Lesson #: 1

Unit Topic/Essential Question: What do you do when you don't know what it is?

Aim/Guiding Question: How do you tell if things are different when they look the same?

Objectives

Students will be able to:

- Make careful observations
- Use a scientific approach to solve whether or not flasks A and B contain similar or different liquids
- Record accurate experimental results
- Hypothesize whether the two liquids are the same or different?

New Terms:

Hypothesis	engage
Observations	explore
Data	summary
Inference	

Materials/Preparations:

2 Erlenmeyer flasks containing liquids. Clock or watch with second hand.
Solutions A and B: For 1 L: 100ml water, 10 g sodium hydroxide, 10 g glucose, 1mL 1% methylene blue. By combining these 4 components you will prepare both solutions. The solutions are the same. Make sure that one flask is filled to the top and put the stopper immediately. The other flask should be filled up only half way. These will establish the difference. The last one when shook will change color due to the presence of oxygen. The first flask should not change color because there is no oxygen in the flask. When let to rest both flasks will become colorless.

Time (min)	Developments	Instructional Strategies
5	Have students work in groups: 4 or 5 students Distribute materials. Two Erlenmeyer flasks containing liquids A and B Clock or watch with second hand. Stoppers to fit flasks (2) and beaker	Motivation
15	Ask each group to examine the two flasks. DO NOT remove the stoppers and DO NOT shake the contents. Ask them to record in a table two or three similarities and differences between the contents of the two flasks. Write the following questions on the board or transparency: 1. Do you think both flasks contain the same liquid? 2. How do you know? 3. Is your answer to the previous question based on experimenting or guessing? 4. Would scientists guess at answer to questions or would they experiment first? 5. Do both flasks contain the same volumes of liquid? 6. What gas might be in the upper half of flask A that is not in flask B? 7. Is there any direct evidence for your answer to question 5? 8. Make a hypothesis about the contents of the two flasks. Are they the same or different?	Group work, problems solving approach, questioning compare contrast, hypothesizing, observations

	9. How do you know? Have each group select one member to go over these questions. Discuss with students the importance of making critical observations and recording accurate data during any experiment	
20	Ask one student read the guiding question: *What do you do if you don't know what is it?* Lead the class to an open discussion about carrying out some experiment to determine if the two liquids are the same or not. *What happens if you shake the liquids?* Ask them to give each flask a one hard shake using an up-and-down motion of his/her hand. Make sure his/her thumb covers the stopper as they shake. Ask each group to observe each flask carefully and record their observations in a new table. They should look for differences and similarities. Write the following questions: 1. After shaking the flasks, do you think they contain different liquids? 2. How do you know? 3. How certain are you about this? 4. What was present in flask A that might have been responsible for the change in the liquid? 5. What happens if you remove some of the liquid in flask B so it appears like flask A? Instruct each group to remove some of the liquid in flask B. Now that they appear the same instruct each group to shake both flasks again. Ask them to record their observations in a new table. Ask: 1. Do both flasks now appear to contain the same liquid? 2. What may have been added to flask B that was not present before? 3. How do you account for this difference? These questions will help students to reflect on the concepts that guide scientific inquiry. Also the students will realize that prior establishment of an adequate knowledge base to support the investigation and help develop scientific explanations.	Problem solving approach, experimentation, gathering data, collaborative work, questioning
10	Ask the students summarize the lesson. Instruct them to clean up their tables and ask them: • Is there any better way to do this investigation? • Was your hypothesis correct? • Is there an alternative scientific explanation for your hypothesis? • Should we do this investigation over? • Do we need more evidence? • What happens if you shake the flasks more then once? Tell them that the next day they will try to answer some of these questions	Oral presenta-tion, feedback, peer review

Suggested Homework:

Have students reflect on questions such as How can we improve this investigation? What information do we need to extend this investigation? Ask students to come up with their own questions about this investigation, etc..

Standards Addressed:

Standard 1- Inquiry

Lesson #: 2

Unit Topic/Essential Question: What do you do when you don't know what it is?

Aim/Guiding Question: How does careful observation lead us to more unanswered questions?

