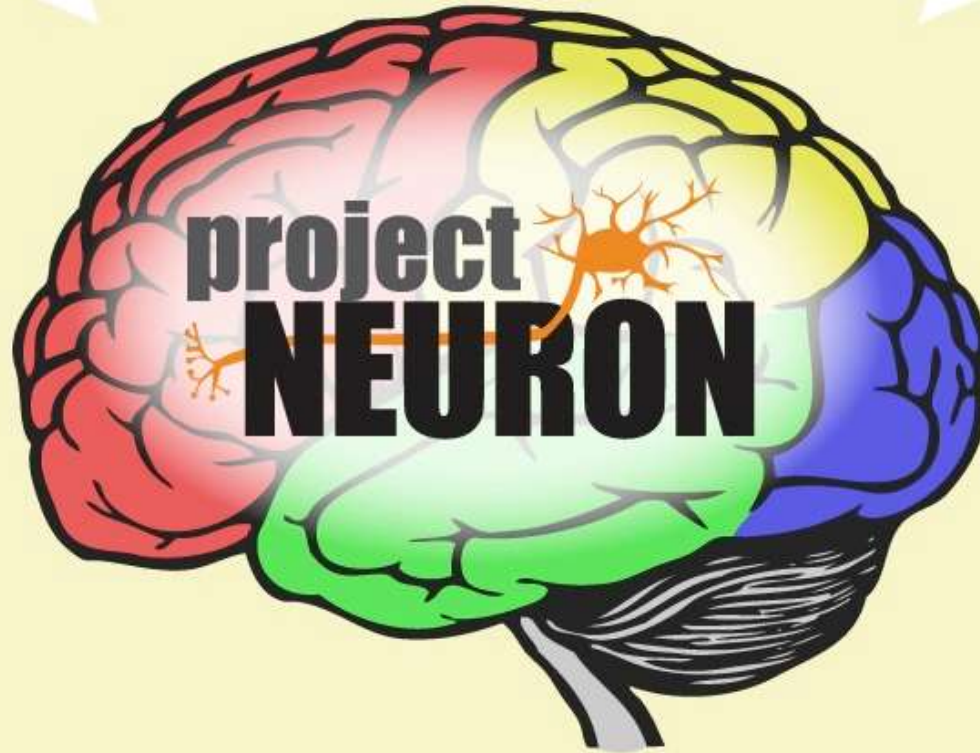


Food For Thought:

A Modeling unit investigating connections between the endocrine and nervous systems, metabolism, and health



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What is Project NEURON?

- SEPA, NIH
- Curriculum development
 - Inquiry-based
 - Connect to standards
- Professional development
 - Summer institutes
 - Conferences
- Educators, scientists, and graduate students

