Source: <https://www.teach-nology.com/lessons/lsn_pln_view_lessons.php?action=view&cat_id=8&lsn_id=21782>

Lesson Plan : Five Food Groups

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| **Teacher Name:** | Melanie Varvi |
| **Grade:** | Grade 4 |
| **Subject:** | Science |

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| **Topic:** | Five Food Groups and Nutrition |
| **Content:** | Students will differentiate between different types of foods to determine which of the five food groups they belong in. Students will also work to understand characteristics of each food group. Vocabulary- grain, vegetable, fruit, dairy, meat/protein, nutrition |
| **Goals:** | Identify the five food groups Identify foods in each of the five food groups |
| **Objectives:** | Students will be able to draw/label the food pyramid and place foods from each food group in the appropriate sections of the food pyramid. |
| **Materials:** | Overhead, poster of the five food groups, story:Case of the Missing Food Groups, menu mix-up worksheet |
| **Introduction:** | Lead a class discussion, asking students what does being healthy mean to you? Why is it important to be healthy? What role does nutrition play in staying healthy? Explain that we will spend the next several weeks exploring nutrition with Arianna Bones and Marcus Muscleman. |
| **Development:** | Explain to students that we need to eat a variety of nutritious foods in order to stay healthy. Identify the five food groups on the food pyramid poster. Name the five food groups and foods that would go in each food group. Read story Arianna and the Case of the Missing Food Groups aloud with students. |
| **Practice:** | Using the story identify the names of the restaurants in the story (Dairy Way Cafe, Munchberg Meatery, Vegetable Valley, Fruit Crate Creations, Great Grains). Review elements from the story and identify foods that were found in each of the resetaurants. Have students identify if these are acceptable foods for that food group. Develop a list of other foods that we could include in each of the restaurants. |
| **Accommodations:** | Students could have a worksheet with 2 choices blanked out and write in 2 other foods that could belong in the food group. Students could draw pictures of foods that belong in each food group. Students could cut out pictures and paste them on a chart of the food pyramid. |
| **Checking For Understanding:** | Students will respond to the following prompt in their nutrition journal: If you were solving the Case of the Missing Food Groups, what three questions would you have asked each of the chefs? and then List one food that can be found in each food group. |
| **Closure:** | Complete an introductory letter to their parents explaining what we will be working on in science/health for the next few weeks. |
| **Evaluation:** | Students will be evaluated on if they can identify the five food groups and foods that belong in each food group. |
| **Teacher Reflections:** | In what ways was I successful? In what ways do I need to improve? What did the students respond to positively? What did the students respond to negatively? What worked? |

Source: <https://www.teach-nology.com/teachers/lesson_plans/math/68polygons.html>

**Lesson Plan Title : Polygons**

**Age Range:**

Grade 6 through Grade 8 (Middle School)

**Overview and Purpose:**

The students will explore and create a poster design using polygons. The posters will be displayed in the classroom and students will be challenged to name as many of them as they can. This activity will allow students a tactile, expressive way to learn about polygons.

**Objective:**

The student will be able to create a poster comprised of at least four different polygons.

**Resources:**

One piece or half piece of poster board for each pair of students

Various colors and types of paper

Markers

Colored pencils

Rulers

Glue and/or tape

White board and markers

Pictures of various polygons

**Activities:**

Write the definition of a polygon on the board (a plane shape with straight sides) and show the students some examples of polygons.

Explain to the students that they are going to work in pairs to create a poster with at least four different polygons. Show them the supplies and encourage them to be creative. Give them one or two days to complete the posters depending on how involved they are.

Display the posters on the wall and discuss the different polygons. Have students research and label all the polygons with their correct names.

**Closure:**

This hands-on activity will allow for a variety of learning styles. Taking time to have students create their own polygons will help them learn the concept much better than if they just read about it in their textbook. The lesson could be extended to include a homework paper that asked students to draw and label polygons with x amount of sides.

Source: <https://www.teach-nology.com/lessons/lsn_pln_view_lessons.php?action=view&cat_id=5&lsn_id=13526>

Lesson Plan : Addition and Subtraction of Unlike Fractions

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| **Teacher Name:** | Ms. Vakil |
| **Grade:** | Grade 7-8 |
| **Subject:** | Math |

