



Solution Fluency

Project Based Learning

IDEAS GUIDE

K-12 Learners

Bring PBL to Your Classroom

Project-based learning is a big part of today's modern learning environments. It takes students on a cool journey of creativity, exploration, and true real-world relevance. What does PBL look like in action in your classroom?

Solution Fluency provides the building blocks for PBL. It's a way for students to learn good problem-solving skills and to become successful with any challenge.

This *PBL Ideas Book* will help them do exactly that. Inside are classroom project ideas for years K–12. There are 9 awesome projects to choose from with choices for primary, middle, and senior grades. But wait—what if the scenario idea you like isn't for your specific grade?

No problem at all. These PBL ideas are customizable and scalable for *any* grade level. They're also cross-curricular in nature, and can be adapted to other subject areas.

Explore these scenarios and think creatively about how you can bring them to life for your students.



Citizenship Day

What can you do to help make people aware of the importance of online responsibility?



Year
K–5

Language Arts, Math, Art & Design, Technology

Digital citizenship and game designs come together in this lesson about teaching online responsibility. Students will learn how to be good digital citizens, and the dangers of irresponsible behaviour online. Using what they learn, they'll design their own participation games and use them to host a class activity day, where other students, teachers and even parents will be welcome to come and learn about digital citizenship in a fun interactive way.

Each group will create 2–3 unique games that are creatively designed to teach the ideas of digital citizenship. You can create these games using standard art materials, or you can incorporate the use of digital technology like cellphones or tablets into the games (this would be useful in question and answer games, for example, when a question is given and responses are made using Twitter, or in word games using an iPad app like Sentence Builder).

Once the games have been approved by the teacher, the class will set up an activity day where other students and teachers (and even parents) will be invited to play the games and learn all about how to be good digital citizens.



DEFINE: In this lesson, students will be researching the tenants of good digital citizenship. Then they'll use their knowledge to creatively design games that teach people about the importance of these practices.



DISCOVER: Student groups begin finding out about what digital citizenship is and why it's so important. Have them record what they discover and look for common threads in what they find from different sources.



DREAM: What kinds of games can teach digital citizenship? Word games? Picture matching? Adventure games where every choice has a different consequence? How about a board game, or even your own game show?



DESIGN: Students start creating their first drafts of the games they want to create. As they do this, they will need to think about how they want to place lessons about digital citizenship into their gameplay.



DELIVER: Students host their activity day for digital citizenship. Other students, teachers, and parents spend the day playing games and learning with them. The kids also get to play the roles of gracious hosts.



DEBRIEF: What did the students learn about digital citizenship and its importance in our online lives? Is it a one-time courtesy, or is it a way of life in the digital world requiring constant diligence and practice?



Light Painters

How can you combine your knowledge of math, art and design to help resolve a problem?



Year
K–5

Math, Art & Design, Technology

A heavy storm recently struck your city, and ravaged a prominent stained glass window in a landmark church. Rather than build a replica of the broken window, the church council has called for artists to submit design templates for a brand new window. That's right up your alley.

You have a good design sense and a talent for creating geometric patterns. Why not try your hand at creating a design? Work in pairs or groups to create the most remarkable stained glass draft you can think of, using the tools of mathematics and fun research. The patterns must include clear geometric shapes and symmetry.

You will need to know the shape and the exact measurements of the window opening to plan the dimensions of the major sections of your design. Using a large window in your home or school, note all important measurements in the template, including the measurements of the major angles and sections of the design. When your design is complete, you will go on to construct a full size overlay of the stained glass window. Create a light-infused work of art!



DEFINE: Students are creating a geometric design for a stained glass window. Use measurements of a window at home or in the classroom, and create a pattern to fit in it.



DISCOVER: Explore the patterns and history of stained glass windows. Look for stained glass windows in the community, and look at window designs from around the world.



DREAM: Now that they have seen a number of geometric window patterns, students begin to think about designs for their own windows. Ask them to sketch a pattern on a rectangular piece of paper.



