

Forward Thinking about STEAM with (actual, extra) Brains!

- *How do we inspire and learn from ALL our students? Travel is good for your brain.*
- Northwest Noggin (nwnoggin.org) : community, neuroscience and art
- **TODAY:** Discover what we've learned, craft brain cells, and examine some real noggins up close.



Kanani Miyamoto



Kanani Miyamoto

Artist, Instructor at
PNCA, Pacific University, PCC
Board Member, NW Noggin

Kanani Miyamoto holds an MFA in Print Media from the Pacific Northwest College of Art (PNCA), and a bachelor's degree in Art Practices from Portland State University. Kanani Miyamoto is an artist, curator and educator. Her artwork has shown nationally. She is originally from Honolulu, Hawai'i and is currently living in Portland, Oregon. She teaches at Pacific University, PNCA, Portland Community College, Young Audiences, The Right Brain Initiative, and NW Noggin's STEAM program.

Bill Griesar



Bill Griesar

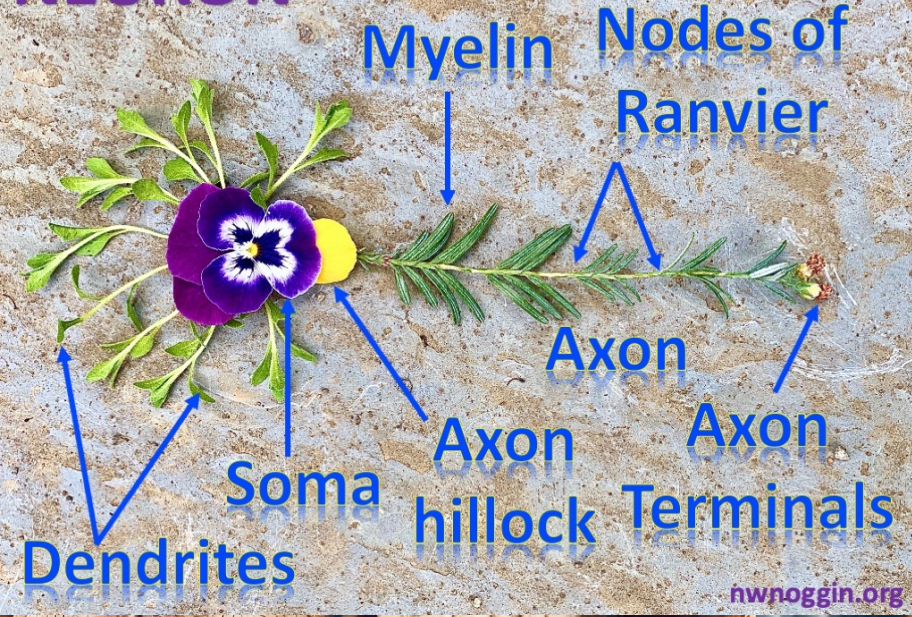
Senior Instructor at
Portland State University
Co-Founder, NW Noggin

Bill Griesar, Ph.D. is Senior Instructor in Psychology at Portland State University and a co-founder and Neuroscience Coordinator of NW Noggin. He has developed and taught arts-integrated neuroscience courses at Portland State University and Oregon Health & Science University since 2001. Through NW Noggin (which is entirely volunteer) he's met with more than 50,000 K-12 students over real brains and art. He's been recognized as an innovator by the Obama White House and has won numerous teaching awards.

Art & Brains!



NEURON



NWNOGGIN



nwnoggin.org

Arts integrated neuroscience
outreach for K-12 & community



Sleep
Anxiety
Depression
ADHD
Autism
Development
Perception
Drugs
Memory
Language
Racial Bias
...



***What you do
has relevance
GO PLACES***



We all pay for research



Greater understanding
More support for research
Increased participation
Less confirmation bias
New directions
FUN!

Connections matter

BUILD NEW CONNECTIONS



- **Academic priority K-12, urban/rural communities, tribal majority schools**
 - Not always well-funded, or valued, often ignored, subjected to standardized testing that primarily benefits others. Complex brain development underway, unacknowledged diversity, racism, bias, police brutality, mental health,...
- **Young graduate researchers, undergraduates (PSU, OHSU,...)**
 - *How does my research relate to the world? How can I explain it? Where can I go from here?*
- **Houseless youth (p:ear), incarcerated youth (MaLaren/Coffee Creek Correctional Facilities)**
 - *"It's like people see me as an object, not as a human being"*
- **Artists: Painters, Dancers, Storytellers, Musicians, Poets**
 - *How does my work relate to other fields? How do I connect with new audiences?*
 - *How is my practice influenced and enriched by discoveries about the brain?*
- **Community organizations**
 - TRIO, Area Health Education Centers (AHECs)
- **Area businesses (BioGift, Intel, Fort George, Floyds/Street 14, Hospitals)**
 - *How can we better connect with everyone in our community?*
- **Members of the public**
 - *Why are my taxes spent on research? Art? What are we discovering? Making?*



**Oh the places
you'll go!**

Noggin + TRIO




Noggin + TRIO



NOGGINS ON THE OREGON COAST

The Stand, Seaside

nwnoggin.org 



Community!



Art!



Fort George Brewery, Astoria



Rosebriar Mansion, Astoria



Astoria Coop



Peter Pan Market, Astoria

THANK YOU FOR SUPPORTING ART/NEUROSCIENCE OUTREACH!

**Astoria Middle School, Seaside Middle School
West Exchange Preschool, Astoria High School**



- Jasmin Mabry**
- Ellie Phelps**
- Michael Deveney**
- Greyson Moore**
- Lidia Echeverria-Garcia**
- Jeff Leake**
- Bill Griesar**
- William Leverette**

Noggin on the Coast
October 4 - 7, 2021



N.W. Noggin
@NWNoggin

“What causes that feeling of [#paralysis](#) as you’re falling asleep? Does [#daylightsavingtime](#) affect sleep? Why is [#sleep](#) important for [#brains](#)? What brings on [#nightmares](#)?”

[#nwnoggin](#) @ [#astoriaoregon](#) high school
🎨👉 [nwnoggin.org/event/noggins-...](#)

[#outreach](#) [#allvolunteer](#) ❤️



N.W. Noggin
@NWNoggin

“Can you get a [#concussion](#) in your [#entericnervoussystem](#) or [#microbiome](#)? Is the [#brain](#) like a computer? What part of the brain is involved w/[#rhythm](#) & making your foot tap? Do you ever see a brain that’s smooth?”



N.W. Noggin
@NWNoggin

“I saw [#mycelium](#) in the forest and it looks like [#brain](#) cells 🍄! I think my [#brain](#) learns through stories” 🥰
🧠👉🐼🥰! Yes ❤️

Some of the deepest insights and questions from [#preK](#) today 😊😊

[#nwnoggin](#) [#oregoncoast](#) 🐦🌊👉👉
[nwnoggin.org/event/noggins-...](#)



N.W. Noggin
@NWNoggin

“Does [#alcoholism](#) run in families? How does smoking cigarettes affect the brain? What about [#cannabis](#)? What happens in your [#brain](#) if you have [#ADHD](#)? [#DID](#)? Why are drugs more dangerous for kids?”

GREAT QUESTIONS @ Seaside Middle School 🧠👉
😊👉 [nwnoggin.org/event/noggins-...](#)



Why art & brains..?

- Motivation, engagement, **empathy**
- Exploration, creativity, INNOVATION
- **Personal relevance of STEAM material**



Build your own mouse line!

 N.W. Noggin
@NWNoggin

Building a #rosehipneuron in
#pipecleaners 🧡 #nwnoggin 🧠🎨
#sciart #scicomm 🦋
nwnoggin.org/2018/08/31/ros...