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| **Topic:** | Fractions Unit - Adding and Subtracting Fractions with unlike denominators. |
| **Content:** | MATH - FRACTIONS UNIT |
| **Goals:** | Students will be able to add and subtract fractions with unlike denominators by using their learned skills to find the greatest common factor and applying it to create fractions with like denominators. |
| **Objectives:** | 1. Students will be able to perform the addition and subtraction of like fractions. 2. Student will transition this skill to include unlike regular fractions that round easily. |
| **Materials:** | Overhead projector, transparencies, white boards, white board markers, pencils, notebooks, and calculators if necessary. |
| **Introduction:** | DO NOW: Students will review greatest common factor by doing a problem to find the greatest common factor between two denominators. Good afternoon class, today we are going to learn to apply what we learned in the last couple of days about greatest common factor to our goal for today which is to add and subtract fractions with unlike denominators. Remember, when adding and subtracting fractions you must always always have the same denominator! |
| **Development:** | I will demonstrate the steps to adding or subtracting fractions with unlike denominators: Here is our problem: 1/3 + 2/9. First can we add these fractions the way they are... no, because the denominators are not the same. Therefore, our first step is to find the GCF, which we learned about. After going through the process, I found that the GCF is 9. Now I must take that GCF and apply it to my fractions. What that means is that we want each of the denominators to be 9 so that the fractions will have like denominators and we can add the fractions. When multiplying fractions one must do to the top what he does to the bottom. With our first fraction 1/3 we had to multiply 3 by 3 to get to our 9. Therefore, we must multiply the top and bottom by 3 to get 3/9. For, the second fraction we need to multiply the fraction 2/9 by 1 to get a denominator of 9. Therefore, our second fractions result is 2/9. We need to add the fractions, 3/9 + 2/9 which we cand do now because the denominators are the same, the answer is 5/9. Repeat process for subtracting fractions. |
| **Practice:** | Students will practice the process demonstrated with me by doing a couple more problems. |
| **Accommodations:** | Students who need help find the GCF will use a calculator to assist multiplication. |
| **Checking For Understanding:** | Students will complete an exit ticket of one subtraction and one addition problem. |
| **Closure:** | I will review the problems on the exit ticket after collecting the paper. |
| **Evaluation:** | EXIT TICKET |
| **Teacher Reflections:** | I will assess the exit ticket to come to an understanding of whether or not the majority of my class understands adding and subtracting fractions with unlike denominators. |

Source: <https://www.teach-nology.com/lessons/lsn_pln_view_lessons.php?action=view&cat_id=12&lsn_id=12767>

Lesson Plan : Conversation About the Weather

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| **Teacher Name:** | Mr. Juiles Niley |
| **Grade:** | College/University |
| **Subject:** | World Languages |

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| **Topic:** | Learning advance vocabulary on the Weather and continuing our conversation HOW'S IT GOING 1.Conversation-small talk 2. The Weather |
| **Content:** | Handouts of new weather vocabulary, Listening test on the weather. Talking about everyday happenings and the weather. |
| **Goals:** | To be able to broaden the vocabulary when talking about the weather so the student can broaden their conversation. To be able to listen and understand. 1. To perfect talking in the past 2. To be able to speak about the weather with more advance language. |
| **Objectives:** | 1.To have the teachers and parents to be able to meet an English speaking person or myself and be able to have small talk with a broad variety of subjects. 2. To be able to talk about the weather with advance language 3. To be able to change Celsius to Fahrenheit 3. To see if they can distinguish between the different types of weather |
| **Materials:** | Handouts, PowerPoint and the blackboard |
| **Introduction:** | Today we will learn new vocabulary concerning the weather and hope to use it in our conversations. Good Afternoon everyone. Today we will advance our small talk and add the topic of the weather. We all know how to talk about simple things concerning the weather so today we will learn more advance terms. Also we will continue our conversation "How's it going?" and work on our past verbs through games and practice. |
| **Development:** | Practice with handouts and listening. Show the PowerPoint and give the handouts for a warm-up. Go over some known words then have them do some practice sentences. I will play Weather Forcaster and they must listen and write down what I say.Then we will practice some more advance words about the weather. |
| **Practice:** | Practice our conversation HOW'S IT GOING. Continued practice of their conversations |
| **Accommodations:** |  |
| **Checking For Understanding:** | Listen to see if they use a variety of new weather words in their conversations. |
| **Closure:** | We will continue broadening our vocabulary on the weather next week then we will move on to describing peoples personalities and appearance. |
| **Evaluation:** | Students will take a weather test the following week. It will include all types of words we have covered this far in the course. |
| **Teacher Reflections:** | OK everyone as we continue our conversations in the next few weeks I want to hear you using more new vocabulary that we have learned. In December you will be tested and I will have a conversation with each of you individually and you must answer without the use of the board. |

Source: <https://www.teach-nology.com/lessons/lsn_pln_view_lessons.php?action=view&cat_id=8&lsn_id=27476>

Lesson Plan : LIFE CYCLE of a FROG

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| **Teacher Name:** | Jeanne M. Maggiacomo |
| **Grade:** | Grade 1 |
| **Subject:** | Science |