DESIGN: After they have experimented with different ideas and designs, the students can begin to create a rough draft of their windows. Have them identify the design elements in their drafts.



DELIVER: Students have drafted the final designs for their stained glass windows. If possible, have them do a full-size overlay using black paper, tape and coloured cellophane.



DEBRIEF: Encourage them to reflect on their own design experiences. How do artists use geometry in their designs? How do they create perfectly symmetrical patterns?



A World Wonder

How can we preserve our world landmarks while still allowing for the growth of global tourism?



Year
K–5

Social Studies, History, Science, Language Arts

There are so many spectacular places here on Earth to see, many of which are visited by millions of sightseers from all over the world every year. Many of these places are in danger of becoming severely damaged. It seems that more and more of Earth's natural beauty is becoming endangered for different reasons. How can we change this for the better?

In this lesson, students suggest how to preserve our natural landmarks. They will create solutions for accommodating a growing number of tourists to a world landmark in a way that protects it from further deterioration. Their recommendation will be designed to allow many people to continue enjoying these landmarks in the years to come.

Collect information on the kinds of things that are threatening them, such as foot traffic or pollution. Your team will construct an informative presentation of a landmark site describing its brief history and why it is important, and why it's a popular tourist attraction. Your presentation will also include your proposed solution for protecting and preserving it while allowing for the continuation of annual visits from tourists.



DEFINE: Students research landmarks that are being endangered by the growth of tourism. They will come up with a unique solution for protecting and preserving this landmark to accommodate the continuing global tourist trade.



DISCOVER: Ask them to focus on those landmarks that are in danger of deterioration and possible extinction. Why is it considered so important to protect and preserve these sites?



DREAM: Find a way to protect and preserve your landmark and allow for the continuing growth of the tourist trade. What could protect these landmarks while allowing an increasing number of people to visit and enjoy them?



DESIGN: Each group will now begin designing the solution they have in mind for preserving their landmark sites. Their solution must include an estimation of tourist growth that they made during the Discovery phase.



DELIVER: Groups present the solutions they have designed for protecting their chosen natural landmark. Their visual representation of the landmark is the main focal point.



DEBRIEF: Have them share what they have learned about our natural landmarks from their research. What did they learn about designing ways to protect them?



Interview with a Hero

Why are high-risk occupations such a necessity in our society?



Year
6–9

Language Arts, Social Studies, Media Studies

Everybody needs a hero—they inspire us, guide us, and help us become better people. History is filled with examples of them, and heroism can even be found among people leading normal everyday lives. Your TV crew has arrived at a scene where one of these heroes has just performed a stunning act of bravery and sacrifice. You are going to stage an interview with this “everyday hero.”

Look at some of the occupations where things such as bravery and quick thinking are involved—police, firefighters, paramedics, and so on. Find stories of people in those professions who have accomplished extraordinary things. View examples of live TV interviews where the interviewer speaks with a policeman, fireman, or EMT to get his or her version of the story.

Your group can create a backstory of the incident, work it into the script for the interview, and assign roles to each member of the group, such as interviewer, camera operator, hero figure, and so on. Structure it as though it were a live story you might see on a news channel, and bring it to exciting life by filming or recording it. Your on-the-scene interview should last about 1 ½–2 minutes.



DEFINE: Working in groups, students will stage an on-scene TV crew interview with a high-risk professional such as a policeman, firefighter, or EMT. They must create the atmosphere of a live news feed, and script and play all the parts.



DISCOVER: Students can first decide what kind of occupation they want to research. What kinds of situations, environments, and people do these professionals deal with every day?



DREAM: Now they place themselves in the driver’s seat while they envision an interview and how they see it unfolding. Here they start to think about playing roles and about creating the exciting backstory for the interview.



DESIGN: Students start mapping out production and creating a timeline with deadlines and responsibilities. They can choose the appropriate medium for their project, and choose a viable location and design it for their interview.



