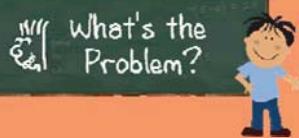
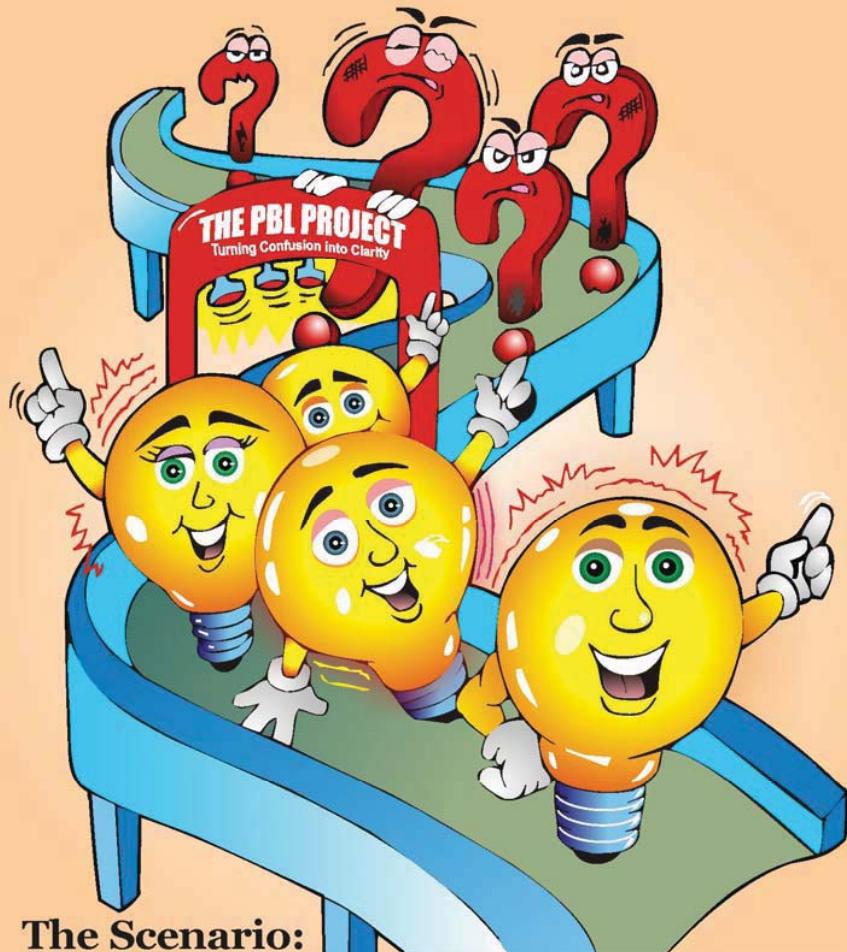


THE PBL PROJECT

Problem-Based Learning. Done Right. Finally.



Integrated Problem Scenarios Early Elementary



The Scenario:

“Outdoor Recess”

You are a teacher whose class wants to extend recess time, but there are concerns about the extra exposure to the sun. How can you protect students from this risk?

- * Features engaging and real-world scenarios
- * Integrates all core subjects
- * Includes all teacher and student resources
- * Provides a full overview of Problem-Based Learning

Problem-Based Learning. Done Right. Finally.

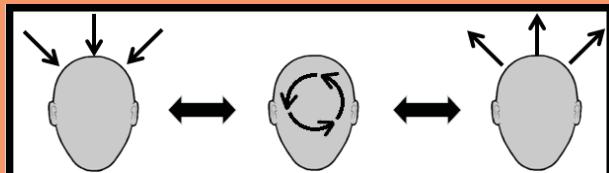
It's an important part of an educator's job to make sure students leave the classroom fully prepared for their lives ahead and equipped with 21st century skills (i.e. skills that focus on communication, organization, technology, and problem-solving). We use these skills every day. Unfortunately, they are often overlooked as students work to absorb names and dates, facts and figures.

That's why **Problem-Based Learning** is so important. It allows students to tackle a scenario that goes beyond a "yes" or "no" answer. In doing so, students will review a variety of resources related to the topic (articles, videos, statistics, infographics, etc.), engage in classroom discussion, and organize their thoughts as they evaluate the information. After all this, they will have a chance to respond to the challenge and defend their approach.

It won't be easy, but it will be very engaging. Best of all, this process will help develop a wide variety of skills that students will use the rest of their lives!

The 1-2-3 of Problem-Based Learning

When faced with any problem, challenge, or situation, students need to be prepared to:



Step 1

Absorb the information

Step 2

Evaluate the information

Step 3

Generate the response

This book will walk teachers and students through the following Problem Scenario:

The Main Problem Scenario:

You are a teacher whose class wants to extend recess time, but there are concerns about the extra exposure to the sun.
How can you protect your students from this risk?

You will approach this Main Problem from several points-of-view

The Math Angle

How long can students stay in the sun without protection?

The Science Angle

What is the impact of sun exposure, and what factors influence it?

Social Studies Angle

Is recess important, and will students benefit if the time is increased?

In the end, you will take all you've learned and give your final response to the Main Problem.



Language Arts serves as the hub for the entire exercise. It is in ELA that all of the other "subject angles" are evaluated and measured against one another, and a final decision about how to approach the Main Problem is made based on all of the available information.

A Note to the Teacher:

If there was something about the cover or title of this book that interested you enough to pick it up and turn to this page, then you probably already know what we are going to say. The truth is that, in today's world, students must leave the classroom equipped with 21st century skills and ready to meet the challenges of real life. One of the best ways to meet these demands is through interdisciplinary **Problem-Based Learning** scenarios. This type of classroom instruction promotes communication, collaboration, curiosity, organization, and problem-solving skills . . . all major components of any reputable set of standards.

The Problem-Based scenarios in this book integrate Language Arts, Math, Social Studies, Science, and other content areas. They offer educators a chance to shift the work of learning from the teacher to the students, where it belongs. If we wish to prepare a generation of students to solve real-world problems, we simply must give them real-world problems to solve... Problem-Based Learning is the way to accomplish this task.

So, let's get ready to begin! Enjoy,

Your Friendly Editors

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Standard Alignment

How many times have you reviewed a new resource and asked, “*How does this align to my standards?*” It’s certainly a fair question, especially considering how teachers themselves are assessed and how their performances are monitored.

What’s interesting is how teachers like to refer to them as “my standards.” Often times, an obsession over a specific set of standards—whether it is a set of state standards or even the Common Core—causes an extremely qualified educators missing a few simple steps. The most important of those steps may be to define what exactly is meant by the term “standards.”

For our purposes, we’ll simply say that “standards” are a written description of what a student should know and what he or she should be able to do related to a specific subject area. A clear set of standards will tell us just well students should know it and well they should be able to do it.

From that broad perspective, standards really don’t change much around the country. You can argue the subtleties all day, and yes some standards are certainly clearer and more logical than others. Still, everyone agrees that by the time a student finishes 1st grade, he or she should know the differences between the four seasons... and a 4th grader should not only know the name of our first president, but also understand why our founders were so adamant about checks and balances... a student should finish elementary school with a firm grasp of all four math operations. You get the point.

Of course, a great set of standards will make these milestones very clear and help a teacher accomplish the goals without missing any steps along the way. We certainly hope that the problem scenario in this book will be helpful in that quest.

As you go through this book, each “subject angle” will provide specific learning goals based on the topics that fit the exercise. In most cases, students will achieve the goals simply by working through the exercise. In other cases, they will have to be “led there” with a little help from the teacher.

However, it’s important to note that Problem-Based Learning isn’t about absorbing names, dates, facts, and figures. A textbook is still great for that. The next page will outline several “hidden learning goals” that are extremely important, and that a textbook just won’t touch.

The concept of Higher-Level Thinking is certainly nothing new, and a number of “educational scholars” have worked hard to define and classify the concept. We’re not going to try to invent the wheel here. Instead, we’re going to use the work of the experts to show how vital Problem-Based Learning is to a student’s education:

Webb's Depth of Knowledge *(the very abbreviated version)*

DOK 1	- selecting information, citing evidence, following simple instructions	Demonstrated as students review various stimulus items
DOK 2	- understanding, explaining concepts, what can be done, sound predictions, logical conclusions	Demonstrated during class discussion and the “thought-gathering” phase
DOK 3	- using information to conceptualize, make broad connections and linkages, and support abstract ideas	Demonstrated as students answer the Extended Response questions
DOK 4	- applying ideas and concepts in a different situation, creating something new with information	Demonstrated as students create their “Products” for each exercise

21st Century Skills

- ◆ Critical Thinking
- ◆ Collaboration
- ◆ Entrepreneurialism
- ◆ Researching
- ◆ Leadership
- ◆ Flexibility / Adaptability
- ◆ Creativity
- ◆ Technological Ability
- ◆ Internet / Media Literacy
- ◆ Planning
- ◆ Social Awareness
- ◆ Data Analysis
- ◆ Communication
- ◆ Scientific Literacy
- ◆ Personal Expression

Throughout student’s education, he or she must develop skills and lifelong traits in order to succeed.