To see other people

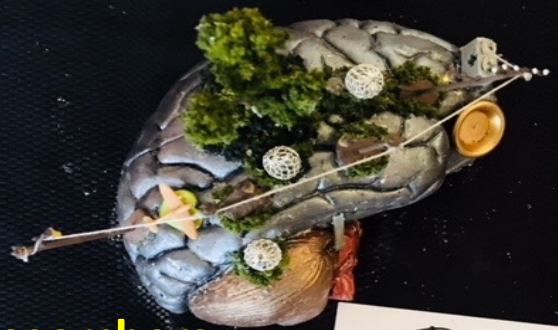


HOMELESSNESS & THE BRAIN

Thurs, Oct 19th
10am - 1pm



Researchers
Clinicians
Policy makers
Houseless youth



Bunny:
"we are all
connected"

Rural Outreach

TO GO PLACES!

Food, housing, baby goats...

Siletz, Amity &
Willamina, OR
Pop: 4,000

Davenport, WA
Pop: 1,700

La Grande, OR
Pop: 13,000

Heppner & Ione, OR
Pop: 1,240

Meservy
Meadows,
OR Pop:
~40



Neuroscience & Law

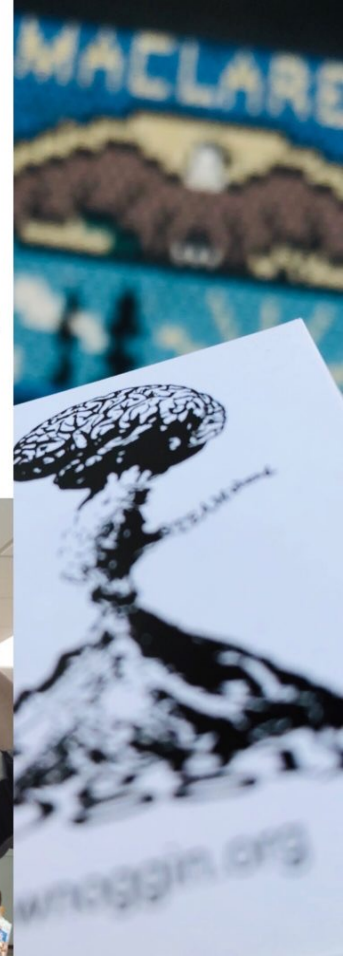
To listen, learn, empower & make change



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.

 Lindsay Keefe on January 24, 2019



MacLaren Youth Correctional Facility



At SfN conferences



Posters, art of neuroscience and...

School visits



Turner Elementary, DC



Public outreach and connection

And also, in the U.S., to Capitol Hill

**More connections: Congressional office visits
Congressional Neuroscience/STEAM briefing**

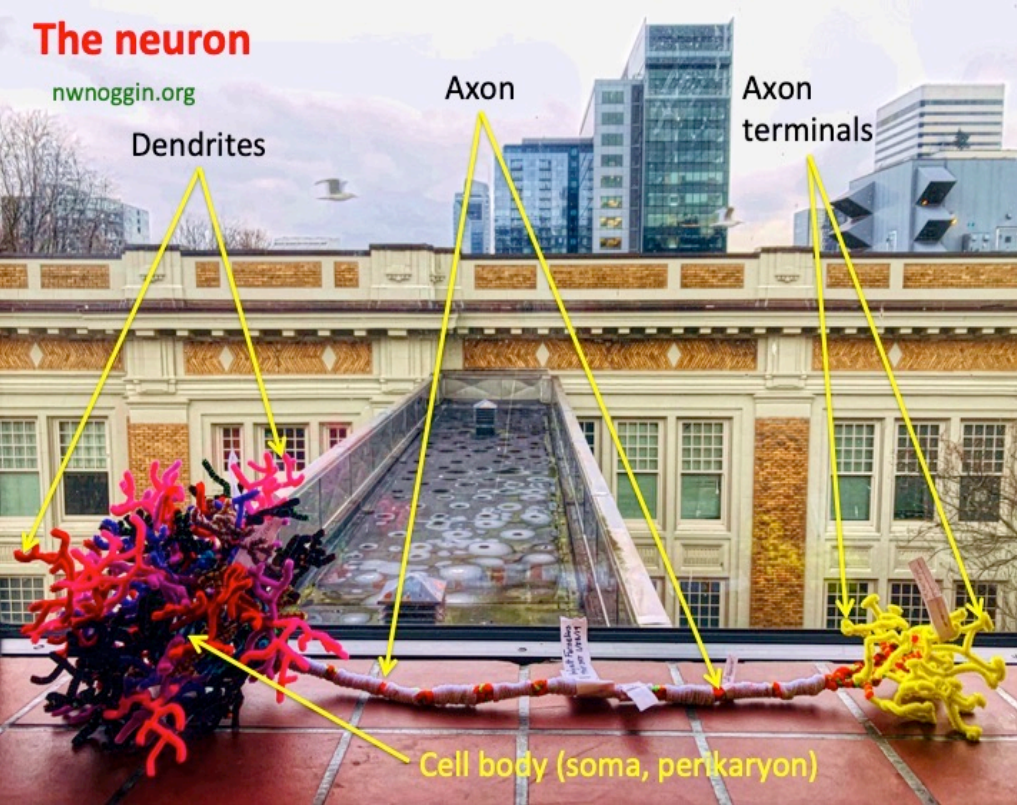
**“Bipartisan”
neuron**



Research should inform policy

The neuron

nwnoggin.org



MAKE YOUR OWN: Details @ nwnoggin.org

Pipe cleaner brain cells!

Making a pipe cleaner neuron...

1. Start with a good amount of (colorful) pipe cleaners, I have 20 here.



2. Create the soma or cell body by linking several pipe cleaner hoops together.



3. Attach dendrites to your soma by wrapping them around the soma pipe cleaners.



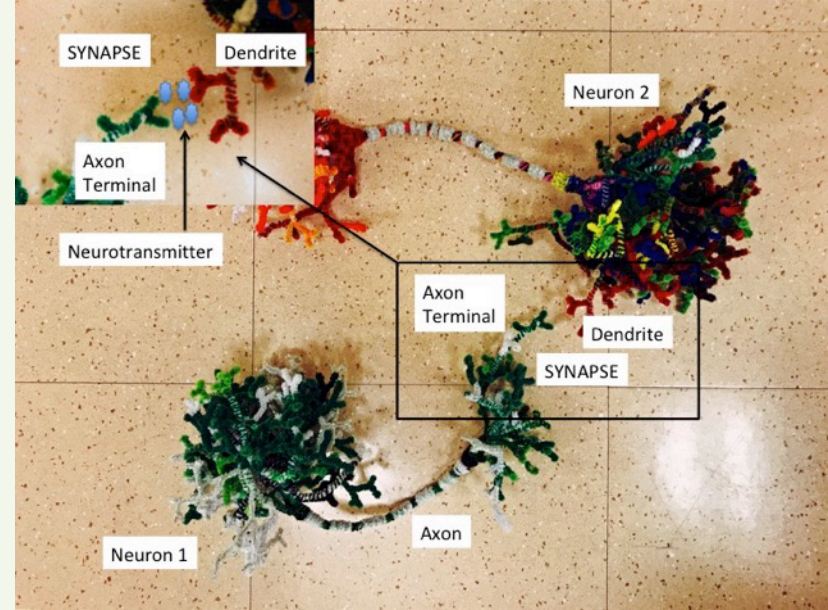
4. Attach axon terminals to the other end of your axon.



5. Wrap myelin around your axon.

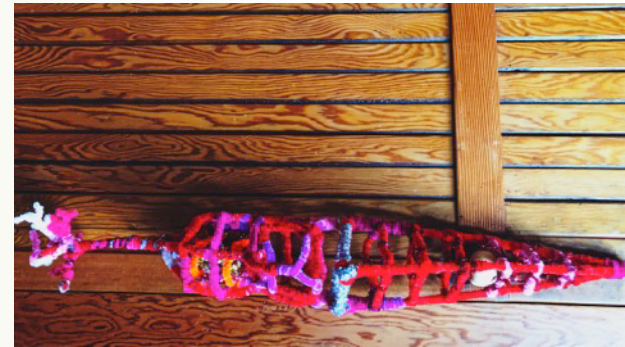


6. Create a nucleus for your soma by wrapping two pipe cleaners around each other. Attach your nucleus inside your soma. You have a neuron!