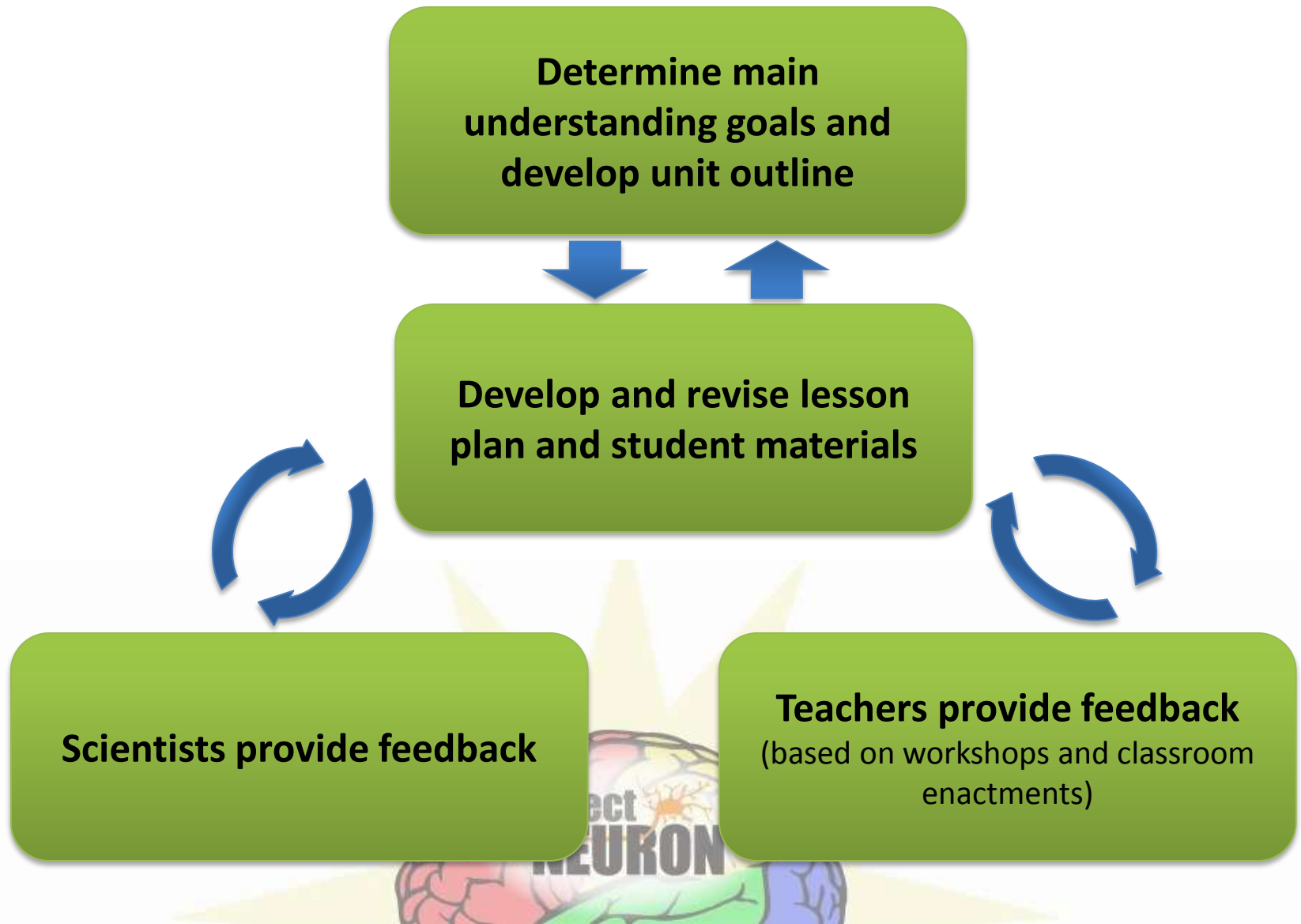


The Microbe Unit: A Collaborative Process

- Science Educators (Project NEURON)
 - Initial unit planning
 - Developing lessons
 - Modify/revise materials based on feedback
- Scientists (Donna & Paul Gold)
 - Initial unit planning
 - Provide feedback on lesson content
- Teachers (High School Science)
 - Initial unit planning
 - Enact lessons in the classroom
 - Provide feedback



An Iterative Development Process



Nature of the “Food For Thought” Unit

- Emphasis on the scientific practice of modeling
- Small groups (4-5 students)
- Teacher and students actively engaged



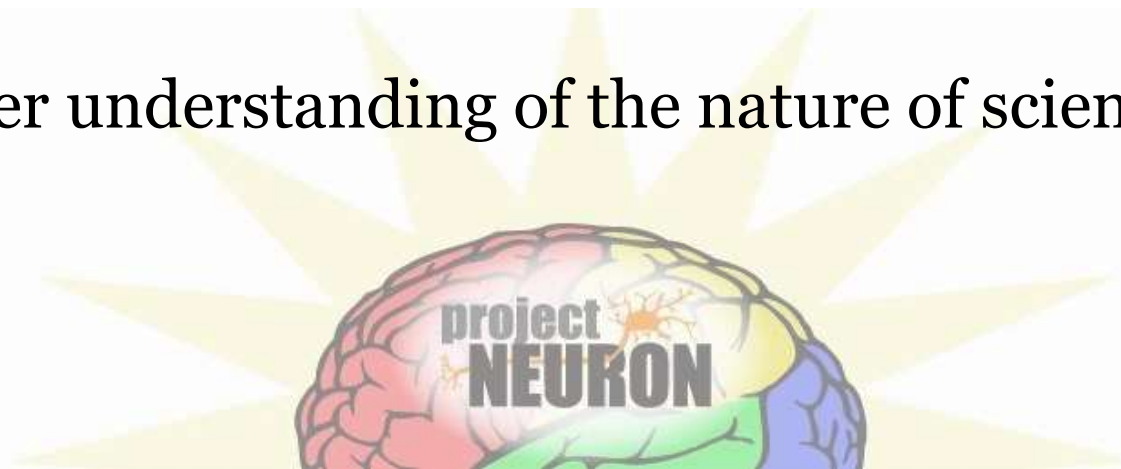
Modeling in NGSS

- **Scientific Practice 2:** Developing and Using Models
- **Crosscutting Concept 4:** Systems and System Models
- Scientists use models to
 - Predict
 - Test and revise
 - Explain and Communicate
- Models not static, but explore a process, an event, a phenomena over time
- Student-generated models



