

Chapter 1 : STEAM / STEAM Overview

Have you ever taught a math lesson that seemed to be going well “with students active, engaged and producing the right answers” but when you ask kids to explain the reasoning behind their work, they clam up or veer off on a tangent? It happens to the best of us, which is why it’s so important to.

We got 19 kids for the club. The first thing we did was split the group into three smaller groups, one group for each of my work experience teammates. We started to make our volcanoes by taping scrunched up pieces of newspaper together with tape, that took a long time. There was a day where Jack was so sick that he had to stay home, lucky for him. By the time he got back, his group had completely torn up his volcano. That what you get for slacking off! So he had to join his volcano with mine and make a double volcano. I painted my volcano brown, yellow, green, red and orange. When we made it explode, we used baking soda, vinegar, dish-washing liquid and food colouring. We coloured the vinegar until we had the colour we want and then we waited. Until –! It was very anti-climactic. It was like toothpaste been squeezed very slowly. For our next experiment we made oobleck. Which is a substance which is in a solid state if you punch it and a liquid state if you put your fingers through it. You make it using dyed water and corn flour. You mix water into the flour so it is not too thick and not too thin. The kids were very excited to play with the oobleck. We let them take home in a bag and put in fridge. We lost a camera in the experiment but eventually we found it. The next we did an experiment it was trapping some smog greenhouse gas in a jar. We first wet the inside of a jar. Then we lit a piece of paper on fire and dropped it in. Next we sealed the jar with tinfoil and out some ice cubes on top. It took a few tries but eventually we did it. The smog just like smoke but a bit darker. We quizzed them on the dangers of pollution and greenhouse gases to the environment and the human body. One boy got all answers and put his hand up so we gave him a prize. It was a fluorescent dinosaur. The very last experiment we did was a hovercraft. That may sound very futuristic and all, but it was made with a pipe, balloon and a disc. Reinforce with sticky tape if necessary. Then blow the balloon up through the pipe and let it go. It should move around a air hockey puck. That was every experiment we did in semester one.

Chapter 2 : Does elaborate and explain mean the same thing

mathematics education should not be limited to saying, for example, that understanding the concept of function is a person's mental experience assigning some object to the term 'function'.

But how are these goals actually achieved in practice? And what kinds of student activities offer the most bang for the buck in terms of enhancing learning? A few key principles apply: Encourage active participation as opposed to simply passive observation. This requires that every student participates, not just the ones who readily volunteer. It also requires that students interact with each other, instead of simply speaking in succession. Facilitate deep processing as opposed to more shallow forms of learning, which involve regurgitating information exactly as it was presented. This requires that students not only hear or see, but also mentally manipulate the information—considering its implications and significance, comparing it to what they already know, synthesizing and digesting it, and sharing it with others. Let students use multiple modalities and if possible, their choice of modalities to experience the content and express their learning. A flipped classroom model also opens up class time for hands-on learning. With that in mind, below are 24 ideas for in-class, deep-learning activities that involve the verbal and written modalities, among others. Educators might also use some of these activities as student assessments.

Verbal Modality Ask seminar-style, open-ended questions that elicit more than one correct answer. Read about the think-pair-share strategy and get more tips here. Ask kids to pair up for an interview activity. One partner acts as the interviewer and the other pretends to be a historical figure, animal, etc. See a sample lesson here. Invite students to record audio clips of themselves explaining a concept. For added fun, use Voki to make an animated, talking avatars. For a multi-character experience, try Plotagon. Try to use as many student-written assessment items in your actual quizzes and tests. Have students take notes on teacher instruction, with the goal of re-stating the content in simpler form. Encourage kids to think about how they would explain the topic to a student at a lower grade level. For instance, ask students to: Think of examples of a concept. Who might be an example of an iconoclast? Think about how something is the same or different from something else. How is photosynthesis like X or unlike Y? Venn diagrams are a helpful tool. What would you want to ask people who lived through the Civil War? Identify what they still wonder about a topic. KWL charts are great for this. Make inferences from a passage or lecture and cite evidence for that inference. Try having kids split note-taking pages in half vertically and use each half for a specific purpose. For example, they might use the left side of the page to record information and the right side of the page to reflect upon that information. More specifically, they might use the left side of the page to summarize, predict, make inferences and pose questions, and use the right side of the page to note accuracy of predictions, list evidence for inferences, answer their questions, list sources for further investigation of the topic, and add personal knowledge or experiences relating to the topic. Ask students to summarize a written passage or define vocabulary terms in their own words. Let kids practice paraphrasing without plagiarizing. Let kids use the Evernote app to take notes that can easily be shared with classmates and the teacher. Try Interactive Notebooks for helping students engage in active note-taking. Ask students to create a PowerPoint slide summarizing a topic or concept. Have young people contribute to a class wiki collaborative writing product on a given topic.

