



# ***Asthma in the City***

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for

**My Environment, My Health, My Choices**

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## ***ASTHMA IN THE CITY***

### **INTRODUCTION:**

This 14-session problem-based learning unit focuses on the health effects of poor air quality. The problem, *Separated at Birth*, (Handout #1) introduces students to twins separated in infancy. Students are asked to explain why one twin has asthma and one does not. Can the environment make a difference in health problems? Students assume roles in groups called *Think-Tanks* that allow them to research the issue by assuming different roles. The roles are: a medical doctor (health care), environmental biologist (environment), epidemiologist (human health) and sociologist (society). They are challenged to explore the problem, research and answer the question, discover ways to evaluate the answers and then present them to other class members.

### **SETTING:**

This problem-based learning unit was designed for a secondary school level environmental science class. However, the problem could be used in a wide range of classes including health, biology, and social studies.

### **OBJECTIVES:**

To develop students' ability to:

- Examine an environmental health problem that has scientific, social, and political dimensions.
- Approach a complex problem through analysis of what they know and they need to know and through development of a problem statement.
- Gather, organize, and synthesize information from various sources, and identify potential ways to address a problem.
- Analyze the pros and cons of potential solutions to environmental health problems.
- Practice collaborative learning.
- Present their research and selected solutions to an audience.



## **UNIT OVERVIEW:**

### **Day One: Meeting the Problem**

Divide the class into teams of four students known as *Think-Tanks*. Have the students read the “Separated at Birth” problem-based learning scenario and then as a class to create a categorical concept map based on what members of the class know from the reading and their own experiences. Think-Tank groups then generate up to four questions about the problem.

- Teacher Information
- Handout #1 – *Separated at Birth*

### **Day Two: Exploring the Problem**

Student *Think-Tank* teams learn about role-playing to address problem. Present information on a problem solving time line and a collaborative work skills rubric. Groups receive a Q&A Update that responds to selected questions from Day One. Students use a PBL (Problem-Based Learning) chart to find out what they know and need to know about asthma and the other issues raised in the PBL. *Think-Tank* groups generate up to four additional questions about the problem.

- Handout #2 - *Problem-Based Learning Timeline Map*
- Handout #3 - *Collaborative Work Skills Rubric*
- Handout #4 - *Role Cards for Think-Tank Members*
- Handout #5 - *PBL (Problem-Based Learning) Chart*
- Q&A Update #1 (*See Sample A for teacher reference only*)

### **Day Three: Defining the problem**

*Think-Tank* groups organize information to make a concept map and develop a problem statement. Groups receive a Q&A Update which responds to selected questions from Day Two.

- Q&A Update #1 (*See Sample A for teacher reference only*)

### **Days Four, Five and Six: Gathering and Sharing Information**

Students are introduced to a Group Research Rubric and the use of a research log. They use library and computer resources to do research on the problem. They record what they learn from each source in their research log. The teacher acts as coach to assist with development of research skills.

- Handout #6 - *Group Research Rubric*.

### **Day Seven: Generating Possible Solutions**



Students use a Decision-Making Matrix to list possible solutions to the problem and evaluate the pros and cons of each solution. Again they submit up to four questions they have about the problem.

- Handout #7 - *Decision-Making Matrix*.

### **Day Eight: Determining the Best Solution**

Groups receive a final Q&A Update which responds to selected questions from Day Seven. *Think-Tanks* use the information in their Decision-Making Matrix to reach consensus and select the best solution. They submit to their teacher this solution with an explanation of why it was selected.

### **Day Nine: Creating Rubrics to Evaluate Student Work**

Students are introduced to the two ways in which they will present the results of their work: a solution product (poster) and an oral presentation. They plan to evaluate their work by creating rubrics to assess posters and presentations.

- Handout #8 - *Solution Product Design Format*.
- Handout #9 - *Presentation Rubric (blank)*
- Handout #10 - *Solution Product Rubric (blank)*

### **Days Ten and Eleven: Preparing Solution Products and Presentations**

Each *Think-Tank* makes a poster and plans a 15-minute presentation for each group. They use an investigation checklist to guide groups in tasks that must be completed.

- Handout #11 - *Investigation Checklist*.

### **Days Twelve and Thirteen: Presenting the Solutions**

*Think-Tanks* present their solutions to the class and evaluate the presentations by other groups. Maximum presentation time: 15 minutes per group.

### **Day Fourteen: Reflecting and Debriefing**

Students reflect on their learning experience and discuss suggestions for what can be done (by individuals, communities, and government agencies) to prevent asthma.