It is in the development of these abilities and traits that traditional teaching methods often fall short, and where Problem-Based Learning greatly succeeds.

Life Habits

- ◆ Patience
- ◆ Imagination
- ◆ Healthy Skepticism
- ◆ Perseverance
- ◆ Leadership
- ◆ Self-Direction

When considering standard-alignment, it is the development of skills and habits that is the greatest benefit of PBL!



“Ask not whether **Problem-Based Learning** fits into the new standards... ask whether the new standards fit into **Problem-Based Learning**.”

A Note to Parents

Of course parents like to be kept in the loop, so they will appreciate a note home to tell them about the Problem-Based Learning and the specific scenario you will be working on with your students. But there's another reason (perhaps a bit more sneaky) why we like to send the letter home. It helps set a tone for the entire exercise, prompting students to approach it with respect and a level of seriousness. It also lets parents say that when you send the "letter home", you mean business.

We've written a sample letter below that can be a model for your Parent Letter. Obviously, you can add your own personal touch to it as you see fit.

Dear Parents,

Our class is preparing to engage in a Problem-Based Learning exercise. The term "Problem-Based Learning" (or PBL) is being used more frequently in education, and I just want to take a moment to explain what we will be doing and what the goals are.

First, it's an important part of an educator's job to prepare our students to leave the classroom ready for the challenges of life and equipped with 21st century skills (such as those focused on communication, organization, technology, and problem-solving). We use these skills every day—opportunities they are often overlooked as students work to absorb names and dates, facts and figures.

For example, let's say you have to go to the bank in the afternoon after school. You may have a lesson on map reading and ask the students to find the best route to the bank. You could give them an incomplete look at the challenge of actually going to the bank. In real life, getting directions to the bank is one thing. To make it a successful outing, you will also ask yourself:

- *What time do I need to go? What are the banking hours? What will traffic be like?*
- *Why am I going? What do I need to bring? Is this a drive-through visit or do I need to go inside?*
- *What else do I need to do this afternoon? How will my bank visit work into my overall schedule?*

And so on... The ability to answer (and know enough to ask) these questions and respond accordingly, enables you to use your time and resources in the best way (even with something as simple as going to the bank). Students need to learn to do the same. Allowing students to work through Problem-Based Learning scenarios will help them develop the skills that go beyond simple memorization.

For our problem-base scenario, we are going to fast-forward to the day when the students are working citizens, and they will have to address a real problem that has no easy answer. Here's the specific task:

You are a teacher and your class wants to spend more time outside during recess. The principal is worried about the added sun exposure. Is it worth the risk, and how can students be protected from overexposure?

Obviously, this is not a "yes or no" problem. To come up with a logical approach, students will review different "stimulus items" related to the topic (articles, videos, statistics, infographics, etc.), engage in classroom discussion, and organize their thoughts as they absorb information. They will look at the problem scenario from several points-of-view across multiple subject areas. Next, they will work in groups to come up with the best approach or method, and they will present their findings in a simulated "real-life" situation. It will be challenging, but very enjoyable and it will ultimately result in a tremendous sense of accomplishment. Best of all, this exercise will help develop a wide variety of skills that students will use the rest of their lives!

Your Friendly Teacher

The Intro to Students

This is the fun part! The success of this exercise greatly depends on the excitement and engagement of the students. As you know, it's best if you can hook them right from the start. We've taken into consideration when creating this Problem-Based Scenario, and these are points you might be worthwhile to stress when introducing the Main Problem:

1 First Person

— your students are *main players in the problem... they are not solving an abstract problem for someone else*

2 Real World

— the problem scenario is a real-life situation... this makes it more relevant and increases engagement

3 Sense of Urgency

— simple phrases like "you must" and "it is important to" help add a sense of urgency

4 Short and Sweet

- limit the introduction of the problem scenario to a few sentences... the details will be ironed out later

The Main Problem

1

The students are participants in the problem, so they will be approaching it from a **first-person** perspective.

2

This scenario is a very **real-world** situation that has taken place in many schools. Students may already have an opinion on the issue, or they will be interested to consider it.

You are a teacher and your class has been asked to spend more time outside during recess. The principal is worried about the added sun exposure. Is it worth the risk, and how can students be protected from overexposure?

3

In definition, a problem should have a **sense of urgency** (otherwise, it's not a problem at all). The wording of the Main Problem was chosen to stress that it is something that must be addressed. Students will become more engaged if they, too, feel the pressure of the situation.

4

As students work through the problem, they will be exposed to many details and related resources. For the introduction, though, it's best to keep it "**short and sweet**" as shown above. This not only grabs students' attention, but it actually makes it easier to understand the final goal of the problem scenario.

A large selection of pages has been chosen for you to review (full book = 88 pages).

Math Standards

As students work through this section of our Problem-Based Scenario, they'll be focusing on several key mathematical content areas. This includes:

- **Data Analysis**
- **Algebraic Concepts**
- **Numbers and Operations**

Student Handout

In addition—and perhaps more importantly—students will need to take on a mathematical frame of mind (in academic circles, this is referred to as the “Standards for Mathematical Practice”), which is a key component of Problem-Based Learning. This means that students will need to:

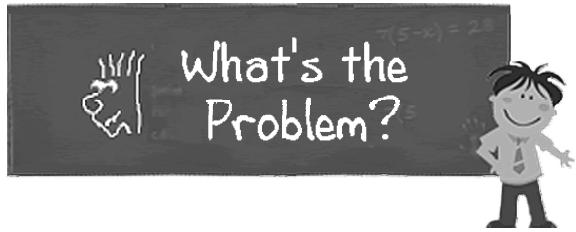
- **Make sense of problems and persevere in solving them.**
- **Reason abstractly and quantitatively.**
- **Construct viable arguments and critique the reasoning of others.**

You may want to share the goals listed above with your students prior to beginning the exercise, but the best part is that they'll be developing these skills whether they realize it or not!

The most important thing to remember when introducing the Problem-Based Scenario is to grab student interest right away. It is a fun and challenging exercise, and you certainly want students to approach it that way.

To make this easy for you, we have created a handout to introduce the “math angle” to your students for this Problem-Based Scenario. This will help them see that they will be looking at the Main Problem Scenario from a specific point-of-view, in this case with a mathematical focus.

Make photocopies of the next page to introduce the “Math Angle” of this Problem-Scenario to your students



*Are you ready to
tackle the problem?*

The Scenario:

You are a teacher and your class wants to spend more time outside during recess. The principal is worried about the additional exposure. Is it worth the risk, and how can students protect from overexposure?

In order to work with this problem scenario like the one above, you must view it from different points of view. In this case, we will look at the following:

Something to think about:

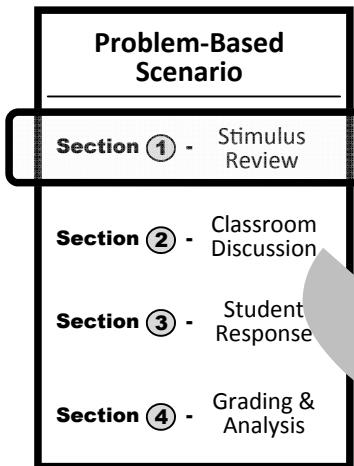
How long can students stay in the sun without protection?

Prior to giving an answer, you will review several resources, talk over as a class, and take time to get your thoughts in order.



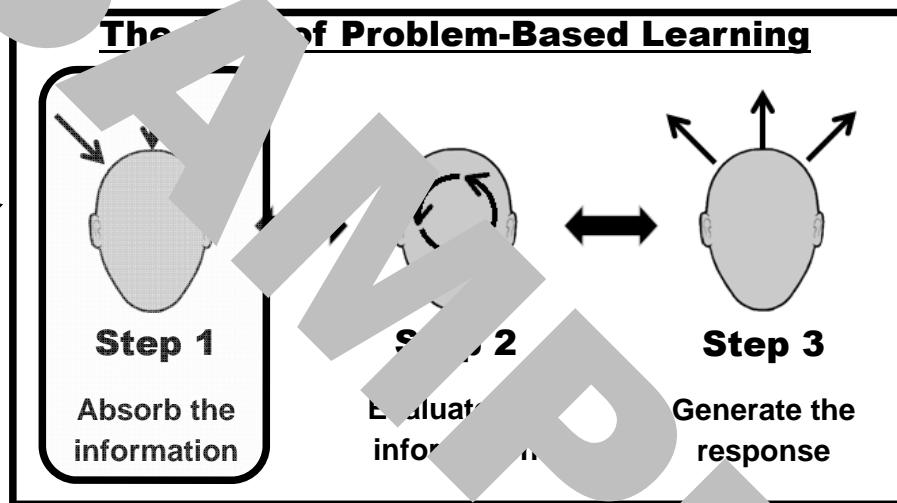
*As you work on this exercise, remember that this is primarily a **mathematics question**. This means that numbers and computations will be needed to support your ideas!*

Teacher Instruction Sheet



Stimulus Review

The Stimulus Review is **Section 1** on your Teacher Instruction Sheet.