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| **Topic:** | Life cycles, frogs as animals. |
| **Content:** | LS1-ALL LIVING ORGANISMS HAVE IDENTIFIABLE STRUCTURES AN CHARACTERISTICS THAT ALLOW FOR SURVIVAL LS1(K-4)POC-3 predict, sequence or compare the life stages of organisms-plants and animals LS1(k-2)-3 STUDENTS DEMONSTRATE AN UNDERSTANDING OF REPRODUCTION BY... 3a. observing and scientifically drawing and labeling the stages in the life cycle of a familiar plant and animal. 3b. sequencing the life cycle of a plant or animal when given a set of pictures. KEY VOCABULARY: egg, tadpole, gills, lungs, frog, life cycle, stages We will go over "F" words on the white board using drawings and writing the name of the drawing using emphasis on the "F" sounds as we play the picture guessing game. We will discuss frogs in science. We will talk about tadpoles, where they live, what they eat how tadpoles turn into frogs. |
| **Goals:** | Our goal is to focus on "F" words and sounds along with daily practice of the sound as well as writing both upper case and lower case F f. We will also focus on #6 counting, recognition and writing 6. By Friday each child should know the sound of "F", words that begin with "f" and be able to write and recognize "F" and 6 by site. Children will gain understanding that animals like plants have a LIFE CYCLE. Children will be able to notice how life cycles are similar from animal to animal. (Children at this age make connections and studying animals is extremely interesting and important to them.) |
| **Objectives:** | Students will be able to verbalize/explain the 4(four) stages of a frog's development. Students will demonstrate through the sequencing of cards the correct order of development. Students will be able to draw and label the stages of development. Each child will be able to tell me words that begin with F and point to the letter F. They will also be able to count up to 6 and find the number 6 on a paper with other numbers. |
| **Materials:** | Introductory poem/riddle SPLASH! Five sets of index cards with the stages of a frogs development. Vocabulary words on smaller index cards to place near the larger index cards with the stages. Cards with pictures of the stages of development. Large vocabulary words: egg, tadpole, gills, lungs, frog, life cycle, stages (with definition on back) White paper (2 pieces) folded to make a book. Pencils and crayons. Tracing pages, writing practice pages, phonics worksheets,coloring pages,number tracing, math counting pages. We will make a frog on a lily pad craft to re-enforce the F and frog science lesson. |
| **Introduction:** | I will present the poem/riddle SPLASH! with the last two lines covered.(Children enjoy reading poems and singing, which helps to build many of the necessary reading skills) After the poem is read, I will present the Learning objective: Today in science we will sequence the life cycle of a Frog. In circle time we will play the guessing/drawing "F" things on the white board game as well as the children giving me "F" words to draw. We will sing songs about a frog. We will count objects up to 6. We will practice the "F" sound together. We also cover days of the week, what's the weather and current events. |
| **Development:** | Using the beginning pages from the book,FROGS by Gail Gibbons,I will read to the class the development of a frog. Stopping throughout to monitor understanding, ask questions and answer any questions.(Children at this age are very curious about living animals, many will tell me how they have seen frogs.) I will show them what shape my mouth makes when I say "F". I will demonstrate how to write the letter F f and 6 on the white board. We will again practice saying words beginning with "F" sounds. |
| **Practice:** | After the story is read, the children will go back to their tables. Each of the 5 tables will have index cards. The index cards have pictures of each stage of development. There will also be key vocabulary on smaller cards to place and help them describe each stage. Children will be asked to work as a team to create the cycle of development a frog goes through. The children will practice writing,saying and finding "F" and 6. They will practice counting to 6. |
| **Accommodations:** | Circulating and monitoring students will allow for help when needed. Placing chart,of the Life Cycle made during the reading of the story,in a visible location will allow for children to access if needed. Having access to the sequence cards at each table will also help them to visualize and draw the stages. Having key voacbulary on index cards for copying if needed. |
| **Checking For Understanding:** | Sequencing activity, verbal responses, final drawing/labeling of Life Cycle of the Frog. (Children have tadpoles in the classroom, their natural curiosity and interest in reading NON-Fiction material will continue to deepen their understanding.) Every day each child answers questions about things that begin with letter "F". In addition each child will point out "F" and 6 on an object in the room as well as counting to 6. We will also discuss what comes before and after "f" and 6 to prepare them for the following week. |
| **Closure:** | Reread the poem that lead into the lesson. Look at our own tank to see what stage they are at. Have children share their books. We will review all letters from A-F and numbers from 0-6. We will continue to review each day to reinforce all letters and numbers covered to date. |
| **Evaluation:** | I will evaluate the student's understanding through their responses to the book as we discuss the stages,also by circulating and listening to discussions at tables as children sequences the stages on index cards,and finally by assessing their drawings and labelings for the completion of their Frog book. |
| **Teacher Reflections:** | As with each lesson, my goal is to have all my students with confidence be able to understand the information presented. With review of the Life Cycle and more readings of Non-Fiction books, knowledge and understanding will be layered and solidified. |

