Student Learning Plan – utilizing PDSA Model
(Technology Integration when applicable)

Instructor: Lauren Huntington **Date(s):** 10/29/14 **Grade Level:** 8

PLAN:

Concept/Topic to Teach: How the scientific method can be used in and out of science class.

Common Core Content Standards/Benchmarks addressed:

SC8.2.1
Students research scientific information and present findings through appropriate means.

SC8.2.2
Students use inquiry to conduct scientific investigations.
• Ask questions that lead to conducting an investigation.
• Collect, organize, and analyze and appropriately represent data.
• Draw conclusions based on evidence and make connections to applied scientific concepts.
• Clearly and accurately communicate the result of the investigations.

SC8.2.3
Students clearly and accurately communicate the result of their own work, as well as information obtained from other sources

SC8.3.1
Students explore the nature and history of science.
• Students explore how scientific knowledge changes and grows over time, and impacts personal and social decisions.
• Students explore the historical use of scientific information to make personal and social decisions.

CCSS.ELA-Literacy.RST.6-8.3
Follow precisely a multistep procedure when carrying out experiments, taking measurements, or performing technical tasks.

CCSS.ELA-Literacy.RST.6-8.1
Cite specific textual evidence to support analysis of science and technical texts.

CCSS.ELA-Literacy.RST.6-8.8
Distinguish among facts, reasoned judgment based on research findings, and speculation in a text.

***ISTE Standards-Students* to be addressed**:

2. Communication and Collaboration

Students use digital media and environments to communicate and work collaboratively, including at a distance, to support individual learning and contribute to the learning of others.

d. Contribute to project teams to produce original works or solve problems

3. Research and information fluency

Students apply digital tools to gather, evaluate, and use information.

a. Plan strategies to guide inquiry

b. Locate, organize, analyze, evaluate, synthesize, and ethically use information from a variety of sources and media

c. Evaluate and select information sources and digital tools based on the appropriateness to specific tasks

d. Process data and report results

4. Critical thinking, problem solving, and decision making

Students use critical thinking skills to plan and conduct research, manage projects, solve problems, and make informed decisions using appropriate digital tools and resources.

a. Identify and define authentic problems and significant questions for investigation

b. Plan and manage activities to develop a solution or complete a project

c. Collect and analyze data to identify solutions and/or make informed decisions

d. Use multiple processes and diverse perspectives to explore alternative solutions

5. Digital citizenship

Students understand human, cultural, and societal issues related to technology and practice legal and ethical behavior.

a. Advocate and practice safe, legal, and responsible use of information and technology

b. Exhibit a positive attitude toward using technology that supports collaboration, learning, and productivity

6. Technology operations and concepts

Students demonstrate a sound understanding of technology concepts, systems, and operations.

a. Understand and use technology systems

b. Select and use applications effectively and productively

Specific Learning Objective: Students will apply the steps of the scientific method to research and answer a stated question, write a testable hypothesis, design an experiment, and gather and analyze data that will support or prove their hypothesis wrong to 80% accuracy according to a grading rubric.

Technology Integration: Using the iPads as research tools allows the students to collect and analyze data from multiple sources to develop a supported conclusion. Students will be able to collaborate to locate, and evaluate information from a variety of sources. They will select information from appropriate sources that answer the specific question. The use of the iPad fulfills the gathering and analyzing data portion of the scientific method as well as gives them the tools to write a supported conclusion.

Assessment(s) to be used: Students will be assessed on the quality of work they put into writing a hypothesis, designing an experiment, and researching and gathering data. They will also be assessed on how they participate and collaborate. A rubric will be used as a guideline for the students to know the quality of work they are expected to submit and as the assessment tool. They will turn in the completed activity to be graded.

Target (performance goal – end of unit): Students will understand how to apply the scientific method to answer everyday questions and solve problems.

Materials needed - including software/hardware and any technology tools:
Handout on which the students will write their work
Grading rubric
iPads with internet access
Pencils
Bowl/jar/hat to draw assigned research question
10-15 different old wive's tales/superstitions/myths written on small slips of paper

Key Vocabulary specific to content and technology tool(s)/concepts:
Scientific Method: an organized way of figuring something out.

Hypothesis: an educated guess. A testable, proposed explanation for a phenomenon.

Research: the systematic investigation into and study of materials and sources in order to establish facts and reach new conclusions.

Experiment: An experiment is an orderly procedure carried out with the goal of verifying, refuting, or establishing the validity of a hypothesis

Old Wives Tale: a traditional belief or superstition that is not necessarily true.