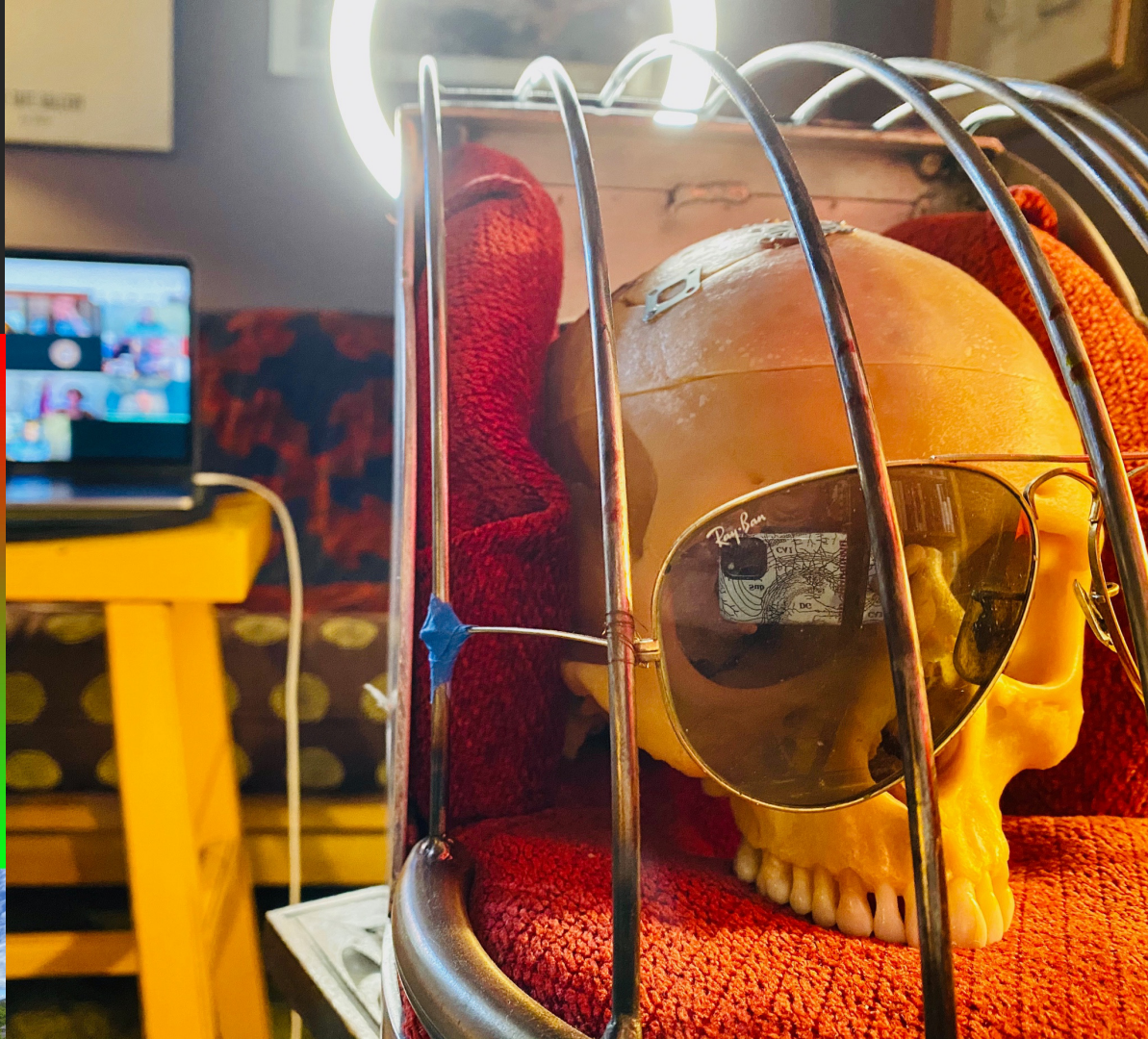
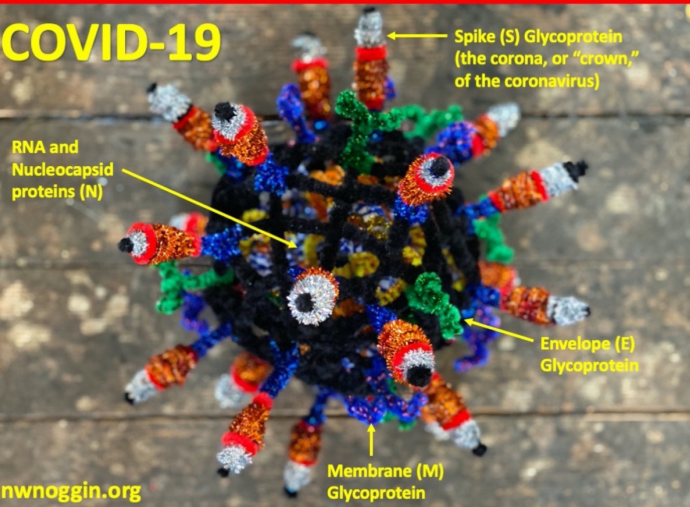
MAKE CONNECTIONS

MAKE ART



Pandemic connections

COVID-19





Public Schools

During COVID-19

[#showusyourbraincell](#)

Neurons are a type of brain cell

The majority of neurons share some basic features

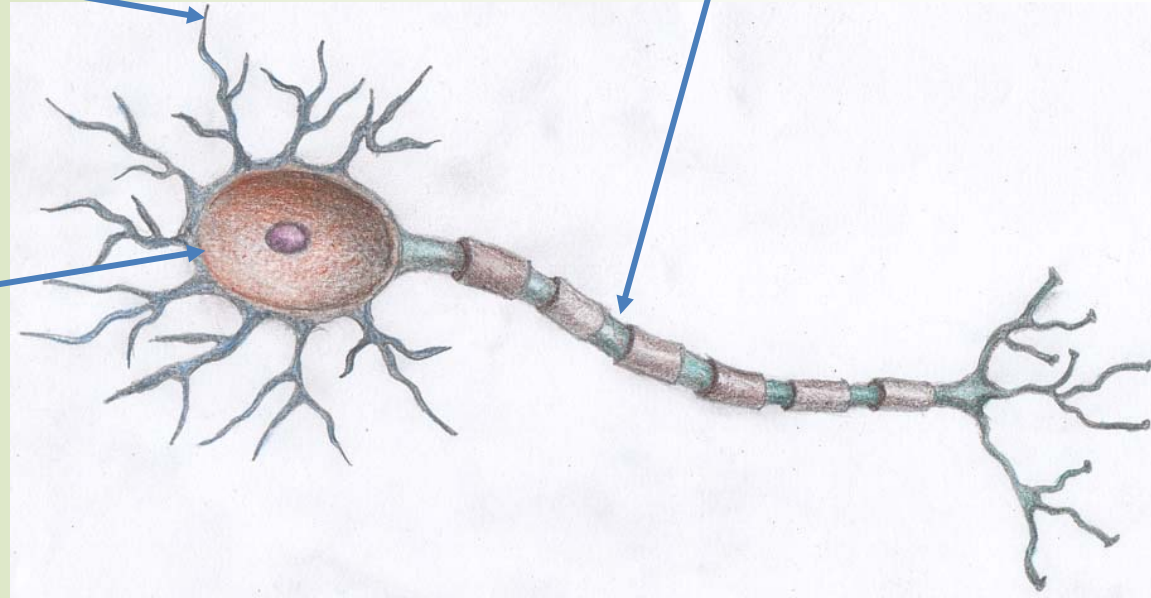
Dendrites

(Receive input from other neurons at gaps called **synapses**)

