STEAM INVESTIGATIONS!

SOLVE THE MYSTERY! BUTTBURGER BUTTBURGER

(BOOK 1) PABLO CIENFUEGOS

Teacher and Parent Guide for Fostering

Scientific Thinking

DP Johnson Ph.D.

About the Author:

DP Johnson Ph.D., or Doug Johnson, as his friends know him has 32 years' experience as an educator, ranging from interpreting Spanish for students in math and science classrooms to teaching mainstream English for middle grades and high school. Johnson currently teaches, writes and publishes in Yakima Washington. He teaches high school English and runs an independent literary press called Cave Moon Press to give voice to different issues around the world. His passion for science has never left, since he started interpreting math and science topics for migrant workers in 1990 in the back of classrooms. He has been the author of at least twenty books, acting as a ghost writer for mysteries and other scientific arenas to help the causes of other writers and educators. He loves playing on a team.

Butt Burger Alvarez? Using his Ph.D. in Educational Psychology around cognition and reading issues, he has taken the genre of mystery fiction and formed questions to spark the imagination. The objective is to not only inspire the reluctant middle school reader, but to excite the underserved STEAM student in your area. This is part of why, at the federal level, The ESSA (2015) tried to bridge the gap in equity around STEAM learning for lower-income students. This effort tries to bolster that adjustment to help all students. You can contact Doug at cavemoonpress@gmail.com for questions about this guide or other writing and science issues you find of interest for your students.

This teacher and parent guide has been correlated to national science standards with an exemplar of one Washington state standard, since ESSA (2015) has given states the option of bolstering their own state standards. A resource page of how to research your state science guidelines under the new STEM rules is offered as well.

Butt Burger Investigations!

Science Solves Crimes!

DP Johnson Ph.D.



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Introduction

The Novels:

Butt Burger Alvarez! Science Solves Crimes! These novels engage STEAM students in four ways. One. We all want to be a hero. We read books to escape our life situations where struggle. Maybe we're lonely. Maybe home life is tough. Maybe our neighborhood is touch. Everybody has something going on. The difficult when you are in middle school is that those raw emotional nerves feel new. As adults we develop coping skills. How do we develop those coping skills around being the hero in our own story? One of those coping skills can be reading. That brings us to two.

Two. Imagination. Einstein famously said, *Imagination is more important than knowledge. For knowledge is limited, whereas imagination embraces the entire world, stimulating progress, giving birth to evolution.* The power of STEAM projects, whether they be in the arts or the sciences, is that they activate our imaginations. For the poor children we serve, reality is all around them and they need no reminders of how difficult life can be. I have a dream... Dr. Martin Luther King Jr. intoned at his speech in front of Lincoln Memorial. It still ripples through our culture because we all need dreams. Dreams take imagination.

Three. Secret Powers. The idea of magic gets a bad rap in our current skeptic culture, but it drives much of our fantasy fiction and a great deal of the most popular books for teenagers. What does that have to do with STEAM? A cursory study of science history reveals that at the budding stages of any scientific endeavor held a misunderstood element of magic. Alchemy was going to turn lead into gold or raise people back from the dead. Kepler, while working out his theories with heliocentric data, made a life out of writing astrology predictions for personal clients and the media. One subject became our modern chemistry. The other subject became our modern astrophysics. Bottom line? Most science starts in the mystery of magic. It ends up feeling like a super-power, once you learn the tenets. Science gives kids a superpower, like all skills learned in school.

Four. Relatable protagonist. Creating heroes with super-powers, (even if they are scientific) is all well and good. Problem? Most of the time, the hero comes from the majority culture. One of the most glaring examples is the Lone Ranger and Tonto. It became the pointed theme of Sherman Alexie's satire, *The Lone Ranger and Tonto Fistfight in Heaven.* Whether science, fantasy or historic fiction, the hero ends up out of the European majority culture, going all the way back to Arthur's round table. America is supposed to be different. Here's the hard question that gives impetus to this curriculum guide. How to you make a poor brown person a scientific hero? There is an illusion that science is devoid of cultural norms that taint other lines of study. These novels and guides seek to address and overcome that illusion. Hopefully the Lone Ranger and Tonto don't have to have a fistfight in heaven, like Sherman Alexie

supposes. Hopefully they can both work in a laboratory, here on Earth, and make it a better planet.