Objectives

Students will be able to:

- Make careful observations
- Use a scientific approach to solve whether or not flasks A and B contain similar or different liquids
- Record accurate experimental results
- Ask questions about this investigation

New Terms:

Trial, analysis, data table, average

Materials/Preparations:

2 Erlenmeyer flasks containing liquids. Clock or watch with second hand.
Solutions A and B: For 1 L: 100ml water, 10 g sodium hydroxide, 10 g glucose, 1mL 1% methylene blue. By combining these 4 components you will prepare both solutions. The solutions are the same. Make sure that one flask is filled to the top and put the stopper immediately. The other flask should be filled up only half way. These will establish the difference. The last one when shook will change color due to the presence of oxygen. The first flask should not change color because there is no oxygen in the flask. When let to rest both flasks will become colorless.

Time (min)	Developments	Instructional Strategies
5	Have each group report to class the questions they came up about yesterday's lesson. If they differ write them on the board. After completing this ask each group to report to the same table they were working yesterday. Distribute the same materials from yesterday.	Oral presenta-tion, motivation
25	Write the following question on board: • What happens if you shake the flasks more than once? Let students make some predictions and have them keep this in their journals Instruct each group to shake each flask hard **once** with an up-and-down motion. Note the exact time in seconds after shaking that it takes for each liquid to return to its original condition. Record the time in a new table. Ask them to shake each flask **hard twice** with an up and down motion. Again record in the same table the time it takes for the liquids to return to their original conditions. Shake both flasks **hard three times** with an up-and-down motion. Record in the same table the time it takes for them to return to their original conditions. After they have completed this part, ask each group to report to class their major findings. Write the following questions to guide presentations: • After one shake, are the two liquids generally "behaving in a	Group work, discovery learning, teacher-peer feedback, taking notes, gathering information

	similar way? • After two or three shakes, are flasks A and B generally "behaving" in a way similar to each other? • How do you know?	
20	Ask each group to look at the last data table. Ask them to come up with at least two questions about this experiment that can be answered by examining the data in the last table. Allow some time for this. Challenge students to pay careful attention to the time it take both flasks to become colorless. Questions vary. Examples are: • Is there any relationship between the number of shakes and the time it takes each flask to return to its original condition? Encourage students to create questions that can be answered by extending this investigation. When students have finished and have received feedback from teacher ask them: • How certain are you about those results? • What can we do to reduce the probability of making errors and so increase the accuracy of the results? Challenge the class to discuss why carrying out more trials will increase accuracy. Ask them to carry out some more trials and ask them to collect data using the last table. The next day you will all analyze the data	Group work, guiding questions, oral presentation, gathering information asking questions, teacher-peer feedback

Suggested Homework:

Ask students to analyze the data table and bring a conclusion about this investigation. Also to bring one question that they would like to investigate.

Standards Addressed:

Standard 1-Inquiry
Key Ideas 1, 2

Lesson #: 3

Unit Topic/Essential Question: What do you do when you don't know what it is?

Aim/Guiding Question: How can you develop an explanation from data?

Objectives

Students will be able to:

- Make interpretation of their observations
- Communicate their interpretations to other students
- Answer reasoning questions about the investigation

New Terms:

Analysis, scientific method

Materials/Preparations:

Evaluation sheet

Time (min)	Developments	Instructional Strategies
5	Ask the members of each group to share their data but specify that today they will work individually. Ask a member of each group to come forward and summarize the lessons of previous two days.	Motivation reviewing
10	Ask to the class: • If you had to explain this to someone who knew nothing about this investigation, how would you do it? Allow some time until students agree on a potential effective way to do this. Ask some volunteers to come forward and try to explain this investigation to potential learners. As they listen to the other presentations ask them to take notes in their journals that can help them to improve their presentations. Intervene when necessary.	Guiding question, oral pre-sensation, teacher feedback
10	Pose the following questions: Tell students that the following questions will help them make some interpretations of what they have observed. Discuss with them that interpretations are reasoning based on observations and experiments. • On the basis of you first observations the first day, could you decide if both flasks contained the same liquid? Explain • After shaking the flasks could you decide if both flasks contained the same liquid? Explain • Which steps may have helped you to decide if the liquids in flasks A and B were similar or different? Explain • Besides the liquid itself, what else seems to be needed in order for the	Direct instruction, questioning teacher feedback

