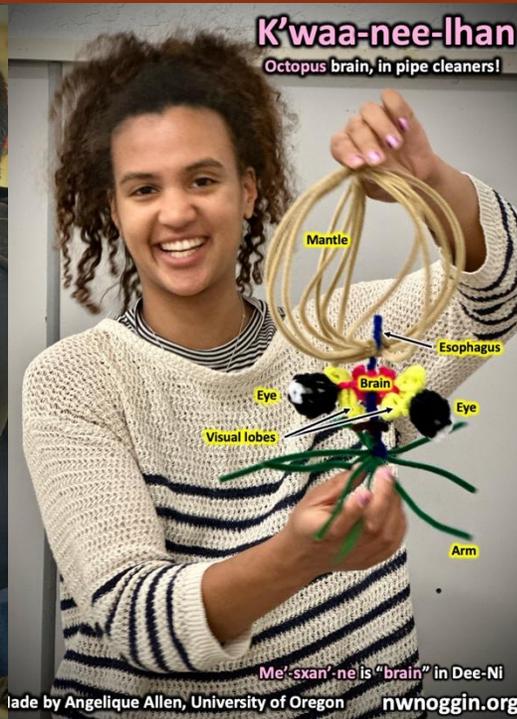


# NORTHWEST NOGGIN



ADAPTATION THROUGH NEUROSCIENCE RESEARCH, BRAINS AND ART!



# ALL VOLUNTEER

ALL OF US. FOR FOURTEEN YEARS (SINCE 2012)!  
NO ADMISSION - NO TUITION - OPEN TO EVERYONE  
80,000+ PUBLIC K12 STUDENTS/COMMUNITY MEMBERS  
LOCAL/NATIONAL/INTERNATIONAL COLLABORATORS



# GO PLACES

- WHERE STEM PROGRAMS DON'T GO
- WHERE MONEY AND RESOURCES DON'T GO
- K-12 PUBLIC SCHOOLS
- RURAL AND URBAN COMMUNITIES
- HOUSELESS YOUTH NONPROFITS
- CORRECTIONAL FACILITIES

Siletz, Amity & Willamina, OR  
Pop: 4000

Davenport, WA  
Pop: 1700

Astoria, OR  
Pop: 10,000

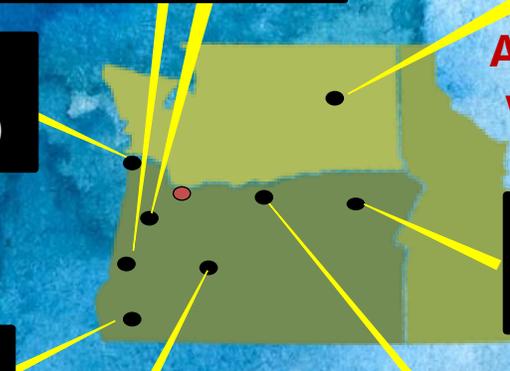
A few places we've been

La Grande, OR  
Pop: 13,000

Meservy Meadows, OR  
Pop: ~40

Sisters, OR  
Pop: 3081

Heppner & Ione, OR  
Pop: 1240



## Youth get visual, hands-on experience with the brain

NW Noggin, a neuroscience outreach nonprofit, reached out to youth at MacLaren Youth Correctional Facility this week to teach about brain development.