Source: <https://www.teach-nology.com/lessons/lsn_pln_view_lessons.php?action=view&cat_id=8&lsn_id=5341>

Lesson Plan : Animal Kingdom Overview

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| **Teacher Name:** | Donna L Coffee |
| **Grade:** | Preschool |
| **Subject:** | Science |

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| **Topic:** | Overview of the Animal Kingdom. |
| **Content:** | Plant Kingdom and Animal Kingdom as basic categories of living things. Basic differences between plants and animals. Sorting of kingdom members into the correct category. Some students will use a list of words, some will use pictures. |
| **Goals:** | Students will describe the differences between plants and animals. If unable to talk, students will use pictures to finish sentences begun by the instructer. Students will correctly categorize animal and plant words or pictures into the appropriate categories: plant or animal. |
| **Objectives:** |  |
| **Materials:** | Worksheets with a number (say, 20) animal and plant words. Pictures of those animal and plant words. A large number of pictures of plants and animals from nursery books or library books. |
| **Introduction:** | Show one picture at a time of a plant or an animal. Briefly talk about each as to what it needs to STAY ALIVE, and what will happen if it doesn't get what it needs. (IT WILL DIE). Introduce the statement that both plants and animals are LIVING THINGS. Do a pet poll and graph the results. |
| **Development:** | Use two poster boards ; one labelled PLANT and one labelled ANIMAL. As a class, sort several pictures and words into one category or the other. |
| **Practice:** | Students return to desks and complete a sorting activity using pictures or words for plants and animals. Staff members monitor. Repeat this activity for three consecutive days. |
| **Accommodations:** | Pictures or words for sorting. If pictures, then glue them to two different sheets of paper labelled with PLANT and ANIMAL(Pictures) If using words, student places a P or an A in the blank next to each word in the list. Or each word may be preceeded by a P and an A, which students may circle , as appropriate. |
| **Checking For Understanding:** | During circle time in the following week, two or three times during the week, ask students to correctly categorize a plant or an animal word or picture. Give each student two or three trials in the circle time, as time allows. |
| **Closure:** | Repeat initial session concerning LIVING THINGS and the differences between PLANTS and ANIMALS. Tell students that in coming weeks we will be studying animals. Complete a bulletin board concerning the study of different kinds of animals. |
| **Evaluation:** | Some students may need more time than one week to categorize PLANTS and ANIMALS. If so, that can be a continuing activity for that student. Students may be given a test, but staff will not use the word "TEST". |
| **Teacher Reflections:** |  |

Source: <https://teachers.net/lessons/posts/4569.html>

**#4569. lesson no1**

**Science, level: Senior**  
Posted Mon Feb 20 13:22:57 PST 2012 by Ihtisham ([Ihtisham](http://teachers.net/cgi-bin/chatscripts/mailform.cgi?uid=shhkzsea&dmn=qszgg.uge&name=Ihtisham&subject=Lesson+Bank+)).  
Elementary and secondary Education, Pakistan  
Materials Required: Charts , Small cars, Balls, etc  
Activity Time: 60 to 80 mint  
Concepts Taught: motion and rest

Lesson No 1  
Class 9th  
Chapter no 3  
Subject Physics  
Topic \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  
(1) ESTABLISHING:  
Learning Objectives  
Following are the objectives of this lesson  
To enable students, define kinematics, motion and rest.  
To enable them, differentiate motion and rest.  
To enable students to produce motion and explain their demonstrations regarding motion and rest.  
To enable students, give example of moving bodies and bodies in state of rest from daily life.  
Material  
Automatic toy cars, balls, charts, markers, white board and text book.  
(2) ELICIT  
After entering the class the teacher will ask these questions from the students to judge their prior knowledge regarding topic and about the topics, already studied.  
If a person wants to go to market how can he reach the market?  
If van does not move will this person reach market? So can we say that only due to the motion of a van, person reaches from his home to market?  
(3) ENGAGE  
The teacher will place a car on a table before the class and ask  
Is this car moving?  
What is the state of car?  
So we shall study about rest and motion with out considering the force or agent which is causing this rest or motion.  
Teacher will show the chart on which topic will be written  
KINEMATICS, REST AND MOTION  
Teacher will orally give brief introduction of kinematics, motion and rest.  
(4) EXPLORE  
The class will divided into appropriate groups and each group will be given a ball, a car, charts and markers. Charts will be consisted following instructions.  
Place the ball and car on a table and answer these questions  
Is the ball changing its position with respect to car?  
Is the car not changing its position with respect to ball?  
Now move the ball  
If the ball is changing its position what is the state of ball with respect to car?  
What the state of car with respect to ball?  
During the group work teacher will guide the groups towards solution by asking questions. After the completion some of the groups will represent their work before the class to help the other s to reach the solution.  
(5) EXPLANATION  
After the completion of group work groups will be asked to represent their work before the class. After the representation of groups teacher himself will explain the phenomenal in detail and to extend the concept teacher will ask the students to work in the same groups.  
(6) ELABORATE  
Students will work in the same groups and all groups will be provided new questions papers and charts to answer these questions.  
Define kinematics.  
Move the car and repeat previous process.  
State and explain motion and rest with the help of any five examples from daily life.  
Can a body be in state of rest and motion at a time?  
If sun is stationary, what is the state of earth with respect to sun?  
During the group work teacher will guide the groups towards solution by asking questions. After the completion some of the groups will represent their work before the class to help the other s to reach the solution.  
(7) EVALUATION  
To judge the improvement in level of achievement of the student and success of teaching process a chart consisted of the following questions will be presented before the class and students will be ask to complete the sentences.  
The branch of physics which deals with the description of motion with out considering the force or agent which cause this motion is called \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  
What is the state of a person sitting on road with respect to moving car \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  
Define motion and rest  
(8) EXTEND  
HOME WOEK  
Search the answer of this question at home and write the answer on your note books.  
Can a body be in state of rest and motion at a time? Explain your answer.