- Handout #12 - *Reflection Questions*.



## **NEW YORK STATE EDUCATION STANDARDS:**

The Asthma in the City unit correlates with the following New York State education standards:

### **New York State Mathematics, Science, and Technology Standards**

#### **Standard 1: Analysis, Inquiry, and Design**

Students will use mathematical analysis, scientific inquiry, and engineering design, as appropriate, to pose questions, seek answers, and develop solutions.

#### **Standard 2: Information Systems**

Students will access, generate, process, and transfer information using appropriate technologies.

#### **Standard 4: Science**

Students will understand and apply scientific concepts, principles, and theories pertaining to the physical setting and living environment and recognize the historical development of ideas in science.

#### **Standard 6: Interconnectedness: Common Themes**

Students will understand the relationships and common themes that connect mathematics, science, and technology and apply the themes to these and other areas of learning.

#### **Standard 7: Interdisciplinary Problem Solving**

Students will apply the knowledge and thinking skills of mathematics, science, and technology to address real-life problems and make informed decisions.

### **New York State English Language Arts Standards**

#### **Standard 1: Language for Information and Understanding**

Students will listen, speak, read, and write for information and understanding. As listeners and readers, students will collect data, facts, and ideas; discover relationships, concepts, and generalizations; and use knowledge generated from oral, written, and electronically produced texts. As speakers and writers, they will use oral and written language that follows the accepted conventions of the English language to acquire, interpret, apply, and transmit information.



### **Standard 3: Language for Critical Analysis and Evaluation**

Students will listen, speak, read, and write for critical analysis and evaluation. As listeners and readers, students will analyze experiences, ideas, information, and issues presented by others using a variety of established criteria. As speakers and writers, they will use oral and written language that follows the accepted conventions of the English language to present, from a variety of perspectives, their opinions and judgments on experiences, ideas, information and issues.

## **New York State Social Studies Standards**

### **Standard 5: Civics, citizenship, and government**

Students will use a variety of intellectual skills to demonstrate their understanding of the necessity for establishing governments; the governmental system of the United States and other nations; the United States Constitution; the basic civic values of American constitutional democracy; and the roles, right, and responsibilities of citizenship, including avenues of participation.



## Day One: Introducing the Problem

### Materials:

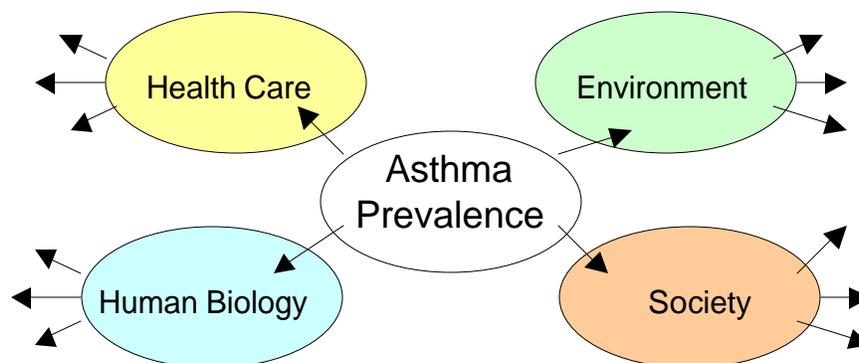
- Copies of *Separated at Birth* (Handout #1)
- Poster paper for group brainstorming
- Markers for each group
- Large paper assembled into huge chart for teacher to make concept map.

### Activities:

1. Group students into *Think-Tanks* (heterogeneous groups composed of four students each).
2. Distribute *Separated at Birth*, (Handout #1) to each student and read it to the entire class.
3. Distribute poster paper to groups and ask them to brainstorm ideas about the scenario. "What is happening? What is the problem?"
4. Lead a discussion about the problem with the students. The class gives input to creating a categorical web. The web should focus on four areas of the problem that will be linked to the *Think-Tank* roles: health care (medical doctor); environment (environmental biologist); human biology (epidemiologist); and society (sociologist).
5. Teacher may prompt additional input by asking general questions that do not divulge additional information. Create an air of excitement and curiosity for the students. Use careful questioning without giving away information about the problem.

If possible leave this map posted through the remainder of the PBL unit:

### Sample Categorical Web Framework.





6. Ask *Think-Tanks* to generate up to 4 questions they have about the problem and write them on paper to hand in at the end of class. Explain that at the beginning of the next class, they will be given an update” of the problem with information that may or may not answer their questions.