This Guide:

These novels, along with this guide, can be used to supplement your current science curriculum provide ideas for more projects or excite your students during your summer enrichment programs. Following the plot lines of the novels, different lines of inquiry and processes follow different branches of science: chemistry, life science, earth science and more. The kicker is that these novels try to actively combine science knowledge with deductive and inferential reasoning, just like we enjoy when Agatha Christie presents us with a case.

Each activity includes:

• **Teacher Cues:** Pages will include hints as to how to round out the clues that help Luis figure out each case along the way. There are also different resources listed that can augment your own efforts around teaching a certain scientific concept.

• **Skill Building Activity:** Each activity will introduce or reinforce a skill used in science, critical thinking, or reading. These skills will also dovetail into helping them come alongside Luis to solve the crime.

• **Analytical Reflection:** Each activity has a chance to reflect, collect the evidence they know about and decode how Luis, or his friends and family caught the criminal. One strong component of this portion is that it reflects the fact that the novels themselves are simply the journal of Luis about his everyday life.

Butt Burger Alvarez! Science Solves Crimes! Supports the Education Student Succeeds Act (ESSA) that was reauthorized in 2015. Adjustments gave us the new priorities about STEM, as well as a deeper focus on the mental health of children in our schools. For all of that new attention, the fact remains that students need basic literacy. This guide can help. While this book mentions Science Standards from the Office of Public Instruction (OSPI) in Washington state, how each state addresses standards and assessments has been put back on their shoulders. Washington State, in particular, filters their standards through the Next Generation Science Standards (NGSS).

You can find all of those standards at:

https://www.k12.wa.us/sites/default/files/public/science/pubdocs/DCI%20Arrangements %20of%20the%20Next%20Generation%20Science%20Standards.pdf

Using Science to Solve Crimes

Following the Clue

A crime is a problem. Somebody steal your lunch money? Problem. Somebody bully Maria? Problem. What happens when you grow up? Bigger people. Bigger problems. Stealing lunch money turns into stealing a car. That's a crime. Bullying Maria? That turns into assault or worse. Big problem. Big crime.



That means police have to use everything they've got to keep us safe, and one of the biggest tools in their toolbox is science and the scientific method. Let's go through the scientific method and see just how helpful it can be in solving crime. The good news? You can start learning it now, so that you can solve multiple problems in middle school. Who knows? If you like it, you may get as good as Luis in the *Butt Burger Alvarez* novels.

Hey Teacher! A quick note. Even though I'm a Ph.D., when I was younger, they told me to embrace my inner child. I was confused. My inner child, (especially my middle school inner child) was never far away. What does that mean for you? As you read along, you'll notice that I'm talking more to your students in this section, than to you about how to develop a lesson. I'm sure you are already doing a whiz bang job at that part. I'm trying to just lend focus to the student and how they might better understand these concepts. I hope it helps.



What's the Problem?

Every day scientists, sometimes have to step back and discover the actual problem. Did you know that every day scientists include your mechanics, construction workers and anybody that fixes something in your house? Something doesn't work. They have to first ask themselves, "What's the real problem?" before they can go about solving the issue. A police officer? No worries. Police officers have one advantage over every day scientists. All those flashing red lights tell them what the problem is right away. It might be a convenience store in your neighborhood that was robbed. There is smashed glass, and a clerk that is rattle because the had a gun waved in their face. Even worse. Red lights, crime scene tape and a sheet draped over a body. Problem! Somebody died! If you like mystery novels, most of them revolve around this type of crime. We know that it makes you mad if someone steals your gum, but that type of problem makes for a very short book. Even with the body being covered by a sheet, the detectives that arrive on the scene have to be a little like your local mechanic. They have to walk around and observe the scene and keep asking themselves, "What's the real problem?" They have to solve a very real scientific problem, so that they can trace the evidence back to the criminal and keep things safe for the rest of us walking the streets.