The MATH ANGLE

It's a fancy term, but the "Stimulus Review" is simply the first step in Problem-Based Learning where students review a variety of information surrounding the specific problem or challenge.

In our Problem Scenario, all of the Stimulus Items have been provided for you. We have intentionally gathered a variety of different types and sources. This is important in today's modern world where information comes from all directions and also sets the stage for Step 2 (Evaluating the Information).

A few examples of the types of Stimulus Items you might see in a Problem-Based Scenario include:

- **Articles**
- **Videos**
- **Infographics**
- **Blogs**
- **Statistics**
- **Lists**
- **Websites**
- **Editorials**
- **Audio Recordings**
- **Cartoons**
- **Primary Sources**
- **Advertisements**

...and much more!

For your convenience, we've placed all of the Stimulus Items for this Problem-Based Scenario on a special website where **both you and your students** can have full access to them. To access these resources, you will go to:

The screenshot shows a website interface with a dark header containing the text "What's the Problem?" and a cartoon character icon. Below the header is a login form with fields for "Login:" and "Password:", each accompanied by a small placeholder text ("Please enter..."). A "Login" button is located at the bottom right of the form area.

http://www.pblproject.com/students

Login: Password:

Login

The Stimulus Items you will see for this section of the exercise include:

Stimulus Item #1

— “**Looking at the Numbers**” (UV chart)

Stimulus Item #2

— “**How Long Is Too Long?**” (infographic)

Stimulus Item #3

— “**Sun Protection Costs**” (article)

A Few Notes:

There are a few things we'd like to highlight as your students get ready to dive into the Stimulus Items. First, these are actual sources that have been gathered for the topic at hand, even if they have been edited or adapted at times due to length, format, or readability. That means that they don't necessarily reflect our personal opinions, and we certainly don't want to take credit for the hard work of others (all source information will be provided). It does, however, provide a nice mix for your students.

Next, the Stimulus Items should give your students the background information they need to generate their responses to the Problem-Based Scenario. There is no need for you to seek out other resources or for students to do their own research.

With that said, it is always great if there is an opportunity for students to get on a computer or head to the library to find their own background information. Being able to conduct your own research is a vital skill to have, and it is referenced throughout Language Arts standards.

Again, this extra step is not necessary to successfully go through the exercise (we know you're already crunched for time!), but we figured it was worth mentioning!

A large selection of pages has been chosen for you to review (full book = 88 pages).

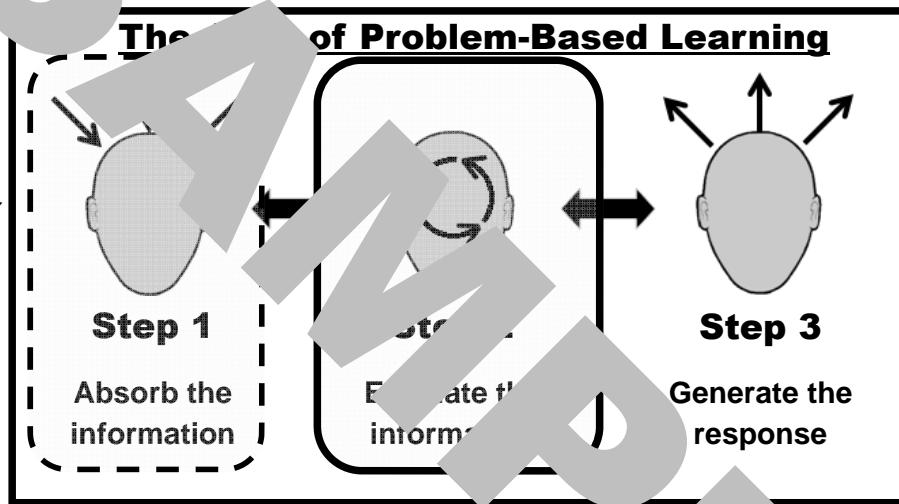
Teacher Instruction Sheet

Problem-Based Scenario	
Section ①	- Stimulus Review
Section ②	- Classroom Discussion
Section ③	- Student Response
Section ④	- Grading & Analysis

Classroom Discussion

The Classroom Discussion is **Section 2** on your Teacher Instruction Sheet.

Teacher
"Quick Sheet"

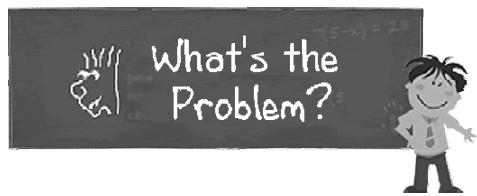


The MATH ANGLE

Now that your students have reviewed the Stimulus Item, it's a fitting time to have a **class discussion** about the Problem-Based Scenario (specifically, the "math angle" that you're working with).

At this stage, there will be a limited amount of new information being added to the table (Step 1), although you might want to introduce ideas not covered in the stimulus, and perhaps students will share original thoughts and experiences. For the most part, though, the classroom discussion is where you want students to evaluate the information (Step 2) to which they've been exposed. It is now that they will begin to organize it all and decide how it will fit together in their response.

The key to a classroom discussion, of course, is keeping everything focused and moving it in the direction you want, and at the same time creating a free environment for students to share and build on ideas. This is certainly where teachers earn their pay! One way we've tried to help (a little bit, at least) is to provide you with the talking points that work well for this scenario. The bold questions are what you will ask your students, and each has bullet points that you can use to guide the discussion.



Leading Questions for Classroom Discussion

Outside Recess (math angle)

How long can you stay in the sun?

- Consider that you can get sunburned in only 15 minutes depending on the UV index (see discussion question)
- Consider that babies are not born with a developed skin protection system, so they burn more easily...even children born to parents with dark skin need full protection
- Consider the number of sunscreens that you use to protect yourself from the sun... *SPF stands for Sun Protection Factor, and refers to the amount of time you can stay in the sun without getting sunburned. For example, an SPF of 15 would allow you to stay in the sun 15 times longer than you could without protection. But in reality, a multitude of factors affect how well you're protected from the sun.*

What is the UV index?

- Consider that the UV index uses a numerical scale to rate the strength of the sun's UV exposure level...the higher the UV index level, the stronger the strength of the sun's UV rays—and the faster you can burn
- Consider that the UV index is issued daily to advise you on the strength of the sun's UV rays in your region (you may want to make a habit of checking the forecast so you'll know how much sun protection you'll need each day)

How can math be used to protect you from sunburn?

- Consider how important it is to know the time of day and how long you're in the sun... *Limit your time in the sun and heat between 11 a.m. and 4 p.m. When your shadow is shorter than you, the sun is very strong. Look for places with lots of shade.*
- Consider how important it is to use the correct amount of sunscreen based on UV index (put sunscreen on when the UV index is 3 or higher) and SPF rating (30 SPF or higher)
- Consider how math skills are needed to understand the UV index forecast, which is a scale that rates the strength of the sun's exposure

Teacher Instruction Sheet

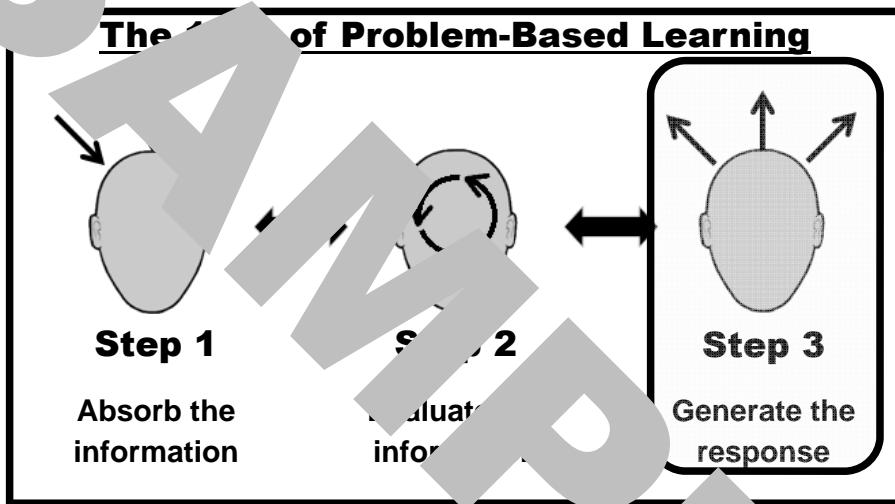
Problem-Based Scenario	
Section ①	- Stimulus Review
Section ②	- Classroom Discussion
Section ③	- Student Response
Section ④	- Grading & Analysis

Student Responses

(Extended Response)

The Student Responses are **Section 3** on your Teacher Instruction Sheet.