### **Post Lesson:**

After the lesson, the teacher should review the question lists generated from each group and use these questions to create a “Q&A *Update #1*” that gives possible answers to the questions. Every question does not need to be answered, but ensure that the answers in no way direct the students to an easy solution to the problem. The goal of the update is to keep the problem intriguing and to motivate students to become engrossed in the process. Sample A illustrates a Q&A Update based on several questions that they students might generate.



## **Day Two: Preparing to Solve the Problem**

### **Materials for each student:**

- *Problem-Based Learning Timeline Map* (Handout #2)
- *Collaborative Work Rubric* (Handout #3)
- *Role Cards* (Handout # 4)
- *PBL (Problem-Based Learning) Chart* (Handout # 5)

### **Activities:**

1. Distribute *PBL Timeline Map* (Handout #2) and explain the steps involved in solving a problem.
2. Distribute the *Collaborative Rubric* (Handout #3) and use this to review cooperative learning expectations.
3. Distribute the *Role Cards* (Handout #4) to each group. Explain the various group member roles. Explain the value of researching a complex problem from different perspectives. Relate roles to the class concept map.
4. Distribute *Q&A Update #1* and *PBL (Problem-Based Learning) Chart* sheets (Handout #5). Explain that completing *PBL Chart* will help them to identify the information needed to solve the problem.
5. Once the *PBL Charts* are completed, explain to the class that the *Think-Tanks* should keep and sign all materials used in class and during research.
6. *Think-Tanks* should create another question list including up to 4 questions they have about the problem and write them on paper to hand in at the end of class. Explain that at the beginning of the next class, they will be given a *Q&A Update #2* of the problem with information that may or may not answer their questions.

### **Post-Lesson:**

After the lesson, review the question list generated from each group. Create a *Q&A Update #2* that gives possible answers to students' questions.



## Day Three: Defining the Problem

### Materials:

- Copies of *Q&A Update #2* for each group
- Research Logs - notebooks in which individual students will record their research (notebooks)
- Markers
- Poster paper
- Tape

### Note to Teacher:

Your role from this point on is to act as coach. Ensure groups are seated in same area daily. Encourage involvement from each member of the *Think-Tank*. Give comments on skills such as learning log organization, and problem statement development.

### Activities:

1. Review the social skills of students using the rubric for collaborative work.
2. Distribute *Research Logs* to each student. Describe how the research log is like a scientific journal. The log is used to document everything that is done during the investigation. Explain that each step in the timeline should be documented in the log, along with specific assignments given by the teacher. Stress that the log is also used for writing down ideas and discussions related to the problem. Display a model of a research log if available.
3. Distribute the *Q&A Update #2* and let the students review the problem and *Need to Know* sheet from previous lessons. Give the groups several minutes to review and make additions to their PBL charts.
4. Explain that it is time to narrow their problem by developing a *Problem Statement*. The format of a problem statement is the following:

*“How can we (state the goal or desired solution)...in such a way that...(state conditions for solving the problem or conditions for achieving the goal ).”*

Display and describe several problem statements from a different problem. For example:

How can we find a way to return the country’s wolf population to normal in such a way that:

- *Environmental impacts are considered (biodiversity, livability).*



- *Health risks are reduced*
  - *Problems are prevented from happening again*
  - *Costs are kept at a reasonable level*
- 5 Ask *Think-Tanks* to develop a problem statement for the “Separated at Birth” PBL. Explain that their *Think-Tanks* problem statement can later be revised once more is learned about the problem. Monitor groups to ensure proper direction and cooperation. Model when necessary.
  - 6 Allow time for groups to share and then refine their problem statements.
  - 7 At the end of class they should record their problem statement in their *Research Log*.



## **Days 4, 5 and 6: Student research on problem in library or computer room**

### **Materials:**

- Library access or teacher selected sources of print information
- Computers with internet capability
- Printer with paper for printing
- *Group Planning-Research Rubric* (Handout #6)
- Access to MLA website:  
[www.english.uiuc.edu/cws/wworkshop/MLA/bibliographymla.htm](http://www.english.uiuc.edu/cws/wworkshop/MLA/bibliographymla.htm)

