Grade Level/Course:
Grade 7 Life Science

Lesson/Unit Plan Name:
Scientific Method Mania

Rationale/Lesson Abstract:
SWBAT explain the scientific method/scientific inquiry. SWBAT to develop a hypothesis and clearly and scientifically communicate their conclusion.

Timeframe:
One week

Common Core Standard(s):

7. Scientific progress is made by asking meaningful questions and conducting careful investigations. As a basis for understanding this concept and addressing the content in the other three strands, students should develop their own questions and perform investigations. Students will:

c. Communicate the logical connection among hypotheses, science concepts, tests conducted, data collected, and conclusions drawn from the scientific evidence.

e. Communicate the steps and results from an investigation in written reports and oral presentations.

Instructional Resources/Materials:
See Scientific Method Week Overview Document below in Activity/Lesson section
Day 1 – PowerPoint, guided notes worksheet and homework worksheet
Day 2 – PowerPoint, guided notes chart, and homework worksheet
Day 3 – Peanut Butter, Jelly, Bread, and knife for demo; homework worksheet
Day 4 – Water, salt, timer, ice cube, and cups for Fresh/Salt water lab; homework worksheet
Day 5 – PowerPoint quiz, student lab books to review Fresh/Salt water lab

Activity/Lesson:
See Scientific Method Week Overview on page 3 for detailed lesson plans

Day 1 – SWBAT write the steps of the scientific method. Teacher will present notes via PowerPoint (see PowerPoint Day 1). Students follow along with guided notes worksheet (see Guided Notes Day 1). Students begin homework worksheet (see Homework Worksheet Day 1) in class and complete for homework.

Day 2 – SWBAT describe the steps of the scientific method and align the six steps in method. Students follow along with teacher's PowerPoint with guided notes sheet (see Guided Notes Day 2). In small groups, students complete vocabulary chart. Teacher continues to assess students' learning. Students begin homework worksheet (see Homework Worksheet Day 2) in class and complete for homework.

Day 3 – SWBAT write a "report" section for a lab report and construct a solid hypothesis. Students instruct teacher on making a peanut butter and jelly sandwich while writing clear steps in lab notebook (following the scientific method).

Day 4 – SWBAT to solve problems using the scientific method. Students work in lab groups to complete Fresh vs. Salt Water Lab (see lab handouts below).

Day 5 – SWBAT clearly articulate evidence and state conclusion from Fresh/Salt Water Lab. Teacher administers PowerPoint Scientific Method Quiz (see PowerPoint Quiz attached). Students will review Fresh/Salt Water Lab within their lab groups and present evidence to class.

Assessment:
Teacher will use formal (I.E. lab report, quiz, science fair project) and informal assessment (I.E. thumbs up/down, 1-5 scale [example: "On a scale from 1-5, how well do you understand steps for scientific method?"], daily "check for understanding" oral questions, think-pair-share)

	Monday	Tuesday	Wednesday	Thursday	Friday
Standard	7.c, 7.e				
Objective	SWBAT write the steps of the scientific method	SWBAT describe the steps of the scientific method and align experiments with 6 steps in method	SEBAT write a "report" section for a lab report and construct a solid hypotheses	SWBAT solve problems using the scientific method	SWBAT clearly articulate evidence and conclusion from science lab
Do Now	Describe a science experiment you have done in your kitchen at home	Define using textbook: 1. Scientific inquiry 2. Hypothesis 3. data	4. Scientific Inquiry 5. variables 6. control	7. manipulated variables 8. responding variables 9. Conclusion	Scientific Method Quiz
Intro to new material	Steps – ppt (attached)	Notes – PPT (attached)	Have students write out steps for making Peanut Butter and Jelly Sandwich while teacher prepares an actual PB&J sandwich	Fresh and Salt Water Lab – See lab print-out below	Review – no new material
Group practice	Guided notes (day 1)	Fill out chart – notes/experiment	Peanut butter and jelly steps translated into scientific report	Students work in groups to complete lab	Review lab from Day 4 with lab group - present evidence to class
Check for understanding	Teacher assess by thumbs up/down	Teacher assess with a 1-5 scale	Teachers assess with question/answer	Teacher walks around room to observe each group	
Independent practice	Worksheet #1	Worksheet #2 – identifying parts	Wkst # 3		
Homework	Finish wkst for homework	Finish worksheet & come up with an idea	Finish wkst 3	Finish for hw worksheet #4	
Materials	Make copies and hole punch		Peanut butter, jelly, bread, knife, plate	Water, salt, cups, ice cubes, lab worksheet	

Guided Notes – Day 1

Name	Period	Date
Do Now		
Objective		

Scientific Method Notes

The 6 Steps of the Scientific Method

Step #1: Pose a _____.

