<table>
<thead>
<tr>
<th>Grade Level/Course:</th>
</tr>
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<tbody>
<tr>
<td>Grade 7 Life Science</td>
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<table>
<thead>
<tr>
<th>Lesson/Unit Plan Name:</th>
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<tbody>
<tr>
<td>Scientific Method Mania</td>
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<table>
<thead>
<tr>
<th>Rationale/Lesson Abstract:</th>
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<tbody>
<tr>
<td>SWBAT explain the scientific method/scientific inquiry. SWBAT to develop a hypothesis and clearly and scientifically communicate their conclusion.</td>
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<table>
<thead>
<tr>
<th>Timeframe:</th>
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<tbody>
<tr>
<td>One week</td>
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<table>
<thead>
<tr>
<th>Common Core Standard(s):</th>
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<tbody>
<tr>
<td>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:</td>
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<td>--------------------------</td>
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<tr>
<td>c. Communicate the logical connection among hypotheses, science concepts, tests conducted, data collected, and conclusions drawn from the scientific evidence.</td>
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<tr>
<td>e. Communicate the steps and results from an investigation in written reports and oral presentations.</td>
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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)
<table>
<thead>
<tr>
<th>Standard</th>
<th>Objective</th>
<th>Do Now</th>
<th>Intro to new material</th>
<th>Group practice</th>
<th>Check for understanding</th>
<th>Independent practice</th>
<th>Homework</th>
<th>Materials</th>
</tr>
</thead>
<tbody>
<tr>
<td>7.c, 7.e</td>
<td>SWBAT write the steps of the scientific method</td>
<td>Describe a science experiment you have done in your kitchen at home</td>
<td>Steps – ppt (attached)</td>
<td>Guided notes (day 1)</td>
<td>Teacher assess by thumbs up/down</td>
<td>Worksheet #1</td>
<td>Finish wkst for homework</td>
<td>Make copies and hole punch</td>
</tr>
<tr>
<td></td>
<td>SWBAT describe the steps of the scientific method and align experiments with 6 steps in method</td>
<td>Define using textbook: 1. Scientific inquiry 2. Hypothesis 3. data</td>
<td>Notes – PPT (attached)</td>
<td>Fill out chart – notes/experiment</td>
<td>Teacher assess with a 1-5 scale</td>
<td>Worksheet #2 – identifying parts</td>
<td>Worksheet #2</td>
<td>Peanut butter, jelly, bread, knife, plate</td>
</tr>
<tr>
<td></td>
<td>SEBAT write a “report” section for a lab report and construct a solid hypotheses</td>
<td>4. Scientific Inquiry</td>
<td>Fresh and Salt Water Lab – See lab print-out below</td>
<td>Peanut butter and jelly steps translated into scientific report</td>
<td>Teachers assess with question/answer</td>
<td>Wkst # 3</td>
<td>Finish worksheet &amp; come up with an idea</td>
<td>Water, salt, cups, ice cubes, lab worksheet</td>
</tr>
<tr>
<td></td>
<td>SWBAT solve problems using the scientific method</td>
<td>5. variables</td>
<td>Review – no new material</td>
<td>Students work in groups to complete lab</td>
<td>Teacher walks around room to observe each group</td>
<td></td>
<td>Finish wkst 3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>SWBAT clearly articulate evidence and conclusion from science lab</td>
<td>6. control</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Finish for hw worksheet #4</td>
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</tbody>
</table>
Guided Notes – Day 1

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.
### SCIENTIFIC METHOD

<table>
<thead>
<tr>
<th></th>
<th>Definition</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Pose a question</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Form a hypothesis</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Design an experiment</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Collect data</td>
<td></td>
</tr>
</tbody>
</table>
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

<table>
<thead>
<tr>
<th>Name</th>
<th>Period</th>
<th>Date</th>
</tr>
</thead>
</table>

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: ____________________________

_______________________________

_______________________________

_______________________________

_______________________________

_______________________________

_______________________________
Day 4 Lab

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)

<table>
<thead>
<tr>
<th>Time</th>
<th>Salt water</th>
<th>Fresh water</th>
</tr>
</thead>
</table>

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

<table>
<thead>
<tr>
<th>Fresh Water</th>
<th>Salt Water</th>
</tr>
</thead>
</table>
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? ______________
   __________________________________________________________________________
   __________________________________________________________________________
   __________________________________________________________________________
   __________________________________________________________________________

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.
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.
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.
"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.
The Scientific Method

**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.