## Noggins on the Coast





Sisters, Oregon



**GO PLACES**



**Future scientists, artists,  
doctors, researchers,...!** 🍀



**GO PLACES  
EXAMINE BRAINS  
ASK QUESTIONS  
MAKE ART**



**Teaching Matters** 🍀



**GO PLACES  
EXAMINE BRAINS  
ASK QUESTIONS  
MAKE ART**



**Engagement, Questions, Learning** 😊



# LISTEN

-LIVED EXPERIENCES  
-RELEVANT KNOWLEDGE  
-SEEING OTHER PEOPLE



Heppner, OR



Knappa, OR

## HOMELESSNESS & THE BRAIN

Portland, OR

Thurs, Oct 19th  
10am - 1pm



pearmentor gallery  
338 NW 6th Ave

STREET KIDS  
ART  
NEURO-  
SCIENCE

nwnoggin.org pearmentor.org

## Noggins + NeuroChem visit Gaza



**Soma**  
Cell body – الجسم الخلية

**Dendrite**  
Finger – أصابع  
Snakeskin – جلد الأفعى  
Ear – أذن

**Axon**  
Spine – محور عصبي  
Stem – جذع  
Rope – حبل

**Axon terminal**  
Roots – جذور  
Mouth – فم

#showusyourbraincell

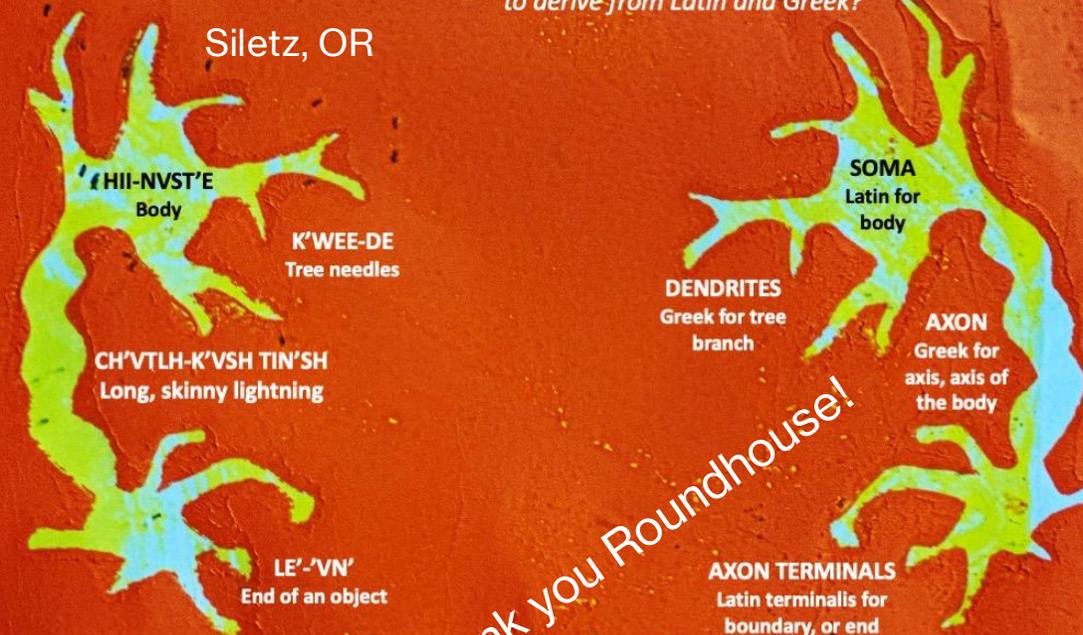
GO PLACES  
EXAMINE BRAINS  
ASK QUESTIONS  
MAKE ART



## DEE-NI NEURON

Siletz, OR

Do neuroanatomical terms have  
to derive from Latin and Greek?



**HII-NVST'E**  
Body  
K'WEE-DE  
Tree needles

**SOMA**  
Latin for  
body

**DENDRITES**  
Greek for tree  
branch

**AXON**  
Greek for  
axis, axis of  
the body

**CH'VTLH-K'VSH TIN'SH**  
Long, skinny lightning

**LE'-VN'**  
End of an object

**AXON TERMINALS**  
Latin terminalis for  
boundary, or end

Thank you Roundhouse!

#showusyourbraincell

nwnoggin.org

# Why do we throw up?

New Post!

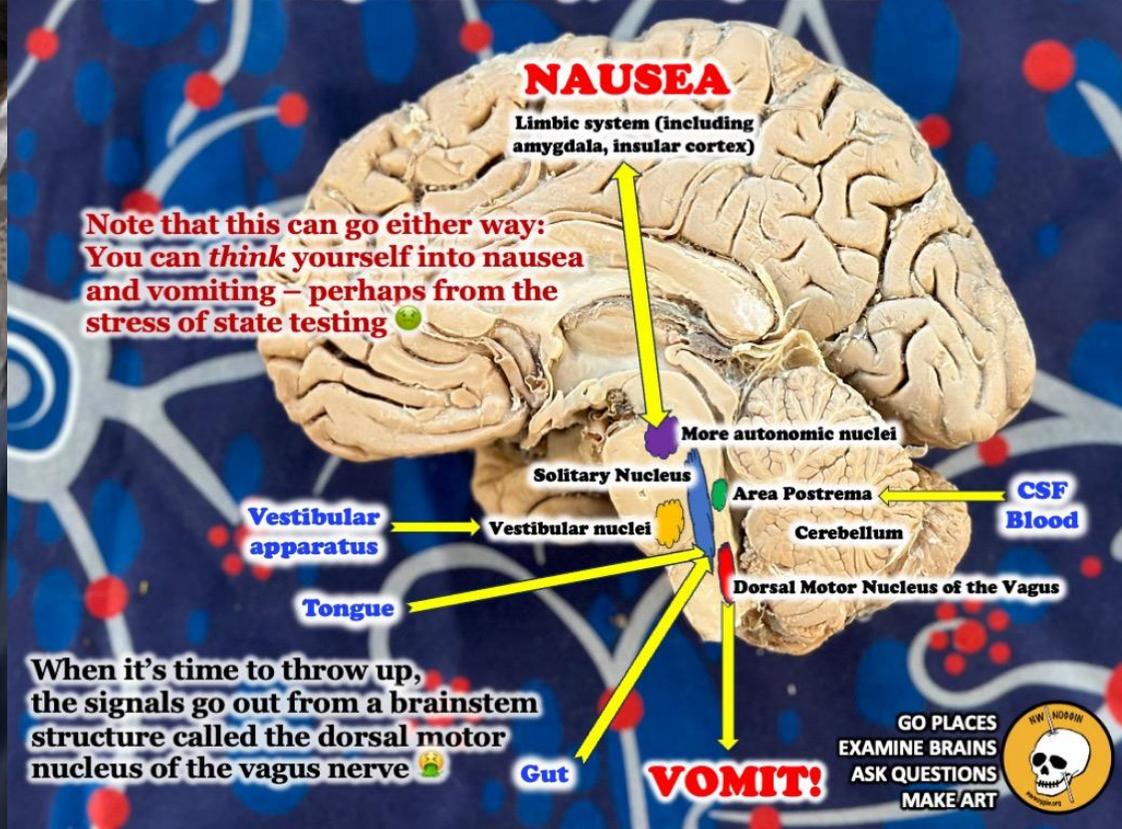
"I don't like testing, and sometimes it makes me throw up. Why do we throw up?" - Third grade student

Important questions from elementary school!



## Vomiting and Nausea in the Brain

The brainstem receives inputs from the gut (including the microbiome) and tongue in the solitary nucleus, the area postrema samples the blood and cerebrospinal fluid, the vestibular nuclei and cerebellum respond to signals from the vestibular apparatus, and additional autonomic nuclei further integrate this information and share it with higher limbic and cortical regions that generate feelings, including nausea...



