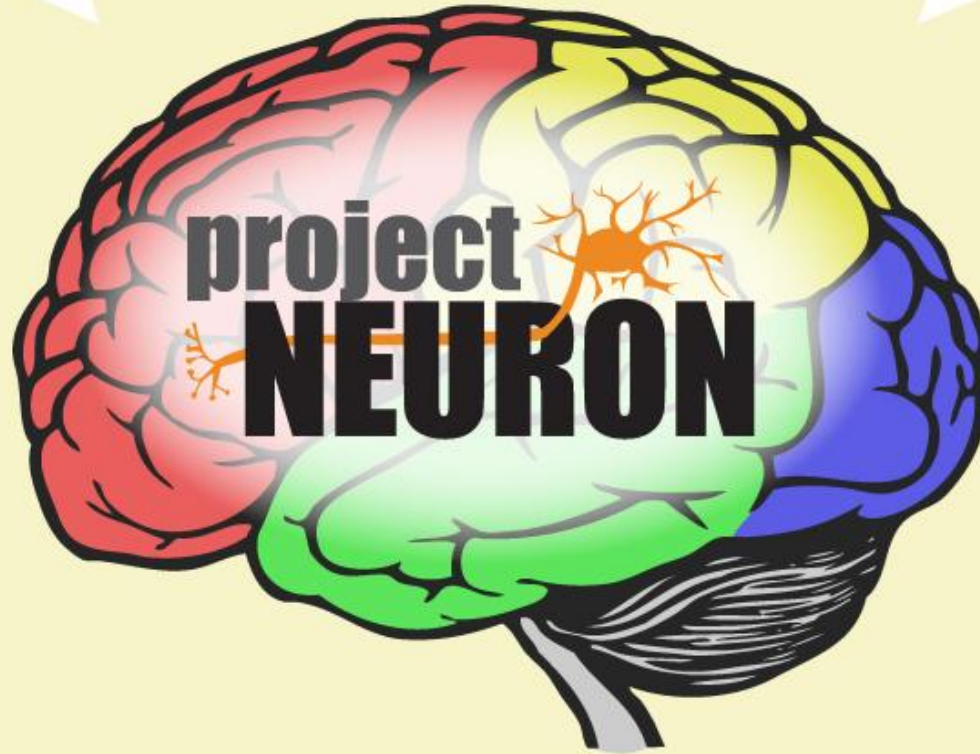# Incorporating the claim, evidence, and reasoning framework into an engaging computer game and curriculum unit

Chandana Jasti, Hillary Lauren, Barbara Hug
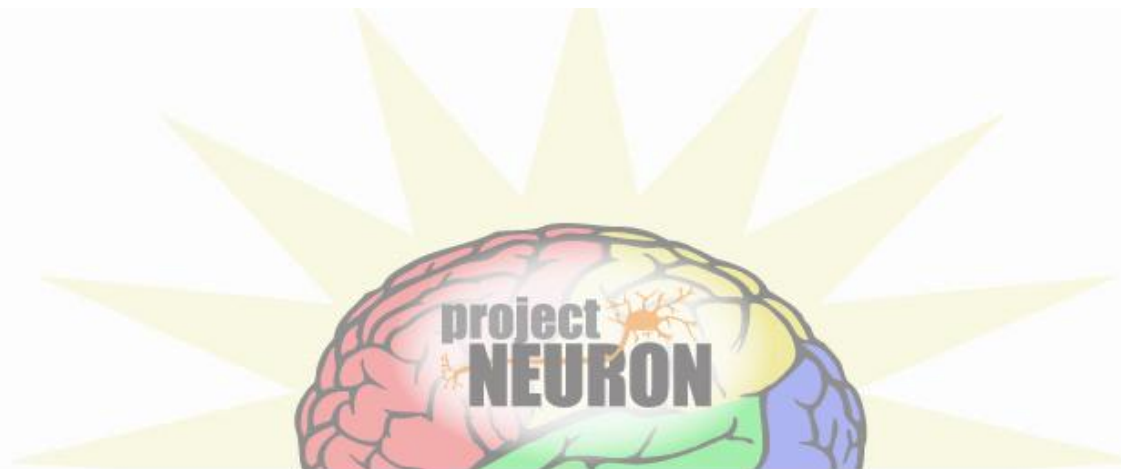
University of Illinois

What is Project NEURON?

