"> Motor to muscles of facial expression, stapedius, stylohyoid, posterior belly of the digastric Taste from the anterior two-thirds of the tongue, and palate Parasympathetic innervation of the submandibular and sublingual salivary glands, lacrimal gland, and glands of the nose and palate
VIII Vestibulocochlear	Internal auditory meatus	<ul style="list-style-type: none"> Vestibular nerve: Position and movement of the head Cochlear nerve: Hearing
IX Glossopharyngeal	Jugular foramen	<ul style="list-style-type: none"> Motor to the stylopharyngeus muscle Taste from the posterior third of the tongue Sensory to general sensation from pharynx, sensory fibers from the carotid sinus Parasympathetic innervation of the parotid gland
X Vagus	Jugular foramen	<ul style="list-style-type: none"> Motor: innervates constrictor muscles of the pharynx and intrinsic muscles of the larynx Parasympathetic innervation to structures in the neck, thorax and most of abdomen to splenic flexure of colon Taste from valleculae and epiglottis Afferent fibers (sensation) from above structures
XI Accessory	Jugular foramen	<ul style="list-style-type: none"> Motor to the SCM and trapezius muscles
XII Hypoglossal	Hypoglossal canal	<ul style="list-style-type: none"> Motor to the intrinsic and extrinsic muscles of the tongue (except the palatoglossus muscle)

Mnemonics	Mnemonic to Remember Names of the Cranial Nerves
	On Old Olympus' Towering Top, A Finn And German Vaulted And Hopped
	Mnemonic to Remember Whether Nerve is Sensory, Motor, or Both
	Some Say Marry Money, But My Brother Says Bad Business Marrying Money

CRANIAL NERVE

CRANIAL NERVE		S/M		FUNCTION	EXAMINATION	
I	Olfactory	O	S	Sense of smell	Identify odors with eyes closed	
II	Optic	O	S	Vision	Test peripheral vision with one eye covered	
III	Oculomotor	O	M	Pupillary contraction, opening the eye, and most extraocular movements	Peripheral vision, eye chart, reaction to light	
IV	Trochlear	T	M	Downward, inward movement of the eye	Test ability to depress & adduct eye	
V	Trigeminal	T	B	M	Temporal and masseter muscles (jaw clenching), also lateral movement of the jaw	Face sensation & clench teeth
			S	Facial. The nerve has three divisions: ① ophthalmic ② maxillary ③ mandibular		
VI	Abducens	A	M	Lateral deviation of the eye	Test ability to abduct eye past midline	
VII	Facial	F	B	M	Facial movements, including those of facial expression, closing the eye, and closing the mouth	Close eyes & smile; detect various tastes - sweet, sour, salty, bitter
			S	Taste for salty, sweet, sour, and bitter substances on the anterior 2/3 of the tongue		
VIII	Acoustic (Vestibulocochlear)	A	S	Hearing (cochlear division) and balance (vestibular division)	Hearing; balance-feet together, eyes open/closed × 5sec; test for past-pointing	
IX	Glossopharyngeal	G	B	M	Pharynx	Swallow & say "ah"; use tongue depressor to elicit gag reflex
			S	Posterior portions of the eardrum and ear canal, the pharynx, and the posterior tongue, including taste (salty, sweet, sour, bitter)		
X	Vagus	V	B	M	Palate, pharynx, and larynx	
			S	Pharynx and larynx		
XI	Accessory	A	M	the sternomastoid and upper portion of the trapezius	Turn head (sternocleidomastoid muscles); shrug shoulders (trapezius muscles)	
XII	Hypoglossal	H	M	Tongue	Protrude tongue (watch for lateral deviation)	

MNEMONIC TO REMEMBER

Names of the Cranial Nerves
● On Old Olympus' Towering Top, A Finn And German Vaulted And Hopped
Whether Nerve is Sensory, Motor, or Both
● Some Say Marry Money, But My Brother Says Bad Business Marrying Money

EXAMINATION

CN	Examination of the cranial nerves
1	Smell
2	Visual acuity, visual fields, and ocular fundi
2, 3	Pupillary reactions
3, 4, 6	Extraocular movements
5	Corneal reflexes, facial sensation, and jaw movements
7	Facial movements
8	Hearing
9, 10	Swallowing and rise of the palate, gag reflex
5, 7, 10, 12	Voice and speech
11	Shoulder and neck movements
12	Tongue symmetry and position