Modeling in Teaching

- Models can serve to connect ideas arising from multiple activities and readings
- Through modeling, student's mental models (student thinking) can be made known to teacher. Great for formative assessment
- The nature of models leads into other scientific practices
- Better understanding of the nature of science



Food for Thought:

L1: Why is glucose important for the body and brain?

L2: How does the body regulate glucose?

L3: What effect does adrenalin have on the body and brain?

L4: How does glucose affect memory in aging populations?

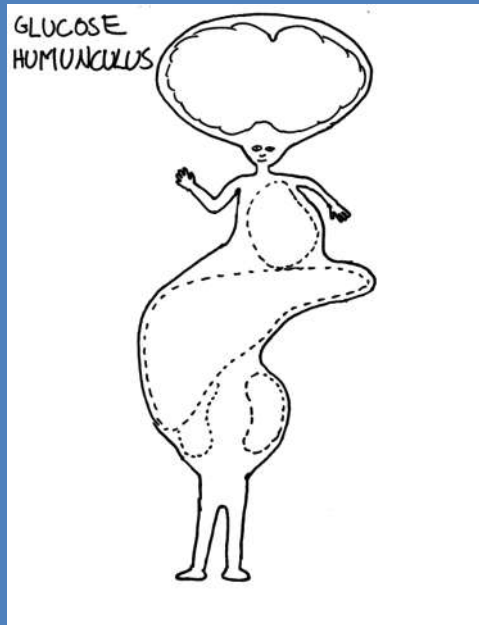
L5: How does glucose dysregulation lead to disease?



Lesson 1

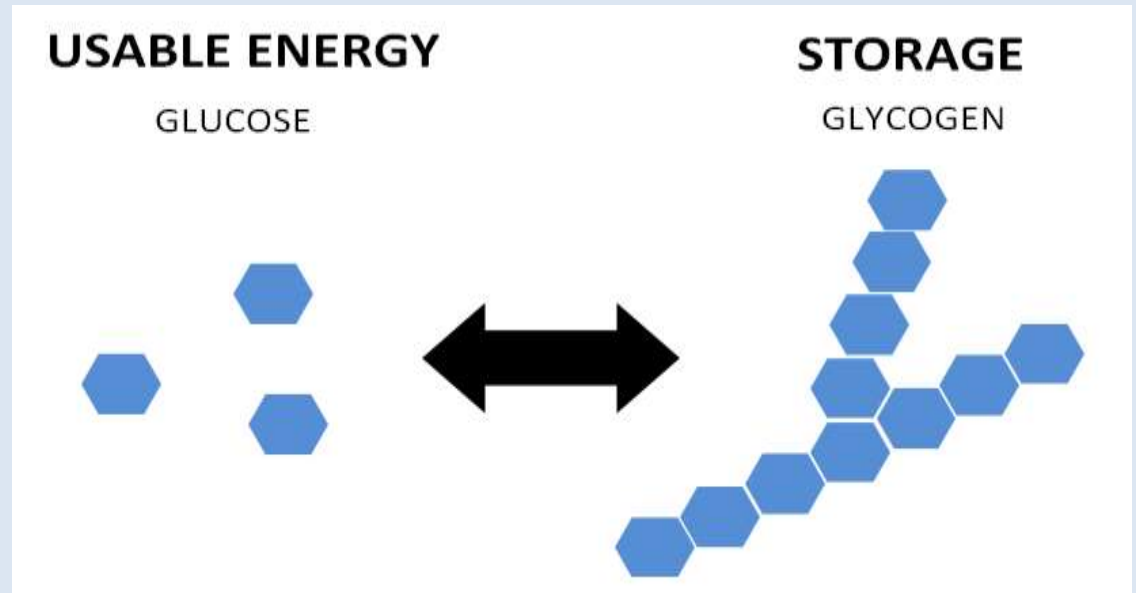
Why is glucose important for the body and the brain?