What do you want to explore? Ask a question about it.

- Choose something that can be answered with an _____.

Step #2: Form your _____.

What do you think the answer to your question or problem will be?

- A hypothesis is an educated guess based on _____.
- Your hypothesis must be very clear so you can _____ it.

Step #3: Design an _____ and test your _____.

Write the steps for how you will test your hypothesis.

- List the _____ you will need.
- Your procedure must be so detailed that another scientist could _____.

Step #4: Collect and Interpret _____.

- Get your materials, follow your _____, and make observations.

- While taking data, you should record _____ and _____ observations.

- Make _____, charts, or _____ using the data.

Step #5: Draw _____.

- In the conclusion, scientists answer the _____ that the experiment asked.

- Look at your _____ and decide what it tells you about your hypothesis. Summarize your data.

-

Step #6: Communicate your _____.

What happened? Was it what you expected? Why or why not?

- _____ your results with others.

DAY 2 – Guided notes/chart

Name	**Period**	**Date**
Do Now		
Objective		

SCIENTIFIC METHOD

	Definition	Example
1. Pose a question		
2. Form a hypothesis		
3.Design an experiment		
4. Collect data		

5. Make a conclusion		
6. Communicate results		

Good Scientific Method Questions

A good scientific question can be answered by doing an _____.

Which of the following are good scientific method questions?

Put a YES next to questions that are good scientific method questions and a NO next to those that are not.

_____ What is the best color in the world?

_____ Will using or not using fertilizer help a plant grow better?

_____ Do athletes run faster with or without vitamins?

_____ How fast can humans run?

Rewrite the 2 questions above that were not good scientific method questions so that they are good scientific method questions.

a)

b)

Create 2 examples of your own good scientific method questions.

a)

b)

Scientific method homework– Day 3

Name	**Period**	**Date**
Do Now		
Objective		

1. What is the scientific method?_____

_____

2. Write the 6 steps of the scientific method in order._____

_____

Today we are going to practice the first three steps of the scientific method. For each situation below, please state a problem and form a hypothesis.

***The problem always ends in a question mark (?) and the hypothesis always ends in a period (.).

Example: Observation: Juan is trying to grow plants.

Problem: Will Juan's plants grow better if he puts them in the sun?

Hypothesis: If Juan puts his plants in the sun, then they will grow better.

3. Observation: Students are late to class.

Problem:

Hypothesis:

4. Observation: Someone is smoking a cigarette.

   Problem:

   Hypothesis:

5. Observation: Students are always tired in my first period class.

   Problem:

   Hypothesis:

6. Observation: Samantha is trying to grow flowers.

   Problem:

   Hypothesis:

Now fill in your OWN observations:

7. Observation:

   Problem:

   Hypothesis:

8. Observation:

   Problem:

   Hypothesis:

9. Observation:

   Problem:

   Hypothesis:

10. It is important to learn how to _____ a good “methods” section in a _____ report.

This is the section where you tell your audience how you completed your

_____ and what _____you used.

11. Today we wrote the steps and materials needed to build a PB & J sandwich. Now it is your turn, please write all materials and steps needed to prepare a bowl of cereal. Be exact, pretend like you are writing to someone who has NEVER made milk and cereal before.

MATERIALS: _____

_____

_____

_____

_____

_____

PROCEDURE:_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

Name: _____ Job:_____

Fresh vs. Salt Water Lab

The scientific method involves 5 steps: question, hypothesis, experiment, data, and conclusion. Any discovery made in science involves these steps where a scientist notices something, asks why or how that happens, and comes up with a reasonable guess to answer it. However, a guess alone does not prove anything. In order to answer his question, he must perform an experiment and look at the data. Only then he will know if his reasonable guess was correct or incorrect. In this lab, you will follow the 6 steps of the scientific method to answer the question, "Does ice melt faster in salt or fresh water?