Multiple Modalities Encourage students to share new knowledge with classmates via the jigsaw method a combination of writing and verbal presentation. Let kids write and draw or represent graphically what they learned. They should imagine themselves riding in an elevator with a stranger and having only 20 seconds to communicate the most essential points. Ask students to write down comments in preparation for contributing verbally to class discussion. Have them set personal goals such as planning to speak a certain number of times during class, planning to either agree or disagree with someone, or planning to express their opinions in detail. Make a movie or multimedia presentation try Animoto.

Chapter 3 : A Guide to the 8 Mathematical Practice Standards | Scholastic

When you elaborate on something you go into greater detail so you can explain something and if someone needs more information on the subject they might say can you elaborate on that.

See all posts Common Core mathematics is a way to approach teaching so that students develop a mathematical mindset and see math in the world around them. We are making problem-solvers. No matter what your objectives, textbook, or grade level, the eight mathematical practice standards are a guide to good math instruction. Here they are in plain English with suggestions for incorporating them into your everyday math class. Understand the problem, find a way to attack it, and work until it is done. Basically, you will find practice standard 1 in every math problem, every day. The hardest part is pushing students to solve tough problems by applying what they already know and to monitor themselves when problem-solving. Give students tough tasks and let them work through them. Allow wait time for yourself and your students. The math becomes about the process and not about the one right answer. Have students make headway in the task themselves. The Georgia Department of Education has created critical-thinking math tasks for every standard. Get ready for the words contextualize and decontextualize. If students have a problem, they should be able to break it apart and show it symbolically, with pictures, or in any way other than the standard algorithm. Have students draw representations of problems. Break out the manipulatives. Let students figure out what to do with data themselves instead of boxing them into one type of organization. Ask questions that lead students to understanding. Have students draw their thinking, with and without traditional number sentences. Inside Mathematics breaks down each practice standard with video segments, as does Illustrative Mathematics. The Mathematics Assessment Project provides sample tasks for each standard. Be able to talk about math, using mathematical language, to support or oppose the work of others. Use "talk moves" to encourage discourse. Work on your classroom environment from day one so that it is a safe place to discuss ideas. Talk moves are a prerequisite to being able to achieve the practice standards. Use math to solve real-world problems, organize data, and understand the world around you. Math limited to math class is worthless. Have students use math in science, art, music, and even reading. Use real graphics, articles, and data from the newspaper or other sources to make math relevant and real. Have students create real-world problems using their mathematical knowledge. DynaMath makes real-world connections fun and engaging for students. Teaching Children Mathematics features articles, lessons, and ideas every month that model mathematics across curriculums. Students can select the appropriate math tool to use and use it correctly to solve problems. In the real world, no one tells you that it is time to use the meter stick instead of the protractor. Try to leave the decision open ended and then discuss what worked best and why. For example, I wanted my students to find their height. They had measuring tapes, rulers, and meter sticks among their math tools. Once everyone found their height, we discussed which tools worked best and why. Leave math tools accessible and resist the urge to tell students what must be used for the task. Let them decide; they might surprise you! Set your manipulative ground rules early to ensure classroom management. The National Library of Virtual Manipulatives gives you every tool you could ever want. Students speak and solve mathematics with exactness and meticulousness. Push students to use precise and exact language in math. Measurements should be exact, numbers should be precise, and explanations must be detailed. All Things Common Core details what precision looks like in a classroom. Find patterns and repeated reasoning that can help solve more complex problems. For young students this might be recognizing fact families, inverses, or the distributive property. As students get older, they can break apart problems and numbers into familiar relationships. Help students identify multiple strategies and then select the best one. Repeatedly break apart numbers and problems into different parts. Use what you know is true to solve a new problem. Prove solutions without relying on the algorithm. For example, my students are changing mixed numbers into improper fractions. Keep an eye on the big picture while working out the details of the problem. I heard Greg Tang speak a couple of years ago and he gave some advice I think fits this standard perfectly. He said to show students how the problem works. The practice standards are a lot to take in. They are the foundation for mathematical thinking and practice in our classrooms. The Hunt Institute has a

great clip telling why these practices are so important. How are the practice standards changing the way you teach in your classroom?