### **Activities:**

1. Explain that the goal of the next few classes is to find research information related to their problem statement.
2. Explain the roles that were given in lesson two. Stress that the student must “think the role” and “live the role.” Describe how this will help direct their research into the problem.
3. Distribute the *Group Planning-Research Rubric* (Handout #6) and review this with the class.
4. Give the website for MLA bibliography format. Review this with the class and ensure that students write the web address in their problem logs so they can determine how to cite information in their bibliography. Ensure that all sources used are documented in the MLA format.
5. Describe to the students that they should use the *Need to Know* class concept map to assist with the research.
6. *Think-Tank* groups should plan on meeting for five minutes at the beginning of each class period to plan what research each member should do. In these meetings they should share the results of their research and update their problem statement and PBL chart.
7. Encourage groups to be creative and thorough with their research. Ensure that groups are cooperating and discussing the problem periodically. While observing the groups, make note of how they are researching in relation to their initial problem statement.



## Day 7: Generate and Analyze Possible Solutions

### Materials:

- One copy of a *Decision-Making Matrix* (Handout #7) for each student
- Poster paper and markers for each group

### Activities:

1. Explain to the class that the goal of the day is to brainstorm all reasonable solutions to the problem and organize the solutions using a *Decision-Making Matrix*.
2. Distribute the poster paper and markers to each group. Ask students to go back to their most recent problem statement, particularly the conditions for solving the problem (“in such a way that”). On the paper, brainstorm as many possible solutions as possible based on the information each person in his/her assigned role has gathered.
3. Allow time for students to share and revise their brainstormed list of solutions.
4. Distribute the *Decision-Making Matrix* (Handout #7) and review its contents with the class. Model how the *Decision-Making Matrix* is used with a simple example.
5. Tell students to select three to five solutions from the brainstorming session and place them in the *Matrix*.
6. They should then list all possible pros and cons of each solution. They should write down the pros (positive consequences) and cons (negative consequences) of each solution. Encourage them to be as thorough as possible.
5. Again, ask the *Think-Tanks* to generate up to four questions they have about the problem and write them on paper to hand in at the end of class. Explain that at the beginning of the next class, they will be given *Update #3* of the problem with information that may or may not answer their questions.

### Post Lesson:

After the lesson, the teacher should review the question lists generated from each group and use these questions to create a *Q&A Update #3* that gives possible answers to the questions. Every question does not need to be answered, but ensure that the answers in no way direct the students to an easy problem solution.



## Day 8: Determine the Best Solution

### Materials:

- Q&A Update #3

### Activities:

1. Distribute *Q&A Update #3* to the groups. Allow approximately five minutes for students to review and discuss the update. They may use the new information to revise their *Decision-Making Matrix*.
2. Write on the board "Consensus". With the class, brainstorm what the word means, where they have heard it, and in what situation do people use consensus.
3. Explain to the class that the goal of the day is to reach consensus about what solution is the best.
4. They should work in their *Think-Tank* groups to review all documents, particularly the *Decision-Making Matrix*, and choose the best solution. The solution they choose must be made by group consensus. It must also be supported by the information discovered during their research and it must answer their problem statement.
5. Ask groups why they think they have the best solution. Be certain they have reviewed the consequences of their solution.
6. Ask groups to formally write down their chosen solution and describe its pros and cons. Collect at the end of class.

### Post-lesson:

Evaluate each solution, write down comments and prepare to return to students at the next class.



## Day 9: Create Rubrics for Presentations and Posters

### Materials:

- *Solution Product Design* (Handout #8) sheet for each student
- *Blank Rubric Form for Presentation* (Handout #9) for each student
- *Blank Solution Product Rubric* (Handout #10) for each student

### Activities:

1. Explain to students that the teacher has reviewed each solution and has made comments on each. Distribute each *Think-Tank's* solution and give time for groups to review and revise the comments and solution.
2. Explain that the goal of the next four classes is for the groups to create a solution product and a group presentation.
3. Distribute *Solution Product Design Format* (Handout #8). Explain that a solution product is a poster board that summarizes the solution and has supporting information from each expert in the group: the Environmental Biologist, Doctor of Medicine, Epidemiologist, and Sociologist. Stress that the product must have a bibliography section and each "expert" must have his or her own section that describes his or her input to the solution.
4. Explain that each group's presentation must include discussion of the solution product and must include input from all the members of the *Think-Tank*. Groups should plan to include visuals in their presentation.
5. Distribute *Blank Rubric Form for Presentation* (Handout #9) and, as a class, develop the presentation rubric with five categories and related rating descriptions. To assist students, post a list of some possible categories and display a sample rubric. If this is the first time your class has developed rubrics, have them begin by focusing on the characteristics of an excellent presentation. "What would an excellent presentation look like and sound like?" Stress the need for balance in presentation among the different "experts" in each group.
6. If this activity is constructive and class time remains, also generate a *Solution Product Rubric* (Handout #10). If no time remains, the teacher can create the other rubric.