Collect the Information= *Evidence*

Like I said, detectives have to walk the scene and ask themselves, "What's the real problem?" Here's the power of science. Whether you are a police detective or mechanic, you have to have an *open mind*. That means, evidence is simply information. It may be a strand of hair that is out of place, or strange footprint at the scene of the crime. When it is a crime, (or you are a scientist) you have to not jump to conclusions right away. Criminals get away when investigators decide ahead of time who is the criminal, or how the crime was committed. You have to keep in mind that you need enough information to create a good conclusion. How does that happen with modern crimes? There is direct evidence, trace evidence and witness accounts.

Direct Evidence: Bullet casing in the wall? Direct evidence. Boot print at the scene? Knife in the garbage? Direct evidence. The great thing about living when you do is all the advancements in scientific testing.

Trace Evidence: Strand of hair to test for DNA? Trace evidence. Stain on the carpet? Trace evidence. Odd paint smudge? Trace evidence. These pieces of information take more than a photograph and a computer search. They need to go back to the scientists in lab coats at the police station to figure out if they help or not.

Witness Accounts: What did other people see? It's not a perfect system, because people all have different ideas, but it is still helpful to talk to people who might have seen the crime, or some event before or after the crime. Remember you need many types of information from different sources to solve a crime. The same is true for all of science. The more information you have, the better chance you have of solving your problem.



Hypothesis= *Educated Guess*

In other scientific situations, you might take a guess, depending on what other people have discovered before about the situation. People discovered that the chemical Sulphur smells like rotten eggs. In fact, your gas company puts Sulphur in natural gas, because you need your nose to wrinkle if you have a gas leak at your house, so bad things don't happen. On the simplest of levels, if you smell Sulphur, you think of rotten eggs. You make a hypothesis. You can take an educated guess that the smell is your little brother, who rips epic farts every time you are trying to win the next level at the video game. It's his secret weapon to make your eyes water and fail. He fist pumps the air, when you choke. He confirms your hypothesis. The evidence confirmed your educated guess.

Detectives use the same thinking, but luckily, they don't have to endure your little brother. Instead, when they face, let's say a murder mystery, they start to take educated guesses to three basic questions.

Motive= Why?: Why would someone want to kill this person? Was it revenge? Did they need the money? Detectives ask that question and start to sift through the evidence to construct an educated guess.

Murder Weapon= How?: How did the crime occur? This becomes key and one nickname for this in the murder mysteries that you read is the detective finding the "smoking gun."

Suspect= Who?: As detectives start to piece together the evidence, they start to creat a list of people who might have created the crime. There are some finer details to how they construct their hypothesis, but this gives you the basics.

In the end, your educated guess about your stinky brother was a pretty easy problem to solve. He has a pattern of leaving epic farts in every room he leaves. Actually, although there are more variables, the same idea still holds true of a detective. Crimes and criminals create patterns. Constructing a hypothesis, examines these common patterns and sees if they can trace it back to the criminal.



OK....so let's break this down for middle school. Say, you weren't sure your stinky brother was the source of the rotten egg smell. You had your hypothesis. Rotten eggs stink. Before you went in to play video games with your brother, you might have experimented, but cracking open an egg from the refrigerator. You smelled the egg. It didn't stink. It's basic, but that qualifies as an experiment.