	liquid to change color?	
	Prepare an evaluation sheet with the following questions: Explain why flask B (the one that was filled up) did not change color when shaken the first time. (*No air was in the flask)* 1. Why must the liquids in the half-filled flasks be shaken in order to produce a color change? (*Air must mix with the liquid in order to change color)* 2. Why did more shaking increase the amount of time needed for the liquids to change back to their original color? *(Each added shake mixes more air into the liquid an thus, the blue color remains longer)* 3. Why is experimenting a better method of problem solving than guessing? *(Experimentation provides evidence and data with which a problem can be solved)* 4. What is meant by the phrase " solving a problem by using the scientific method"? *(Using observation experimentation, interpretation, and hypothesis formation to solve a problem)*	Guiding questions assessment
10	Ask students interchange answer sheet after they have answered all five questions. Go over the answer with students. Ask each student to evaluate each question as if they were the teacher. Assign 20 point to each paper. After they have finished collect all the paper for teacher reevaluation.	Assessment teacher peer feedback

Suggested Homework:

Ask students to research about what New York City uses to prevent icing on walkways during the winter They will discuss that next day.

Standards Addressed:

Standard 1

Lesson #: 4 (1st day)

Unit Topic/Essential Question: What do you do when you don't know what it is?

Aim/Guiding Question: How can you design an investigation?

Objectives

Students will be able to:

- Devise ways of making observations to test proposed explanations
- Develop and present proposals including formal hypothesis to test their explanations, i. e. they predict what should be observed under specific conditions if the explanation is true
- Identify and define the basic concepts of experimental design.
- Carry out their plan for testing explanations, including selecting and developing techniques and recording observations as necessary

New Terms:

hypothesis	dependent variable	control group
constants	independent variable	repeated trials

Materials/Preparations: Per group

Beaker or plastic cup (150ml), thermometer, scoop or plastic spoon, safety goggles, calcium chloride, clock, water, graduated cylinder. (Calcium chloride is a chemical used to prevent icing of walkways and roads. When it is dissolved in water it releases heat increasing the temperature of the water)

Time (min)	Developments	Instructional Strategies
10	The following activity has been designed to provide the basis for observation, data collection, reflection and analysis of the events. Show to the class a bottle of calcium chloride. You may want to let them have a close look at it or even touch it. Ask: • What is this? Have you seen this before? What s this for? To motivate students you may want to show them an important use of this product, for example, pour some of this chemical on ice or snow (if available) and let them observe the reaction. Ask them to write their observations. Ask them to share their observations orally.	Motivation, questioning communication skills Demonstration
15	Divide class into small groups. After they have shared their observations, ask them to come up with questions that they would like to explore about this chemical and how to investigate the question. Challenge students to come up with as many questions as possible and ask them to share what they are going to explore and how they might conduct their proposed exploration. Lead the class to an open discussion and have them agree on one question that the whole class can work on. Remind students about materials available for this investigation. (As the class discuss possible questions challenge them to elaborate on questions that may give them full understanding of how this chemical works) E.g. • How does calcium chloride prevent icing on walkways?	Brainstor-ming, guiding questions, read aloud, discovery learning, group work, ongoing teacher/peer feedback

	• How much calcium chloride is needed for this? After the entire class has agreed on the question to be explored, ask them if they need some information about calcium chloride. This will introduce the importance of doing research and establishing adequate knowledge prior to the investigation. You may have available prepared worksheets with plenty of information about calcium chloride. Distribute this information to each group and after reading aloud ask some questions (check for understanding)	
20	Once students have some knowledge about calcium chloride and the question to explore, ask them to design a way to investigate this problem. In designing this investigation tell students that they need to cope with problems such as the limitations of equipment. To help students in this process, ask them to do the following: 1. Place 50 ml of water in a plastic cup. 2. Measure and record the initial temperature of the water. 3. Add a spoon of calcium chloride to the water and dissolve stirring it for one minute 4. After one minute record the temperature of the water and describe your observations. Ask them: • *What would happen if more calcium chloride were added to the water?* • *What would you hypothesize about the effect of adding more calcium chloride to the water?* Finish the lesson by having each group explain to the class how the would test their hypothesis, how they would collect the data, and how they would represent the data. The next day the will carry out their experiment.	Demonstra-tion, guiding questions, Experimentation, designing and planning, oral presenta-tion, group work

Suggested Homework:

Have students bring a complete written report on how they will design and carry out their investigations with the materials available.

Standards Addressed:

Standard 1-Inquiry

Lesson #: 5 (day2)

Unit Topic/Essential Question: What do you do when you don't know what it is?

Aim/Guiding Question: How can you test your hypothesis?