Source : <https://teachers.net/lessons/posts/4586.html>

**#4586. Scientific Thinking and Problem Solving**

**Science, level: Middle**  
Posted Sun Apr 1 15:29:56 PDT 2012 by Kristie Caldwell ([Kristie Caldwell](http://teachers.net/cgi-bin/chatscripts/mailform.cgi?uid=usdvowddc&dmn=kukv2.uge&name=Kristie+Caldwell&subject=Lesson+Bank+)).  
Sheridan Junior High School, Sheridan, Wyoming  
Activity Time: 50 minute lessons  
Concepts Taught: Scientific Method

Scientific Thinking --Lesson 1 (two 50 minute class periods)  
Objectives: Assess student's prior knowledge on scientific thinking and problem solving.  
Brainstorm how scientist think and solve problems.

Materials:  
• 2 large pieces of butcher paper for each class period  
• Large Sharpie marker  
• 1 copy of "What is a Scientist" activity per student  
• Colored Pencils  
• School picture of each student (optional)

Lesson Overview:  
1. Warm-up: Students will write down what they think scientific thinking is on a 3 x 5 card. Students will pair-and-share their ideas then turn their cards in for the teacher to use as an assessment of prior knowledge.

2. Brainstorm Activity: Whole class  
a. Place one of the sheets of butcher paper on the board with the title "How do Scientists Think" written at the top.  
b. Ask students to brainstorm ways that scientists think and solve problems. Write down all ideas.  
c. Place the second piece of butcher paper on the board with the title "Who are Scientists?"  
d. Ask students to brainstorm the characteristics of people who are scientists. Write down all ideas.  
e. Leave the lists on the board for students to reference in the next activity.

3. What is a Scientist? (attached)  
a. On the left side of the paper draw a scientist. Use the colored pencils to add color.  
b. On the right side of the paper write a short paragraph describing what it means to think like a scientist.  
c. When students are done have them walk around the room and observe each other's drawings of scientists. As a group discuss the similarities the students observed (there will be many that look like the stereotypical mad scientist). Then discuss the stereotypes that most people have concerning what a scientist looks like and why the students think those stereotypes exist. (Male, white, balding or crazy Einstein hair, wearing a lab coat, working in a lab, glasses etc.)  
d. Have the student's pair and share their paragraphs.  
e. Optional: Give each student a copy of their school picture to glue over the head of their scientist drawing. Discuss how everyone is a scientist.  
f. End the activity by having students look at a variety of age-appropriate books depicting scientists working in different science fields, male and female, young and old, different nationalities, etc. (Your local public library or school librarian can help you collect a variety of appropriate books.)

Assessment:  
• All activities provide an assessment of prior knowledge.

Scientific Thinking --Lesson 2 (50 minute class period)

Objective: Introduction to thinking scientifically and solving problems logically.  
Use what was learned from a disproved hypothesis to guide the formation of a new hypothesis  
Work in teams to solve problems to foster collaboration and sharing of ideas.

Materials:  
• For each group of 3 students: Two pieces of clothesline about 1.5 meters each with a slip knot tied on each end.  
• Rope Problem Activity pages for each student

Lesson Overview:  
1. Warm-Up: Complete and discuss the pre-lab questions for the activity.

2. Rope Problem Activity (attached)  
a. Read through the procedure with the students.  
b. Using volunteers, demonstrate the proper way to "tangle" the ropes.  
c. Place the students into groups of 3.  
d. Explain the details for each job (Person A, Person B and the recorder)  
e. Hand out materials and let them start thinking and solving problems!  
f. You will most likely need to give periodic hints on how to solve the problem. I usually let the kids work on it for 10 minutes or so and then give a hint. Without hints they soon get frustrated and give up. This is also a good time to remind students that scientists frequently hit dead ends and that each "failed" hypothesis is really a learning point.  
g. Once everyone has successfully solved the problem, have the students work in their groups and answer the post-lab questions.  
h. Discuss the post-lab questions as a class.