Student Handout



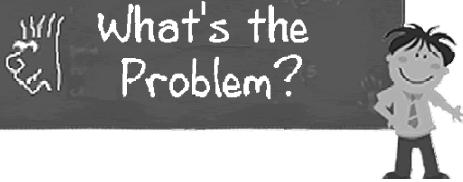
On your Teacher Instruction sheet, you'll see that each scenario provides two types of response options for your students—Extended Response and the Product Option. Let's look at the "Extended Responses" first.

As you would expect, the Extended Responses are simply questions revolving around the Problem-Based Scenario that the students answer through their writing.

Most likely, the Extended Responses are similar to what you might see during a Performance Task of a comprehensive assessment (where students are given a range of information to review, and then must give their conclusions based on the evidence). The "test prep" benefits alone make it worthwhile for students to complete the Extended Responses, but the broader benefit is their ability to take the information they've been exposed to and generate a logical response to a problem scenario.

The rubric and process for grading Extended Responses is on the following pages. Also, we will leave it up to you whether you want to allow students to use notes they have taken throughout (we think it's fine for them to do so), and also how strict you want to be with time limits (a half hour or so should be fine).

Here are the Extended Response questions for this scenario.



What do you think?

The questions below are centered around the Problem-Based Scenario you've been reviewing. Please answer the questions on separate sheets of paper.

- 1) What is the UV index and how can it be used to determine the length of time you can stay in the sun?
- 2) Looking at the UV index, what recommendations would you make concerning the length and location of recess? What is your reasoning?



Remember to support your answers with evidence that you've gathered from what you've read and discussed in class!

Teacher Instruction Sheet

Problem-Based Scenario	
Section ①	- Stimulus Review
Section ②	- Classroom Discussion
Section ③	- Student Response
Section ④	- Grading & Analysis

A large selection of pages has been chosen for you to review (full book = 88 pages).

Grading Rubric (Extended Responses)

The Grading Rubric is **Section 3** on your Teacher Instruction Sheet.

Student Handout

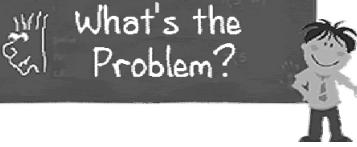
One thing that your students may not understand about these Problem-Based Scenarios is that the answer is never “yes” or “no.” Instead, students must think their way through the muddy waters of different calculations and challenges, while you guide them along the journey.

Of course, the end result needs to be more than just one back—and that's why proper grading is so important. While students may believe that grades exist only to cause stress and fill the blank spaces on a report card, the broader truth is that when students are graded in a clear and fair way, it enables them to continually improve their approach and response.

The Extended Responses for this scenario can be graded using the rubric to the right. It is divided into four sections:

- 1) Math Content** (*What do you want students to bring to the table based on previous discussions?*)
- 2) Writing Focus** (*Was it clear what point the students were trying to make?*)
- 3) Use of Evidence** (*Did the students back up their position with evidence, quotes, statistics, and facts?*)
- 4) Language & Conventions** (*Did students limit mistakes and respond in a thorough and professional manner?*)

Here is a copy of the rubric for your students to review.



How do I get a great score?

Listed below are the four different areas that will be evaluated as your responses are graded. Be sure to consider each area as you write.

Rubric Section #1: **Math Content** – you must show a high level of background knowledge and general understanding of the topic

****in other words:** *Was what have you learned from previous lessons?*

You showed a great understanding of the subject.



You showed barely any understanding of the subject.

Rubric Section #2: **Productivity & Distribution of Writing** – you must organize and sustain your writing based on a defined purpose

****in other words:** *Was it clear what you were trying to say, and did you focus on that point?*

You had a clear purpose and organized everything around that purpose.



You didn't have a clear purpose and there was little organization.

Rubric Section #3: **Combining Knowledge and Ideas (use of “evidence”)** – you must support your arguments and positions with outside information

****in other words:** *Did you back up your position with facts, evidence, or quotes from a source?*

You supported your main idea with evidence and provided key facts and details.



You provided almost no support for your main idea and provided few facts or key details.

Rubric Section #4: **Command of the English Language** – you must use proper grammar, spelling, vocabulary, and other conventions of the English language

****in other words:** *Did you limit mistakes and respond in a thorough and professional manner?*

You were professional and showed a command of the English language.



You were sloppy and need to do a better job following the rules of the English language.

A large selection of pages has been chosen for you to review (full book = 88 pages).

Science Standards

As students work through this section of our Problem-Based Scenario, they'll be focusing on several science content areas. This includes:

- Sun & Shadows
- Weather (safety)

Student Handout

In addition—and perhaps more importantly—students will need to take on a scientific frame of mind (in academic circles, these are referred to as the “Science and Engineering Practices”), which is a key element of Problem-Based Learning. This means that students will be:

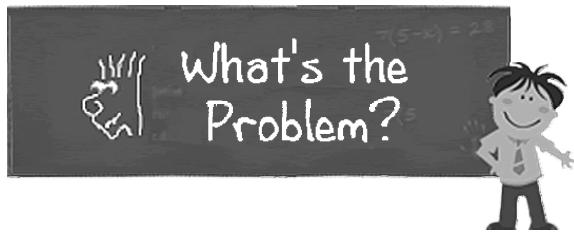
- Asking questions and defining problems.
- Constructing explanations and designing solutions
- Engaging in argument from evidence.
- Obtaining, evaluating, and communicating information

You may want to share the goals listed above with your students prior to beginning the exercise, but the best part is that they'll be developing these skills whether they realize it or not!

The most important thing to remember when introducing the Problem-Based Scenario is to grab student interest right away. It is a fun and challenging exercise, and you certainly want students to approach it that way.

To make this easy for you, we have created a handout to introduce the “science angle” to your students for this Problem-Based Scenario. This will help them see that they will be looking at the Main Problem Scenario from a specific point-of-view, in this case with a scientific focus.

Make photocopies of the next page to introduce the “Science Angle” of this Problem-Scenario to your students



Are you ready to tackle the problem?

The Scenario:

You're a teacher and your class wants to spend more time outside during recess. The principal is worried about the additional exposure. Is it worth the risk, and how can students be protected from overexposure?

In order to work with a complex scenario like the one above, you must view it from different perspectives. In this case, we will look at the following:

Something to think about:

What is the impact of sun exposure, and what factors influence it?

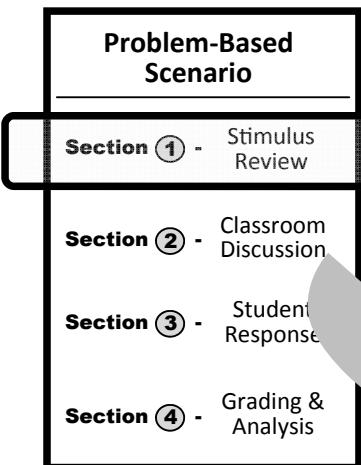
Prior to giving an answer, you will review several resources, talk over as a class, and take time to get your thoughts in order.



As you work on this exercise, remember that this is primarily a science question. This means that scientific facts will be needed to support your ideas!

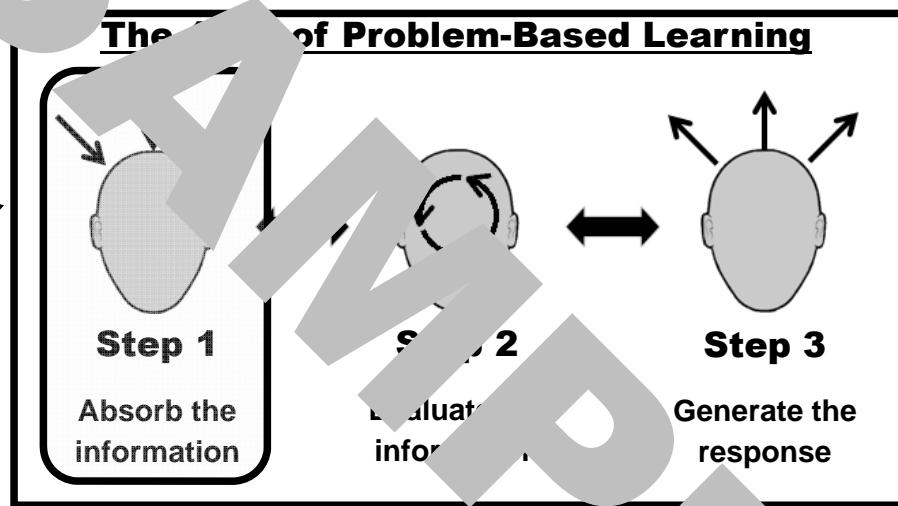
A large selection of pages has been chosen for you to review (full book = 88 pages).