Objectives

Students will be able to:

- Identify and define the basic concepts of experimental design.
- Carry out their plan for testing explanations, including selecting and developing techniques and recording observations as necessary

New Terms:

(carry over terms)

hypothesis	dependent variable	control group
constants	independent variable	repeated trials

Materials/Preparations:

Beaker or plastic cup (150ml), thermometer, scoop or plastic spoon, safety goggles, calcium chloride, clock, water, graduated cylinder. (Calcium chloride is a chemical used to prevent icing of walkways and roads. When it is dissolved in water it releases heat increasing the temperature of the water)

Time (min)	Developments	Instructional Strategies
5	Have students review yesterday's lesson by asking each group to explain how they will carry out their investigation. It is important that teachers intervene to focus student's attention on the need to use the available materials for this investigation. Make sure that all groups convene in the same investigation: *The effect of Various Amounts of Calcium Chloride on the Temperature of Water"*	Review, group work peer feedback
15	Let students spend some time carrying out the experiment. Walk around the classroom as students work. Make careful observations as to each group is doing more than one trials, control group, controlled variables, constants etc., Ask them to write in their journal every step including their observation and data. Also make sure that each group collect data in a reliable way so that these data can be analyzed an explained later on After they have finished their work, ask them to clean up their tables and return all materials.	Group work, use of scientific method, discovery learning
25	This is a great opportunity to develop and reinforce experimental design concepts through classroom experiments and research discussions. Start this section by asking: • What was your hypothesis? (*Varies: If more scoops of calcium chloride are added to water, then the temperature of the water will increase)* • What did you purposely change about the calcium chloride? *(The number of scoops: maybe one, two or three, etc)*	Direct instruction, guiding questions, teacher, peer feedback. Taking notes

	• How did you determine the response to these changes? • *Students should refer tot the temperature change as they added more and more calcium chloride).* • What remained the same during the experiment? *(Students should refer to the amount of water, the size of scoops, etc.)* Introduce the concepts of independent and dependent variables, constants and trials. For example: Variables refer to all factors that change in an experiment. Ask: *what were the variables in this investigation*? . The variable that you purposely change is called the independent variable. *What was the independent variable in this investigation*? . The variable that changes in response to the independent variable is called dependent variable. *What was the dependent variable?* And explain that all factors that remained the same in an experiment are called constants. *What were the constants in this investigation*? Ask: *Do you have more confidence in one measurement or several measurements?* Usually students understand that several measurements increase confidence by reducing the effect of chance or random errors. Repeated trials refer to the number of times you perform the experiment. Ask How many trials were there in your investigation? Ask: *what if in the room there were other factors that could have affected the change in the water temperature*? *How can you identify the presence of these variables that you do not about them*? Lead the class to discuss the importance of having a control group in every experiment. Ask *what was the control group in your investigation*? Probably they did not have any. Explain that the control group could have been a cup of water doing with it the same things you did with the other but not adding any calcium chloride. By doing this you would have detected the presence of a hidden variable. It is very important that as you explain these concepts give each group the opportunity to share their results. Some students may have done the experiment taking into account all these elements. Before ending the lesson tell students that the next day we will discuss how to display and communicate these findings to other people.	

Suggested Homework:

Ask each group to bring a DATA TABLE and a GRAPH that represent their major findings. Yow will discuss this the next day.

Standards Addressed:
Standard 1- Inquiry
Key Ideas 1 and 2

Lesson #: 6(1st part)

Unit Topic/Essential Question: What do you do when you don't know what it is?

Aim/Guiding Question: How can we construct an appropriate data table for organizing data?

Objectives

Students will be able to:

- Construct an appropriate data table for organizing data
- Construct a graph from a brief description of an investigation and a set of data
- Describe the relationship between variables depicted on the graph

New Terms:

Materials/Preparations:

Time (min)	Developments	Instructional Strategies
5	Draw a data table with all the information from the calcium chloride experiment. (Review protocol about how to write an appropriate data table) Ask the class how many of them had a similar data table for the experiment they conducted yesterday. Have each group compare their data table with yours. Ask them to write in their journal similarities and differences. Call some volunteers to move forward to make a public comparison of both tables.	Motivation, oral presentation, Compare and contrast
20	Draw a rectangle on the board. Review with students the day before experiment. Pay special attention to the dependent and independent variables. • What were the independent and dependent variables in yesterday's investigation? Keep a class discussion until students come up with the concept that the variable that they purposely change is called independent variable and because of this they assign levels to this variables. Example: in the calcium chloride investigation they change the number of scoops. They used first 0 scoop, 1, 2, 3 scoops. This information should be placed in a column on the left of the table. Then the other variable, which is the one that responds to the independent variable, i.e. the dependent variable goes in the middle of the table. **Amount of Calcium Chloride** | **Change in temperature (C) Trials 1 2 3** | **Average change in temperature (C)** 0 1 2 3	Direct instruction, Compare and contrast, Guiding questions, Teacher-peer feedback Recognizing Variables Recording data