DELIVER: Students now present their projects for the rest of the class. They will show their film or present their audio recording. Alternatively, they may also be performing the interview as a rehearsed live scene.



DEBRIEF: Urge them to reflect on what they have learned about the importance and necessity of these dangerous occupations and their place in modern society.



Cultural Food Fair

How do restaurants manage operating costs and expenses?

Year
6–9

Math, Social Studies, Food Studies, Finance

Our world has many diverse and rich cultures, each with something unique to offer. There's one love that we all share, though, and that's the love of different foods. You are about to embark on a cultural journey where you will learn about many different cultures, as well as good money management, profit, and pricing. The class will be doing this to raise money for charity.

Your group will choose a specific culture and a choice of 2 to 3 dishes native to that culture. Research this culture and some of the foods and dishes that they enjoy. Create a shopping list and purchase all the items required to make these dishes. Base your list on the approximate number of people who will be attending, assuming that there will be one serving per person. Be sure to keep the receipt for your groceries; you will need this to calculate cost against profit later. Decide on a place where you will gather to do the cooking and spend a fun evening creating your fancy dishes.

On the day of the food fair, create and decorate a kiosk to sell your food—one that will attract customers. You must set fair and reasonable prices for your dishes and keep an accurate record of the money you take in.



DEFINE: In this fun-filled lesson, students learn about different cultures while managing the details of cost and profits as they collaborate on a cultural food fair. The goal is to sell them in an advertised food fair bazaar to raise money for charity.



DISCOVER: Students discuss the ethnic dishes they feel would be best to serve at their food fair. Let them discover as much as they can about the culture they will represent and what its most popular native foods are.



DREAM: How will they decorate their kiosks to attract business and describe the culture they are representing? How will they present the foods in an appealing manner? Who will be doing what task during the food fair?



DESIGN: Students begin to create designs for their kiosk and food presentation. They may choose to decorate their stands with traditional adornments in the style of the culture. Then it's time to build, shop, and cook!



DELIVER: It's finally time to hold the food fair. Students will prep their dishes and set up their kiosks. They are now "open for business." Students are free to decorate their kiosks and even dress in cultural attire if they wish.



DEBRIEF: This is a time for students to reflect on all the new experiences they've had. Not only have they gained knowledge of other cultures, but also they have learned about business, and about cooking.



I Object!

How are stories used to shape our impressions of historical figures?



Year
6–9

Social Studies, History, Language Arts, Law

Marie Antoinette declared, “Let them eat cake!” Robin Hood stole from the rich and gave to the poor. George Washington could not tell a lie and chopped down a cherry tree. *Or did they?* That is a question we still ask today. In reality, these stories are not necessarily true. But how do we know what and whom to trust when historical facts have been re-written?

You and your team decide to investigate a person or event in history to try to find the truth. How were these stories created? By whom or where were they first recorded? But even more importantly, why? What were the possible motives behind the creation of these stories? How did these stories come to be considered a part of history? How have we come to have a common understanding about them?

Once you have explored the story and the people/motives behind it, your team will hold a mock trial to determine if the historical myth is “guilty” or not of the actions from the story. Call the witnesses, present the “evidence” and re-enactments as to whether this myth should be allowed to remain a part of history, or be replaced with the truth. You must present both sides of the argument and allow the jury to decide.



DEFINE: The students are presented the challenge of researching the story behind the myth of an historical figure or event and creating a mock trial to determine whether or not the myth should be allowed to remain a part of history.



DISCOVER: Students search for the truth of the origin of the myth surrounding a famous historical figure. They will examine the societal, political, and/or moral reasons the myth was developed.



DREAM: Students consider the reasons for the evolution of the myth. They will consider what evidence to include as part of the prosecution (the truth) and as part of the defense (the myth).



DESIGN: The students will now write, rehearse, film, and edit their trial or any piece of it that is being pre-recorded. Any pieces of evidence that need to be created are now prepared.