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

Project NEURON Curriculum Units

All available at http://neuron.illinois.edu

- **Do you see what I see?**
  - *Light, sight, and natural selection*

- **What can I learn from worms?**
  - *Regeneration, stem cells, and models*

- **What makes me tick...tock?**
  - *Circadian rhythms, genetics, and health*

- **What changes our minds?**
  - *Toxicants, exposure, and the environment*
  - *Foods, drugs, and the brain*

- **Why dread a bump on the head?**
  - *The neuroscience of traumatic brain injury (TBI)*

Unit: Why dread a bump on the head?
The neuroscience of traumatic brain injury

- Lesson 1: What is traumatic brain injury?

- Lesson 2: What does the brain look like?

- Lesson 3: How does a CT scan help diagnose TBI?

- Lesson 4: How to build a neuron

- Lesson 5: What happens to neurons after TBI?

- Lesson 6: Exploring the data behind brain injury

- Lesson 7: What can we tell others about TBI?

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Framework and NGSS

Disciplinary Core Ideas	Crosscutting Concepts	Scientific Practices
• LS1.A: Structure and Function • LS1.D: Information Processing	• Patterns • Cause and Effect • Structure and Function	• Analyzing and interpreting data • Constructing explanations • Obtaining, evaluating, and communicating information

Claim, Evidence, and Reasoning
A framework for scientific explanation
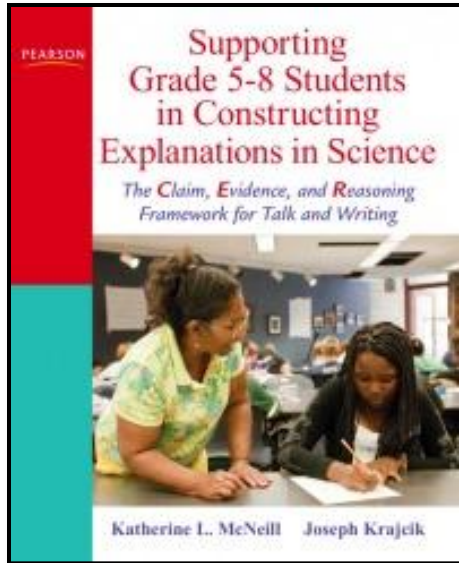
McNeill & Krajcik (2012)

Claim
- A statement that expresses the answer or conclusion to a question or problem

Evidence
- Scientific data that supports the claim

Reasoning
- The justification that links the evidence to the claim

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Goals in creating the game

- Link to new Framework for K-12 Science Education
  - Constructing explanations
  - Neuroscience content

- Engaging and fun

- Use in or out of classroom

- Simulate a realistic medical case

What is "The Golden Hour"?

- Named for a medical term
- Educational computer game
  - Play as a medical student
  - TBI case study
  - Indications of TBI
  - CT scan analysis
  - Surgical procedure
  - Medical professions

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Medical mentors

Susan Picotte,
Lead Physician

Peter Safar,
EMT

Allana Cormack,
CT Technician

Charles Drew,
Neurosurgeon

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The Golden Hour Game

As the "super" medical student, the player must...

Scene 1: EMS

-Respond to 911 call

-Check vital signs

-Assess consciousness
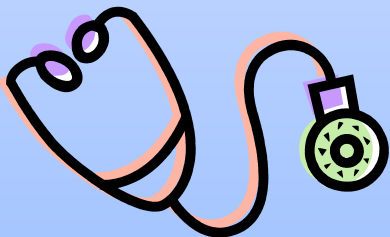
Scene 2: CT Scan

-Review brain anatomy and function

-Interpret CT scans

-Identify TBI location and type

Scene 3: Surgery

-Conduct brain surgery
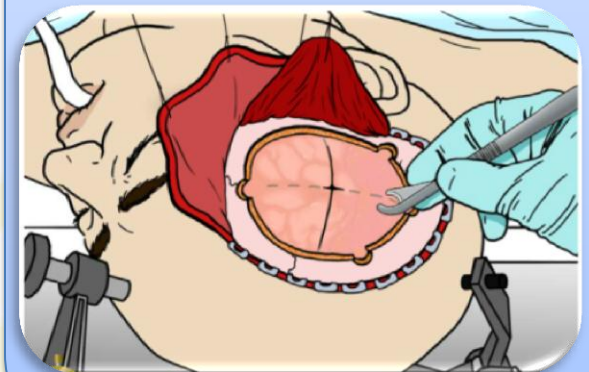
Assessment Scenes