The one key difference with crime science (called forensic science) is that the adults all use equipment you are learning right now, like microscopes, and computers for data analysis. They take the direct and trace evidence and conduct an experiment. Let's just say repeat your experiment with the eggs, but this time, you put in a Smellometer 6000 because you don't want to smell the eggs, and you need to pinpoint the exact origin. (A Smellometer 6000 doesn't exist, so don't look for it online.) The point is, that's what a forensic scientist does for the detective. They test the guesses of the detectives by experimenting and giving them better information.

Why do you do this in science? Well, it's just as important to eliminate your bad guesses as to discover your good guesses. Is it an easy process? Not always. When Thomas Edison was asked what he thought about failing to make a working light bulb, he is famously quoted as saying, *I haven't failed. I have just found 10,000 ways that won't work.* When you become a scientist, you have to be persistent, and repeating experiments will solve the problem, so don't give up. That's the biggest thing you can learn from science. Don't give up. An experiment is not a failure. You are not a failure. An experiment is just testing an educated guess.

STEP 5 Analyze your Data= *Did you Guess Right?*

How do you know if you guessed right? You analyze. That means that somebody looked at the evidence with your hypothesis (experimented) and then let you know if you guessed right or wrong. Here's the deal. Schools weren't always built for the scientist. Can you imagine if Thomas Edison tried to take his Life Science quiz 10,000 times, telling the teacher, "I know I can get it next time." Not so much.

The scientist has a rough go with school because unless you get an awesome, whiz bang teacher, (like the one you have using this book) there always seems to be an exact right and wrong answer. If you get it wrong, it means you failed and should do the exact same thing better a second time. Sometimes that is true.

The point is, when a forensic scientist offers data related to the evidence, they aren't a teacher offering red marks and gold stars. A forensic scientist is simply stating, "The evidence doesn't support your hypothesis. Try again." That means that you can try again with your current hypothesis, or adjust your hypothesis to reflect the data.

Even if you are in middle school, I hope you understand that that is an entirely different process than a red mark on your test when you said that 2 + 2 = 5. For instance. Take the *Case of the Stinky Brother*. If you smelled rotten eggs, and you experimented to see if it was eggs in your refrigerator, the data said you were incorrect. You didn't give up. You simply tried something else. Video game. Brother farts and grins with a fist bump. Case solved. You had new evidence and with your eyes watering from the smell, you confirmed a new hypothesis.

But what can you do, if you grow up and want to solve crimes as a forensic scientist? There has to be more to life than stinky little brothers. Here are a few specific scientists that analyze specific data for detectives in our modern world. Oh, there'll be some geek words in here. Most of our scientific words come from Ancient Greek or Latin, so we can kind of translate them if we see the pattern. You'll notice that almost all the scientists have *…ologist* at the end. That means "they study."

• **Anthropologist:** This scientist comes from the root word, *Anthro* meaning man, so an anthropologist "studies man." That can mean anything from a type of culture to maybe why a bone would look a certain way at a crime scene.

• **Biologist:** *Bio* meaning life, you are getting introduced to this in Life Science. A biologist can be anything from someone who helps whales to a person who becomes a doctor. For crimes, this job means they analyze maybe the source of blood or saliva that have been left at the crime scene. Was the fluid from the criminal? From the victim?

• **Chemist:** Since you were little, you've seen chemicals for cleaning or other reasons. Chemists have the job of figuring out what types of chemicals were used in the crime. Was it a poison (a chemical) that killed the person? Was it bleach (a chemical) that compromised DNA?

• Odontologist: Sometimes the victim is in such bad shape, they can't figure out who it was, and one of the few ways to figure that out is to have a forensic scientist, (who could be your dentist if they didn't want to solve crimes) look at their teeth to see if they can identify the victim.

• Entomologist: This scientist has a huge name that really just means *Bug Lover!* They know so much about insects, that they can trace the behavior patterns of bugs at the crime scene to see if that offers clues. Think of them as biologists that just loves insects.