DELIVER: The students will now hold their trial for the class. After all of the evidence has been presented, the class will vote as to whether or not the myth should be allowed to remain.



DEBRIEF: Discuss with the students what factors led them to their decision. Were specific witnesses or pieces of evidence were most persuasive? Were there any common elements in the myths examined by the class?



From the Heart

How can we use music and images to evoke specific feelings and inspire positive actions?



Year
10–12

Language Arts, Social Studies, Media Arts, Music

Hunger and famine in different parts of the world can be so far removed from our awareness. But once in a while, we get a glimpse of this tragedy through organizations devoted to helping others worldwide. In our entertainment-obsessed culture, we always stand up and take notice when a popular celebrity adds their voice into the mix.

Suppose you are a famous singer/songwriter who has been asked to lend your voice to a campaign promoting the awareness of third world hunger. The organization running the commercial has asked you to create a poetic verse that will be performed as a voiceover for a special project they are working on. They will use it with images/film clips to create a powerful statement that will promote awareness of the problem and inspire action to remedy it.

Working with others in a group, research the background and nature of the situation. You must collect powerful images/film clips to create a campaign spot for television lasting one minute. The TV spot will pair stirring and emotional images with appropriate music, and the celebrity will recite or sing the poetic verse in a voiceover.



DEFINE: Students are promoting awareness of hunger in third world countries. They'll create an original one-minute commercial with a narrative voiceover, and make use of powerful and emotional imagery in a TV-style presentation.



DISCOVER: Research what is happening in underdeveloped nations in regards to hunger. Have students also investigate what charities have already done to help such situations, and what success they have had.



DREAM: Your team will create a TV commercial about third world hunger to raise awareness and inspire people into action. Imagine you have a powerful and popular celebrity figure on board to help lend their voice.



DESIGN: In this stage, the groups will go on a search for the best photos and footage to use in their commercial projects. They will write the poetic verses for their voiceover using their knowledge of the plight of those who are hungry.



DELIVER: Students make all the finishing touches and final revisions to their projects, and prepare them for presentation. They can then present their one-minute commercials to the class in their desired format.



DEBRIEF: Let students talk about why it's so important to be aware that the world is full of people in need, and what they and everyone else can do to contribute to the cause of ending world hunger.



Mythic Proportions

How do cultures and myths influence one another?



Year
10–12

Social Studies, History, Media Arts, Language Arts

You and your friend have just watched a behind-the-scenes feature on the *Harry Potter* films that compares them to other films and literature. Your teacher points out that while there are similarities in plot elements and character types, they both have slightly different overall messages. To help you understand this concept, your teacher asks you to create your own “Making of Myths” documentary.

Research the birth, purpose, and nature of literature, theatre, and mythology in ancient Greece. Focus on how and why stories and performances were used to teach morals, values, and beliefs in this time period. Look at the similarities and differences of the mythological creation stories in other cultures as well.

You will then need to write and create a presentation that includes performances of sections of each myth and information as to the structure of the myth, its influences on future myths, and its influence on society. The presentation may include sharing images and text or acting out scenes from different myths followed by a series of narrative speeches that explain the cultural significance of what was just shown.



DEFINE: Students study the origins and uses of mythology and theatre in Greek culture to write their own documentaries. They will explore how and why these myths were used to teach and reflect Greek morals, values, and culture.



DISCOVER: How are the morals/values/beliefs of a specific culture taught? What are some common themes among the stories in their mythology? How does the format of the myth reflect the society it comes from?



DREAM: Students can draw inspiration by watching “behind the scenes” and “director commentary” features on DVDs of Hollywood classics, “making of” TV specials, and lectures from writers, theatre artists, and visual artists.