Cell Body

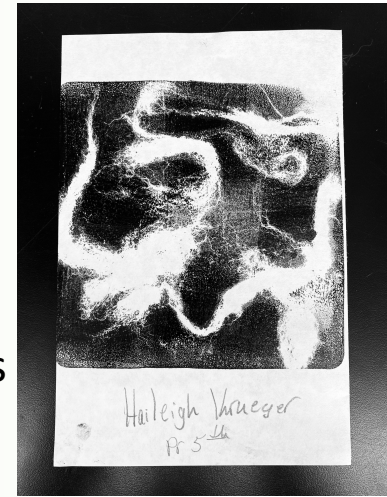
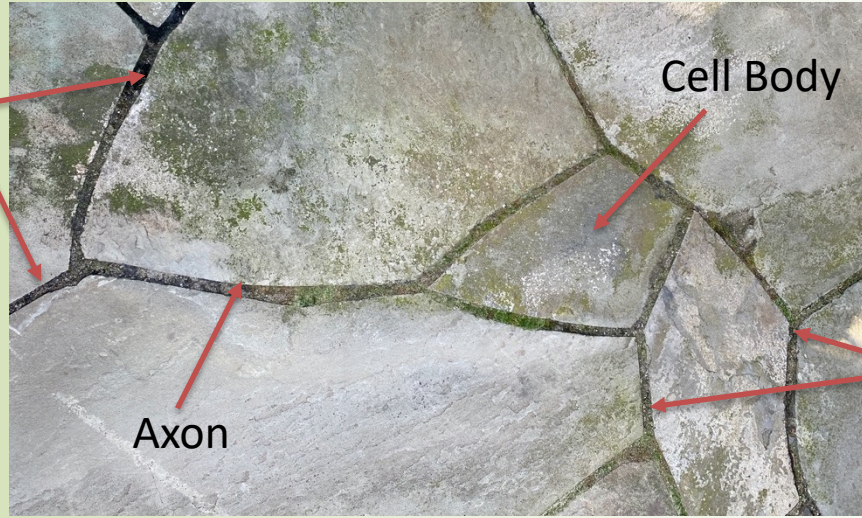
(or Soma, location of **nucleus** and cell **DNA**)

Axon (Carries electric message)



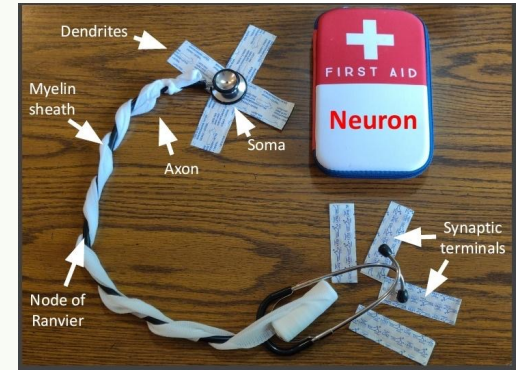
Found Object Brain Cells

Take a look around you, what things do you see that share those structures?



Can you construct a neuron out of things that you find?

What things for you represent the function of a neuron? Or the function of specific parts of a neuron? Do those things have personal meaning, or say something about you?



Neuron

By Leigh Wilson



#showusyourbraincell

*How does the brain react to trauma?
What in our brain makes us bored?
How does our brain know what's bad for us besides using common sense?
What happens when the fusiform gyrus is damaged?
Is synaesthesia linked to a certain part of the brain?
Where in the brain are memories kept?
How does the brain remember taste? Like when you eat something, how does your brain remember which taste it is?
How do we remember sound?
Why do we sleep and dream?
How does the brain react to addictions?
How much memory does your brain have? "I'll forget where my phone is, but then I'll remember some random crap from when I was 6, which isn't fair because I don't care about when I was 6."
Why do some people agree on the same things but disagree on other things?
Is it possible that your brain may interpret colors differently than other people?
What are dreams and why do we have them?
Why are there so many different ways that people cope?*



Seaweed Neuron

Dendrites



Cell body (or soma)

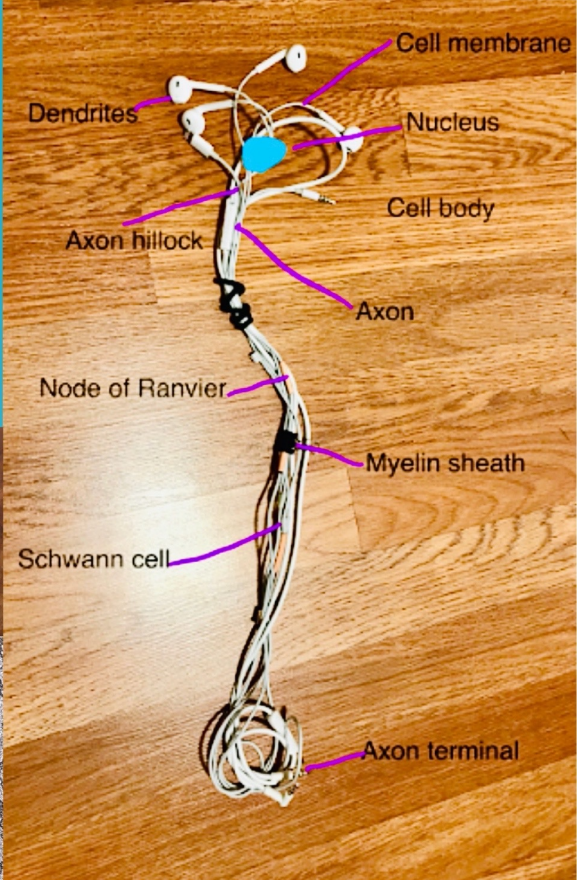
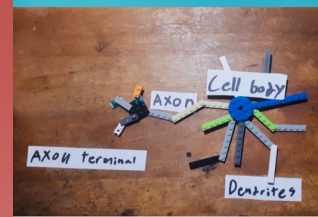
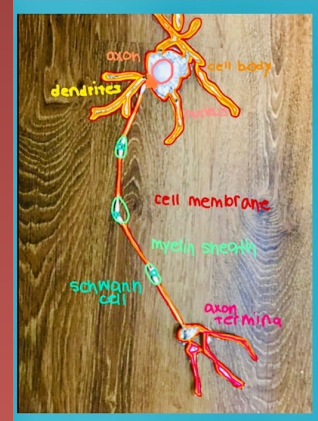
From Plage des Chevrets in St-Coulomb in Northern Brittany, France

Axon

Axon Terminals

By Leigh Wilson, Kings College London

#showusyourbraincell

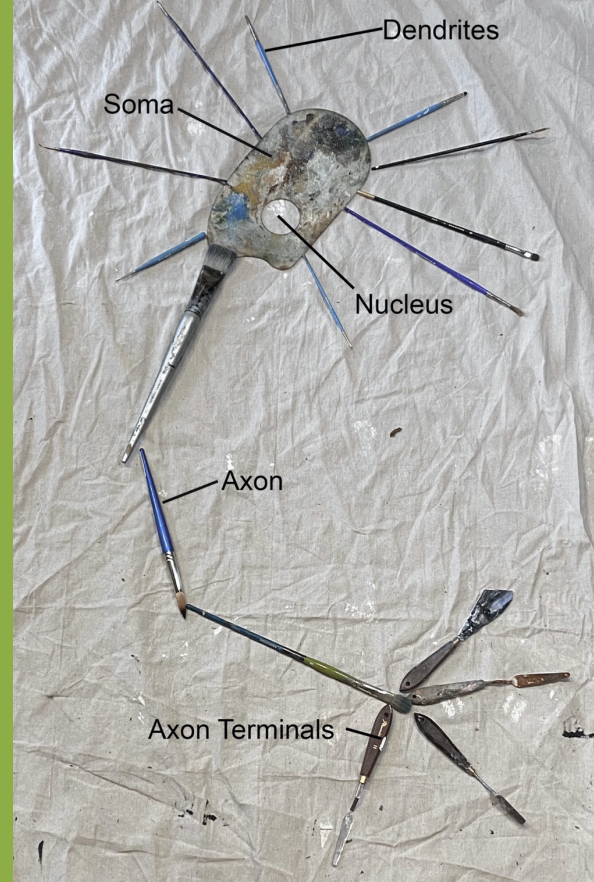
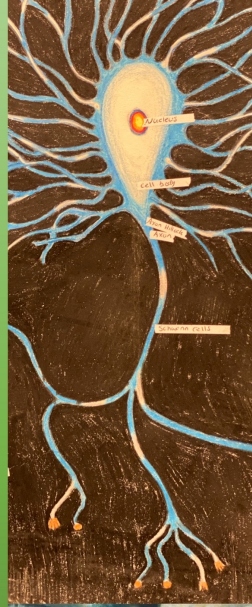