	Explain to the students that this column should be divided into many rows as many trials they will be conducting. Ask how many trials they conducted in yesterday's experiment. If they did two trials then two columns, and so forth. Pose the following questions: What information do you thing goes to the right of the table? Challenge students that for each level of the independent variable they should calculate the average for the number of trials they carried out. And that information goes in that column. Ask the class to use a data table like this one and transfer the data they collected yesterday into it.	
20	Tell students to get the data from the first investigation about shaking the flasks A an B and try to design a good table for the data they collected during that lab. Allow time for this and when they finished ask them to go the board and draw their tables. Discuss whether students are right or wrong. Explain.	Assessment

Suggested Homework:

As homework tell the students to construct a graph for the calcium chloride experiment. Ask them to bring that graph tomorrow since you will be studying that.

Standards Addressed

Standards 1- Inquiry

Lesson #: 7

Unit Topic/Essential Question: What do you do when you don't know what it is?

Aim/Guiding Question: How can a graph be constructed from a set of data?

Objectives

Students will be able to:

- Construct an appropriate data table for organizing data
- Construct a graph from a brief description of an investigation and a set of data
- Describe the relationship between variables depicted on the graph

New Terms:

x-axis, y-axis, interval, scale, bar and line graph

Materials/Preparations:

Graphing paper

Time (min)	Developments	Instructional Strategies
5	*Review* homework. Ask students to compare their graphs with their peers. Spend some time discussing the major parts of a graph: data pairs from a data table, labeling the axes, constructing an appropriate scale for each axis, and plotting the data on the graph.	Reviewing Compare and contrast
20	Distribute graph paper. Instruct students that they will be constructing a line graph for the data table of the calcium chloride experiment they performed two days ago. Ask students to take out the table. If not available you can use a similar one. Tell students that the first thing to do is to give a **title** to the graph. Challenge students to give an appropriate title to the graph. Ask, What would be the next step? Make sure that a transparency is being used to illustrate the process. Discuss with them that it is very important to **label the axes.** What information should be placed in the vertical and horizontal axes? Let students try to answer. Explain that by convention, scientists place the independent variable (the number of scoops of calcium chloride) on the horizontal axis. And the dependent variable (the change in water temperature) on the vertical axis. Ask students to proceed to label both axes. After doing this, ask, what would be the next step? They must look at the set of data on the data table and figure out what scale to use on each axis. To determine an acceptable value for the axis interval, ask the students to find the difference between the largest and smallest values for the variable and then divide this difference by 5. Then round the resulting quotient to the nearest convenient counting number. Any number that is easily counted in multiples works well, such as multiples of 2, 5, or 10. You may want to send students to the board and do the calculations.	Direct instruction, Questioning

	After this step has been completed ask students to plot the data pairs.	
20	After students have completed the graph for the calcium chloride experiment, ask them to construct another graph, this time using the data table for the first investigation they conducted. (Flasks A and B)	Teacher-peer feedback, Informal assessment

Suggested Homework:

Distribute different data tables and ask students to construct the correspondent graph.

Standards Addressed:
Standard 1- Inquiry

Lesson #: 8

Unit Topic/Essential Question: What do you do when you don't know what it is?

Aim/Guiding Question: How do scientists seek answers to questions?