Assessment:  
Observe to determine whether students are using good problem solving techniques and revising their hypotheses each time. Observe to see whether students are learning from disproven hypotheses and using that evidence to create an improved hypothesis. I carry a class roster spreadsheet and make notes while I am walking around.

Scientific Thinking--Lesson 3 (2 50 min. class periods depending on pacing)

Objectives: Differentiate between real science and pseudo-science.

Materials:  
• Video: Bill Nye the Science Guy-Pseudoscience  
• Video Activity Sheet--1 per student  
• Scientific Method Notes--1 per student

Lesson Overview:  
1. Warm-Up: Ask students whether astrology is real science. Ask students whether paleontology is real science. Have student's pair and share reasons why or why not.

2. Video: Bill Nye --Pseudo Science. (attached)  
Real science must be testable and repeatable.  
Pseudo-science cannot be repeated and is not really a testable problem or question.  
Please watch the video for examples of real science and examples of pseudo-science. Write these examples on the chart on your video worksheet.  
• Discuss the differences between pseudo-science and real science when the video is complete. Also list examples of each.

3. Scientific Method Notes (attached)  
a. Fill in the notes together as a whole class.

b. Discuss how this is the formal method scientists use when solving real problems like determining the effect of pesticides in water on frog deformities. This method cannot be used to validate the existence of ghosts or Bigfoot, for example, because the problem (Does Bigfoot exist?) is not really testable in a systematic way and any evidence that was collected (ie. a video of a Bigfoot) could not be repeated for validity.

4. Exit Card: Have students define real science and pseudo science and give an example of each.

Assessment:  
Use the exit cards to determine whether students understand the objective or whether there needs to be some re-teach.

Scientific Thinking--Lesson 4 ( One 50 minute class period)

Objective: Learn vocabulary and review the steps for the scientific method

Materials:  
• Brain Pop Notes page--1 per student  
• Brain Pop--www. brainpop.com (there is a short term free trial period available)  
• I have. . .who has vocabulary cards  
o Please print two copies of the master page. Have one copy laminated and cut out each individual card. These cards will be the game cards. Keep one copy of the master intact and stapled together for the teachers to use as a "cheat sheet" during the game.

Lesson Overview  
1. Brain Pop Activity (attached)  
a. View the brain pop video on scientific method. Pause occasionally for students to fill in the notes.  
b. Review and discuss the notes as a class.

2. I have. . .who has. . .vocabulary game. (Cards master attached)  
a. Pass out one or more cards to each student until all cards are gone. Students do not need to have equal numbers of cards.  
b. Choose an "I have. . ." definition to start the game. The starting point does not matter as the game will come full circle.  
c. The student with the chosen definition will say, (example) "I have controlled experiment. Who has a way of learning about the natural world?"  
d. The person who has the term to go with the previous definition should then speak up and say, " I have science. Who has. . ." etc.  
e. The first few times you play the students will need lots of hints and prompting to get through the game. Help them out or they will get frustrated. Also make sure to fix mistakes immediately or the entire game will de-rail. After the students begin to get the hang of the game and get a better grasp of the vocabulary they will start picking up speed. This is the time to turn it into a friendly competition and start recording the fastest time for each class period on the board. The students love the challenge!  
f. Once students get the hang of the game, this activity is quite useful for those times you have 5 or so minutes to fill at the end of a class period.  
g. If students are having a difficult time with the vocabulary consider making a vocabulary study sheet for students to fill in as they play the game. Make a two column sheet that has the definition already filled out in the right hand column, leaving the left hand column for the term blank. While playing the game students will fill in the terms on their study sheet. These sheets can then be used as a reference during the game. The teacher can gradually release the students from the need to have a reference page in front of them. This is also a good accommodation for SPED students or students who need remediation.

Assessment:  
Monitor progress of knowledge of scientific vocabulary and the steps of the scientific method. I use a roster spreadsheet for this activity. I print out a roster with 8 or so columns. Then I write the date at the top of the column whenever we play the game. I put a ++ (have it down), + (could use additional practice) or -- (needs re-teaching) for each student so that I can monitor progress and provide additional forms of practice or one-on-one re-teaching if necessary.

Scientific Thinking--Lesson 5 (Two 50 minute class periods)

Objectives: Differentiate between observations, inferences and predictions.  
Differentiate between qualitative data and quantitative data.