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Neuron



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By James & Mark
Rutledge-Gorman

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Tuna Jig Neuron

#showusyourbraincell



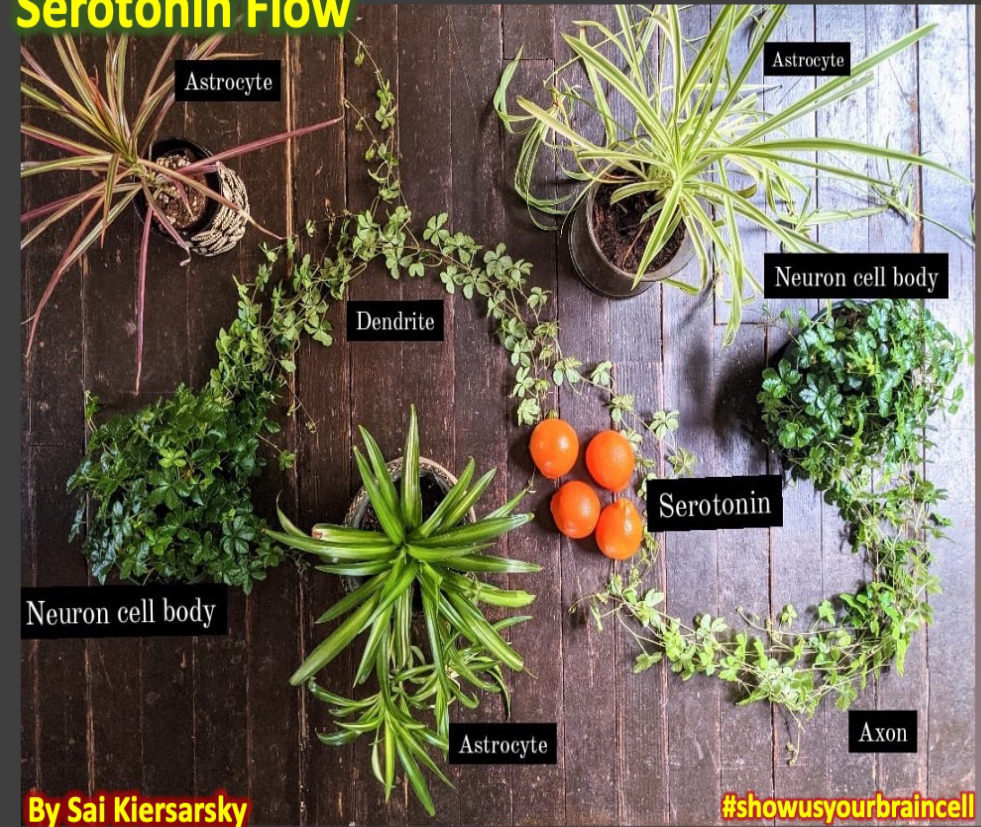
Jigging is a type of fishing where your boat stays in place, or slowly drifts, while the line is jerked up and down to imitate the swimming of prey

In Oregon, tuna jigs are primarily used for trolling, a style of fishing where you pull hooks through water behind your boat

LEARN MORE
<https://Seagrant.oregonstate.edu>

By Amanda Gladics,
Oregon Sea Grant, OSU

Serotonin Flow



By Sai Kiersarsky

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ANY BRAIN CELLS
Glial cells
Pyramidal neurons
Photoreceptors
Inner hair cells
Nociceptors
Rhombic lip neurons
Meissner's corpuscles

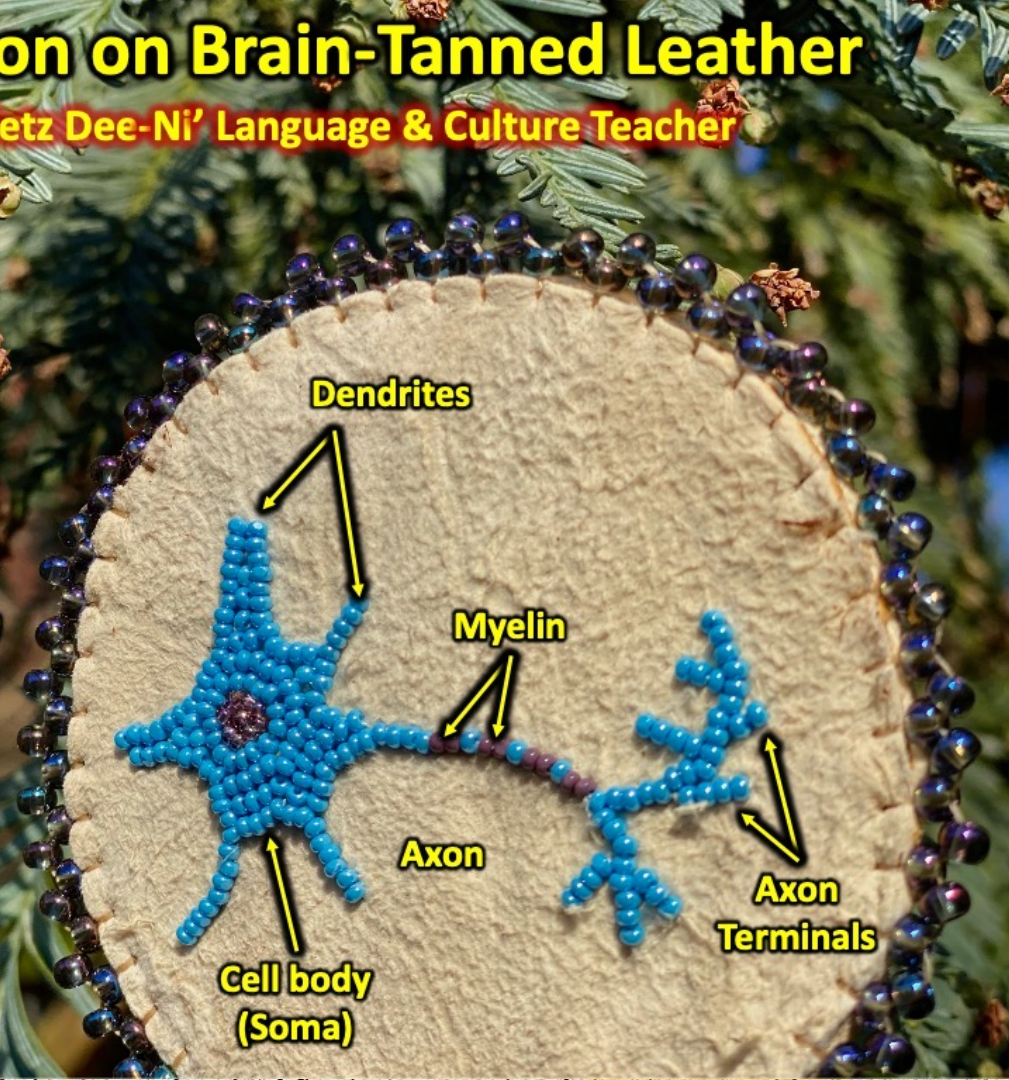


Beaded Neuron on Brain-Tanned Leather

By Theresa Smith, Siletz Dee-Ni' Language & Culture Teacher

"Every animal has enough brains to tan its own hide"