Helpful hint: a traditional believe that is actually true.

DO:

Anticipatory Set (lead in or introduction of content; motivation and engagement of students):
Opener: The students are accustomed to coming to class and doing a writing prompt or "opener." The question "Have you used the scientific method in the last week? Explain?" will be written on the board for the students to write about in their interactive notebooks. After about 5 minutes, we will discuss what they came up with.

Step-by-Step Procedures: (List pg. #, books, etc.; be specific)

THE TEACHER WILL: Ask students what they wrote about in the opener.

THE STUDENT WILL: : Participate in discussing how they used the scientific method in the last week.

THE TEACHER WILL: Ask the students if they know what an old wives tale is and if they have any examples of one.

THE STUDENT WILL: : Attempt to tell me what an old wives tale is and provide examples.

THE TEACHER WILL: Explain that an old wives tale is a traditional belief or superstition that is not necessarily true. Tell them that some of these sayings/beliefs are true and those we will call "helpful hints." Provide examples of common old wives tales and helpful hints: An apple a day keeps the doctor away, sitting too close to the T.V. can give you bad vision, wait 30 minutes after eating before swimming, if you swallow gum it will stay in your digestive track for 7 years, too much loud noise can cause hearing loss, going outside with wet hair can give you a cold, chicken soup helps get rid of sickness, warm milk helps you sleep, turkey makes you tired, you can get the flu from a flu shot, carrots are good for your eyes, we only use 10% of our brains, breakfast is the most important meal of the day, caffeine, chocolate, or cheese before bed can cause weird dreams … Some of these are untrue old wives tales, and some are true helpful hints. Ask the students how we can find out whether or not these are true.

THE STUDENT WILL: : Students will (hopefully) conclude that using the scientific method can help us determine whether or not these are true.

THE TEACHER WILL: Ask the students if they've ever seen the television show "Mythbusters." Explain that the scientists on this show use the scientific method and perform experiments to prove whether old wives tales, superstitions and myths are true or false. So today, the students are going to become mythbusters themselves.

Introduce the activity. Handout a question sheet and rubric to each student. Explain that they will work in pairs to form a hypothesis, design an experiment, and research a common belief to find out if it is a true helpful hint or a false old wives tale. Each group will be researching a different topic.

Go over the handout and the expectations as stated in the rubric. Explain that they will answer the first 4 questions without the iPads. They will state the question about their topic, form a hypothesis (making sure it's an if … then statement) and justify the hypothesis, as well as design an experiment that they think would work to test the hypothesis. After they answer the first 4 questions, they can get the iPads and use them to research their tale. They will write down the information they find about their topic. They must use more than 1 source, and the rubric will tell them what is expected as far as number of sources. To get the full amount of points, at least 3 sources are required. They must site their sources. After they feel they have a sufficient amount of research, the students can draw a conclusion about their topic and decide whether it is a true helpful hint or just an old wives tale. They will develop a conclusion, and write whether their hypothesis was correct or not.

Divide the students into pairs. Explain that they will draw a piece of paper from a bowl, and that piece of paper will have their assigned topic.

Go around to each pair and allow them to draw form the bowl.

THE STUDENT WILL: : Collaborate in pairs to finish the handout. They will answer the first 4 questions on their own, then they will be allowed to obtain their iPads and use the internet to do research. They will have a rubric to guide their quality of work so they know what is expected of them.

THE TEACHER WILL: Conclude the activity by telling them the scientific method is an important aspect of problem solving in real life. It can be used to research and answer questions they might have, solve day-to-day problems we all face, and become real life mythbusters. They will continue to use the steps of the scientific method throughout this science class, and their lives.

Applications (for students with lower skills – differentiated instruction); look for how technology tools may assist:
Student A: Make sure to clarify instructions.
Student B: Read and clarify instructions. Extra time to complete work.
Student C: Simplify and clarify instructions. Extra time may be needed.
Student D: Read, and re-read directions. Allow wait time to process and respond to directions, questions, and steps given. Give reassurance and positives. Student will work better if positive interactions are happening. Extra time to work on assignments. Give frequent breaks.

Extensions (for students with higher skills – differentiated instruction); look for how technology tools may extend learning: Students who need extensions may research more than one topic. They may also perform their experiment at home and gather and analyze their data and draw a conclusion from that for extra credit. The advanced class can extend this activity, and all of them may actually follow through with their experiment design.

