A HELPFUL GUIDE TO

Interactive Flat Panel Displays in the Classroom

Choosing an Interactive Flat Panel | Buyer's Tips | Benefits for Education | Lessons

mimio®

Introduction

Large flat panel displays fill an increasing number of living rooms with dazzling images, and the theater experience is becoming a daily experience at home. Many of today's students are accustomed to high definition (HD) – for them it has become the expected standard. As educators and schools strive to find ways to better engage students and motivate learning, they are recognizing that using interactive HD technology in the classroom is key. But the search for the best choice of interactive flat panel display – one that offers stunning images, touch technology, and seamless integration – can be daunting. What does the technical jargon mean? What are the best ways to use the technology? And can the school's already strapped budget accommodate the right purchase?

This guide can help educators overcome some of the hurdles they face when choosing and implementing an interactive flat panel display. In it we outline the key factors to consider in selecting the right display for your purposes. We include quick tips for buyers, highlighting the top five things to think about when making this purchase. And you'll also find specific ideas for using these displays to create more engaging and effective learning through collaboration in the classroom.

Table of Contents

Choosing an Interactive Flat Panel Display for the Classroom

Incorporating new technologies into existing environments may initially appear easy. But when implementation and adoption begin, “easy” sometimes becomes “how come we didn’t think about that earlier?” This scenario can be particularly common in the critical world of instructional technology, where teachers often ask, “Whose bright idea was this, and when will I be receiving professional development training to properly equip me?”

The truth is, there are some major considerations involved in adoption planning for interactive flat panel displays. You can avoid the pitfalls by following this guide to the specific parameters.

Not “What do I buy?” but “Why should I buy?”

Planning for many technologies often seems to start with asking, “How many should we buy and which brand?” But it’s usually better to begin by asking, “Why are we thinking about buying these?” A well-considered purpose can provide strong guidance for subsequent decisions about choosing, implementing, and adopting any technology, including interactive flat panel displays.

How do you intend to use the interactive flat panel display being considered? Is an interactive classroom display being considered because it is new and exciting (two of the worst possible reasons), or because it can fulfill an important instructional purpose? Will it be used primarily to show videos? Will it be used to display Web pages, on which the teacher will highlight important points? Or is collaborative interactivity the core purpose of the purchase?

If the primary purpose is to show videos, a smaller size display is practical. If showing text-heavy images such as Web pages and slides is the primary intended use, then a larger display with single-user interactivity might suffice. If the goal is to have multiple students interacting collaboratively and simultaneously on the display, a large screen size – coupled with very flexible touch interactivity – is your best option.

Plasma Versus LCD/LED

Choosing between plasma and LCD/LED displays has become very simple, because the last remaining manufacturer of plasma displays recently exited the market. The only flat panel displays available for purchase now are LCDs.

All LCD (Liquid-Crystal Display) displays are backlit; a light source behind the actual LCD makes the picture visible. There are two types of LCD backlighting: cold-cathode fluorescent lamps (CCFLs) or Light Emitting Diodes (LEDs). LED backlighting is the better choice.

LCD displays with LED backlighting generally produce images with greater contrast. They are also thinner, cost less to produce, consume 20-30% less power, are more environmentally friendly when disposed of, run cooler, and have a significantly longer life. For all these reasons, LED backlighting has become the more standard technology.

Media coverage and store ads talk so much about “LED displays” that the term has received broad public acceptance. However, it is technically inaccurate. The displays are all LCDs with LED backlighting. True LED displays use a technology called Organic Light Emitting Diodes (OLED), and they are still a few years away from release.

The Hype of UHD/4K Versus HD

Electronics manufacturers tend to introduce a new technology before most people have fully adjusted to the last one. Ultra-High-Definition TV, also called 4K, UD, or UHD, is a case in point. Ultra-High-Definition displays have four times the number of pixels as High-Definition (HD) displays. The images are truly beautiful – but typically cost 40-60% more than the current HD displays. The question for decision makers is whether that extra resolution adds enough value in the classroom and to student learning to justify the incremental cost.