Teacher Instruction Sheet



Stimulus Review

The Stimulus Review is **Section 1** on your Teacher Instruction Sheet.



The SCIENCE ANGLE

It's a fancy term, but the "Stimulus Review" is simply the first step in Problem-Based Learning where students review a variety of information surrounding their specific problem or challenge.

In our Problem Scenario, all of the Stimulus Items have been provided for you. We have intentionally gathered a variety of different types and sources. This is important in today's modern world where information comes from all directions and also sets the stage for Step 2 (Evaluating the Information).

A few examples of the types of Stimulus Items you might see in a Problem-Based Scenario include:

- **Articles**
- **Videos**
- **Infographics**
- **Blogs**
- **Statistics**
- **Lists**
- **Websites**
- **Editorials**
- **Audio Recordings**
- **Cartoons**
- **Primary Sources**
- **Advertisements**

...and much more!

For your convenience, we've placed all of the Stimulus Items for this Problem-Based Scenario on a special website where **both you and your students** can have full access to them. To access these resources, you will go to:

The screenshot shows a login interface for a website titled "What's the Problem?". At the top, there is a question mark icon and the title. Below the title, there are fields for "Login:" and "Password:", each with a corresponding input box. A "Login" button is located at the bottom right of the form area.

http://www.pblproject.com/students

Login Password

What's the Problem?

Login:
Password:
Login

The Stimulus Items you will see for this section of the exercise include:

Stimulus Item #1

- “Playing Safe in the Sun” (video)

Stimulus Item #2

- “Watch Your Shadow” (article)

Stimulus Item #3

- “Be Sun-Wise” (tips)

A Few Notes:

There are a few things we'd like to highlight as your students get ready to dive into the Stimulus Items. First, these are actual sources that have been gathered for the topic at hand, even if they have been edited or adapted at times due to length, format, or readability. That means that they don't necessarily reflect our personal opinions, and we certainly don't want to take credit for the hard work of others (all source information will be provided). It does, however, provide a nice mix for your students.

Next, the Stimulus Items should give your students the background information they need to generate their responses to the Problem-Based Scenario. There is no need for you to seek out other resources or for students to do their own research.

With that said, it is always great if there is an opportunity for students to get on a computer or head to the library to find their own background information. Being able to conduct your own research is a vital skill to have, and it is referenced throughout Language Arts standards.

Again, this extra step is not necessary to successfully go through the exercise (we know you're already crunched for time!), but we figured it was worth mentioning!

A large selection of pages has been chosen for you to review (full book = 88 pages).

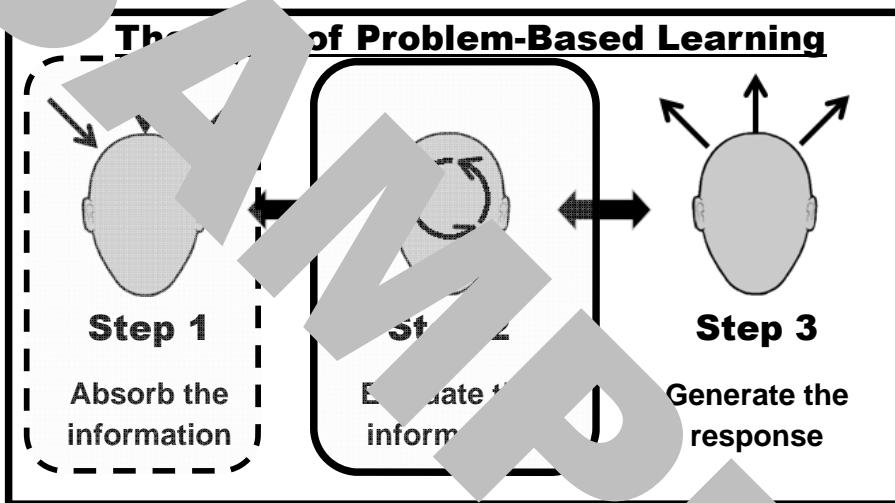
Teacher Instruction Sheet

Problem-Based Scenario	
Section ①	- Stimulus Review
Section ②	- Classroom Discussion
Section ③	- Student Response
Section ④	- Grading & Analysis

Classroom Discussion

The Classroom Discussion is **Section 2** on your Teacher Instruction Sheet.

Teacher
"Quick Sheet"

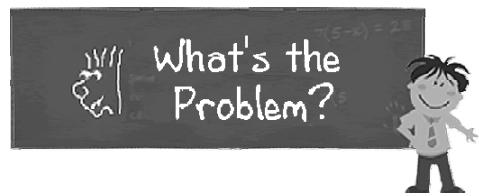


The SCIENCE ANGLE

Now that your students have reviewed the Stimulus Item, it's a fitting time to have a **class discussion** about the Problem-Based Scenario (specifically, the “science angle” that you’re working with).

At this stage, there will be a limited amount of new information being input to the table (Step 1), although you might want to introduce ideas not covered in the stimulus, and perhaps students will share original thoughts and experiences. For the most part, though, the classroom discussion is where you want students to evaluate the information (Step 2) to which they've been exposed. It is now that they will begin to organize it all and decide how it will fit together in their response.

The key to a classroom discussion, of course, is keeping everything focused and moving it in the direction you want, and at the same time creating a free environment for students to share and build on ideas. This is certainly where teachers earn their pay! One way we've tried to help (a little bit, at least) is to provide you with the talking points that work well for this scenario. The bold questions are what you will ask your students, and each has bullet points that you can use to guide the discussion.



Leading Questions for Classroom Discussion

Outdoor Recess (science angle)

How is the sun helpful?

- Consider that the sun is necessary for life on Earth...without it, plants and animals would be unable to grow and thrive
- Consider that the sun gives us light and keeps us warm
- Consider that the slow revolution of the Earth around the sun causes the seasons
- Consider that the sun allows our body to make Vitamin D, which helps in our bone development

How is the sun harmful?

- Consider that over exposure to the sun can result in sunburn and skin damage, which will cause our skin to age more quickly and may lead to serious ailments
- Consider that the sun can harm your eyes
- Consider that the sun has an impact on inanimate objects as well, causing colors to fade and plastics and other materials to get weak over time

How can you protect yourself from the sun?

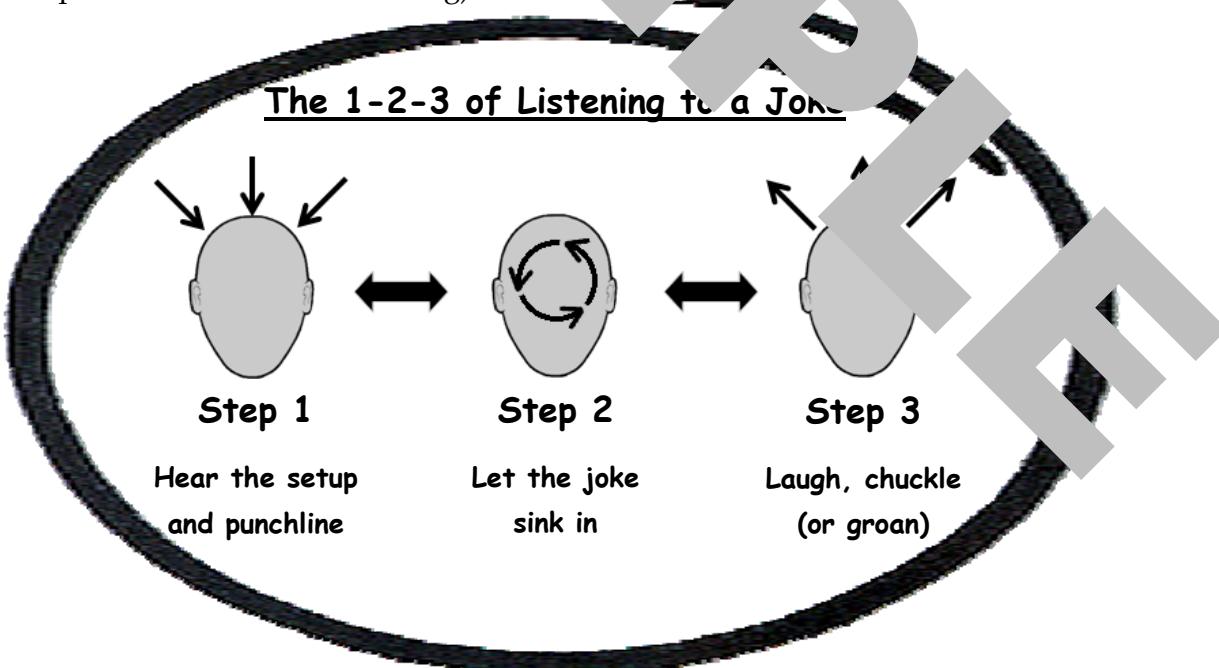
- Consider how easy it is to "cover-up"... wear tightly-woven clothing that blocks out light (if you can see your hand through the fabric, it offers little protection)
- Consider the importance of sunscreen... a sun protection factor (SPF) of at least 15 blocks 93 percent of UV rays
- Consider wearing a hat... a wide brim hat (not a baseball cap) is ideal because it protects the neck, ears, eyes, forehead, nose, and scalp
- Consider wearing sunglasses (make sure they provide protection against both A and B rays)
- Consider drinking plenty of cool liquids (especially water) even before you feel thirsty
- Consider limiting exposure... UV rays are most intense between 10 a.m. and 4 p.m. (if you're unsure about the sun's intensity, take the shadow test: **If your shadow is shorter than you, the sun's rays are the day's strongest!**)

A large selection of pages has been chosen for you to review (full book = 88 pages).