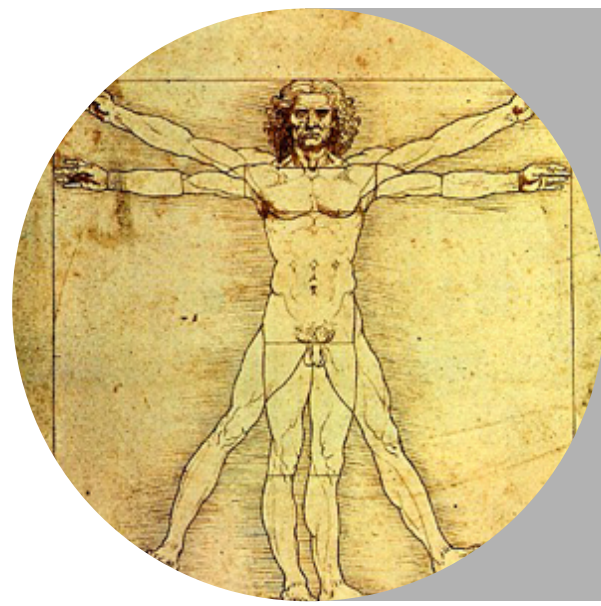
DESIGN: Students begin constructing their “Making of Myths” documentary by writing the text, creating physical movement, and creating/gathering audio and visual materials.



DELIVER: Each group now rehearses and performs their “Making of Myths” documentary for the class. They can use projections, music, sound effects, physical movement, and more to bring their works to life.



DEBRIEF: What were some of the challenges of analyzing myths from different cultures? What were effective and ineffective ways of organizing and presenting this information?



Da Vinci Code

How does math contribute to our understanding of the human form?



Year
10–12

Math, Science, Anatomy, Art & Design

The Leonardo Da Vinci drawing “Vitruvian Man” stated fixed relationships between a person’s measurements, such as “the length of the outspread arms is equal to the height of the man.” Are these relationships true to life, or are they Da Vinci’s ideal?

Begin your investigation by testing these measurements on classmates. Remember to record hand and height measurements from different volunteers, and then graph each pair of measurements as a point on a coordinate plane. Once you have graphed the measurements, look for linear associations. Compile these as well into a graph. Then the real fun begins!

When you have graphed your measurements and found a ratio from the line of fit, draw your own Vitruvian Man (or woman) according to the ratio derived from your observations. You can use drawing software or a ruler and paper to draw the figure and the body parts in the correct proportions.

As with the original, your drawing should include a canon of proportions that spells out the significant relationships between body parts. The more measurements you collect, the more proportions you can reveal and the better your drawing will be.



DEFINE: In this lesson, students work in pairs to graph people’s body measurements and draw a Vitruvian figure based on the proportions they observe. They’ll present their drawings, graphs, and “canons of proportions” to the class.



DISCOVER: Why is it called the Vitruvian Man? Which proportions in the canon might hold for both men and women? Which would hold for only one gender? Would kids and adults have the same body proportions?



DREAM: Students now think about which proportions they’d like to measure, and list the exact body lengths they will need to record. They will need to consider how to organize data and keep track of measurements.



DESIGN: Students must now finalize their list of measurements and obtain rulers or tape measures for collecting the data. They will create a timeline with specific milestones for their group as well.



DELIVER: The groups now create and present their figures and describe their graphs, the proportions they looked for, and their findings. Encourage questions about the methods for measuring and graphing body lengths.



DEBRIEF: Student pairs discuss the feedback they received from the class and reflect on what they have learned about using bivariate graphs to investigate proportional relationships.