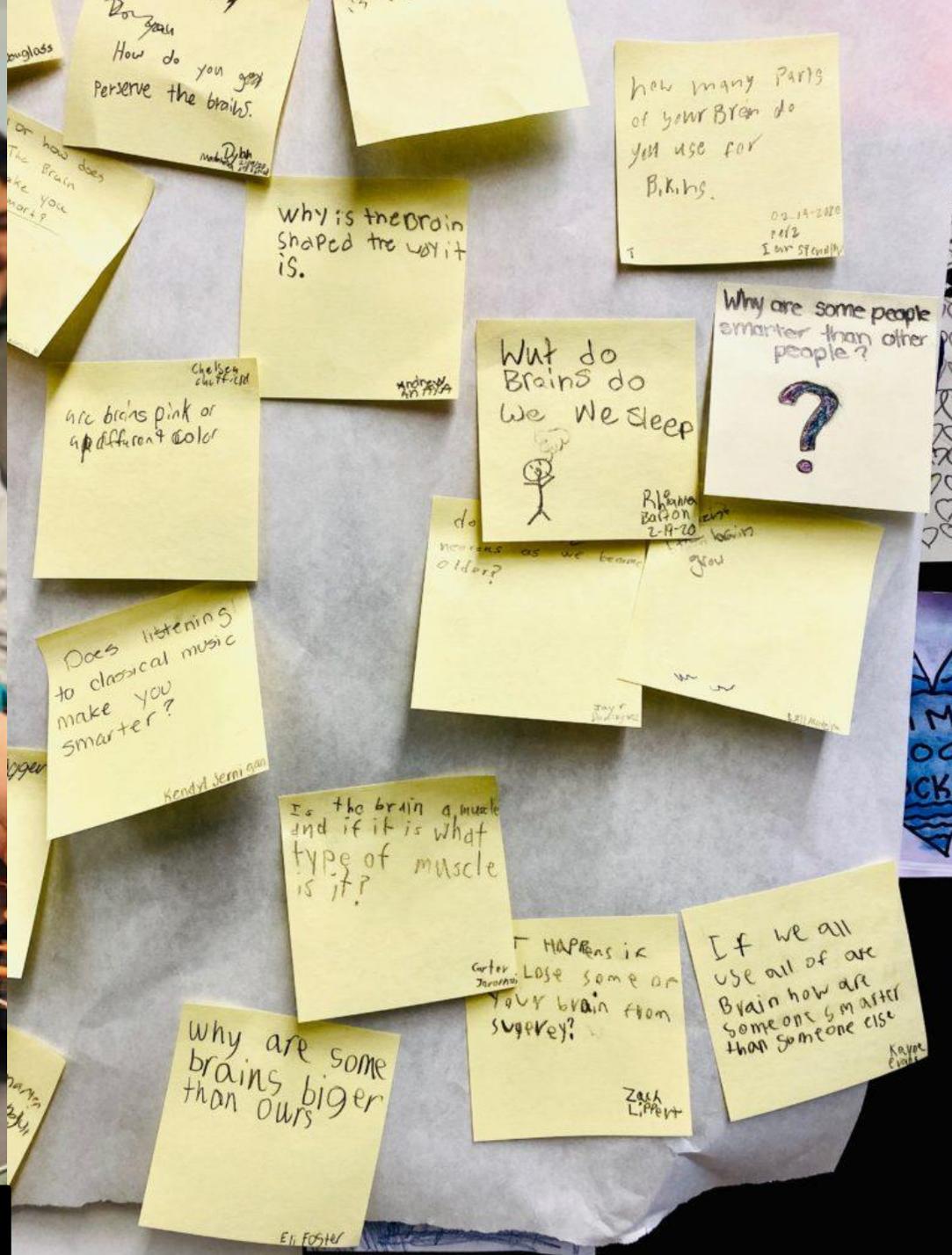
When it's time to throw up, the signals go out from a brainstem structure called the dorsal motor nucleus of the vagus 🤢

GO PLACES  
EXAMINE BRAINS  
ASK QUESTIONS  
MAKE ART



GO PLACES  
EXAMINE BRAINS  
ASK QUESTIONS  
MAKE ART





Grants Pass

# SHARE STORIES

- EMPOWER NEW VOICES
- BROADEN THE CONVERSATION
- MAKE PUBLIC INVESTMENT IN RESEARCH RELEVANT
- INVITE NEW PARTICIPANTS, PERSPECTIVES & **BRAINS**



***“The youth had an AMAZING time on Friday. They were beaming when we left and told me that’s the most fun they have had in a really long time. Thank you so much for providing such a rewarding outlet for them! 🌟” – Project Pooch***



**MacLaren Youth Correctional Facility**

**GO PLACES  
EXAMINE BRAINS  
ASK QUESTIONS  
MAKE ART**



Portland, OR



Astoria, OR

What fantastic workshops we've had, exploring the crossroads of theatre and neuroscience with our friends from NW Noggin! 🧠🎭 Our students jumped right into the fascinating world of brain science, getting hands-on with all sorts of brainy activities and bringing brain cell characters to life through their creative improv interpretations.

We can't wait to team up again and continue this amazing journey of discovery. Thanks to the incredible NW Noggin team for making learning so much fun! 🌈💡

- Hilary Adams, Program Director, Kids Make Theatre



GO PLACES  
EXAMINE BRAINS  
ASK QUESTIONS  
MAKE ART



"I just want to give you a HUGE 'THANK YOU' for coming to our school. Our kiddos are still talking about it! This will be a day they will remember for years. I wanted to let you know that I have received nothing but EXTREMELY positive comments from teachers.

'Better than a trip to OMSI' one said. One teacher told me this re-ignited her enthusiasm for teaching. Another teacher told me she appreciated how each student's question was answered and made the students feel important and eager to ask questions!

Everyone was so impressed with all of the presenters and THEIR enthusiasm and energy. (Impressive how they handled all of the spontaneous questions!!). It truly was the best presentation I have seen here (and I have been here about 15 years)! Thank you!!"

— Tami Swearingen, Jewell School District, Oregon



GO PLACES  
EXAMINE BRAINS  
ASK QUESTIONS  
MAKE ART

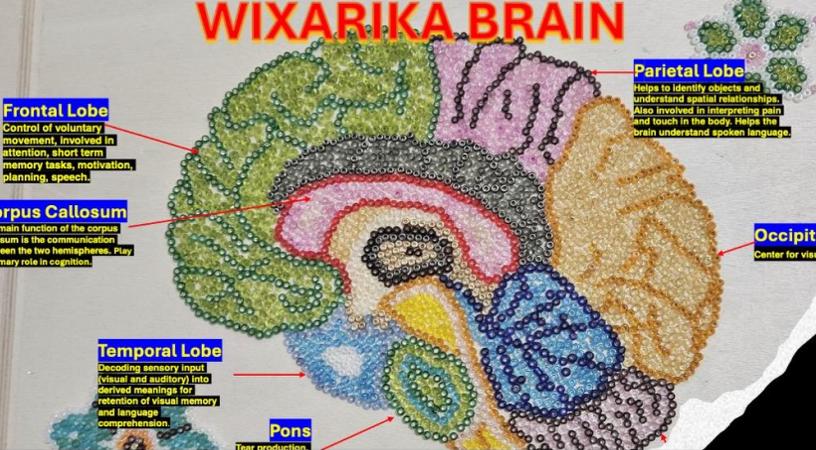
Kids Make  
Theatre

# MAKE ART

- ENGAGEMENT
- PERSONAL RELEVANCE
- SELF-AWARENESS AND EMPATHY
- ADAPTATION AND PLASTICITY



## WIXARIKA BRAIN



**Frontal Lobe**  
Control of voluntary movement, involved in attention, short term memory tasks, motivation, planning, speech.