• **Geologist:** *Geo* stands for *earth* in Ancient Greek, so this person studies dirt. Well, dirt and rocks. If you like rocks and dirt, this is your world. For a crime scene, they can offer special insight into what might have changed in the soil that will give clues to help the detective.

• **Pathologist:** *Pathos* is the Ancient Greek word for sadness. Diseases make people said, so the Ancient Greeks decided that people that studied disease were studying what makes people sad. The modern name stuck, so this scientist specializes in examining cells and tissues with specialized microscopes and equipment. They take samples from a crime scene to find more clues about a victim or suspect

• **Psychologist:** *Psyche* meant many things in Ancient Greece, but ultimately in translates in the modern world as a person who studies your mind. Let's face it. Criminals have a creepy mind, and psychologists help detectives by trying to analyze the behavior of criminals and what part of their creepiness led them to commit the crime.



Draw Conclusions= *Solve the Crime!*

Remember the *Case of the Stinky Brother*? You went through all the steps, and in the end, you solved the crime. No doubt about it. Your little brother is stinky. Same happens with a detective. To summarize. **What's the problem?** Dead body. Big problem. **Collect Information.** Where is the body? Is there a tire track? What time of day is it? There is a ton of information out there. You are trying to narrow your focus to solve the crime. **Hypothesis.** You can use patterns you have seen before to start. Detectives start with Motive (Why?), Suspect (Who?) and Weapon (How?). As with all scientific activities, there may be a new discovery, or a new pattern, but detectives start with what they know. **Experiment.** Does the DNA collected from the scene match the victim? The criminal? **Analyze the Data.** With a team of specialized scientists who concentrate on forensics (trying to solve crimes) the detectives can refine their data or their hypothesis. Results? **Draw Conclusions.** *Catch the Criminal! Solve the Crime!*

I hope you enjoy this exploration into how the exciting world of science works and can make our world a better place when we keep an open mind and try to be fair to people around us.

Forensic Vocabulary

accomplice: a person who may have helped commit a crime alias: fake name someone uses, and proves with fake identification alibi: details about where a person was during a crime that implies they are innocent. crime where the person illegally burns down buildings arson: when a person, deprived of oxygen, can't breathe and is rendered unconscious asphyxia: or dead autopsy: process of surgically examining a body after death ballistics: study of how a bullet behaves being fired from certain guns in certain situations blood analysis: deciding what types of blood and who they belong to at a crime scene breaking and entering: breaking into another person's business or residence in order to commit a crime calibre: internal diameter of a gun barrel that determines the size of the loaded bullet cause of death: process of deciding what caused a person to die chain of custody: procedure making sure evidence in an investigation doesn't get stolen or corrupted. circumstantial evidence: evidence that points to a crime, but may be only due to circumstances instead of true reasons that will solve crime clue: a discovery, like a fact, object or comment that helps solve a crime. contusion: a bruise showing itself through dark coloration on the skin coroner: government official in charge of autopsies crime scene investigator (CSI): a person trained in figuring out who commited a crime. crime scene: Logic that uses deductions and inferences to help draw conclusions crime: an event that breaks a given legal code. criminal profiling: using psychology to help investigators try to understand possible thought patterns and behavior of criminals. deduce: logic that uses deductions and inferences to help draw conclusions detective: person who walks through the scientific process to help solve a crime **DNA profile:** genetic markers found by forensic scientists that point to the identity of a person evidence: fact, object or comment used as proof in a crime investigation person with specialized training who can explain forensic evidence expert witness: in a court room during a trial fingerprint: unique swirl given to every person used in identifying victims and criminals forensic science: from the Latin, "In open court" forensic science uses normal science methods in order to prove crimes in court a crime where one person intentionally fakes another document for illegal gain forgery: homocide: when one person intentionally kills another person hunch: Intuition or guess not based in proven facts interrogation: asking a suspect, witness or victim questions about a crime investigation: process of using the scientific method in gathering information and analying it in order to solve crimes. larceny: stealing objects of little value misdemeanor: crime that the court defines as small, so that it is punishable by