- After each main scene

- Summative report
  - Data collection
  - Medical tablet

- Multiple choice dialogue

- Open response: scientific explanation

How to play

- Menu
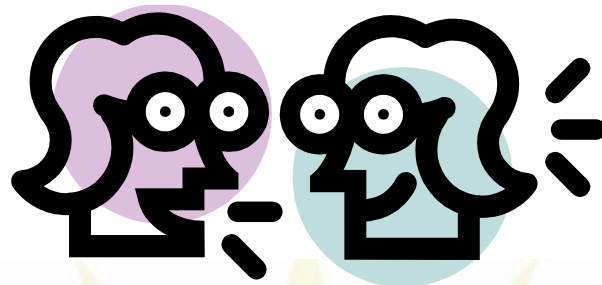 - Select scene 2

- Navigation
  - Messages
  - Toolbar
    - Tablet
    - Menu
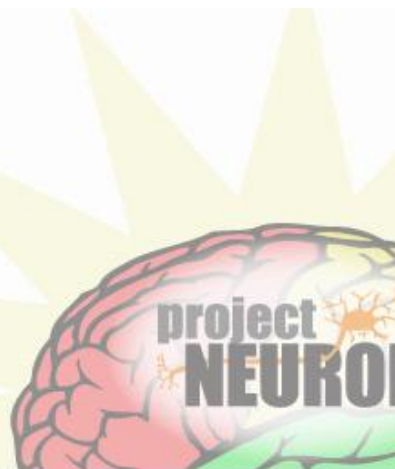
Play time!

- Available on computers today
  - Click on desktop icon
  - Start at Scene 2
  - Fill out paper reports

- Online: http://neuron.illinois.edu/games/
  - Select "The Golden Hour"

Share out

- What were your CERs?

- Discuss in groups: 1 minute

CER through dialogue

- Claim
  - "What should be the next step in treatment?"

- Evidence
  - data in tablet report

- Reasoning
  - "How does…?"
  - "Why do you think…?"

- Rebuttal

Rubric for CER
(High Level)

Claim	Evidence	Reasoning	Rebuttal
Makes an accurate and complete claim.	Provides appropriate and sufficient evidence to support claim.	Provides reasoning that connects the evidence to the claim. Includes appropriate and sufficient scientific principles to explain why the evidence supports the claim.	Recognizes alternative explanations and provides appropriate and sufficient counter evidence and reasoning when making rebuttals.

McNeill & Krajcik (2012)

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Student Responses

Student Example #1

- CLAIM: The patient needs to be sent in for an emergency surgery.
- EVIDENCE: The CT scan showed that the patient had suffered a subdural hematoma.
- REASONING: The subdural hematoma could increase pressure on the brain, and inflict more damage.

Student Example #2

- CLAIM: Bleed in the brain.
- EVIDENCE: We did a cat scan.
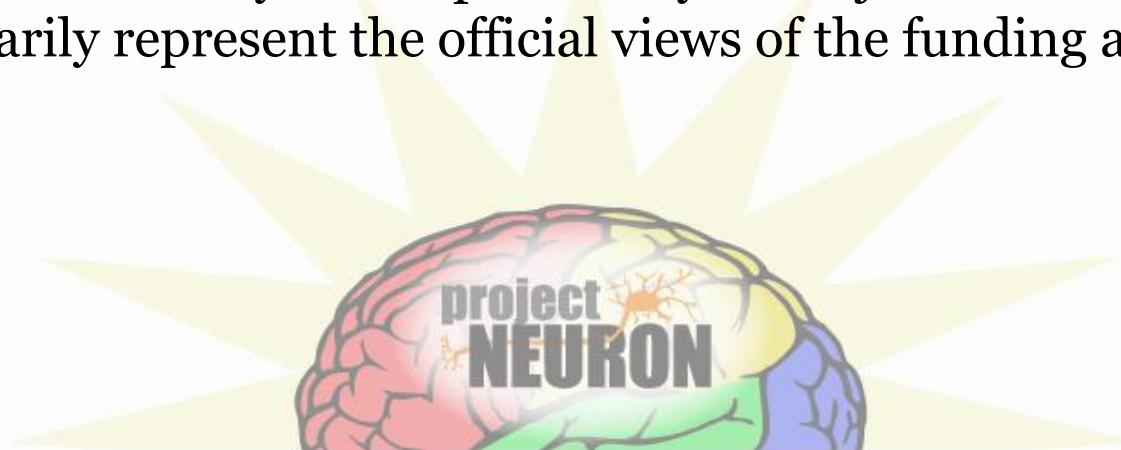- REASONING: The cat scan showed a subdural hematoma.