**Corpus Callosum**  
Main function of the corpus callosum is the communication between the two hemispheres. Play primary role in cognition.

**Temporal Lobe**  
Receiving sensory input (visual and auditory) into derived meanings for retention of visual memory and language comprehension.

**Pons**  
Brain reproduction.

**Parietal Lobe**  
Helps to identify objects and understand spatial relationships. Also involved in interpreting pain and touch in the body. Helps the brain understand spoken language.

**Occipital**  
Center for visual

*"Wixarika art is made by indigenous people from the states of Nayarit, Jalisco, and Sinaloa in Mexico. It consists of forming figures with 'chaquira' beads one by one, using bright colors. Among the multiple Wixarika designs are peyote cactus, which is a stimulant that indigenous people use in rituals. I decided to do a Wixarika brain so I could easily remember the lobes, and the internal parts of the brain. Additionally, I wanted to connect part of my culture with what I have learned in this wonderful class."* — Cristina Gomez Aguilar, Portland State University





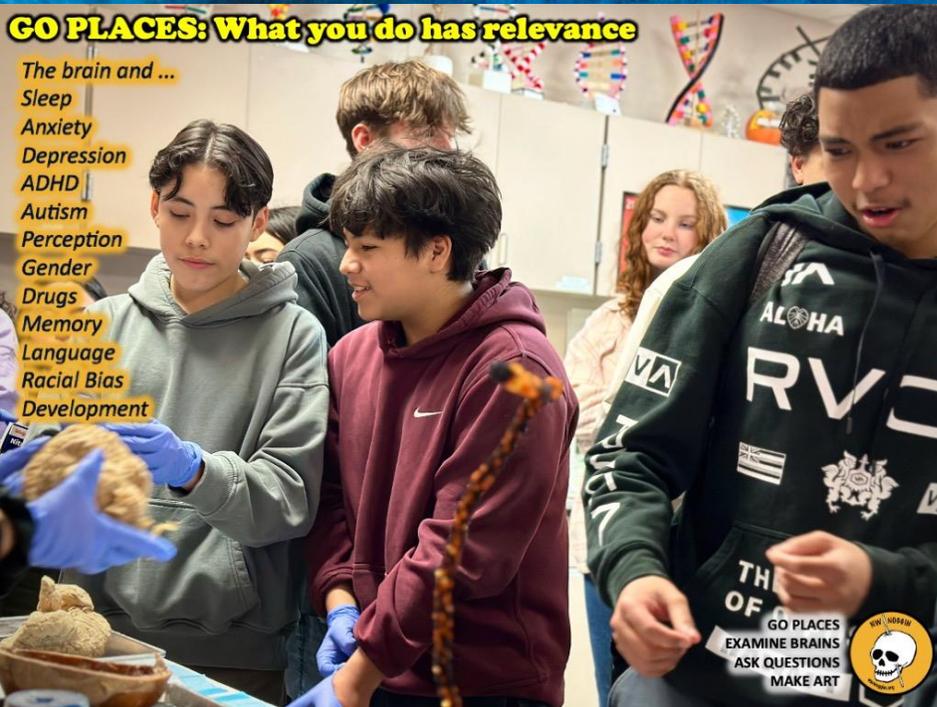
# INFORM POLICY

- RESEARCH TOPICS ARE POPULAR!
- INTERDISCIPLINARY/STEAM APPROACHES WORK
- 1. SCHOOL START TIMES FOR ADOLESCENTS
- 2. PERMANENT STANDARD TIME
- 3. HOUSING FIRST



## GO PLACES: What you do has relevance

- The brain and ...
- Sleep
- Anxiety
- Depression
- ADHD
- Autism
- Perception
- Gender
- Drugs
- Memory
- Language
- Racial Bias
- Development



### Healthy start times



#### What is changing?

We are changing our schools' start times schedule next year based on learnings from our community feedback as well as the most current research about adolescent development. We plan to solidify our bell schedules and announce the official new times before the last day of school on June 20, 2023.



# Federal and State Governments Took the Brains Out of Biology!

WHERE ARE THE BRAINS IN K-12 PUBLIC CLASSROOMS? KIDS BENEFIT FROM AND WANT TO LEARN MORE ABOUT NEUROSCIENCE

## Fourth Grade

- 4-LS1-1. Construct an argument that plants and animals have internal and external structures that function to support survival, growth, behavior, and reproduction.** [Clarification Statement: Examples of structures could include thorns, stems, roots, colored petals, heart, stomach, lung, brain, and skin.] [Assessment Boundary: Assessment is limited to macroscopic structures within plant and animal systems.]
- 4-LS1-2. Use a model to describe that animals receive different types of information through their senses, process the information in their brain, and respond to the information in different ways.** [Clarification Statement: Emphasis is on systems of information transfer. ] [Assessment Boundary: Assessment does not include the mechanisms by which the brain stores and recalls information or the mechanisms of how sensory receptors function.]

We need better standards:  
Brains only mentioned in 4<sup>th</sup> grade!



**NEW POST**

Synapses to Shares  
By Zach Salcido @ PSU

***Social Media...  
...and the brain!***

## National Endowment for the Humanities



**“About half my students wouldn’t make it to first period class last year; now that school starts an hour later everyone gets here! They’re still a bit tired but a lot more ready to learn...”**  
— Coreyanne Russell @ Fort Vancouver High School, Vancouver, Washington



**GO PLACES  
EXAMINE BRAINS  
ASK QUESTIONS  
MAKE ART**



# Thank you KOIN TV!

OREGON

## The neuroscience of time change and health

by: Joyce Ogirri  
Posted: Mar 10, 2024 / 05:01 PM PDT  
Updated: Mar 10, 2024 / 11:16 PM PDT



### Bill Griesar does neuroscience at PSU

SHARE    

PORTLAND, Ore. (KOIN) — Time is relative. Daylight Saving Time doesn’t actually add more time to the day, it just changes the rhythms of sunrise and sunset times.