A Little Humor...

While you may enjoy the material on the next page, please know that we are not adding a humor section simply to offer an escape from the task at hand. Laughter is another important step in helping students (especially younger elementary students) develop the skills of Problem-Based Learning.

Truth be told, the jokes in this book may not be all that funny (we tried our best), but that's not the point. When you tell a joke to younger students, their first reaction is likely a blank stare and furrowed brow. It's at that point that the steps of Problem-Based Learning (absorb the information, analyze the information, respond to the information) kick into full gear. Around the “Aha!” moment that you're looking for, whether it's a laugh or a groan. That's the moment you know they've gone through the entire process of listening to a joke (which, just so happens, look very similar to the steps of Problem-Based Learning):



The next page features a few jokes that fit with the “subject angle” and might be worth sharing and will help your students casually practice the skills of Problem-Based Learning



"Outdoor Recess" - Science

On a very hot day during recess:

Zack: Do you remember back in February when we built a snowman right here?

Robin: Sure, but that was months ago... What made you think about a snowman on a hot day like this?

Zack: Well, did you see that puddle on the ground? I think that's it!

(This one is silly enough to get a giggle and a reminder of how different the seasons can be)

George seemed nervous on the swing and during recess.
"What's wrong?" his teacher asked.

"Didn't you see those bumblebees flying over there?"

"Sure," said the teacher looking over. "But that was on the other side of the building. They're too far away to hurt you."

"Well," replied George. "You told us the sun can be dangerous, and it's almost 100 million miles away."

(George has a good point! Then again, perhaps he needs a better explanation about the "dangers" of the sun.)

Knock! Knock!

Who's there?

Canoe.

Canoe who?

Canoe put some sunblock on me before I go outside? I don't want to get burnt!

(Not bad for a "Knock! Knock!" joke, and your students will surely appreciate it.)

Social Studies Standards

As students work through this section of our Problem-Based Scenario, they'll be focusing on several social studies content areas. This includes:

- **Becoming a Good Citizen**
(why recess is a fundamental part of education)

Student Handout

In addition—and perhaps most importantly—students will need to understand basic principles of social studies, which is where the benefit of Problem-Based Learning. This means that in addition to the basic social studies standards, students will become familiar with the broader themes of social studies. For example:

- | | |
|--|---|
| <ul style="list-style-type: none">• Culture and Cultural Diversity• Time, Continuity, and Change• People, Places, and Environments *• Individual Development and Identity *• Individuals, Groups, and Institutions | <ul style="list-style-type: none">• Political Authority and Governance• Production, Distribution, and Consumption• Science, Technology, and Society• Global Interdependence• Civic Ideals and Practices |
|--|---|

*an asterisk has been placed beside each theme that is a major part of this PBL exercise.

You may want to share the themes listed above with your students prior to beginning the exercise, but the best part is that they'll be developing a broader understanding whether they realize it or not!

The most important thing to remember when introducing the Problem-Based Scenario is to grab student interest right away. It is a fun and challenging exercise and you certainly want students to approach it that way.

To make this easy for you, we have created a handout to introduce the “social studies angle” to your students for this Problem-Based Scenario. This will help them see that they will be looking at the Main Problem Scenario from a specific point-of-view, in this case with a focus on society and historical trends.

Make photocopies of the next page to introduce the “Social Studies Angle” of this Problem-Scenario to your students



What's the
Problem?



Are you ready to
tackle the problem?

The Scenario:

You're a teacher and your class wants to spend more time outside during recess. The principal is worried about the health consequences. Is it worth the risk, and how can students be protected from overexposure?

In order to work through a complex scenario like the one above, you must view it from different perspectives. In this case, we will look at the following:

Something to think about:

Is recess important, and will students benefit if the time is increased?

Prior to giving an answer, you will review several resources, talk over as a class, and take time to get your thoughts in order.



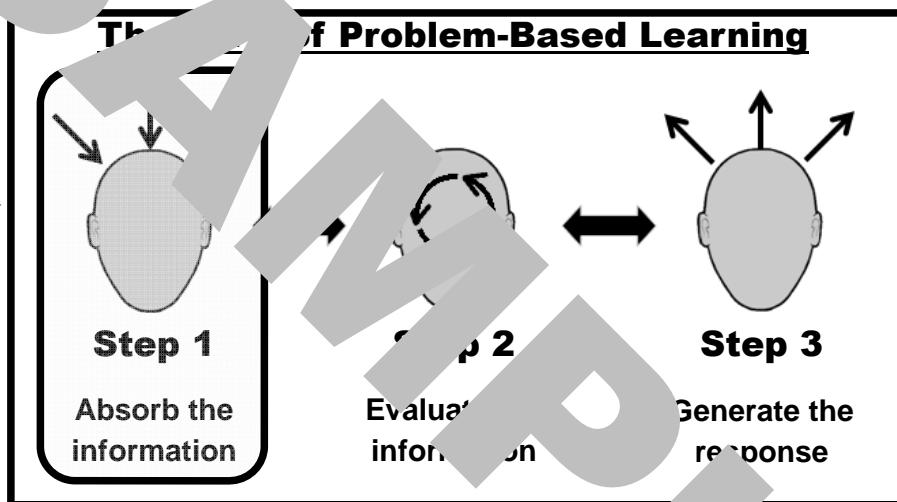
As you work on this exercise, remember that this is primarily a **social studies question**. This means that you must consider how people live and work together when coming up with your ideas!

Teacher Instruction Sheet

Problem-Based Scenario	
Section ①	- Stimulus Review
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Stimulus Review

The Stimulus Review is **Section 1** on your Teacher Instruction Sheet.



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The Stimulus Items you will see for this section of the exercise include:

Stimulus Item #1

- “All About Recess” (Infographic)

Stimulus Item #2

- “Why Kids Need Recess” (Editorial)

Stimulus Item #3

- “Children and Outdoor Activities” (Video)

A Few Notes:

There are a few things we'd like to highlight as your students get ready to dive into the Stimulus Items. First, these are actual sources that have been gathered for the topic at hand, even if they have been edited or adapted at times due to length, format, or readability. That means that they don't necessarily reflect our personal opinions, and we certainly don't want to take credit for the hard work of others (all source information will be provided). It does, however, provide a nice mix for your students.

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Teacher Instruction Sheet

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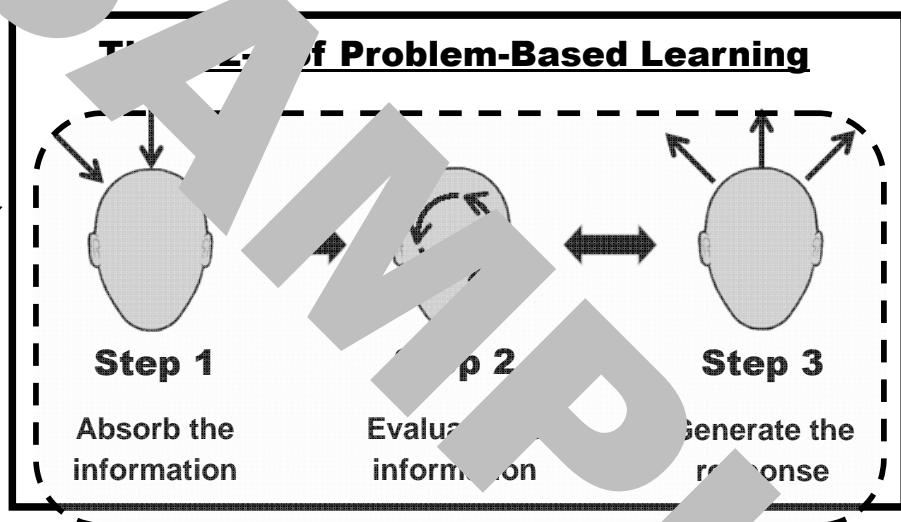
The SOCIAL STUDIES ANGLE

“Thought-Gathering”

Sheet

The “Thought-Gathering” Sheet is an interim step prior to the student responses.

