

# Maximizing Student Learning Through Hands-on Inquiry Based Labs

**Presenter: Savannah Stanley**



## Savannah Stanley

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- Taught AP Chemistry, PreAP Chemistry, and On-Level Chemistry for 5 years in DFW
- Bachelor of Arts in Chemistry from University of North Texas
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# Kahoot: Let's see what you know!

<https://create.kahoot.it/details/9935a311-a7d9-4042-a4f4-df10863fa781>

# What is Inquiry Based Learning?

- Using student's curiosities to promote higher levels of learning
- Student centered, teacher facilitated
- Promotes critical thinking skills in students



# **3 types of inquiry based learning**

## **Type 1: Structured Inquiry**

- You direct students to take soil samples from several different locations (e.g. home, school, park) and analyze the composition for differences.

## **Type 2: Guided Inquiry**

- Students choose where they will take soil samples and analyze the composition differences using their own methods.

## **Type 3: Open Inquiry**

- Students choose their own topic surrounding soil samples and create an experiment to answer their essential question.

# Set the expectations BEFORE the lab

- Get those kids HYPED for lab!
- Before the lab, have students utilize pre-lab work
  - Watch a video intro and summarize for a bell ringer
  - Perform a lab demo
  - Complete a series of pre-lab questions
  - Create an interactive questionnaire for students to answer about the lab (ex. padlet)



# Getting the lab to make sense!

- Make time for **analysis** after a lab!
  - Four Square summary
  - Round table analyzing
  - Take time to discuss the data
- Reference the lab throughout the unit
  - This will reinforce the importance of the lab itself
- During the lab, get the students asking probing questions

# **After the lab, how do you check for student understanding?**

- Exit ticket for lab: “Describe the purpose of the lab today”
- 5 X 5 lab quiz
  - 5 questions in 5 minutes covering the most important aspects of the lab
  - This can be taken the start of the next block



# PAVO

# FLINN SCIENTIFIC

- All-in-one platform with science content, customizable labs, hands on inquiry based ready to use instruction!
- Designed for all levels: Advanced, High School and Middle School
- 8 subject content areas
- Over 10,000 units of content at your fingertips
- Customizable content for differentiation
- Asynchronous & synchronous capabilities
- Grade faster and easier with digital submissions!

# PAVO LEARNING PATHWAYS



FUNCTIONS	360SCIENCE	SCIENCE2GO	FLINN LABS	FLINN PREP INQUIRY LABS
Student Level	High School	High School, Middle School	High School, Middle School	AP Sciences
Hands On Inquiry Labs	✓	✓	✓	✓
Asynchronous learning	Asynchronous portions	✓		Asynchronous portions
Editable content	✓	✓	✓	
Digital Submission Capabilities	✓	✓		✓
NGSS Standard Aligned	✓	✓	✓	College Board Standards
Video	✓	✓		✓
VR/AR/Simulation Capabilities	✓	✓		✓

# Connecting TEKS to labs

(11) Science concepts. The student understands the energy changes that occur in chemical reactions. The student is expected to:

(B) **describe** the law of conservation of energy and the processes of heat transfer in terms of **calorimetry**;

(C) **classify** reactions as exothermic or endothermic and represent energy changes that occur in chemical reactions using thermochemical equations or graphical analysis; and

(D) perform **calculations** involving heat, mass, temperature change, and specific heat.

360Science: Hand warmer lab

<https://www.flinnsci.com/360-science-the-thermodynamics-of-hand-warmers-3-year-access/ap10485/>

Science2Go: Thermochemistry Series

<https://www.flinnsci.com/science2go-chemistry/el8563/>

# Exit Ticket: How do you make inquiry learning effective in your classroom?



<https://padlet.com/stanleynsavannah/cast2021>

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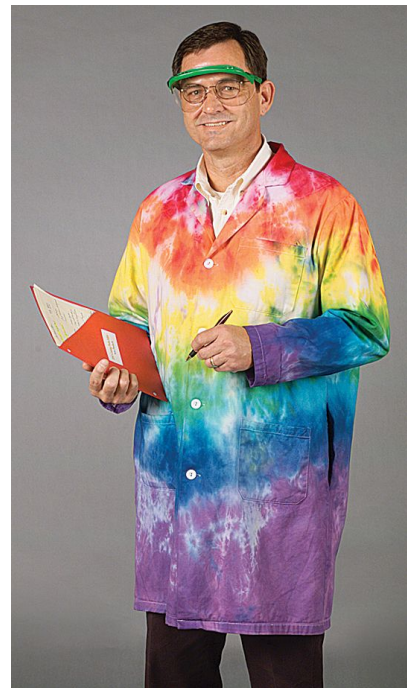


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