Now that we have entered another season with later daylight, people are once again coming to grips with the changes in those rhythms.



# RESEARCH SAYS: Standard Time is best for our brain





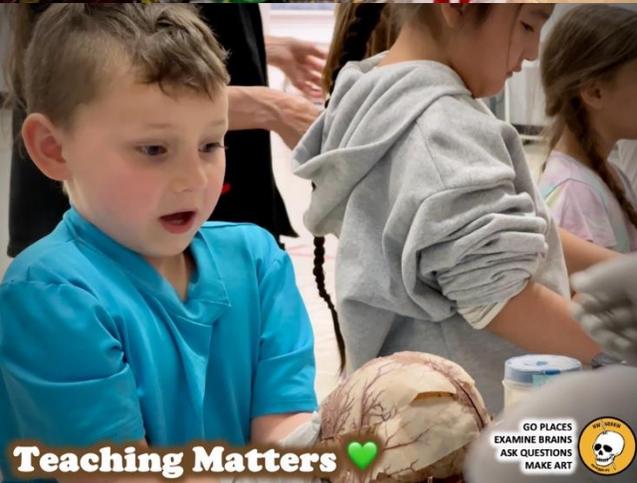
**NW NOGGIN @ SW Oregon**  
**Economic Summit May 2025**  
**Canyonville, Oregon**

**GO PLACES**  
**EXAMINE BRAINS**  
**ASK QUESTIONS**  
**MAKE ART**



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**Teaching Matters**



**Teaching Matters**



**Teaching Matters**



**Teaching Matters**



A group of diverse children and an adult woman are shown in a close-up shot, looking excitedly at something off-camera. The woman on the left has her mouth wide open in a joyful expression. The children, of various ethnicities, also show expressions of interest and excitement. The background is slightly blurred, showing other people and a yellow cone on a light-colored floor.

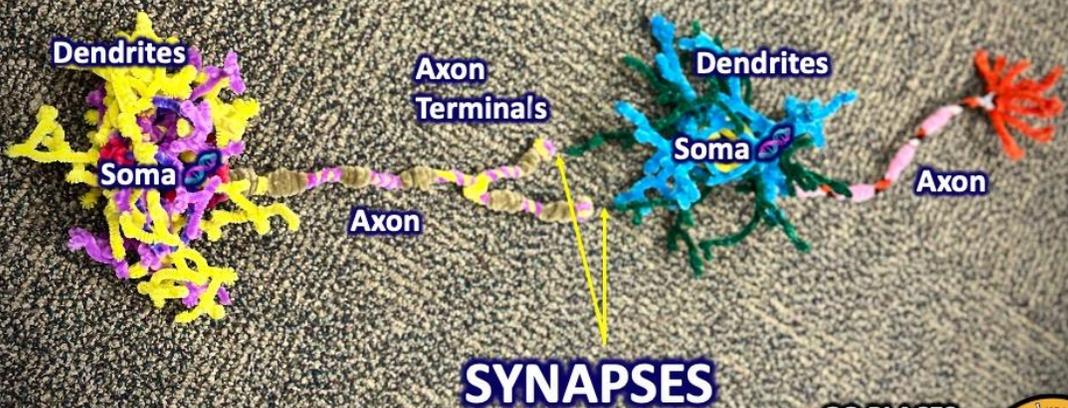
# BRAIN RESEARCH IS COMPELLING

- \*PEOPLE ARE INTERESTED
- \*THEY WANT TO HEAR ABOUT IT, AND BE INCLUDED
- \*LARGE INSTITUTIONS GET FUNDING, BUT DON'T ALWAYS GO PLACES, LISTEN, SHARE STORIES ACCESSIBLY OR MAKE OR SUPPORT ART AND ENGAGEMENT

# YOUR BRAIN IS UNIQUE

WE BEGIN WITH ~175 – 200 BILLION NEURONS  
END UP WITH 86 BILLION IN THE AVERAGE ADULT!  
FORMATION OF NETWORKS, BASED ON EXPERIENCE

## Neurons Connect



**100 TRILLION synapses!**

GO PLACES  
EXAMINE BRAINS  
ASK QUESTIONS  
MAKE ART



Perceptions, Memories,  
Expectations, Habits,  
Biases, Schema,  
*Jumping to conclusions*