The term elaboration can be used to mean a lot of different things. When we are talking about studying using elaboration, it involves explaining and describing ideas with many details.

Elaborate Evaluate When planning a lesson each of these areas should be completed. Often times these lessons may take a few days to complete. It means to wow them in a way that catches their attention. It is not forcing children to learn but inviting them to do so. This is how lessons are introduced. It does not have to be difficult or overly detailed just interesting enough to open students' minds for the learning process to begin. Using Smartboard technology, videos, illustrations, asking questions, KWL charts, reading a great book, acting out a character or even introducing a game are ways to engage students at the beginning of a lesson. **Explore** Once students are fully engaged in the lesson, intrigued by a video or maybe a book, now it is time to allow them to explore the concept. Let's say I do a lesson on Camouflage, first I would engage them with an informative video, explaining camouflage with animation. Now in the explore they will play let's say a game where they will go outside and break up into teams. Each team will be given a minute to find as many various colored strings scattered in the grass. The idea with exploring is to give the learner the opportunity to practice or work with their new knowledge in some way. The most effective explorations allow for mistakes or trial and error. It is looking at a concept before discussing all the details, with hopes that students will discover answers to possible questions through exploration. **Explain** Students now have an opportunity to hear from their educator. They also may pose questions to the student to see what they are able to explain what they have learned. Checking for misunderstandings helps the teacher to observe what objectives need to be clarified or taught. So for example, with the Camouflage Lesson, once the students have picked as many strings as possible, they should count each color that they picked. Which color did they pick up the most, which color did they pick the least amount of? Have them make a chart, so they can look at their findings and compare as a group. Students should notice that they picked less green strings because the green was blending in with the grass. They have more of a different color like purple because of its contrast in color. This explaining is done without the teacher having to do much lecturing. The lesson is reinforced by what the students have seen from their exploring. **Elaborate** Here the students can participate in an extension or a different activity that either re-teaches an objective or teaches more details about the concept being taught. Here differentiation can be used. A student above level will need an elaboration that extends or enriches the lesson. A student below level will need perhaps a repeat of the same explore activity with more teacher input to guide students through again to correct misunderstandings. Again with the camouflage, elaboration may be discussing what other animals besides say frogs use camouflage? What elements in their habitat allow them to do so? Doing so will allow him or her to re-teach or elaborate on what was misunderstood. **Evaluate** Finally, after the objectives are taught, it is time to assess. What have students effectively learned? What do they not understand? What should be done to help them? Assessments do not have to be the traditional quiz or essay. It can be a reflection, a project, book report, or a model. Like with the camouflage lesson, the evaluation could be an assignment where students come up with 5 facts about camouflage and illustrate each in their own unique way. They might make a model, paint a picture, or make a mini book with drawings and facts to illustrate what they learned. Using a rubric the teacher or parent can now easily grade or make note of what is learned and of what needs to be retaught. I think that it makes teaching the lesson easier in that the students are more willing to learn, the activities are set up, the lesson sequence is well thought out and the objective is thoroughly covered. Use the following words when questioning and make sure to keep the Scientific Method in mind: What do you observe? Analyze the data, what can you conclude? What connections can you make?

Chapter 5 : BetterExplained “ Math lessons that click

Utilizing the 5E lesson design of Engaging, Exploring, Explaining, Elaborating, and Evaluating what they learn, the students will conduct investigations, explore real world scenarios, and develop ideas in order to answer the posing questions and problems.