	paying a large fee (fine) or less than a year in jail.
motive	the reason behind why a person acts a certain way. In this case,
	why they would commit the crime.
murder weapon:	term for object, poison or event that caused the intentional
	death of another person
naked eye:	evidence that can be readily observed at the scene without
	the need of forensic analysis
perpetrator:	person suspected of committing a crime
petty larceny:	stealing something valued less than \$250.
post mortem:	a wound or event that occurs on a body after death
ransom:	amount of money a criminal asks during kidnapping to return the victim
robbery:	stealing things from other people, sometimes involving violence
	or the threat of violence
solvents:	liquid that chemically impacts solids or liquids to create a new solution (liquid) person considered a possibility in the list of people who committed a specific
suspect:	crime
time of death:	point of time when death occurred, helping investigators create a
	timeline for the crime
toxicology:	toxic, meaning poison, this is the study of chemicals in a victims body
	that may have contributed to their death
trace evidence:	substances discovered at a crime scene that need to be tested by a forensic lab,
	even if found in small amounts
verdict:	decision made by a judge or jury related to a crime and if a suspect
	is innocent or guilty
victim:	person harmed in the crime
witness:	person who offers information about a crime either through direct
	observation, or during other events.

Forensic Word Search

VRTEYCNFGYAIDCRIMINALPROFILING V X G L A B R V H N V O E P A D K Y Z E U C V O Y T B B V I V R Z R C T B I O M O O D L B X F L V X C A S Z K E L R Q C V G L Z X T S C M C X B U J U M K R H P A L R M C N P K W R O G O M S Z M I U E O V C T W Z F V S E C I A Y E A O H F G BWKFBITRHCSRECXJJXQRABKEFCSBVI HABOVVZCBRXCINWMPRZTURPUACPWWV DLFRRHMUSINDEQEIFUMWTEATEOZCPS H I E E L P N M L M W C N N Z S T U D I O A E R C M C R V Z V A B N A B Y S W E U W N R E L K Q G T P X P Z H P U I C C ESASSRHTPWJFCACIIFLNSACNGLLMMU V U L I P E V A O C N A V T D U N V N E Y C A S U I U E Z Z I F L C H A R N Z C U L R L Q N G V V S H P W X L C S S W C DCISYKWTIFGIHYLUACESBKMHJEFCBO EKSCXIAIAKEBLSVSIPHSKMKWFWFELR N S T I I N H A M Y Q I X E U Z L G R U T L R O Z Z P N O O C I I E A G W L X Q M O M R W W V D G O W I C Y Y F R E O N EOCNUAZEQ | UVEYS | YQE I FUGBVQERDE Q T S C G N B V Ì F C E C S B C H D W T B I E A S B K | A R CDHETDSIIQIMMBHJANFCETLTTGCPNU N K Z U C E T D H C P N Z N F L D U V K O C A E | O I | A | H C R N Z N M E G Q P D G B T K R N S H V N T P W X R Y L L ALLZWTYN I NBMDEPZAUYEEXTIZVEC ΥV X M E U B E R C H H I F Y L R N C U H E O V Z U V T W K S N A X A D E R I E U K Q J J Q T P C X J P E F N B S E S X I I R C O E S I Y W B U A G X Q Q M R U H H A P D H Z I T C SΗ S V H L N N D I E V K U O R U I X I N R O S O E D I O F U B O G S R Z G A Z C O V O Y L N I C X N L K E B X A M Z N Y S N Z D | M K X E X X L E E A V Y H S Z T L P N O W T X D Y P U C H À I N O F C U S T O D Y L J B Y W Q O E W O W H P V H

crime scene investi	igator (CSI):	circumstantial evidence:	alias:
breaking and entering:		criminal profiling:	alibi:
forensic science:	expert witness:	chain of custody:	
blood analysis:	cause of death:	fingerprint:	
crime scene:	accomplice:	DNA profile:	
contusion:	detective:	asphyxia:	
evidence:	coroner:	calibre:	
autopsy:	ballistics:	deduce:	
arson:	crime:		