- Glucunculus as an explanatory model



Lesson 1

Why is glucose important for the body and the brain?



Lesson 2

How does the body regulate glucose levels?

- Cracker activity
- Stop-animation video
- Connecting analogy through class discussion

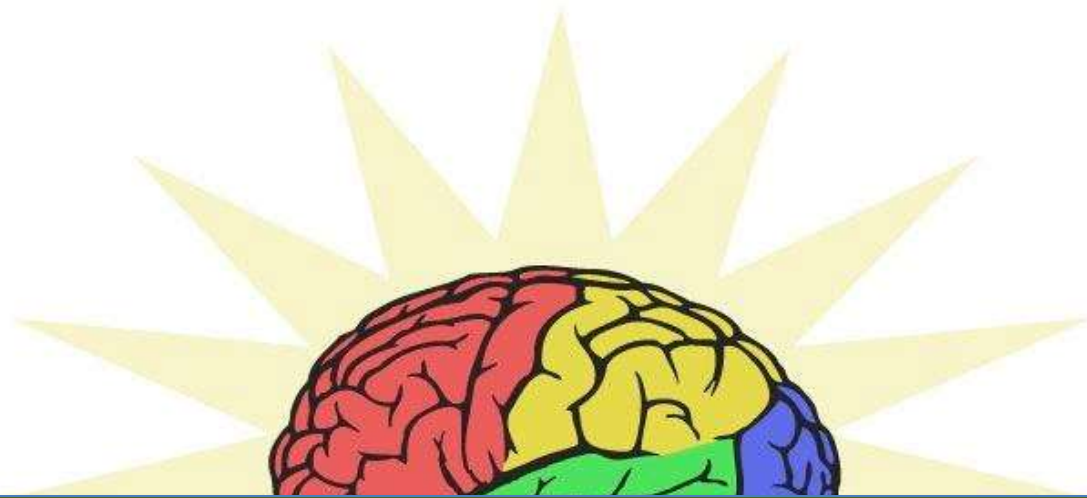
See the video used to introduce this concept at

<https://neuron.illinois.edu/videos/video-the-endocrine-system>

Lesson 2

How does the body regulate glucose levels?

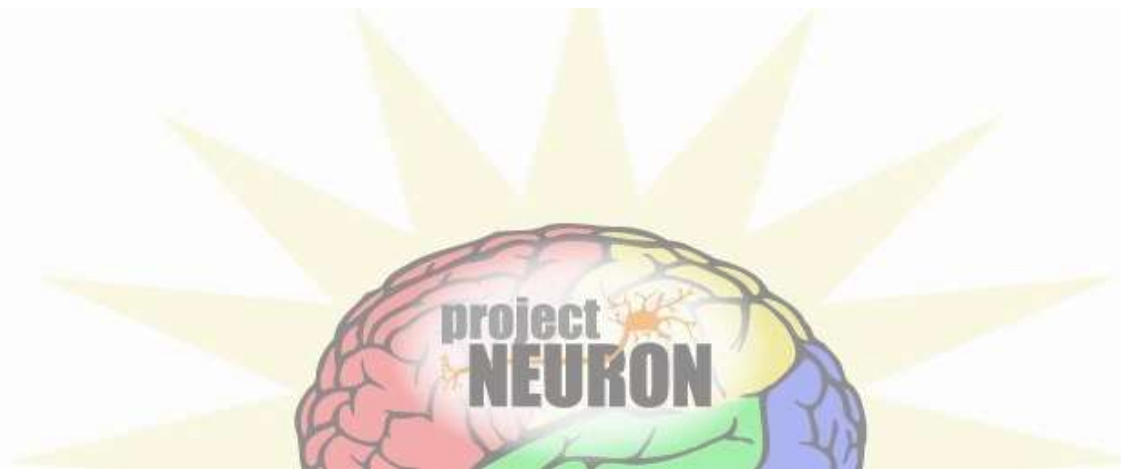
- Students apply their framework of the endocrine system to specific hormones: glucose and insulin
- Students apply their models working through different medical scenarios.



Lesson 3

How does adrenalin (epinephrine) have an effect on the body and the mind?