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nwnoggin.org





#showusyourbraincell

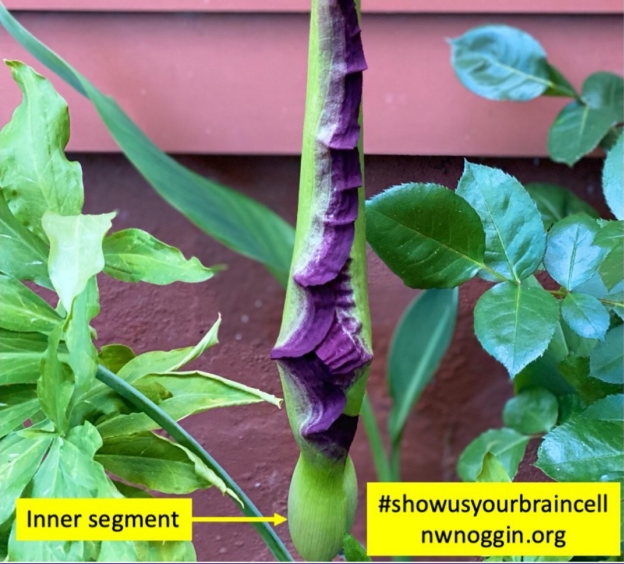
Dracunculus Vulgaris

Smells like rotting flesh
Pollinated by flies

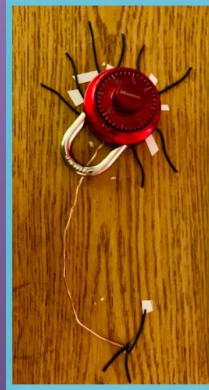
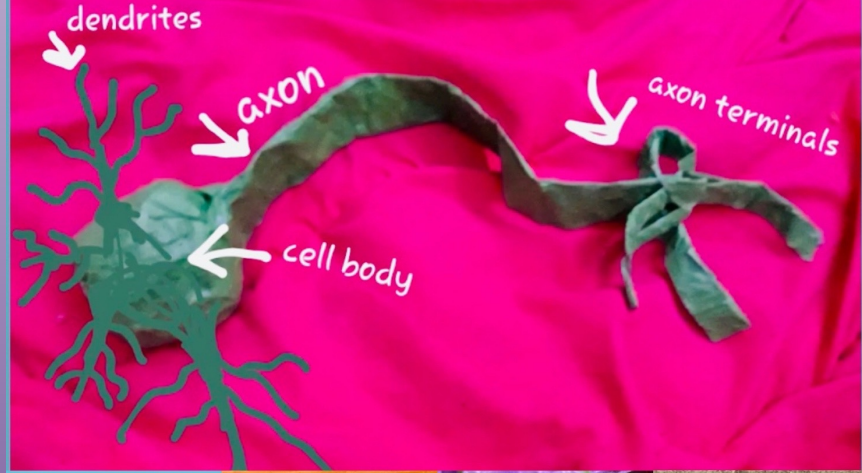
Or...retinal cone cell?

Membranous disks
(sites of photopigment)

Outer segment

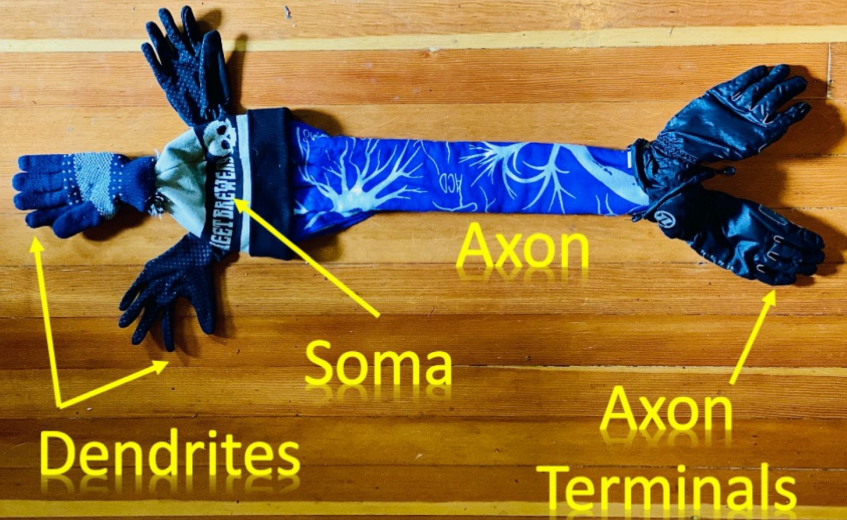


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nwnoggin.org

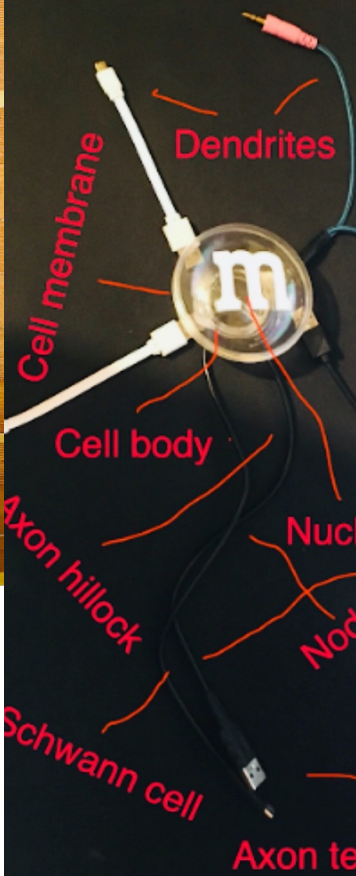
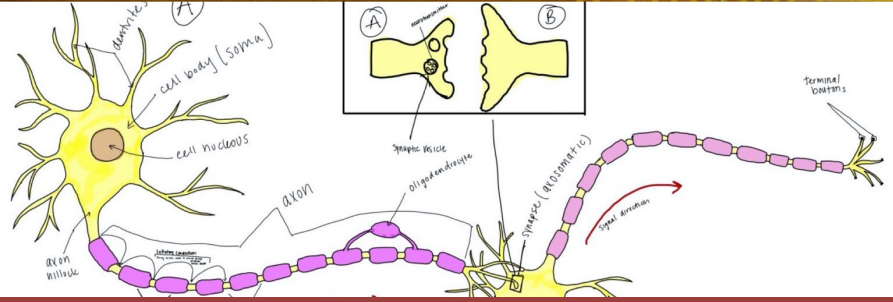
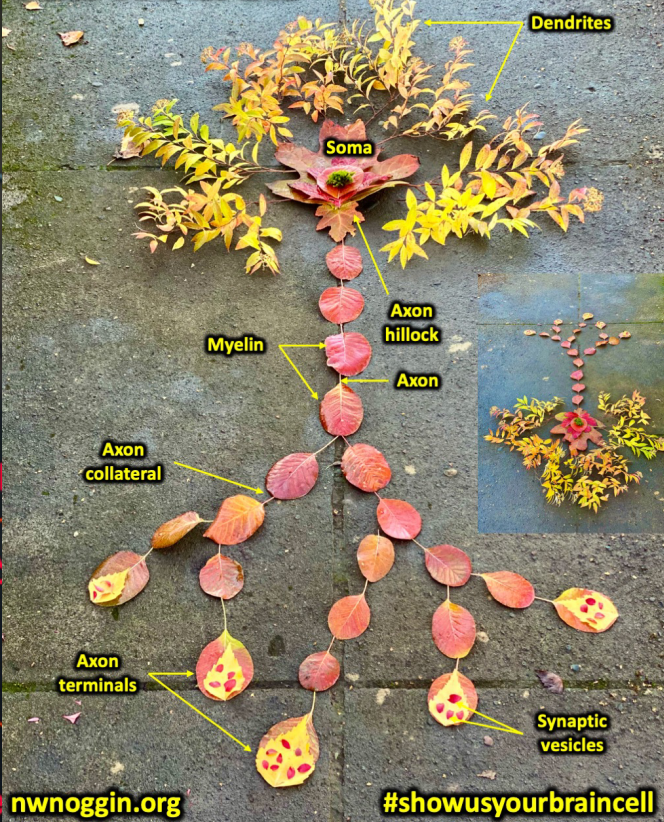


#showusyourbraincell

Neuron from the coat rack



Fall Neuron



Axon terminals nwnoggin.org

#showusyourbraincell

#showusyourbraincell

Taste afferent

Taste afferents are arranged like sections of an in **taste buds** on your tongue, with tiny **microvilli** poking out of **taste pores** for detecting chemicals (**tastants**) in food.



nwnoggin.org



Microvilli
Site of receptor proteins that bind chemicals you can taste (tastants)