Standard-Definition (SD) TVs, the ones replaced by HD displays, had too little resolution to support the text-heavy slides that are common instructional tools. High-Definition displays do a superb job of displaying a wide range of text sizes. UHD displays provide even higher resolution, but the enhancement offers little additional readability to the text sizes typically used for a classroom full of students.

When considering the “latest” technology, it is critical to weigh the real educational benefit it can provide to student learning against its cost. If the potential rewards justify the cost, it’s still important to consider what impact its cost could have on your budget. The “latest” isn’t always the greatest when looked at through this lens.

Choose Screen Size in Relation to Classroom Size

Once the basic technology package has been selected, the size of the display is the next crucial decision. Numerous websites provide guidance for choosing the screen size for a residential flat screen TV. A common recommendation says home viewers should sit between 7 and 12 ft (2 and 4 m) away from a 65 in. (1651 mm) TV, and between 10.5 and 18 ft (3.5 and 6 m) away from an 84 in. (2133.6 mm) unit.

However, these recommendations assume a very different situation than educators face. Educators need to go back to the question of purpose.

Residential displays are purchased almost exclusively for entertainment, whereas most interactive classroom displays are purchased by schools for instruction and communication. Home TVs are rarely used to display text-centric slides, but interactive flat panel displays do so much of the day. Home TVs are often watched with the lights turned down. Classrooms are frequently bathed in bright sunlight and the glow of fluorescent lighting.

Educators should choose a screen size large enough that 20-point type can be easily read from the farthest point away from the display in the classroom. That usually translates to 3X the diagonal screen size. A 70 in. display can thus serve students as far away as 17.5 ft (5.3 m), and an 84 in. display can serve students as far away as 21 ft (6.5 m).

With this simple equation in mind, look at your school's classroom size and seating arrangements to determine what screen size will make for best viewing in that room. There's no need to buy a display bigger than what's needed for every student to clearly view the material. And the inverse is also true: you don't want to bring in an HD display with a screen size that leaves the students in the back squinting to read the lesson at the front of the room.

Position and Viewing Angle

All flat panel displays have some fall-off in image quality (primarily brightness) when viewed from an angle. Current models are far better than their predecessors of 3-5 years past, but educators should still keep viewing angles in mind when laying out a classroom. Work with the educators and tech professionals in your district to optimize classroom layouts for collaboration and viewing to ensure that the technology and the educational advantages are working hand-in-hand. As with all performance specifications, a real-world assessment is more valuable than reading even the most trustworthy spec sheet!

Power Consumption

As previously mentioned, LCD displays with LED backlighting typically consume 20-30% less power than those with CCFL backlights. They still do consume power, however, and the larger the size, the greater the consumption. Also, identical sizes from different manufacturers can have different power draws. Power use will increase your overhead expenses, and should be taken into consideration with regards to your long-term budget.

When comparing models and manufacturers, take a close look at power use. It can vary widely.

Connection Types – and Why They Matter

There are three major connections that can be made to an interactive flat panel display.

Video. The most important connection types are HDMI (High-Definition Multimedia Interface) and VGA (Video Graphics Adapter). Interactive flat panel displays should have at least two HDMI inputs. Each HDMI cable carries digital video and audio, which simplifies wiring and provides higher quality over longer cable lengths than the analog VGA signal. At least one VGA input should also be provided for compatibility with the large percentage of PCs and laptops that are VGA-only. Composite video and S-Video are anachronisms that add cost to the display and provide no value except in unusual circumstances.

Audio. The HDMI connections carry audio as well as video, so there is no need for separate audio connections to correspond with the HDMI. VGA connectors do not carry audio, so a corresponding stereo analog audio input is necessary for each VGA input. A microphone input can be a convenience if teachers are likely to be equipped with sound reinforcement systems.

Control/Network. Video projectors are often equipped with RJ45 LAN connectors, whose primary purpose is to enable centralized shutdown, to reduce power consumption and extend lamp life. Since interactive flat panel displays “sleep” if they aren’t used for a user-defined period of time, this feature is not required. However, there may be possible future uses for a LAN connection.