### Post-Lesson

Create word-processed copies of the *Solution Product Rubric* and the *Presentation Rubric* created in class. You will use these rubrics for subsequent lessons.



## Days 10 and 11: Plan Solution Products and Presentations

### **Materials:**

- Poster boards and art materials
- *Investigation Checklist* (Handout #11)
- *Solution Product Rubric* (created by class/teacher)
- *Presentation Rubric* (created by class/teacher)

### **Activities:**

1. Distribute the word-processed *Solution Product Rubric* and *Presentation Rubric* to the *Think-Tanks*. Review the rubrics with the class.
2. Explain that the goal for the next two class periods is to create the presentation and solution product (poster).
3. Explain that each group will have a minimum of 10 and a maximum of 15 minutes for their presentation.
4. Distribute the *Investigation Checklist* (Handout #11). Explain to the class that everything on the checklist must be completed by the presentation day.
5. Students should work in their *Think-Tank* groups to create their production solution posters and plan their presentations. Monitor students and assist when appropriate.
6. Create and post a presentation order list so *Think-Tank* groups can see when they present.

### **Note to Teacher:**

Invite parents and/or other teachers to observe the presentations on Days 13 and 14.



## Days 12 and 13: Presenting the Solutions

### **Materials:**

- Overhead projector or digital projector for use during student presentations
- *Presentation Rubrics*, enough for every student and visitor to critique at least three groups
- *Solution Product Rubric*, enough for every student and visitor to critique at least three groups

### **Activities:**

1. Introduce to the class the invited guests who have come to see the presentations.
2. Distribute *Presentation Rubrics* and *Solution Product Rubrics* to the people who visit. Ask them to use the rubrics to evaluate each presentation and solution products poster.
3. Review the process of how to use the rubric. Stress the need for respect to the groups that are presenting. Explain how each group has a minimum and maximum time. The time will be monitored and the teacher will respectfully warn each group when the finish time draws near.
4. Groups present. After each group presents, allow time for student and visitor questions and critiques.



## Day 14: Reflection

### **Materials:**

- One copy of *PBL Reflection Questions* (Handout #12) per student.

### **Activities:**

1. Congratulate the class on a job well done. Give positive encouragement to each group in front of the class by highlighting specific accomplishments of each group.
2. Distribute the *PBL Reflection Questions* (Handout #12) to every student. Ask students to write their answers to the questions privately in their *Research Logs*.
3. Ask class “What should we do now?” Steer the students into generating some actions that they could take to solve a dilemma such as this. This activity can be used to generate more ideas for possible research or actions to be taken by the students to confront the environmental health problem. For example, students may wish to examine the air quality of the high school or in the air quality in the area where they live.
4. Explain to the class that they have become “stakeholders” in the problem. Describe how they understand things about asthma and environmental health of which many others are not aware. They have become experts. As experts, what other actions could be taken? What can they do to prevent this problem or to learn more about the problem? This activity can be used to generate more ideas for possible research or actions to be taken by the students to confront the environmental health problem. For example, students may wish to examine the air quality of the high school or in the area where they live.
5. Write a list of possible extension activities that the students develop during the debriefing. The extension ideas could be used to create lessons and activities to be used in the future.



## Handout #1:

### *Separated at Birth*

Shamika Davis and Regina Carter are twins who were separated at birth. Their parents were killed in a car accident days after they were born. Soon after, they were adopted, but by two different families. They have spent their childhood as strangers to each another.

The family that adopted Shamika lives in an upper-class suburban neighborhood. Now that Shamika is graduating, her parents finally tell her that she has a twin sister named Regina living in the city.

She is surprised and angry. She is determined to meet her twin sister. After making many phone calls and visits to the adoption agency, Shamika finally obtains Regina's last name: Carter. She also finds out that Regina goes to school in the city nearby.

Shamika calls a relative who works for the city school district as an administrator. Luckily, he is able to find out that Regina Carter is a junior at East High School. After school the next day, Shamika drives her parents' BMW to East High to find Regina. In the main office of the school, Shamika finds that Regina has not been in school for the last two weeks. An administrator tells Shamika that Regina is a hardworking student, but she has missed too many days of school. While the administrator is speaking with her, Shamika notices Regina's home address on the computer screen and memorizes it.