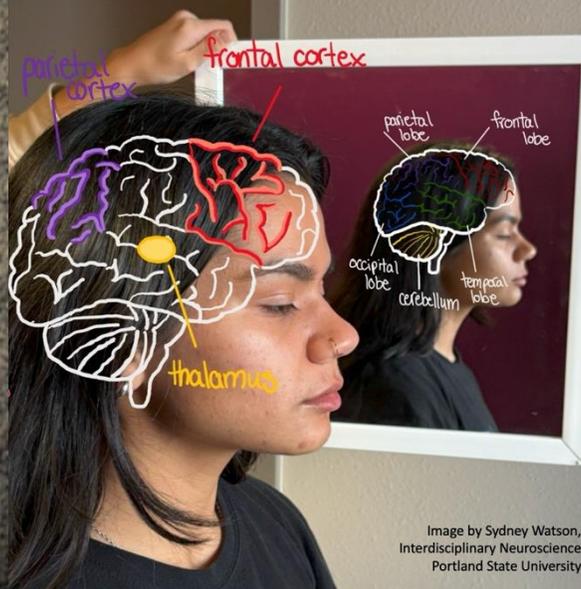
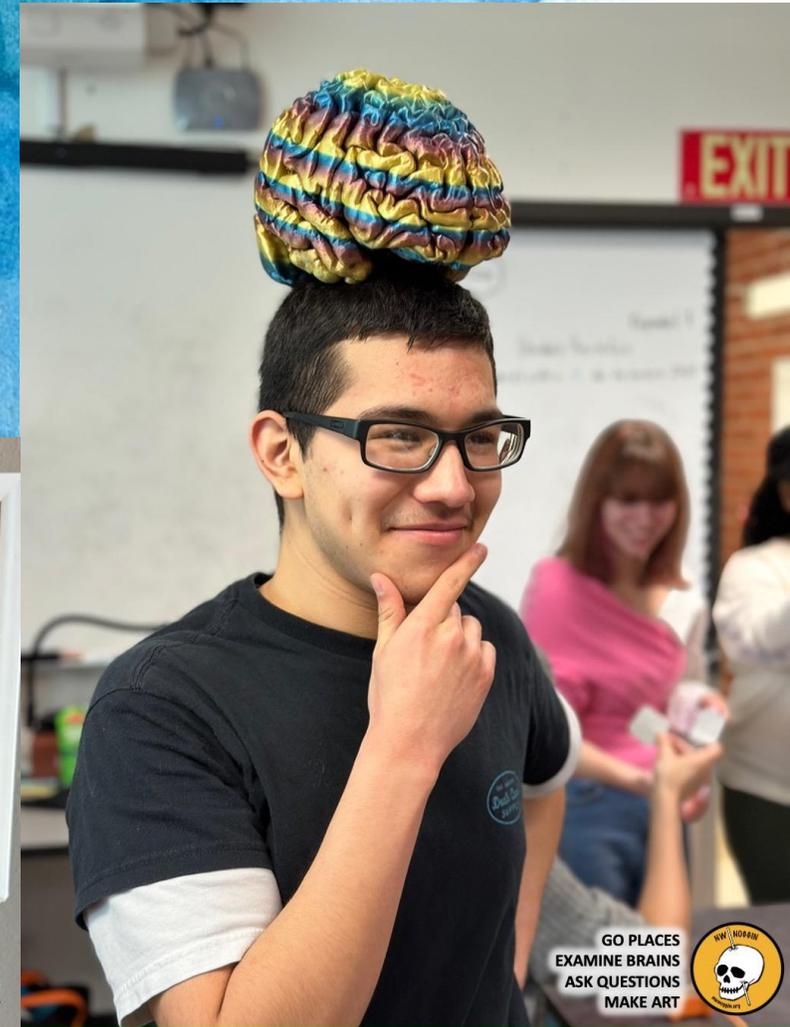


Image by Sydney Watson,  
Interdisciplinary Neuroscience  
Portland State University



GO PLACES  
EXAMINE BRAINS  
ASK QUESTIONS  
MAKE ART



# BRAINS DEVELOP

*How are you perceived?  
What experiences shape you?  
What opportunities do you have?  
What are the social rules for you?*

**ADULT BRAINS BECOME MORE FIXED: NETWORK IN HABITS AND BIASES  
YOUNG BRAINS ARE MORE PLASTIC, CHANGEABLE, AND RESPOND TO NOW**

***And the world always changes***

**We need brains that are changing TODAY**

**nwnoggin.org**  
**#neuroscience #art**  
**#teaching #outreach**

**Parietal lobe**  
Touch, pressure, vibration, position  
Integration of somatosensation, vision, vestibular  
Spatial mapping of body and surroundings

**Thalamus**  
Important initial processing of sensory information  
All afferent inputs except olfaction (smell) synapse here

**Corpus Callosum**  
Large band of myelinated cortical axons  
Connects left and right hemisphere

**Frontal lobe**  
Social decision making  
Motor planning and output  
Under development through  
adolescence/young adulthood

**Occipital lobe**  
Visual processing

**Cerebellum**  
Balance, movement  
Various aspects of cognition  
Most neurons (69 billion!)

**Brainstem**  
Autonomic regulation (Vagus Nerve parasympathetic output), basic reflexes

**Human Brain**  
**Mid-sagittal view**



**Future scientists, artists,  
doctors, researchers,...!** ❤️



**Teaching Matters** ❤️

GO PLACES  
EXAMINE BRAINS  
ASK QUESTIONS  
MAKE ART



GO PLACES  
EXAMINE BRAINS  
ASK QUESTIONS  
MAKE ART



# ENRICHMENT MATTERS

MARIAN DIAMOND RESEARCH

More enrichment, more pathways, more possibility,...