It's Not Just About the Picture

Don't neglect to consider sound quality when evaluating displays. If you doubt its importance, try listening to a movie without seeing the picture and then watch the picture with the sound off. That simple test shows the incredible importance of sound.

Most interactive flat panel displays have a built-in audio amplifier and internal speakers. They are not intended to be theater-quality sound systems, but are usually fine for a classroom. If the unit under consideration does not have internal audio capabilities, an external system will need to be provided. That will add to the cost of your purchase and installation, and will also add to the complexity of the resulting system.

What About 3D?

The general consensus is that, except for a limited set of special-purpose applications in the sciences, 3D is not needed. Some say that 3D has met the same fate as quadrophonic sound, Cinerama, and vibrating movie theater seats – nobody cares about it. Others argue that 3D is not dead, just sleeping. But the dearth of 3D instructional and entertainment content, and the fact that some manufacturers have dropped the feature from their TVs, reinforce the general consensus. It only makes sense to get 3D if you need it for a clear and specific instructional purpose.

Watch the Picture, Listen to the Sound

Nobody would buy a car without a test drive. The same thinking ought to apply to buying an interactive flat panel display. The best way to "test drive" a flat panel display is with well-lit, nicely shot, and familiar high-quality content, in an environment as similar to a typical classroom as possible.

Select and then become familiar with the test content – take the time to get to really know it. Take note of objects in the shadows. Look for detail there – the folds of a coat, strands in a character's hair. Remember whether the sky is a soft pastel or the color of a robin's egg, or whether it has an almost iridescent glow. Long stable shots are better for evaluation than quick cuts. Think National Geographic rather than action movies.

Listen to the audio, as well. A clip from a music video is not usually suitable for evaluating video, but can be excellent as one element of an audio test suite. Take note of the bass, listen

for crispness in the horns, the sizzle of cymbals. Be sure to also have a clip with extended speech for judging intelligibility. An interesting test is a clip in which the actors speak with accents different from your own. Intelligibility can suffer if audio quality is marginal.

Do try to evaluate the unit in an environment as much like a classroom as possible. A trade show floor provides as poor a venue for evaluating a flat panel display as the showroom floor does for a car. The chosen technology will see years of use, and it needs to produce great pictures and excellent sound. A proper test is essential.

Interactivity in the Classroom

Picture quality, resolution, image size, audio quality, the right selection of audio and video inputs and outputs – these are all important considerations in choosing a flat panel display for a classroom. But there are additional considerations when choosing an interactive flat panel display. These three are key:

- How many simultaneous single-touch students can it accommodate?
- How many simultaneous gesture, or dual-touch, students can it accommodate?
- How many simultaneous single or dual-touch students can it accommodate in the same horizontal plane?

Another potentially valuable consideration is whether the device can differentiate between touch and pen. And another is the ability to track off the surface, though actual experience suggests that capability sounds better on paper than in actual use.

Moving Interactivity Beyond the Display

Interactive classroom technology was once limited to the front of the classroom. The introduction of handheld devices such as tablets and smartphones has enabled interactivity to move into the hands of teachers and students in ways unimagined a decade ago.

The hardware and software that compose an interactive classroom technology need to enable activities, not just produce static screens on which annotations can be added, to be pushed out to the student handheld devices. The system further needs to enable the student to execute the activities, automatically send the results back to the teacher's system, graded, and then display them so the teacher can dynamically tailor the instruction in response to actual student results.

It's this dynamic partnership between the interactive display and mobile devices that will truly help us promote learning and collaboration. That's the aspect of technology that we should be looking for when we add it to our classrooms: more dynamic and effective learning.

Accessibility

Interactive flat panel displays can help make classroom content more available to students who would otherwise have trouble accessing it. Potential issues include language/hearing problems, vision problems, height limitations, and other physical challenges. When choosing a display, keep the following accessibility considerations in mind: closed caption display, second audio program (SAP), and screen size.