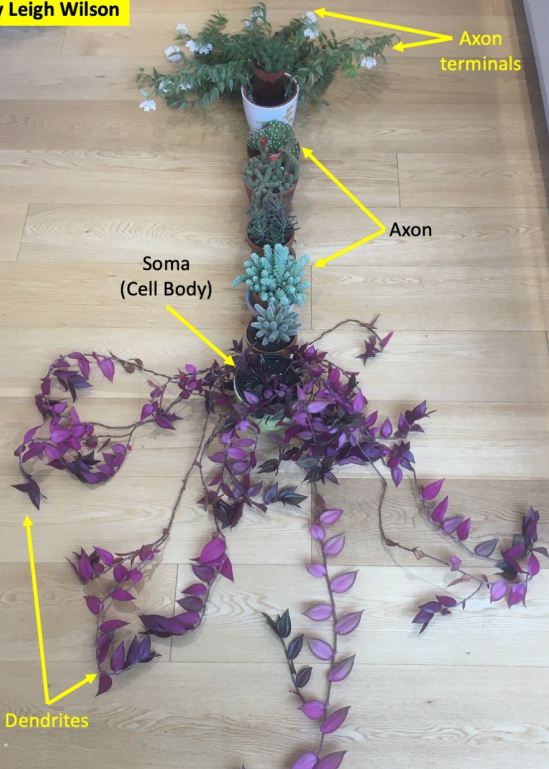
Nucleus

#showusyourbraincell



#showusyourbraincell

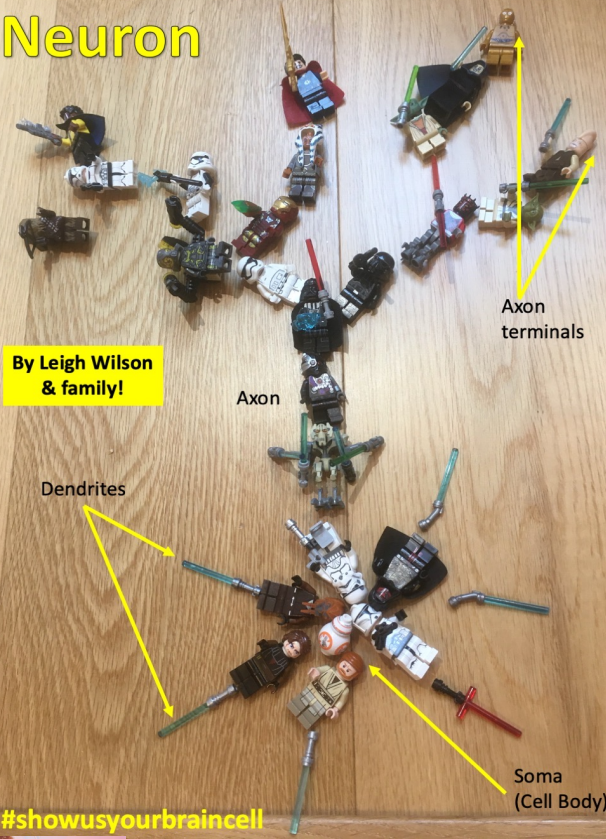
By Leigh Wilson



Neuron

#showusyourbraincell

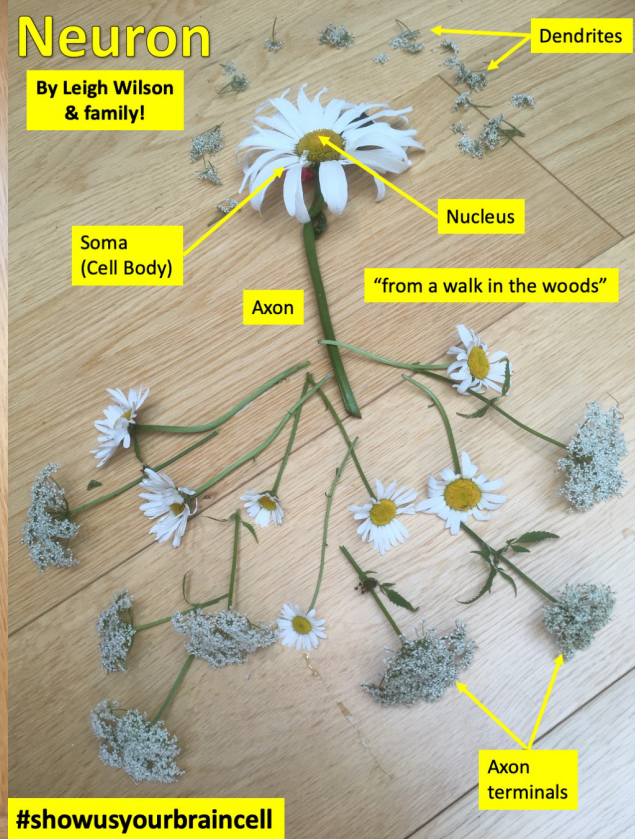
Neuron



By Leigh Wilson & family!

#showusyourbraincell

Neuron



By Leigh Wilson & family!

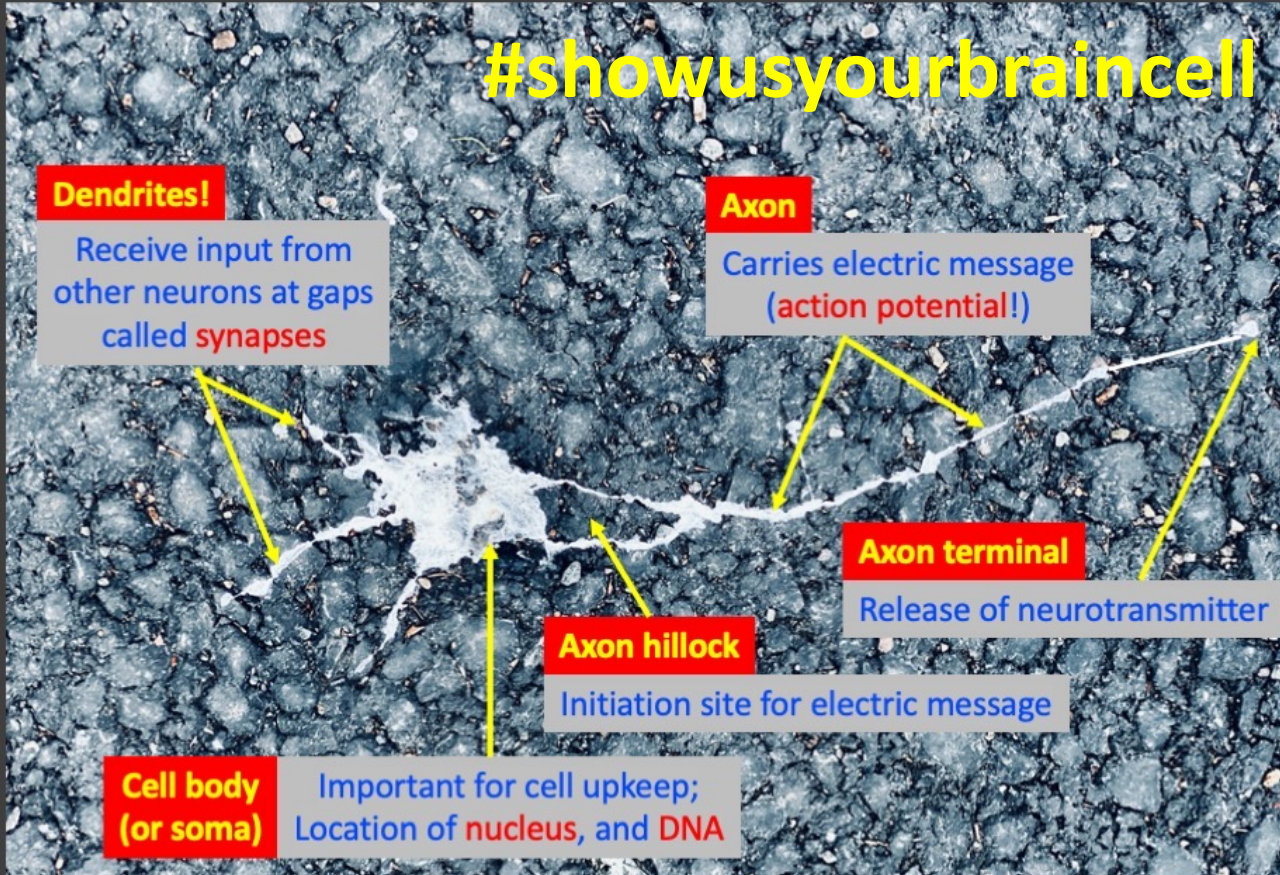
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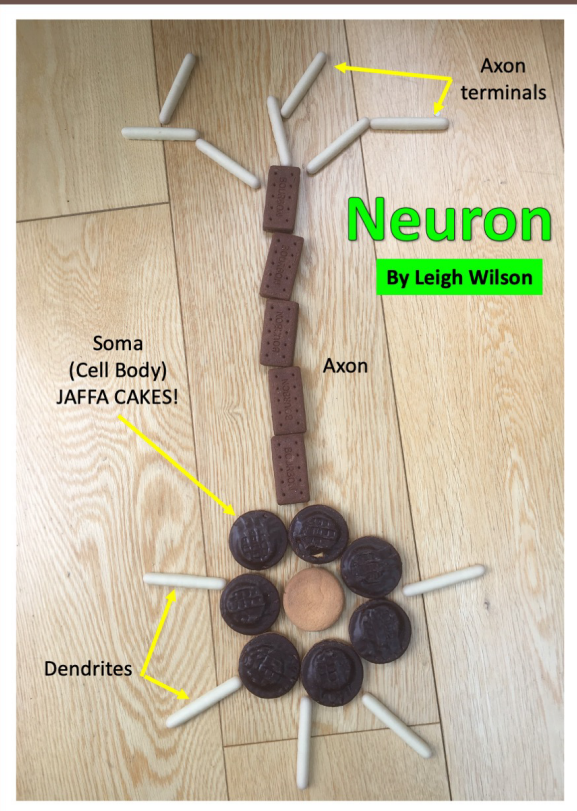
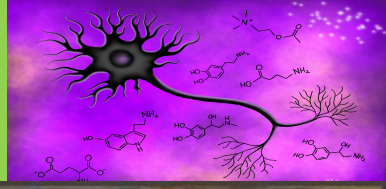
#showusyourbraincell