R

Scientific Vocabulary

(Adapt to YSD needs)

acid: base: chemical properties: classify: closed system: concept: conclusion: data analysis: data: DNA: English system: experiment: heterogeneous: homogeneous: hypothesis: identify: investigate: laboratory: logical argument: measure: Metric system: observation: open system: pH: physical property: predict: research: scientific method: simulation: skepticism: validity:

Scientific Terms



<u>Across</u>

2. Core pathway scientists use for discovery

3. Answer derived from logic and evidence

4. Part of object observable without special tests

7. Placing object into category under a theory

10. Not believing first opinion, or piece of evidence

12. Evidence you notice with your five senses

15. Quantifying weight, distance, or volume

18. Methodically look for clues

19. Educated guess about the future

20. Location with equipment for experiments

21. Put into categories

22. Things described in evidence by chemistry

<u>Down</u>

 Measurement system, using numbers divisible by 10, for distance, weight and volume

5. Mixture of substances

6. Reasoning through a case with evidence

8. Logical, structured test of an outcome

9. Measurement system

with feet, pounds and gallons

11. Educated guess based on theory

13. Practicing an outcome with special methods

14. Same substance

16. Actively seeking background information on topic

17. Sifting through data to look for patterns

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Case Notes Mamá Killed a Witch!



Pssst!!! Teacher!!

I know you love all the geek moments of science. This guide is for that kid in the back of your class picking his nose...on a good day. Try to have a good time.

Crime Scene: It happened at the dude ranch in Grand Vista (code for Grandview). Two ladies died from arsenic poisoning. The clue was the smell of almonds.

Investigation: Why do certain chemicals smell, certain chemicals don't.

What do you Students need?

- An onion
- An apple
- A potato
- A blindfold

Lab:

1. Step 1

(Teacher, you might have to work on this ahead of time, to smooth out the lab.) Wash the apple, onion, and potato, and ask an teacher to slice, paper thin of pieces of each.

2. Step 2

Have your partner put on the blindfold. Taste one slice of each of the fruits and vegetables. (You should be able to easily tell which is which.) Take off the blindfold and see how close you were to identifying each fruit or vegetable. Write down your thoughts in your journal.

3. Step 3

Put the blindfold on again. *This* time, hold your nose, so you can't smell. Try each sample. Notice any differences when you can't smell? Does the texture matter? Is the texture the same? Take off the blindfold and make notes on what might have changed from your first experience. Remember, the more precise your observation when you can are investigating, the better scientist become, and the faster you solve the crime.

Hey! Teacher!

- <u>Skill Building</u> Have each student open a Google Doc, or have the group open a shared Google Doc, depending on your level of tech. You can have them write it on paper around their own tables, if you need a low-tech solution. Either way, have them type or write *Can you trust a certain smell to be a sure way to find a clue?* Have the students do a Google search as to how the nose works when we smell. You can post YouTube videos or charts. Have them write down 5 things they learn about smell. If they use a shared Google Doc, they can all report their research and verbally share what they find.
- 2) <u>Crime Scene Analysis.</u> Students read the crime scene synopsis from Butt Burger's journal. They review the suspect list and speculate in their own virtual journal about what could prove the crime from the scene. Take loose notes. Don't get too stressed, as if this is a math problem with a straight answer.
- 3) <u>Speculate in Groups.</u> The students can discuss in small groups, or you can formalize this into presentations. Other students can offer evidence or critiques to narrow down the solutions.
- 4) <u>Finish the Book!</u> After students have finished the book, have them trade their journal notes to reflect on what helped Butt Burger solve the crime. Didn't figure it out? No worries. Write down what you learned in the process. Put a star in your journal about the part that you want to carry forward.