

## Ensuring a Successful Year

### JUMPSTART

#### Session 6: Ensuring a Successful Year

## PART 1 - Interactives and Real World Connections

We've spent time this summer talking about CK-12's FlexBooks® and adaptive practice, as well as including videos within your texts. But, we wanted to take a few minutes to go into more depth on our applications in the real world and our interactives. Our vision is that these applications and interactives enable learners to explore real world settings and discover concepts in a fun and interactive way.

### Real World Applications

If you look at any page, for example this one on "Scale Distances or Dimensions," you can see a real world application option within that concept. If I open one of these, let's say the one on "Sizing up Statues," you'll see that this application includes how this concept applies in the real world - in this case, the size of the Statue of Liberty versus a model of that particular statue. You could go through here, have students read about it, maybe watch a video that goes with it, or check out another link and do some Explore More work. Students could then do their own project on scale models, or you could have this be a self-contained exercise.

Let's look at another example, this one from science. Here's the real world application that goes with "Force" in Physical Science. In this case, it talks about freerunning and parkouring. So, you can see different feats of those runners and then you can go and explore this concept and answer some questions about force and Newton's Laws.

### PLIX:

Beyond these real world applications for Concepts, we have our interactives. If you go to the home page, you can open our Simulations or our PLIX directly from the homepage.

If we go into PLIX, you'll see a number of different interactives related to topics in math and science. You can change the branches that you want to show up by simply selecting or unselecting concepts in both math and science.

If we go into any one of these, whether it's in Probability, Chemistry, Life Science, you'll be able to open those options and have students explore. Let's look at a couple of particular options. In this case, this topic has to do with turning words into numbers. This is actually an elementary topic, so it's a great example for students that are younger. In this case, it says, "Each big square block counts as a hundred, each long as ten, and each square block as one." If I go down a little further, it gives me the directions and the explanation of how to interact with this PLIX. I can then try different parts and even answer some challenge questions. You'll see these

questions that relate to the PLIX vary from multiple choice to categorizing, and even to larger discussion questions. The goal is really to have students explore a concept and get at various levels of learning within that concept.

If we look at another PLIX (this one in Biology), you'll see the interaction, the description that tells you how to interact with it, and the challenge questions that go with it. These are not currently part of our assessment system, but you will soon have the option to assign one of these PLIX to a group within the system and have students explore the concept accordingly.

### **Simulations:**

If we go into our Simulations, you'll see a number of different options for Physics simulations at this time. You could open any one of these, or you could look at the resources here and click on that to download a worksheet that relates to that particular simulation. You can also filter these simulations, either by standards for NGSS or by a Concept. Let's say we filtered this by "Work, Power, and Energy." I could then pick particular topics within here or just explore the topics within that larger concept.

Let's open the one on the ramp and piano. You'll see this starts with some question related to the topic. In this case, "Can you and your friends lift this piano into the truck?" If you click play, you'll see an explanation of this topic and how things relate. You can continue to watch this video to see the introduction to this concept, or you can move forward to our sandbox environment.

From here, you'll see the option to change the number of friends, the weight of the piano, and even the ramp length or truck bed height. And then you can click play to see if those friends can actually move that piano. You'll see if I change this to one and make the piano significantly heavier, and even shorten the ramp length, then the person can't actually lift it onto that truck bed. You also have the option to explore using the actual graph component, or you can hide that graph for younger students and just have them mess around with the environment. You can even "enable the last run," showing the current and the last run to compare two different options. For all of our Simulations, you'll see a tutorial video if a student is having trouble figuring out what parts to adjust within this sandbox environment. You can also click on the Concepts and go explore any of the Concepts that are related to this particular Simulation. You can give us feedback, or you could ask different questions related to this concept. And then you can share it, using our "share-o-plane."

The next part of any Simulation is our slider-based questions. And these really have students answer a question using that environment. So, if I click on this first one, it will bump me back to that environment and now I can answer the question. I can even show the question if I'm not sure what it said there. In this case, "Adjust the slider so the weight of the piano is 5 and then the truck bed height is 1." So, I'm going to move it to 5 and 1. And, "the number of friends is 1. What is the minimum ramp length you need to get the piano into the truck?" So, I can see does

it work at 3? Nope. 4 or even 5, but in this case 4? And look, at the distance of 5 times the original amount, I can get it in there, so now I can “Submit” this question.

The final component of any Sim, if I move on from here, is that of related ideas. These are real world examples where students can apply what they just learned to new environments. For example, “Can you build a machine that can reduce force without increasing distance?” They could go down and look at more examples from here. You can even contribute your own for both here as well as the “Community Contributed” questions that go with this particular simulation.

So, each Sim has four components. It has the original introduction, the sandbox environment where they can mess around and try different components of this system, the questions, and then that application.

We hope that using these, our PLIX, and our Real World Applications, students will start by being curious, discover how math and science work within a class or even on their own, and never stop exploring the world around them.

## **PART 2 - CK-12 Concept Map (8:21)**

If, instead of only searching for a particular concept, you’re looking for content that is related to a topic, you can use our new Concept Map option at the top of any concept page. This is in beta, but is a wonderful way to find content that relates to a topic your students are studying.