You can find neurons everywhere!

#showusyourbraincell

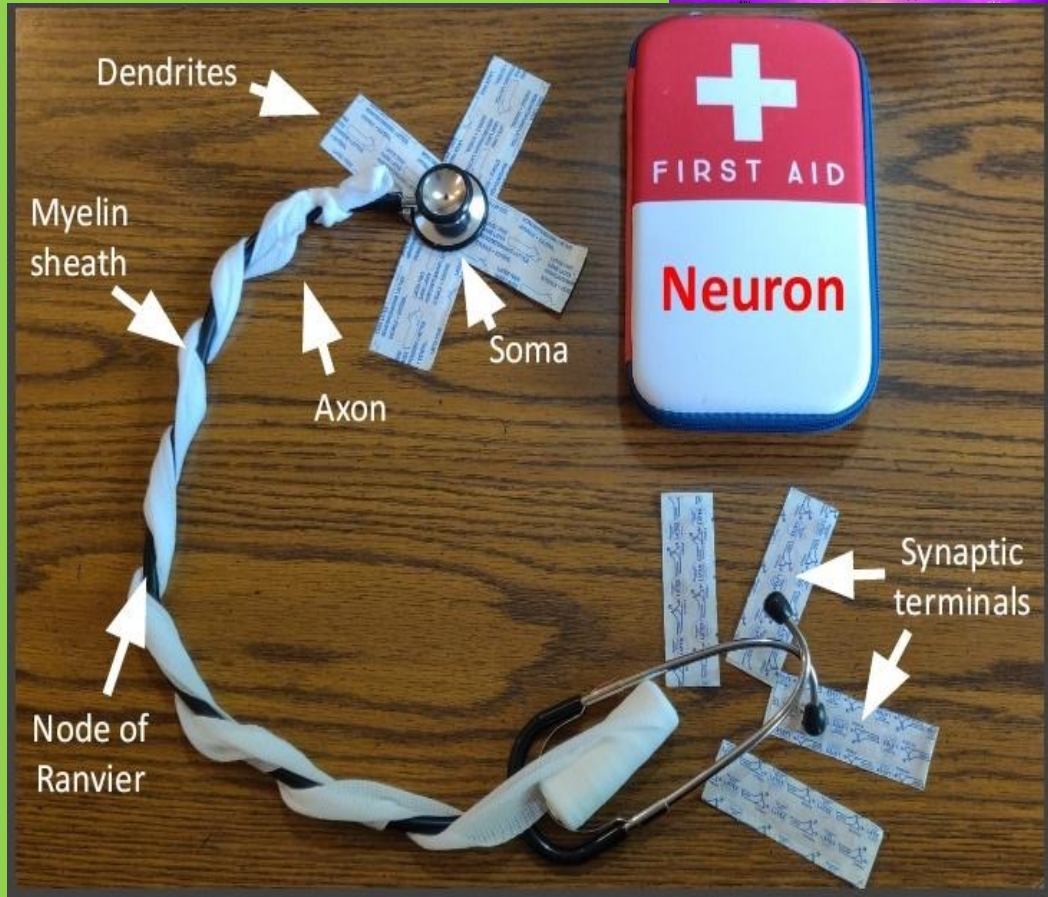


Make your own – AND SHARE!

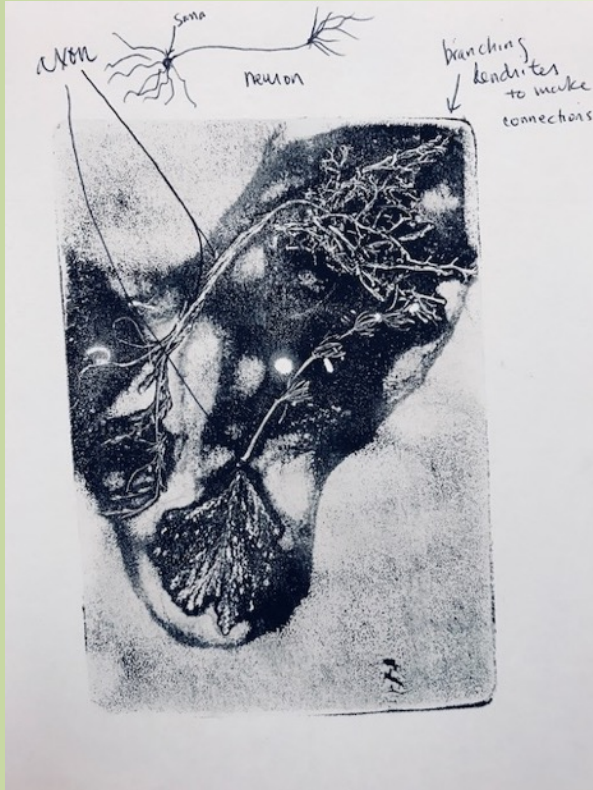


#showusyourbraincell

#showusyourbraincell



TODAY: Neuron gel prints



NEURON GELATIN PRINTS



Objective

Students will learn about the form and function of neurons through a simple printmaking process.

Introduction

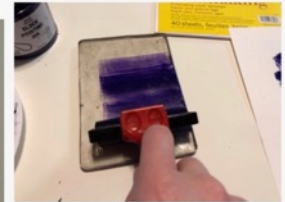
Prior to the project discuss what a neuron is and its basic functional parts followed by a discussion of why plants and neurons might have similar forms. Take a look at the many different forms of neurons.

Materials

- Gelatin slabs, or Gelli plates
- Block printing ink (water soluble is best)
- Printing paper (printmaking paper works best but drawing paper will do as well) Plant material (smaller plants work best)
- Ink roller (Brayer) Barren

Making a neuron gelatin print

1. Take your gelatin slab or Gelli plate and roll ink on to it (you want a thin even layer of ink, too much ink will not work as well).
2. Place plants on the plate in a neuron like pattern (thinner and smaller plants work better)



3. Place your paper face down on top of the plate, apply pressure with your barren or press with your hands if don't have one (apply a good deal of
5. Carefully remove the plants from the plate, you'll notice that impressions of them have been pressed in to the ink.