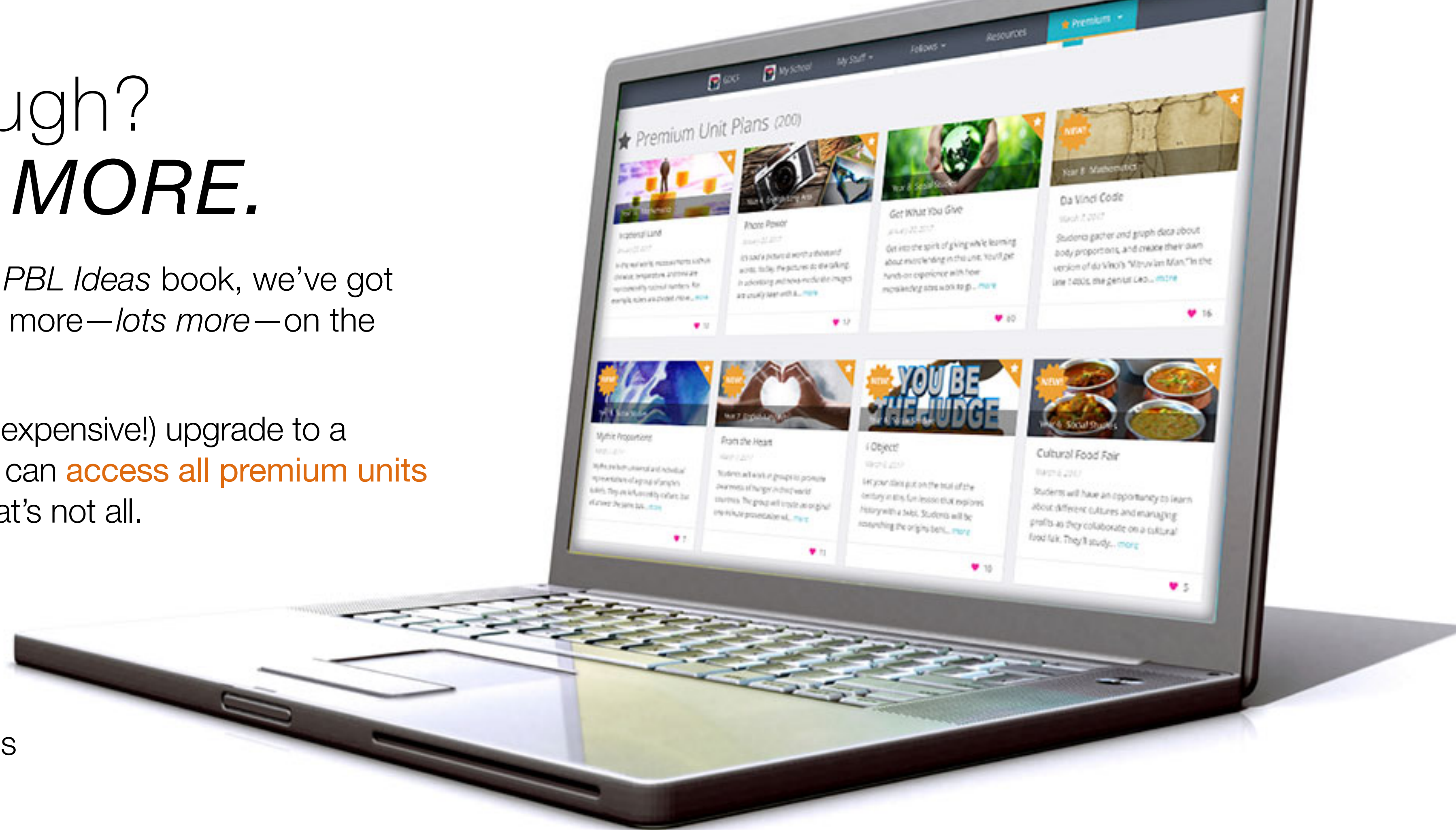
Can't Get Enough? Then Get **MORE.**

If you enjoyed the scenarios in this *PBL Ideas* book, we've got good news. You can get access to more—*lots more*—on the **Solution Fluency Activity Planner**.

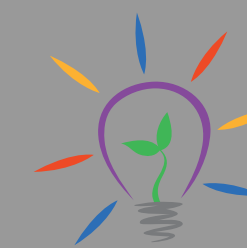
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