Shamika thanks the administrator and runs to her car, consulting her map to find a street she has never visited in one of the lowest-income neighborhoods in the city. She pulls up to Regina's driveway and her jaw drops.

On the front porch stands a girl who looks exactly like herself. Shamika timidly gets out of her car and looks at Regina. Startled, Regina stands frozen looking at Shamika. At the same moment, they both say "Are you...!?". A black dog runs off Regina's porch and happily rubs up against Shamika. Cautiously, Regina steps toward Shamika. They smile at each other and immediately hug.

After many hours of laughing and crying, Shamika exclaims how interesting it is to have so much in common with another person. "We look the same, we like the same foods, TV shows, books, we both play trumpet...we even have the same name for our dog!"

"I know!" said Regina, "even the clothes we like and music too... do you have a mean temper like me?"



“Are you kiddin? I get grounded at least once a month for being mean to my step brothers,” said Shamika.

Then Shamika asks, “How come you haven't been going to school?”

“It's this asthma I have,” said Regina. “It seems like every day I have an attack of some sort. At night I have a hard time sleeping because I cough and cough. By the time the morning rolls around, I can hardly get out of bed. I get sick too.” “Do you have asthma too, Shamika?”

“No, I don't think so” said Shamika. “You are the first person that I know who has it. Does it hurt?”

Regina explained, “Sometimes it hurts. Last week, it was so bad that my stepbrother Brandon and I both had to go to the emergency room. They gave us some inhalers and medicine, but we'll probably run out soon.”

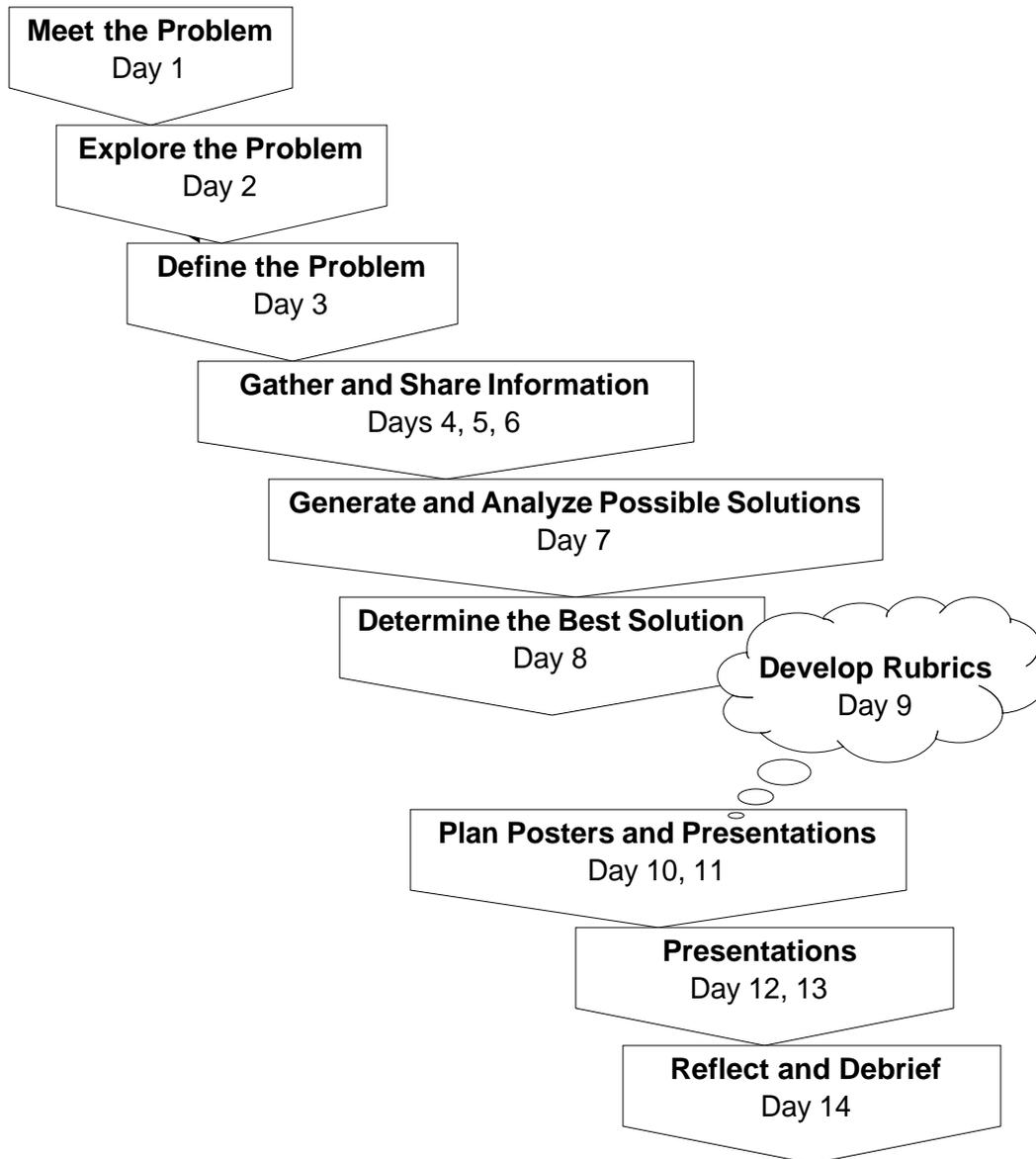
Shamika thought out loud “It's funny that I don't have asthma, being a twin sister and all. I wonder why that is?”