Let’s say you were teaching Scientific Notation, and wanted to see what other topics were related to it. Having gotten to the concept page via browsing or searching directly, you can simply click on the Concept Map button in the top right to see what other concepts relate. You’ll notice that this topic is clearly related to other topics in both science and mathematics. If you were only looking for topics within math or within science specifically, you could choose to limit your search accordingly (by only math, only science, or all).

Once you have decided whether you are looking for interdisciplinary options or topics strictly within math or science, you can click on any concept title to see what resources CK-12 has to offer for it. For example, you could click on “Mathematics Tools for Physics.” By clicking on “Learn more,” that concept page will open for you and you can explore any of the content there.

Alternatively, you could explore what concepts are related to anyone of these topics, by clicking on a node and expanding your concept map. Let’s say “Scientific Method.” You can always collapse this option by clicking on the node again. If you want to keep exploring, let’s say “Scientific Method,” then “Development of Hypotheses,” and even “Testing Hypotheses,” you

can continue to explore, always diving into the content by clicking on the title or details. If you want to zoom in or out, or get a full aerial view, those options are in the top right.

If you wanted to explore these relationships without starting from a particular concept page, you can choose any branch by scrolling down on the homepage - let's pick "Trigonometry," - and then clicking on the Concept Map option at the top. This will bring you to our concept map page where you can search a topic or choose any recommended starting place, such as "Pythagorean Theorem to Determine Distance." At this point in time, you can continue to explore the connections the way we did for "Scientific Notation."

## **PART 3 - Creating a Lesson Using CK-12 (11:53)**

We've talked a lot about the resources CK-12 offers and the variety of different modalities that students and teachers can use when they are learning and teaching a concept. We really want to spend a few minutes talking about different ways that you could use CK-12 to teach a unit or a particular concept to your students.

### **Student Exploration:**

The first option - let's say I was teaching "Quadratics" for my Precalculus class - would be to go in and just share this Concept as a whole. I could go into the concept and click "Share Me" and share it with Google Classroom, or I could share any particular read within here to a group or class I had on CK-12. From there, I could really have students take full control of their learning and just say, "Explore whatever you need: the read, the video, and the PLIX that goes with it, and come up with your understanding of a particular concept." From there, I could assign the practice and assess how students are doing and fill in any gaps if students are misunderstanding or need more help with a particular topic.

I could even say, "Just search for 'Quadratics,'" and then maybe they pull some stuff from "Methods for Solving" or even from "Graphs of Quadratic Functions." We could then pull the class together and have them teach each other different concepts within that unit.

### **Customization of Curriculum:**

If I wanted to create my own curriculum, I could go in and I could pick a particular book for Precalculus. In this case, you'll see a Math Analysis book that has those longer lessons that include a couple different concepts within that. I can choose to customize this book. And, once I'm in and customizing it, I could go into the section on "Quadratics" and edit that particular section. I could change the title, or I could just save it generally as "Quadratic Functions."

Once I'm in that section for my book, I have a number of different options. I can change any of this text, I can go in and I can update the videos that are in it or even the examples, and I could put different resources at the bottom or attached as pdfs or worksheets. From here, I could

really structure the way I want students to interact with this concept. Let's say, you notice here that there's a topic and an introduction using projectiles. So, instead of starting from here, I could say, "Explore this Simulation" and I could go into a simulation for Physics that relates to this topic. In this case, the one on water coming out of a fountain really allows students to explore angles, height, speed, and even where it lands. I can simply copy this URL and paste it into my read. This could start a great discussion on what factors might be incorporated into this particular function. We could talk about height, angle, and all of these other components and really start off this discussion with something that they've engaged with already.

Once students have explored an introduction, they can go through and read the basic content within this particular topic. I can embed a video, either by pulling one from different concepts specifically related to "quadratics" or by creating my own and including it in this particular read. I can also, partway through this exploration - let's say down here where they're talking about the summary and analysis of quadratic functions and different methods to solve - I could open up a PLIX that relates to this, and this has to do with completing the square. So, I could take this and copy it and include it. So, when we talk about completing the square method, I could say, "Start by exploring this PLIX," and then link that directly to my PLIX.

I can even choose to go into a particular assessment for different methods and I can pull up the embed code for that practice and include it at the beginning of these exercises, by using the "Embed Media" option and pasting in the embed code. You'll see this media option show up here. And then, when I save and finalize this particular read, you'll see that the link to the Simulation, the link to the PLIX later on, and even the embedded practice for this particular concept - if we scroll all the way down - give students an option to chronologically explore this based on the way that you have set up this lesson.

### **Supplemental Resources:**

One final option for doing this and setting up your curriculum is to use CK-12 resources as supplemental to your curriculum. You can do that by sharing everything within Google Classroom, or within a group that you have set up. One note: The practice that we just saw in that particular read is really just having students explore. If you want to see how they are doing on that concept, you will need to create an assignment within a CK-12 group and then you'll be able to see the reports on how students are doing for that Concept.

### **Wrap-up:**

So, whether you use CK-12's resources by allowing students to just go explore and understand a concept using any modality that works best for them, you create a CK-12 FlexBook®, or you share your content within a CK-12 group or LMS like Google Classroom, you're welcome to use CK-12 as your full curriculum or as supplemental to what you are doing.

I know that I as a teacher would have loved to have these simulations or other resources from CK-12 when I taught Precalculus, and I bet that you guys have a lot of great other ideas on how

to use CK-12 resources within your class, school, or district. We hope that you will continue to share these ideas within our forum and with each other as you work within your school.