Step 1: Question *(1 point)*

_____

Step 2: Hypothesis *(3 points)*

If I test to see_____

then I predict_____

because_____

Step 3: Experiment (Materials) *(2 points)*

- ☐ Cups:_____
- ☐ Water:_____
- ☐ Timer

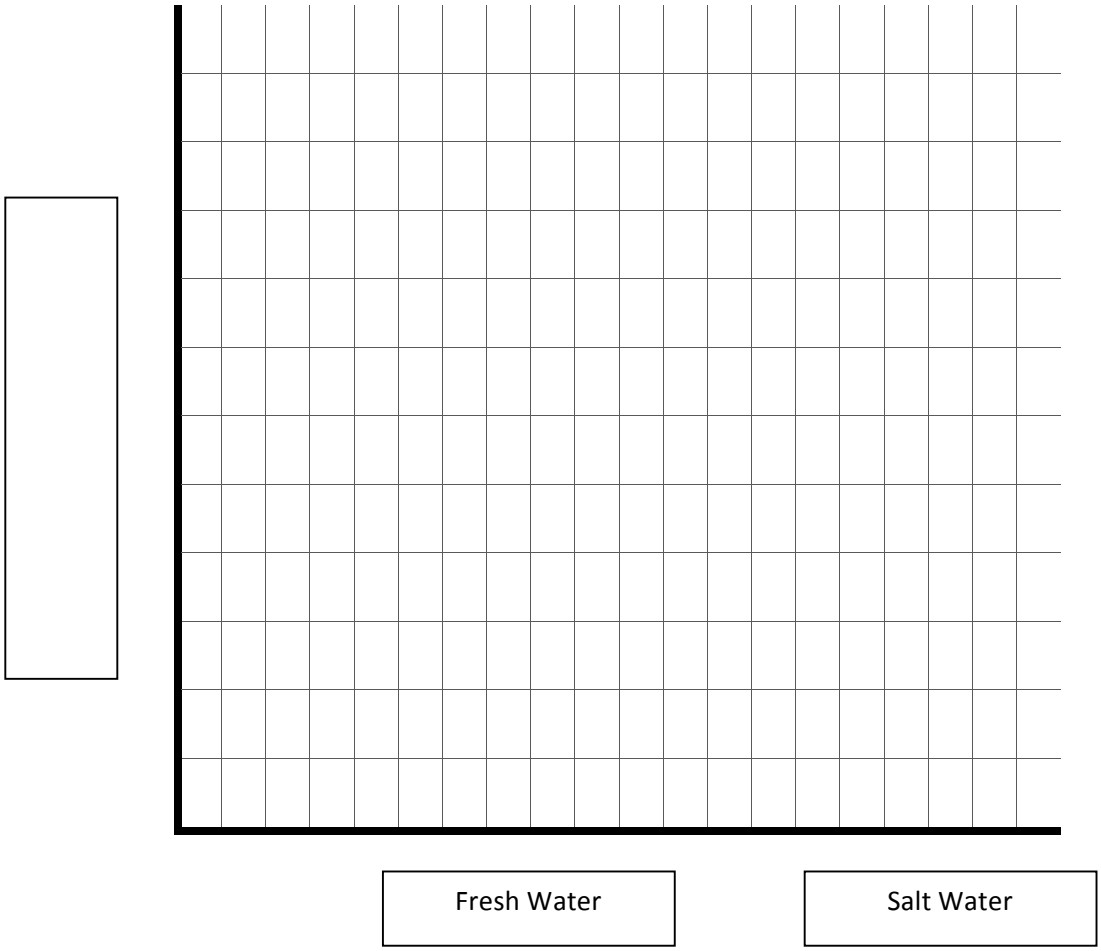
Step 3: Experiment (steps)