Objectives

Students will be able to:

- Write a title and hypothesis of an investigation
- Design a complete experiment with the materials available
- Determine the effect of some factors on the rate at which chemical reactions occur

New Terms:

Chemical reaction, reactants, products

Materials/Preparations:

Time (min)	Developments	Instructional Strategies
5	Take a beaker and put in some 100 ml of water. Drop a tablet of Alka-Seltzer (effervescent tablets) and let it dissolves. As students watch the tablet dissolves, ask: What is going on inside the beaker? Let students observe the reaction and call for some volunteer to explain the entire class their reaction. Write on the board.	Motivation, (Do-Now), presentation
10	Introduce the concept of **chemical reaction,** ask the class for examples of common chemical reactions that take place almost everyday and that they can experience on daily basis. For example: rusting Ask: What happens in a chemical reaction? Brainstorm When you consider necessary intervene and explain: "In order for a chemical reaction to occur, the particles, atoms or ions, which are the REACTANTS, must physically come into contact with one another. Anything that increases the frequency of these encounters will increase the rate at which PRODUCTS are formed." You may want to write an equation on the board in which students can represent the reactants and the products in a chemical reaction. Instruct students to focus their attention on the Alka-Seltzer tablets and water. Ask: *Think about possible factors that may cause an increase in the rate of reaction and explain how each one of these factors might affect the rate of reaction.* Allow discussion until students come up important factors such as temperature at which the chemical reaction occurs, the concentration of the reactants, etc. Make sure that students explain how each one of these factors might affect the chemical reaction. Have some volunteers explain their answers to the entire class.	Direct instruction, Guiding questions, Discovery learning, Oral presentation

20	After students show sound understanding about how some factors might affect a chemical reaction, ask them to design an investigation in which they will determine how these factors affect a chemical reaction. Tell them that for the purpose of simplicity we all will work with Alka-Seltzer tablets, and ask them again, how do you think those factors that you have just described will affect the time it takes a tablet to dissolve in a cup of water. Form groups of 3 students. Allow each group to select any factor they want. And ask them to design the experiment. The following questions may help them design the experiment: 1. **Title of the Investigation** (The *effect of the independent variable on the dependent variable).* Challenge students to review their notes to determine what is the dependent and independent variables. **2. Hypothesis.** *(Describe what would happen to the dependent variable as you change the independent variable)* For example: If I increase the temperature of the water, then the reaction will be faster, etc. **3. What materials would you need to carry out this investigation?** Here the students may list all materials they plan to use to carry out the experiment. **4.** Using the materials listed above, describe the **procedure** follow. **5.** Indicates**: trials, constants** **6.** Draw a data table according to the guidelines you earlier learned **7.** Proceed to test your hypothesis. (This part will be done the next day)	Group work, Discovery learning, Guiding questions, Taking notes, Direct instructions
10	After students have finished designing their investigations, ask a member of each group to share with the entire class their design. Ask students to take notes if they consider they want to improve or change their experiment.	Oral presentation, Assessment

Suggested Homework:
Ask each student to bring a complete design of this investigation. Make sure get approved by teacher.

Standards Addressed:
Standard 1- inquiry

Lesson #9 (day 2)

Essential Question: What do you do when you do not know what is it?

Aim/Guiding Question: How do scientists seek answers to questions?

Objectives

Students will be able to:

- Write the title and the hypothesis of an investigation
- Design a complete experiment with the materials available
- Determine some factors that affect the rate at which chemical reactions occur

New Terms:

Materials/Preparations:

Alka-Seltzer tablets (enough per group), cups or beaker (100ml), ice, heater, thermometer

Time (min)	Developments	Instructional Strategies
5	Ask each student to report to his or her original group that was formed yesterday. Ask them to review their experiment design and make sure that all the materials they need are available. Ask them to read their procedure.	Reviewing
20	Ask each group to come to the front and collect all the materials they need to carry out their investigation. Instruct to perform as many trials as necessary. Make sure that they collect data and control some variables. Teacher should walk around and make sure that each member of the group remains on task. Be available to answer any question. When students finished, ask them to clean their workstation and bring materials to the front. Distribute graph paper and instruct them to graph their results according to the guidelines they learned earlier. Be available if it is necessary	Discovery learning, Experimental Design, Group work Collecting data
20	Ask each group to report their investigation to the class. You may use a rubric to evaluate the report. The following questions may help students to reflect on their findings: 1. Was your hypothesis supported by the data? 2. How certain are you about those results 3. What explanation did you expect to develop from the data? 4. Were there any surprises in the data? 5. How confident do you feel about the accuracy of the data? 6. Is there a better way to do this investigation?	Analysis questions, assessment, Oral presentation

Suggested Homework:

Distribute prepared worksheets with brief description of several scientific investigations. You may want to have students evaluate the investigations and assign them some analysis questions.

Standards Addressed

Standard 1- Inquiry, Key Ideas 1 and 2