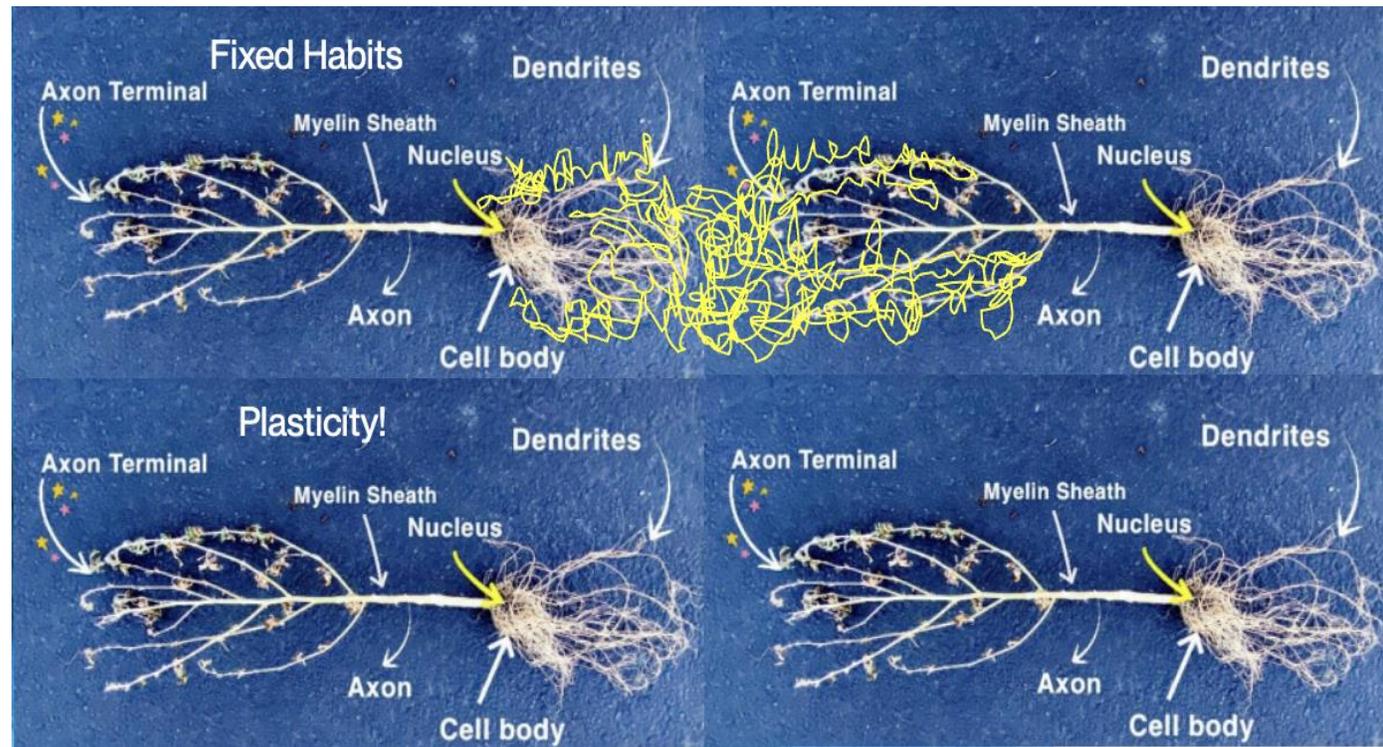
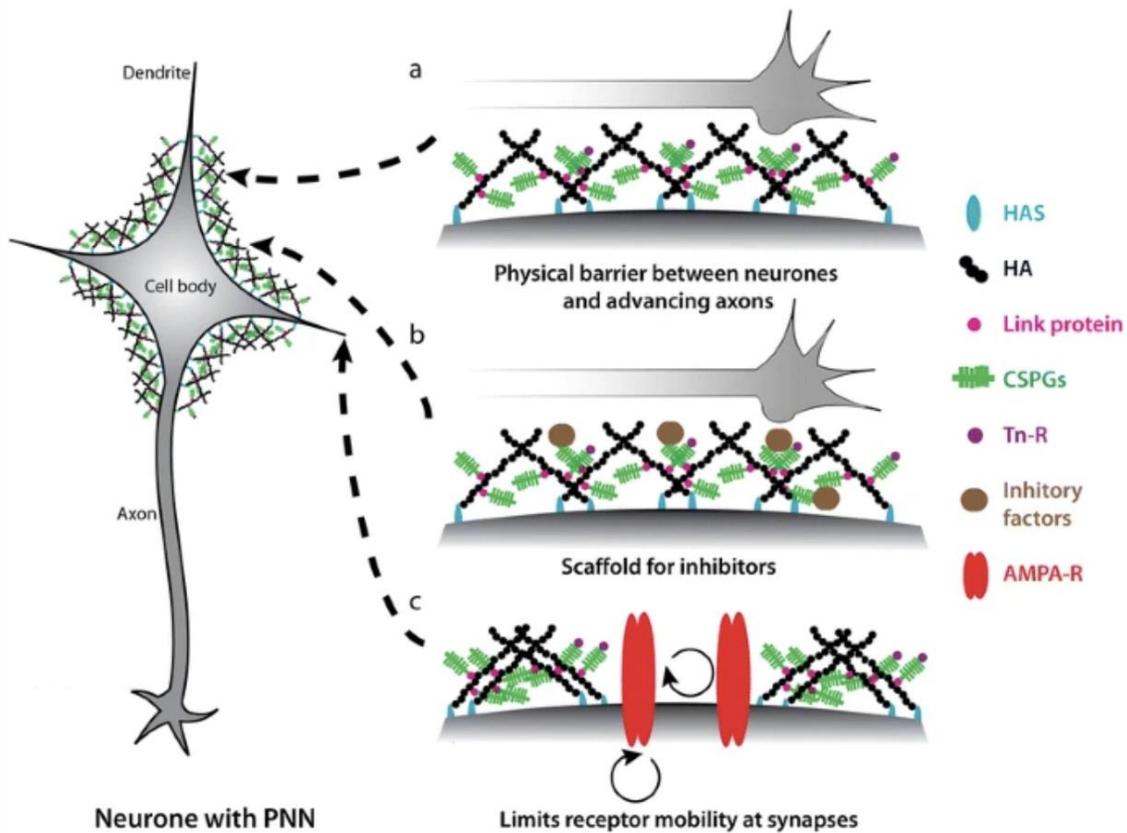
if the human brain is so "complex" and "smart" why are some people so stupid?



# PLASTICITY IS POSSIBLE

ADULT BRAINS CAN ADAPT!  
FIXED NETWORKS REQUIRE LESS ENERGY TO MAINTAIN AS IS  
PLASTICITY (CHANGE) TAKES ENERGY, EFFORT AND GROWTH

*The perineuronal net and the control of CNS plasticity,*  
Difei Wang & James Fawcett, Cell & Tissue Research (2012)



# ENGAGING BRAINS

*If you're motivated, intrigued, curious, engaged, your brain is more plastic.*

CHANGE YOUR ENVIRONMENT: GO PLACES  
WELCOME NEW BRAINS, FROM MORE BACKGROUNDS  
LISTEN TO WHAT YOUNG PEOPLE HAVE TO SAY  
PROVIDE RESOURCES AND ENRICHMENT  
PROMOTE ADULT PLASTICITY