1. Work in groups of 4. Only the material leader can get the materials for the group.
2. Pour fresh water in the fresh water cup.
3. Pour salt water in the salt water cup.
4. Class timer will start
5. Put 2 cubes of ice in each cup when Ms. Tai gives the signal
6. Record the time it takes for ice to melt in salt water in the data table.
7. Record the time it takes for ice to melt in fresh water in the data table.
8. Include units!! (time in minutes or seconds)

Step 4: Data Analysis *(4 points)*

	Salt water	Fresh water
Time		

Step 4: Data Analysis (Graphing) *(3 points)*



Step 5: Conclusion. *(7 points)*

1. How long did it take ice to melt in fresh water? _____
2. How long did it take ice to melt in salt water? _____
3. Looking at your data, was your hypothesis correct or incorrect? _____
4. Explain in 2-3 COMPLETE SENTENCES about what happened in your experiment. Be detailed.

_____
_____

_____
_____

Homework:

1. What is an inference?
2. Write an inference about your family.
3. Write an inference about your school.
4. Write an inference about your math class.
5. Write an inference about a sport.

Scientific Method Homework – DAY 4

Name: _____ Period:_____ Date _____

List the steps of the Scientific Method In the space provided.

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____

In the space provided, use the Scientific Method to solve the following problems. Follow the step-by-step process you wrote above to find a solution. Write your answer in ***PARAGRAPH FORM*** and be sure to write in ***COMPLETE SENTENCES***.

Observation 1: One morning you wake up and discover that your radio no longer works.

Observation 2: You take all of your books home from school and promptly finish your homework. The next morning you wake up and cannot find your bag with your books in it. Your brother has a backpack that looks very similar to yours.

Name	Period	Date
Do Now		
Objective		

The Scientific Method

How do scientists make discoveries? They follow the five steps of the **scientific method:**

1. Make **observations.** Check out the world around you to find out everything you can about a problem you want to solve.

2. Form a **hypothesis,** or predict what you think will happen when you do the experiment.

3. Perform **experiments,** or tests, that will prove your hypothesis is right or wrong.

4. Collect **results.** What happened when you did your experiment? What information can you collect?

5. Draw **conclusions,** or answers, about your hypothesis by taking a good look at your results.

Name: _____ Date: _____

"The Scientific Method" Questions

___ 1. In the scientific method, before conducting any experiments, it is necessary to

a. make discoveries.
b. draw conclusions.
c. form a hypothesis.
d. collect results.

___ 2. If the hypothesis is proved wrong, the next step would be to create a new hypothesis and follow steps of the scientific method steps again. What step would be next?

a. collect more results.
b. draw conclusions.
c. conduct more experiments.
d. do nothing, you are done.

___ 3. An experiment that is most appropriate to prove the hypothesis that it rains more in April than in March would be to

a. count how many days it rains in April.
b. measure the growth of flowers during the month of March.
c. count the number of sunny days in March and April.
d. collect and measure the amount of rain in March and in April.

___ 4. The step just before deciding whether your hypothesis is correct or incorrect would be to

a. make a prediction.
b. perform an experiment.
c. collect results.
d. make observations.

___5. What question about the world around you could be answered using the scientific method? Explain how you could use the scientific method to answer your question.

_____

_____

Name: _____ Date: _____

"The Scientific Method" Answer Sheet

Seq. 1. In the scientific method, before conducting any experiments, it is necessary to

a. make discoveries.
b. draw conclusions.
c. form a hypothesis.
d. collect results.

Seq. 2. If the hypothesis is proved wrong, the next step would be to create a new hypothesis and follow the steps of the scientific method again. What step would be next?

a. collect more results.
b. draw conclusions.
c. conduct more experiments.
d. do nothing, you are done.

DC 3. An experiment that is most appropriate to prove the hypothesis that it rains more in April than in March would be to

a. count how many days it rains in April.
b. measure the growth of flowers during the month of March.
c. count the number of sunny days in March and April.
d. collect and measure the amount of rain in March and in April.

Seq. 4. The step just before deciding whether your hypothesis is correct or incorrect would be to

a. make a prediction.
b. perform an experiment.
c. collect results.
d. make observations.

DC 5. What question about the world around you could be answered using the scientific method? Explain how you could use the scientific method to answer your question.

Answers will vary but should follow the scientific method.