Discussion

- How could you use this game in your classroom?

  - To teach scientific practice (constructing explanation)?

  - To teach content?
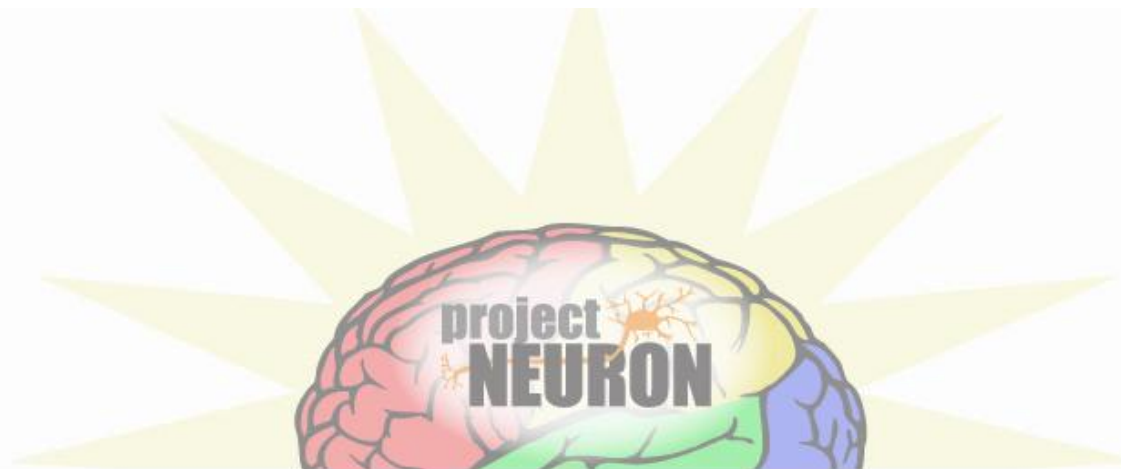
Acknowledgements

- NIH, SEPA
- University of Illinois
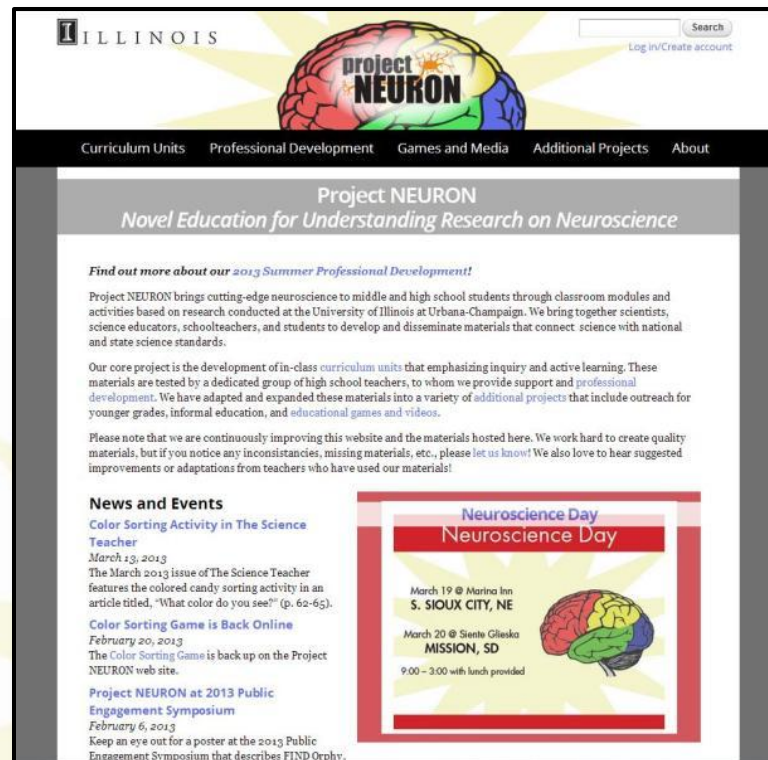
Thanks!

For additional information visit:
http://neuron.illinois.edu

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neuron@illinois.edu