**MAKE ART**

**GO PLACES**



**Thank you Noggin  
Volunteers**



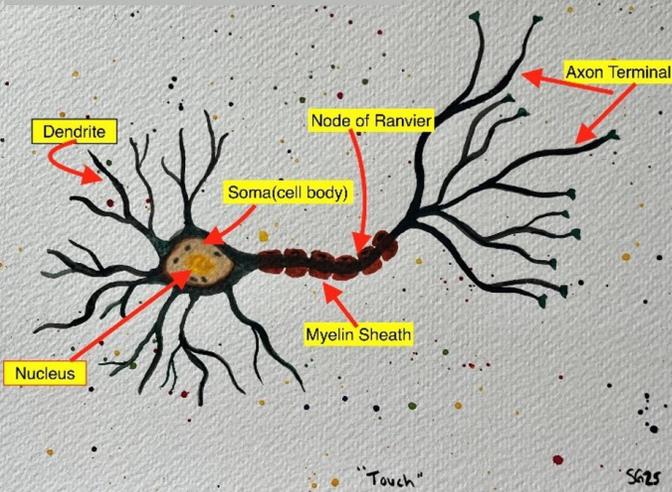
**Teaching Matters**

GO PLACES  
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**NW NOGIN**

GO PLACES  
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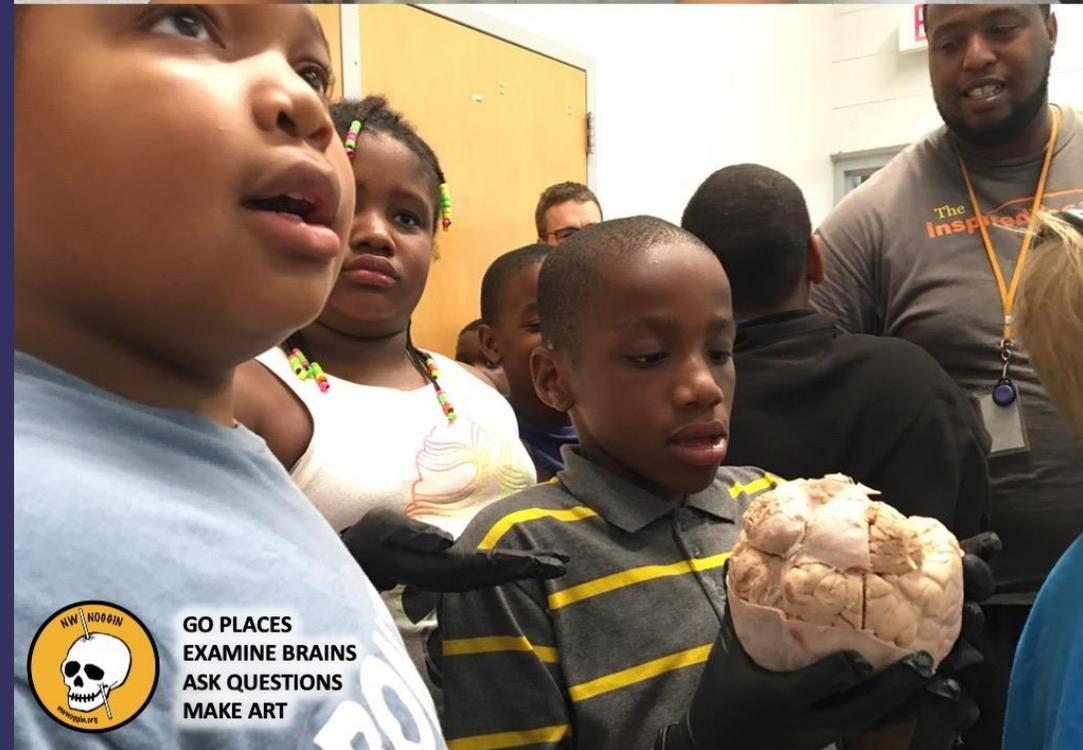
Watercolor neuron painted by Sheila Grayson,  
Psychology student at Portland State University



# Engagement, Questions, Learning 😊



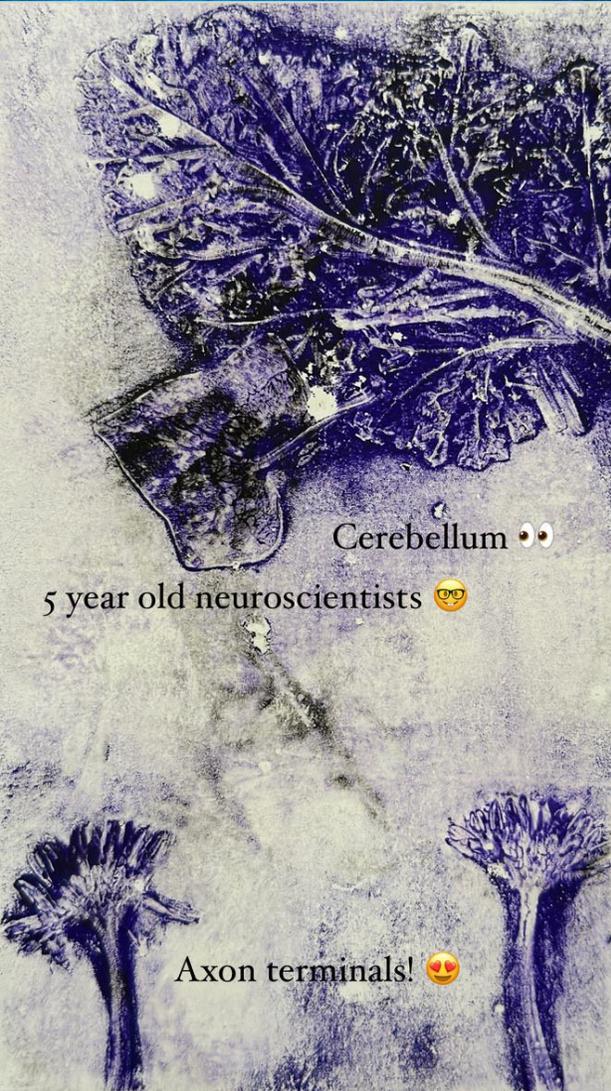
Future neuroscientists 🎨🧠❤️🧐



 **GO PLACES  
EXAMINE BRAINS  
ASK QUESTIONS  
MAKE ART**

 **GO PLACES  
EXAMINE BRAINS  
ASK QUESTIONS  
MAKE ART**

# LET'S MAKE SOMETHING!



Cerebellum 🧠

5 year old neuroscientists 🧐

Axon terminals! 🧡