Suddenly, Shamika realized it was 7:30 and she had to bring the car home by 7:15. “My parents are going to kill me. Let's get together again this weekend. Maybe you can come to my house.”

“Yeah, that would be great. I want you to meet my folks too. I'm so happy that you came over. Give me a call.” They both hug and Shamika leaves the house.



## Handout #2: Problem-Based Learning Timeline





## Handout # 3: Collaborative Work Skills Rubric

Name \_\_\_\_\_

Category	Excellent	Good	Satisfactory	Needs Improvement
<b>Contributions</b>	Consistently contributes both useful ideas and extra effort.	Usually contributes both useful ideas and extra effort.	Sometimes contributes useful ideas. Does what is required.	Rarely contributes useful ideas. Does only part of what is required.
<b>Time Management</b>	Consistently uses time well to ensure things get done on time.	Usually uses time well to ensure things get done on time.	Tends to procrastinate but usually gets things done before deadlines.	Does not get things done by the deadlines and lets others do much of the work.
<b>Attitude</b>	Never publicly critical of the project or the work of others.	Rarely is publicly critical of the project or the work of others.	Occasionally critical of the project or work of other group members.	Often publicly critical of the project or the work of others.
<b>Focus on Task</b>	Consistently stays focused on the task.	Usually is focused on the task.	Sometimes needs to be reminded to stay on task.	Frequently needs to be reminded to stay on task.
<b>Preparedness</b>	Consistently brings needed materials to class and is ready to work.	Usually brings needed materials to class and is ready to work.	Usually brings needed materials to class but sometimes need to be reminded to get to work.	Often forgets needed materials or is not ready to get to work.
<b>Monitors Group Effectiveness</b>	Routinely monitors the effectiveness of the group and makes suggestions to make the group more effective.	Usually monitors the effectiveness of the group and works to make the group more effective.	Occasionally monitors the effectiveness of the group and works to make it more effective.	Rarely monitors the effectiveness of the group and does not work to make it more effective.
<b>Working with Others</b>	Routinely listens to, shares with, and supports the efforts of others.	Usually listens to, shares with, and supports the efforts of others.	Occasionally listens to, shares with, and supports the efforts of others.	Rarely listens to, shares with, and supports the efforts of others.



## Handout # 4: Role Cards for Think-Tank Groups

# Epidemiologist



You are an Epidemiologist hired by the city to investigate the problem presented to your *Think-Tank*. Your specialty is the study of diseases and how they affect the human population. Epidemiology is the study of the distribution and determinants of diseases and injuries in human populations. Epidemiologists describe who has a disease in a population to help identify its causes. Once the cause is understood, interventions can be developed to prevent, manage, and control the disease.



## Doctor of Medicine



You are a Doctor of Medicine hired by the city to investigate the problem presented to your *Think-Tank*. Your specialty is urban health care. You are particularly interested in how care is distributed to different socioeconomic groups.



## Environmental Biologist



You are an Environmental Biologist hired by the city to investigate the problem presented to your *Think-Tank*. Your specialty is how the quality of the air in urban environments negatively impacts the health of citizens who live there.



## Sociologist



You are a Sociologist hired by the city to investigate the problem presented to your *Think-Tank*. Sociologists look at how groups influence individual behavior, how groups cooperate or conflict with one another, and how societies are established and changed. They are concerned with social problems that occur in societies such as crime, discrimination, poverty, and inadequate health care.