Lesson 3

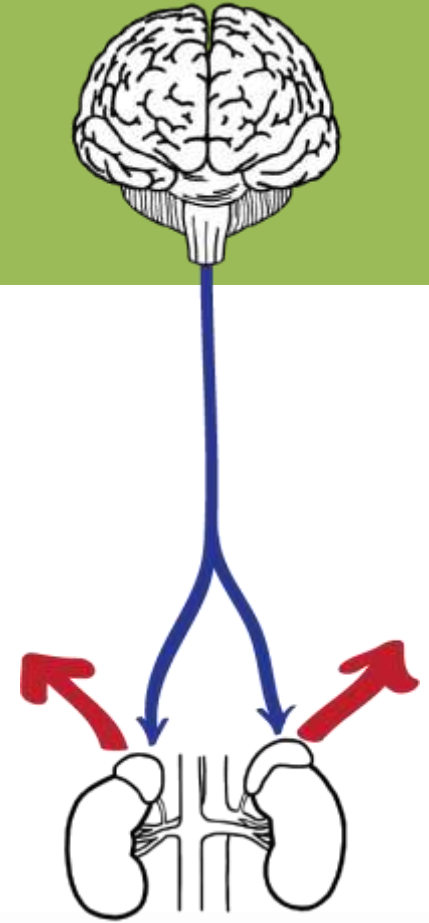


Using Models to Make Predictions

PREDICT:

Develop a model of how adrenalin (epinephrine) induces changes in the body.

- Use what you know about the endocrine system
- Use what you know from prior experience



REMEMBER:

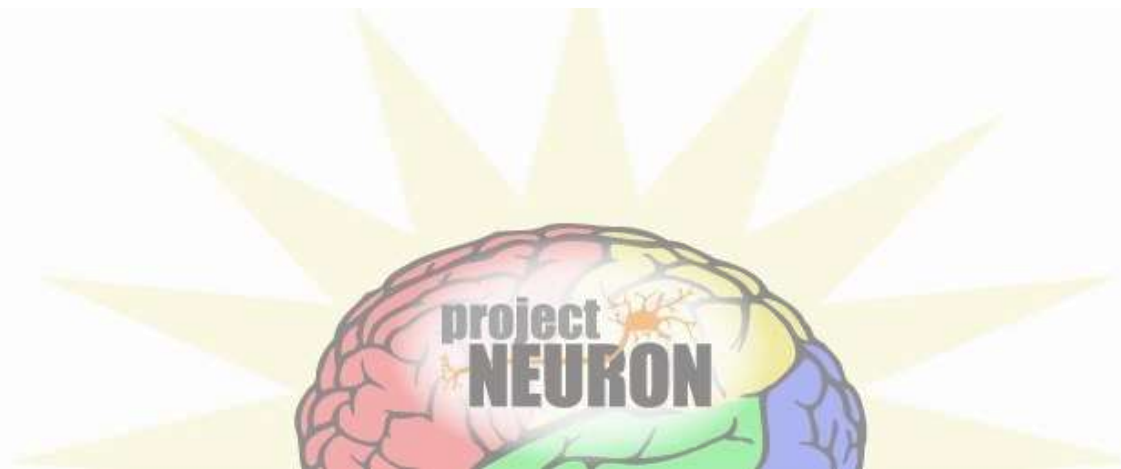
At this point you are creating a model to make predictions. This is exactly how scientists create models. They make predictions through observation and from previous scientific knowledge. After using their models to predict, scientists then test their models to see if their predictions are supported. If not, scientists then need to revise their existing model in light of new evidence. You will be testing your model in the second part of this activity.

Using Models to Test

TEST:

Based on new evidence determine if:

- Your model is supported by evidence
- If you need to add to your model
- If you need to revise your model



Lesson 4

Do glucose and
adrenalin affect
memory in aging
populations?



Rat Recall



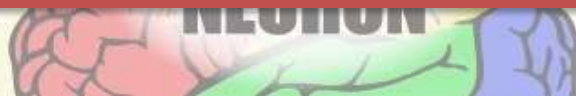
Lesson 5

How does glucose dysregulation lead to disease?

Discussion

- How could you use this unit in your classroom?
 - To teach content?
 - To teach scientific practices, crosscutting concepts, and disciplinary core ideas?
- Do you have comments or suggestions about Lesson 3?
- Questions about Modeling for teachers, students, scientists?

All materials can be found at: **neuron.illinois.edu**



Thank You

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- University of Illinois

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