Student Handout

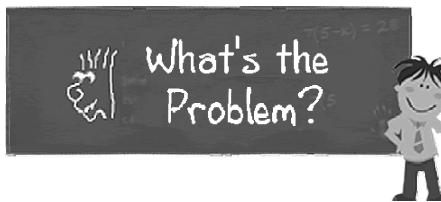


So, by this point, you've had students review Stimulus Items related to the Problem Scenario. That led to a stimulating (we hope) classroom discussion on the topic.

Often times, there is a feeling of “information overload” at this stage. Students may have enough information to generate their constructed responses and/or further refine their product options (we'll talk about these on the upcoming pages), but their thoughts may be all over the place. They may still have to pick their position, refine their arguments, focus their proposal, perfect their design... and so on.

That's where the “Thought-Gathering” Sheet comes in. This isn't to be confused with any “note-taking sheets” your students may have written while they were looking through the Stimulus Items or listening to the discussion. Rather, this is a final stage where they sort everything (including their own notes) to prepare for their response. It is a chance to tie together Step 1, Step 2, and Step 3 (shown above).

We have provided a “Thought-Gathering” sheet that works with this exercise and is a good chance for students to organize their ideas prior to creating their responses.



Outdoor Recess

"Thought-Gathering" Sheet



Should we have outdoor recess?

A Pros vs. Cons Sheet

YES

NO

Reasons to have outdoor recess:

Reasons NOT to have outdoor recess:

If we do have outdoor recess, what do we need to keep in mind?

If we do NOT have outdoor recess, what should we do instead?

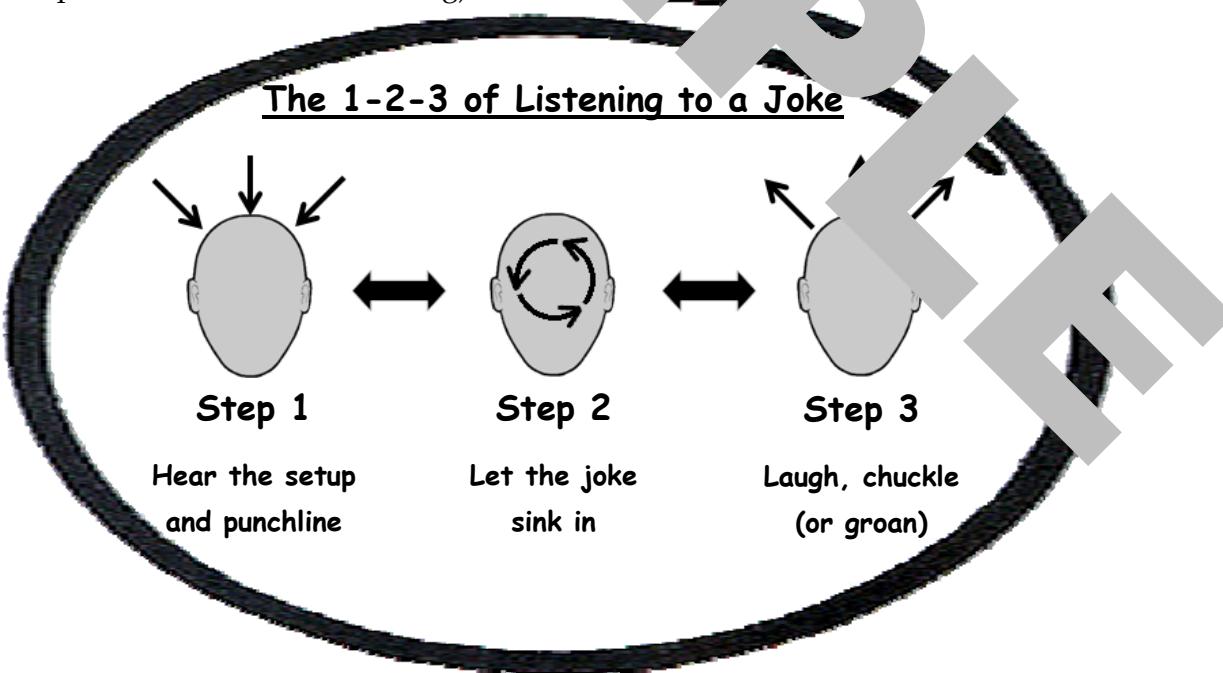
SAMPLE

A large selection of pages has been chosen for you to review (full book = 88 pages).

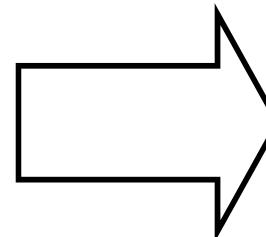
A Little Humor...

While you may enjoy the material on the next page, please know that we are not adding a humor section simply to offer an escape from the task at hand. Research has shown another important step in helping students (especially elementary students) develop the skills of Problem-Based Learning.

Truth be told, the jokes might not be all that funny (we tried our best), but that's not the point. When you joke to younger students, their first reaction is likely a blank stare and furrowed brow. It's a key point that the steps of Problem-Based Learning (absorb the information, analyze the information, respond to the information) kick into full gear. And it's this Aha! moment that you're looking for, whether it's a laugh or a groan. That's why you'll see they've gone through the entire process of listening to a joke (which just so happens to look very similar to the steps of Problem-Based Learning):



The next page features a few jokes that fit with the “subject angle” and might be worth sharing and will help your students casually practice the skills of Problem-Based Learning



"Outdoor Recess" - Social Studies

Teacher: Jimmy, I'm a little concerned about you because we didn't get to go outside today due to the rain.

Jimmy: I'm fine, why are you worried?

Teacher: Well sometimes you have a little trouble concentrating when we don't go outside for recess.

Jimmy: I'm sorry what are we talking about?

(I think we can all relate to Jimmy's lack of energy on days without recess!)

Teacher: It must be time for a break. I see every day about this time you have trouble answering simple questions and you lose complete interest. Have you ever noticed that?

Jennifer: I don't know, and I don't care.

(This one is a take on an old classic, and hopefully your students will recognize the punchline.)

"It's too hot to play outside," complained Cathy.

"Don't be silly," replied her teacher. "It's a beautiful day. Don't you just want to run around and get some exercise?"

"Well, sure," admitted Cathy. "But I think if we go inside and sit down, the feeling will eventually pass."

(Another joke inspired by a classic punchline that is unfortunately the thought process used by many of us to avoid exercise!)

A large selection of pages has been chosen for you to review (full book = 88 pages).

Student Responses

Language Arts

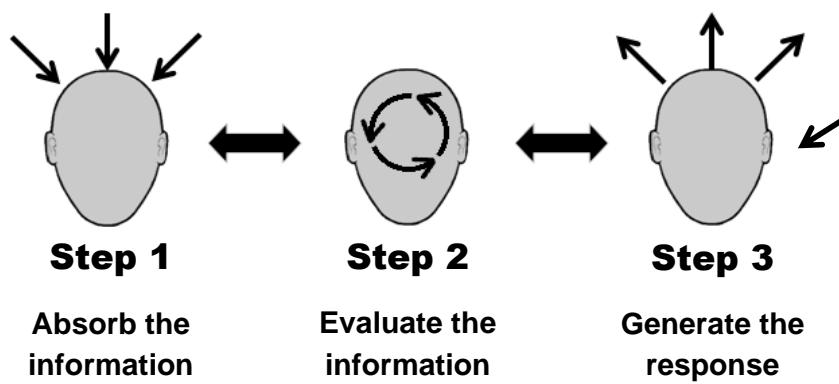
In previous sections of this book, students have only concentrated on one piece of the puzzle – now it’s time to look at the Main Problem Scenario as a whole, incorporating everything that has been researched and discussed along the way.

To respond to the Main Scenario, a prompt has been provided (shown to the right). Your students’ writing – and perhaps oral presentations – will need to meet several expectations from a Language Arts perspective. Students must:

- Show the ability to comprehend informative texts and resources
- Explain their position and overview of the scenario
- Support their positions with evidence from their research
- Articulate clear opinions (*stressed at the primary level*)
- Form compelling arguments (*stressed at the middle school level*)
- Demonstrate speaking and listening skills

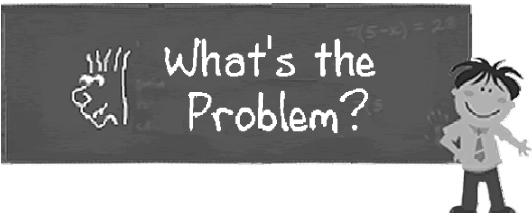
The skills above will only be demonstrated if students are able to absorb Stimulus Items, organize their thoughts, and approach the Problem Scenario in a logical way. If they fail in these tasks before a single word is written on paper, they will never be able “write their way out of it” at this stage of the game. To put it another way:

The 1-2-3 of Problem-Based Learning



*This is not merely a writing exercise!
Student responses will never satisfy all of the requirements listed above if Steps 1 and Steps 2 are incomplete.*

Here is the Language Arts prompt for this Problem Scenario.