## Handout #5: PBL (Problem-Based Learning) Chart

Know	Need to Know	Ideas or “Hunches”



## Sample A (for teacher reference only): Q&A Update # 1

### ***If they are identical twins, why don't they both have asthma?***

Genes play a part in predisposing someone to developing asthma. There isn't a single "asthma gene". Instead the combined effects of several genes add up to produce a susceptibility to asthma. Research has suggested that environmental factors - such as our home environment, the food we eat and our lifestyle - have been shown to play a part in the development of asthma.

### ***What happens during an asthma attack?***

When someone has an asthma attack, the muscles in the walls of the airway contract and the walls of the airway swell. This narrows the airway. Mucus produced in the lining of the airway further blocks the passage of air.

### ***What causes an asthma attack?***

Different people have different triggers for their asthma attacks. But some things that may cause an asthma attacks include:

- Colds or infections
- Pollen
- Hard exercise
- Dust and dust mites
- Molds
- Worrying or being upset
- Some pesticides
- Some medicines (like aspirin)
- Smoke
- Hair spray or perfume
- Pollution
- Cockroaches
- Furry animals

### ***What is the difference between having allergies and having asthma?***

An allergy is an inflammatory reaction or response to a specific substance. Allergic reactions can involve nasal membranes, the eyes, the skin, and the tongue, and the breathing passages in severe reactions. Asthma is a chronic, inflammatory lung (lower respiratory) disease that causes difficulty breathing.



## Handout # 6: Group Planning-Research Rubric

Names of *Think Tank* Group Members: \_\_\_\_\_

Category	Excellent	Good	Satisfactory	Needs Improvement
<b>Ideas/Research Questions</b>	Develops at least 4 creative and insightful research questions and pursues them independently.	Develops at least 4 reasonable research questions and pursues them independently.	Requires some assistance in developing at least 4 reasonable research questions and pursues them.	Requires considerable assistance in developing at least 4 reasonable research questions and pursues them.
<b>Delegation of Responsibility</b>	Each group member can explain information needed by the group and what each group member's responsibilities are.	Each group member can explain what each group member's responsibilities are.	Each group member can explain what his/her group responsibilities are.	One or more group members cannot explain what his/her group responsibilities are.
<b>Plan for Organizing Research Findings</b>	Each group member can explain the group's plan for sharing and organizing their research findings	Each group member can explain the group's plan for sharing or organizing their research findings.	Some group members can explain the group's plan for sharing or organizing their research findings.	Group members cannot explain the group's plan for sharing and organizing their research.
<b>Quality of Sources</b>	Group members independently locate at least 4 reliable and interesting information sources for each of their research questions.	Group members independently locate at least 4 reliable information sources for each of their research questions.	Group members need some help to locate at least 4 reliable information sources for each of their research questions.	Group members need extensive help to locate at least 4 reliable information sources for each of their research questions.



## Handout # 7: Decision-Making Matrix

Possible Solutions	Pros	Cons



## Handout # 8: Solution Product Design

The solution product is a poster created by the group. The solution product must follow this exact format. A rubric will be used to critique the solution product. Be certain to include a bibliography for each supportive information section.

Group Names	Information from:	
	Environmental Biologist	
	Doctor	Solutions to the Problem
Problem Statement	Sociologist	
	Epidemiologist	



## Handout #9: Presentation Rubric

Category	Excellent	Good	Satisfactory	Needs Improvement



## Handout #10: Solution Product (Poster) Rubric

Category	Excellent	Good	Satisfactory	Needs Improvement



## Handout #11: Investigation Checklist

Name: \_\_\_\_\_

I put my name on all work that I and my group completed.

I completed a *PBL Chart* sheet.

I created a *problem statement* with my group.

I fulfilled my role in the group by researching my area of expertise while following the *Group Research Rubric*.

I followed the *MLA Format* for citing work properly.

I completed the *Decision-Making Matrix*.

My group chose the best solution by consensus.

I assisted the group in creation of the *Solution Product (Poster)*.

I assisted the group in the creation of the *Presentation*.



## Handout #12: PBL Reflection Questions

Answer these questions independently.

1. What did you learn?
2. How does this new knowledge change your perception of what you thought you understood?
3. How could this new knowledge be applied to improve your life or the lives of others in your family, school, or community?
4. What are you thinking, feeling, and valuing as a result of this unit?
5. What else would you like to share?
6. What questions or puzzles remain?