Materials:  
• Copy of the "Boy in Water" activity sheet and "Ancient Coin" activity sheet for each student.  
Both can be found at the following website:  
http://www.blm.gov/id/st/en/fo/shoshone/wilson\_butte\_cave/teacher\_pages/Archaeology\_FUNdamentals/Observation\_and\_Inference\_activity.html

• Observation Mini-lab for each student  
• Materials for lab (see lab sheet for list)

Lesson Overview  
1. Warm-Up: Play a round of I Have. . .Who Has. . . for vocabulary review and practice.

2. Observation, Inference and Prediction Activity (Boy in the Water & Ancient Coin)  
a. As a class, review what observation, inference and prediction are. Talk through several examples of each until you feel that students are ready to try to the activity in small groups.  
b. Pass out the Ancient Coin activity. Have students work in pairs or small groups to determine whether each statement is an observation, inference or prediction. When students are finished discuss the answers as a whole class.  
c. Pass out the Boy in the Water activity. Have students work individually to determine whether each statement is an observation, inference or prediction. When students are finished discuss the answers as a whole class. Have students correct any mistakes in a colored pen and hand in when completed.

3. Observation Mini-Lab (attached)  
a. As a class discuss the difference between qualitiative (descriptive) and quantitative (numerical) data. Discuss that each type of data is equally important and depending on the investigation you may collect only type of data or you may collect both types of data.  
b. Have students work in pairs to complete the lab.  
c. As a class discuss the results.

2. Quiz: Observation, Inference and Understanding Check (attached)  
a. Have students take this short formative quiz to check for understanding of this the objectives of this lesson.

Assessment:  
Make piles of "has it, little more practice, and re-teach" for the boy in the water activity. Provide future opportunities for re-teach and practice for students who need it and enrichment for students who "have it". Use the results from the formative quiz to guide future instruction in terms of moving forward or taking some time to re-teach concepts.

Scientific Thinking--Lesson 6 (One 50 minute class period)

Objective: Practice making predictions and writing hypotheses for a real problem  
Make qualitative observations and organize this data into a table.  
  
Materials: Example  
• Lab Activity Sheet for each student  
• 2 Liter pop bottle with 3 holes in the middle of one side.  
Holes should be approximately ½ inch apart.  
• Electrical Tape to cover the holes.

Lesson Overview:  
1. Warm-Up:  
a. Review qualitative and quantitative data.  
b. Review how to write an if. . .then. . .hypothesis.  
c. Introduce independent and dependent variables and how they relate to the if and then statements in the hypothesis.  
i. For example: If I pull the tape from the first hole (independent variable--the variable the scientist changes on purpose), then water will flow from the hole. (dependent variable--the variable that changes in response to a change in the independent variable.)

2. Three Hole Bottle Activity (attached)  
a. Follow the procedure on the lab.  
i. Hints:  
1. Be careful not to pull the tape down past the hole you are on so you don't give away what will happen next.  
2. Replace the tape after each class period. When the tape gets too waterlogged it won't stick well and the bottle will leak.  
3. Make sure lid is on tight so water does not leak from the hole when it shouldn't be.  
4. For fun: The teacher can stand on a table holding the bottle over the head of a student volunteer while removing tape from the holes. I like to provide the student volunteer with a big yellow rain hat, but a large plastic trash bag will do. Nothing at all and a little bit of getting wet is also fun.  
5. You will need to model how to create a data table for students since this will likely be the first time they create one.

3. Exit Card: Write an If. . .Then. . .hypothesis on the board for students to copy onto a 3 X 5 card. (ie. If I given my corn plant fertilizer everyday then it will grow taller). Have the students underline the independent variable and circle the dependent variable. Extension: Have students write an additional hypothesis themselves and underline the independent variable and circle the dependent variable.

Assessment:  
Make piles of "has it, little more practice, and re-teach" for the exit cards. Provide re-teach opportunities for students who need it and enrichments for students who have it.

Scientific Thinking--Lesson 7 (Two 50 min. class periods.)

Objective: Introduce solving a problem using scientific inquiry.

Materials:  
• Scientific Inquiry Lab page--1 for each student  
• Scientific Inquiry Steps Reference Page--1 for each student  
• 2 small beakers  
• Water  
• Salt and sugar--pre-measured at 3 grams each per student group.  
• Plastic spoon  
• Timer , clock or watch

Lesson Overview

1. Warm-Up:  
a. Review independent and dependent variables.  
b. Practice identifying which variable is the If statement in a hypothesis and which variable is the Then statement by giving students examples to underline and circle the appropriate variables.

2. Scientific Inquiry Lab  
a. Project a copy of the lab sheets on the board. Since this is the first time that students will be completing a lab, everyone will be doing it together at the same time.  
b. The left side of the paper is the notes side. The right side of the paper is the lab activity side.  
i. Work through both sides of the first page together. (Use the attached key)  
ii. Fill in the information for the data section.  
iii. Have the students work in pairs to complete the lab and record the data in the data table.  
iv. Work through the conclusion section together.  
v. Clean-up.