Students will be able to explain and elaborate upon their feelings. Introduction 5 minutes Ask students to use adjectives to describe how they feel today. Record the words on a sheet of chart paper or on the board to create a list of feelings. Challenge students to think about which words are physical feelings like sore, tired, sleepy, or sick and which words are emotional feelings such as excited, amused, disappointed, worried, or content. Encourage students to pick out the emotional feelings, and circle those. When we do that, we have strong social skills, which is the way we interact with others in a healthy and positive way. When we elaborate, we explain or describe in detail. Offer students an anecdote about a time when you experienced a feeling that you needed to talk about. For example, tell students about a time when you were feeling a certain way about something that happened, but someone close to you was unaware of how you felt. Plans were canceled that you were really excited about, and this made you feel disappointed or let down. Tell students how important it is to communicate with others by following these two steps: Ask yourself, What am I feeling right now? Ask yourself, Why do I feel this way? What caused this feeling? Continue to share with students that you handled the situation by having a conversation with your loved one and elaborating on your feelings. Model an example sentence by writing it on the board: I felt disappointed when our plans were canceled because I was really looking forward to seeing the show and spending time with you. Instruct them to write four feelings that they hear described in the book, and to not worry about correct spelling. Divide students into small groups and instruct them to review the sticky notes they filled out during the read-aloud. Have the groups select four feelings that the main character experienced throughout the story, then explain that they will write elaborative sentences about these emotions. Write sentence frames on the board for students to follow as they write their elaborative sentences. Instruct students to elaborate on their feelings by completing the worksheet. Point out that good elaboration includes writing a complete sentence that describes an instance in which they have felt each of those feelings. Remind students to use the same sentence frame used throughout the lesson as a way to support them in writing a complete sentence for each feeling. Offer sentence frames for reluctant writers to support them as they elaborate. Challenge advanced students to choose three feelings and write a short story about a character who experiences all three. Remind students to include a setting, problem, solution, and events in order. Put students in groups to act out a story in which each character represents an emotion. Review and closing 5 minutes Instruct students to review the sentences they wrote during independent practice. Tell them to draw a star next to their favorite sentence. Call on non-volunteers to read their chosen sentence to the class. Offer praise for the sentences they shared, restating the part where elaboration occurred in the sentence. Remind students that good social skills are important for maintaining positive relationships with people we interact with. When we share our feelings and elaborate, we are allowing others to support us, teach us, and to simply listen. Related learning resources Lesson plan Elaborating on My Feelings This lesson teaches your students how to identify feelings, and then elaborate on them by speaking and writing in complete sentences.

Chapter 6 : Elaborating on Feelings | Worksheet | calendrierdelascience.com

Science and Mathematics Papers and Journal Articles some explaining and elaborating might have occurred in the first session, depending on student responses. It.

Hannah Hudson on March 8, Brought to you by The National Council Of Teachers Of Mathematics More Have you ever taught a math lesson that seemed to be going well—”with students active, engaged and producing the right answers—”but when you ask kids to explain the reasoning behind their work, they clam up or veer off on a tangent? Ask probing questions that require students to explain, elaborate or clarify their thinking. This includes articulating the steps they took to solve a problem or complete a task. Minds in Bloom Give students adequate time to respond. Research has shown that we often give students less than five seconds to answer a question in math class! When we move so quickly, we lose the chance to see how students are making sense of mathematics. Ask students to make the mathematics visible. By this we mean discussing the connections between mathematical ideas and relationships. This means landing on a desired conclusion in advance and giving little attention to student responses that veer from the desired path. You may be focused on students arriving at a particular answer, for example, or using a certain strategy to the exclusion of others. In a funneling question pattern, the focus is often on information gathering with one or two higher-order questions at the end. A focusing question pattern blends information gathering, probing, reflection and justification. It involves asking students what they notice and encouraging them to communicate their thoughts clearly. This video case study shows the difference between funneling and focusing questions in action. Encourage students to ask questions of one another. It is much easier to facilitate a focusing question pattern when you are not the only one in the room directing conversation. Encourage students to support, challenge and question one another. Ensuring Mathematical Success for All. Click here to learn more about this essential guide to mathematics teaching practices. You can follow her on Twitter at hannahhudson or on Facebook here. Email her at hannah weareteachers.

Chapter 7 : "Ghost Map Math" by John R. Jungck

depicting, understanding, elaborating, and critiquing the public health issues raised in Johnson's book. Specific pedagogical examples and resources are included to illustrate applications and opportunities for.

Chapter 8 : 8 Ways to Pose Better Questions in Math Class - WeAreTeachers

in those reviews will be on elaborating the research-practice dia- the Teaching for Robust Understanding of Mathematics (TRU Math) suite, described later.

Chapter 9 : Solution-Explain the concept and processes of elaborating

A last-minute Aha! moment showed me math could make sense, even be enjoyable, when presented with: A friendly, curious attitude A mix of intuitive and technical understanding.