What do you think?

The prompt below is centered around the Problem Scenario you've been reviewing. Please provide your response on a separate sheet of paper.

You are a teacher and you have decided to increase recess time by 10 minutes for your class.

Write a letter to parents to explain why this is in the best interest of students. You must also let the parents know how you are going to protect students from sun overexposure during this added recess time.

Read the letters to your class and see if they would be happy with your decision if they were parents.

Grading Rubric (Language Arts)

Student
Handout

One thing that your students must understand about these Problem-Based Scenarios is that the answer is not “yes” or “no”. Instead, students must think their way through the mud, mire, and muck of different situations and challenges, while you guide them along the journey.

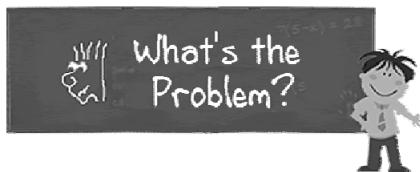
Of course, the end result needs to be more than a pat on the back—and that's why proper grading is so important. While students may feel that grades exist only to cause stress and fill the blank spaces on a report card, the broader reason is that when students are graded in a clear and fair way, it encourages them to continually improve their approach and response.

In many ways, the Language Arts prompt is more difficult than the others because students aren't being asked to stay within the boundaries of math, science, or social studies. Instead, they are given the green light, free to use any research from all other subjects (and anything else they want to bring to the table) to form their response. This may sound easier, but the truth is that the ability to organize information and pull out key evidence (a tricky task for students) becomes critical and more difficult at this stage. Let's see how they do!

The writing prompt for the Problem Scenario can be graded using the rubric to the right. It is divided into four sections:

- 1) Logical Approach** (*Did students use a reasonable strategy to deal with the Main Problem?*)
- 2) Writing Focus** (*Was it clear what point the students were trying to make?*)
- 3) Use of Evidence** (*Did the students back up their position with evidence, quotes, and facts?*)
- 4) Language & Conventions** (*Did students limit mistakes and respond in a thorough and professional manner?*)

Here is a copy of the rubric for your students to review.



How do I get a great score?

Listed below are the four different areas that will be evaluated as your responses are graded. Be sure to consider each area as you write.

Rubric Section #1: **Logical Approach** – you must show that a thoughtful and sound process was used to solve the Main Problem

****in other words:** Did you use a reasonable strategy to deal with the Main Problem?

You provided a clear and sound strategy in your response.

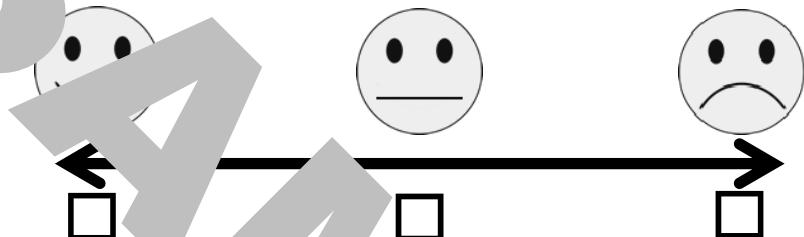
Logical Approach

you must show that a thoughtful and sound

process was used to solve the Main Problem

****in other words:** Did you use a reasonable strategy to deal with the Main Problem?

You did not give details about a sound strategy in your response.



Rubric Section #2: **Production and Distribution of Writing** – you must organize and sustain your writing based on a clear purpose

****in other words:** Was it clear what you were trying to make, and did you focus on that point?

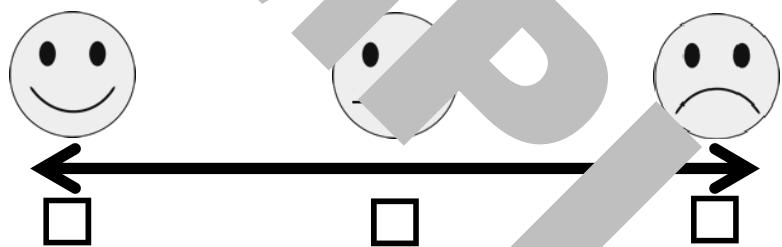
You had a clear purpose and organized everything around that purpose.

Production and Distribution of Writing

you must organize and sustain your writing based on a clear purpose

****in other words:** Was it clear what you were trying to make, and did you focus on that point?

You didn't have a clear purpose and there was little organization.



Rubric Section #3: **Combining Knowledge and Ideas (use of evidence”)** – you must support your arguments and positions with outside information

****in other words:** Did you back up your position with facts, evidence, quotes, and statistics?

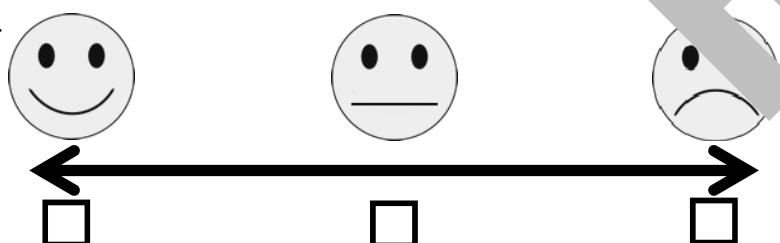
You supported your main idea with evidence and provided key facts and details.

Combining Knowledge and Ideas (use of evidence”)

you must support your arguments and positions with outside information

****in other words:** Did you back up your position with facts, evidence, quotes, and statistics?

You provided almost no support for your main idea and provided few facts or key details.



Rubric Section #4: **Command of the English Language** – you must use proper grammar, spelling, vocabulary, and other conventions of the English language

****in other words:** Did you limit mistakes and respond in a thorough and professional manner?

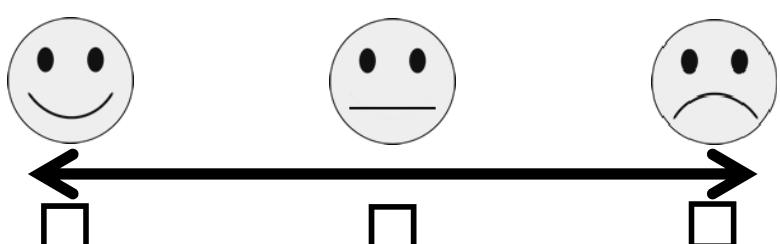
You were professional and showed a command of the English language.

Command of the English Language

you must use proper grammar, spelling, vocabulary, and other conventions of the English language

****in other words:** Did you limit mistakes and respond in a thorough and professional manner?

You were sloppy and need to do a better job following the rules of the English language.



A large selection of pages has been chosen for you to review (full book = 88 pages).

How long will it take?

Without a doubt, the most common question we are asked is:

"How long is this going to take?"

Our answer is, *It's up to you!* (which could be seen as dodging the question). The truth is that it's all about options and flexibility. Obviously, the time will greatly vary if you just do a "subject angle" (i.e. one problem) (i.e. one section of this book) or do the entire integrated Problem Scenario (i.e. the whole book). Consider these guidelines:

1 or 2
periods/
blocks

2 weeks
or more

A specific "subject angle", focusing only on the stimulus review and classroom discussion

All steps of a single "subject angle", with students answering the "Extended Response" questions

The entire PBL Integrated Scenario, with students solving the Product Options, collaborating in groups, and presenting results

If you're crunched for time, you may concentrate on one section of this book (the "subject angle"), and probably won't be able to dive into the Product Option. Still, this will be a great introduction into Problem-Based Learning for your students.

It will certainly take longer to go through this whole book, including the Product Options and presentations for each subject angle (i.e. every section in this book)

In the end, if you can take a Problem Scenario all of the way from beginning to end, including each "subject angle", as well as the products, group work, and presentations that go with each one, your students will have accomplished quite a bit. For that reason, we have included a **"Certificate of Accomplishment"** that you may want to provide to show students that their efforts are appreciated. Remember, you want them to enjoy the whole experience!

Student Handout

Photocopy this certificate to give to your students.

Certificate of ACHIEVEMENT

Awarded to _____

for completion of the following:

Problem-Based Scenario: "Outdoor Recess"

By completing this entire scenario, you have learned that you have the ability to approach a real-world problem about outdoor recess. You have been given a variety of different sources, evaluate all of the information provided, and provide a clear and logical response to the challenge.

Great
Job!

Given this day _____ in the year _____

Signed _____