(next two main sections completed after plan has been taught)

STUDY:

Results – How did students perform? – (includes assessment results) What was the outcome of lesson objectives; is homework/reinforcement and independent practice needed?
The students were really enthusiastic about this activity. It ended up being a fun way to teach them how to properly use the scientific method. This activity was worth 20 points. The students were graded in 5 different areas on a scale of 0-4. I was pleasantly surprised with the quality of work I received. The overall class average was 17.74/20 points or 88.7%. Fourteen out of seventeen students received a 90% or higher. Only three students turned in effortless work and/or chose not to cooperate with the activity. That's pretty good for 8th graders! I managed to hit all of my lesson objectives with the outcome I was looking for. This topic will continue to be enforced throughout the school year, as well as in science classes they will take in the future.

Reflection/Evaluation: What worked?

I graded my students based on a rubric that was handed out with the assignment. The students who chose to follow the rubric did an excellent job meeting all the expectations. They were careful about spelling and punctuation as well as making sure their work was easy to follow and read. The students who scored a little lower did not take the time to do neat work, or read through all of the expectations on the rubric. Clarity was a big thing in my grading strategy. If the students clearly wrote their hypothesis, steps to their designed experiment, research data, and conclusion, they received a high score. If I was left questions after reading their answers they lost points.

Relating the topic of the scientific method to their lives everyday with the anticipatory set worked really well. The students were immediately engaged and wanted to share how they used the scientific method recently. This made for an entertaining few minutes where the students were able to be funny and make real connections.

Another strategy that worked well was relating the activity to the popular television show "Mythbusters." Most of the students have seen the show and said they loved it. Although I had to break the news to them that they

weren't actually going to be performing experiments, they were still excited to get to the bottom of a question and be a myth buster themselves.

Letting the students draw their topic instead of assigning one to them was a very successful strategy. They were excited to draw from the bag and the element of surprise added to their excitement. Not one group complained about their research topic.

One thing that I didn't talk about in my introduction or bring up at all that was absolutely necessary was how much time they were allotted to work on this activity. Middle schoolers need time management or else they will take almost an entire class period (90 minutes) to complete a task. I think I was excited to teach and the time frame didn't even cross my mind. In reality they should have spent maybe 45 minutes to an hour on this activity, not the entire period. I am impressed with the quality of the some of the work I did get. Students did use their time to put effort in, but I will keep time management in my mind for all the other lessons I teach.

The students who chose not to put any effort in, are students who usually choose not to put effort into anything. One student just couldn't get motivated no matter who was there to try to get him going. Turns out, he felt overwhelmed because it was the end of the quarter and he had poor grades due to missing a lot of school.

ACT:

Closure (Reteach/reflections/relevance/review – What needs to happen next? Do certain concepts need to be retaught?
Earlier in the semester, the idea of "research" was not fun for these students. They also did not know where to even begin with researching online and finding quality information. I am really impressed with how far they've come with their research skills, but more enforcement on using research could definitely be used with this group.

They seem to have a handle on using the scientific method in different ways to find answers in different situations. They recognize that they use it to solve everyday problems, but can also use it in a more detailed way to answer questions that they might not know the answer to, or they know the answer but don't know why. This was the first opportunity the students got to design an experiment around a hypothesis and most of them were able to design something that would give them conclusive results, but this is something that they could use more time and instruction on.

Name:

What is the old wives tale or helpful hint you are researching?

1. State the question:

2. Form a hypothesis (What do you think? Is this false and an old wives tale or a true helpful hint?)
Be sure to use an If …. Then … statement.

3. Justification for the hypothesis:
(Why did you make that prediction? You can use a personal experience if you have one …)

4. What kind of experiment(s) could you use to test your hypothesis? Write the steps to your experiment. (make sure this could actually be done in real life!)

5. Use the iPads to research your question and gather data and information that you find online. List the information you find and your sources! (check the rubric for the number of sources you should have)

6. After researching, what can you conclude about your question? Is this an old wives tale or a helpful hint? Why? Is your hypothesis correct or incorrect? Use your research to support your answer.

An apple a day keeps the doctor away

Don’t sit too close to the TV or it will damage your eyes!

Wait 30 minutes to an hour before swimming after you eat!

If you swallow your gum, it will take 7 years to digest!

Too much loud noise can cause hearing loss

Cold weather can give you a cold

Chicken soup helps get rid of sickness

A glass of warm milk will help you sleep

Turkey makes you tired

Getting a flu shot can give you the flu

Eating carrots is good for your eyes

We only use 10% of our brains

Breakfast is the most important meal of the day

Consuming caffeine, chocolate, or cheese
before bed will give you weird dreams