Assessment:  
Have students debrief their thoughts about the first complete scientific inquiry on an exit card. On a 3 x 5 card have students write their thoughts about:  
• I liked . . ..  
• I didn't like. . .  
• I feel like I really understand. . .  
• I am confused about. . .

Use the data from the cards to structure what concepts may need more review in warm-ups etc.

Scientific Thinking--Lesson 8 (One 50 minute class period)

Objective: Assess the progress of students understanding of unit objectives.  
Practice writing questions and hypotheses, and identifying variables for a real-world scientific problem.

Materials:  
• Strange Case of Beri Beri and Discovery of Penicillian Practice sheet--One per student  
• Scientific Method Quiz

Lesson Overview

1. Warm-Up: Using data you have obtained from exit cards and observations, review concepts that students need some re-teaching on and / or play a round of I have. . .Who has for vocab. practice.

2. Scientific Method in Action: The Strange Case of Beri Beri (attached)  
a. Talk about how this is an actual event that happened which was solved inquiry and the scientific method.  
b. Read through the event together with the students.  
c. Having students pair and share, work through each question one at a time.  
i. Give each pair about two minutes to discuss their answer to question #1 and reasons for it and write it down on their paper. Then discuss what answers students came up with as a whole class.  
ii. Move on to question 2 and repeat the procedure through question # 5

d. Have students work on the penicillian problem individually.  
i. Walk around and offer individual help to kids.  
ii. Go through the correct answers to the questions as a class when everyone has finished.

3. Scientific Method Quiz (attached)  
a. Have students take the quiz and turn it in.

Assessment:  
Use the data from the quiz to determine the need for whole class re-teaching, differentiated instruction within the classroom for students as different levels of comprehension of the objectives, or if students are ready to move on.

Scientific Thinking --Lesson 9 (One 50 minute class period)

Objective: Hypotheses / theories can change when new information is discovered.  
Scientists may not come up with the same conclusion, even when they have the same evidence or data to work with.

Materials:  
• Dogs and Turnips Activity Pages and Word Cards  
All materials can be found at the following site.  
http://www.ucmp.berkeley.edu/education/dynamic/session4/sess4\_act1.htm

Lesson Overview:

1. Dog and Turnip Activity  
a. Go to the link above to download all the materials and a very detailed explanation of the procedure and purpose for the assignment.  
i. Hint:  
1. Copy each set of word cards on different colored paper so if groups accidently mix their words they are easy to sort out.  
2. Have students work in groups of two. Larger than two results in not enough action and kids getting bored.

2. Exit Card /Assessment:  
Have students write down the "big ideas" they came away with from this activity. Use this information to assess whether students understood the objectives for this lesson.

Scientific Thinking--Lesson 10 (Two 50 minute class periods)

Objectives: Students apply the knowledge they have gained over the course of the unit on solving a  
scientific problem.

Materials:  
• Paper Falling Lab--one for each student  
• 3 pieces of scrap for each student  
• Timer, clock or watch

Lesson Overview:

1. Warm-Up: Use information you have gathered from the informal assessments and observations during the past few days of the unit to determine what should be reviewed / re-taught during this time.

2. Performance Assessment: Paper Falling Lab (attached)  
a. Explain the purpose of the lab is to see if students know and are able to do a scientific inquiry themselves.  
b. Have the procedure written on the board. The procedure is hard to write and most students are not ready to do so at this time so the lab does not have a place for the procedure on it.  
c. Read through the problem together and explain what you expect each student to demonstrate for you on the lab paper.  
d. Give each student a copy of the lab, 3 pieces of paper and a timer or access to a clock. Assign a partner that will help them to time their paper falling. The partner is only for help with timing, each student should complete their own independent investigation.  
e. Turn the students loose to investigate!

Assessment:  
This unit is an introductory unit for a year-long theme of science inquiry. Students are not expected to be proficient at completing an investigation independently at this point in time. This is the first of many performance assessments that students will complete throughout the year. By the end of the year students should be proficient at completing an assessment like this by themselves. This assessment is useful in showing progress (or lack of progress) toward the objective of solving a scientific problem in a logical manner.

Scientific Thinking--Lesson 11 (One 50 minute class period)

Objective: Demonstrate understanding of scientific thinking.

Materials: Unit Summative Assessment--one per student

Lesson Overview:

1. Warm-up: Review concepts relevant to the test the students are about to take.

2. Unit Summative Assessment (attached)  
a. Each student will complete the summative assessment.

Assessment:  
Use the data from the summative to plan for future differentiated instruction on scientific thinking and problem solving. This unit is an introductory unit for a year-long theme of scientific thinking and problem solving. Students should be monitored for growth towards the unit objectives through-out the year. Provide opportunities for re-teach and re-assessment of this unit test for students who are not proficient.