Another aspect of accessibility is text size. A High-Definition display supports zooming in to increase the visual size of the image for those who have difficulty seeing/reading. That same zoom capability can increase the image size of on-screen manipulatives, to help those with dexterity issues.

Finally, consider physical access. Many interactive flat panel displays are mounted at a fixed height on the wall. Adjustable wall mounts and elevator floor stands are a convenient way to make the height adjustable for small children or people who use wheelchairs.

Classroom Software That Meets Your Needs

Interactive flat panel displays present the images, animations, videos, and individual and collaborative activities that help instruct and educate. But it's the software that powers all the hardware in an interactive classroom.

In today's interactive classroom, there are two primary software packages: the front-of-the-classroom content development, presentation, and assessment package; and the mobile package that extends the front-of-classroom experience to the student and teacher handheld devices.

Some key questions to ask about classroom software include the following:

- Does it have the needed features? (You should determine in advance which features are "essential," which would be "nice to have," and which "we might use sometimes.")
- Can it be used school–wide, on all types of interactive classroom devices from multiple vendors?

- Is it easy enough to learn, and are the teachers willing to learn it?
- Is the user interface available in the required language(s)?

These questions are relevant to the mobile software:

- Does it support the required devices and operating systems?
- Is its load on the school's wireless WiFi network acceptable?
- Do images move quickly enough from the front of the classroom to the student handhelds?
- Can the teacher control and/or monitor handheld use, to ensure that students focus on the lesson?
- Does it enable interactive activities, annotation, and student note-taking?
- Are the results of the students' personal work automatically pushed back to the teacher's PC, graded, and presented in graphical form for teacher review?

Conclusion

Deploying interactive flat panel displays is a project that deserves proper planning, including the consideration of several room and application factors, and an active evaluation of the products being considered. Knowing the specifics of how the technology will be used in the classroom and what you want it to be able to do will help you make the smartest choice. When you can answer those questions, decisions about choosing, implementing, and adopting an interactive flat panel display will come more easily. And you can be confident that the technology will indeed enable more dynamic and effective learning in the classroom.

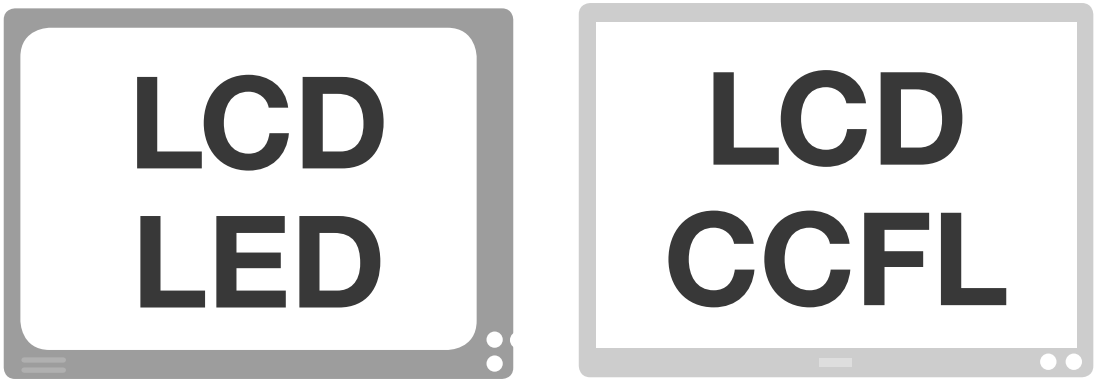
Further Reading

For the truly inquisitive reader, here are some sources that offer additional depth on the subject of buying a flat panel display. Keep in mind that a flat panel display for the classroom is subject to different considerations than an interactive flat panel display for the home.

http://www.cnet.com/news/myths-marketing-and-misdirection-hdtv-edition/
http://www.cnet.com/topics/tvs/buying-guide/
http://en.wikipedia.org/wiki/4K_resolution

5 Buyer's Quick Tips for Flat Panel Displays

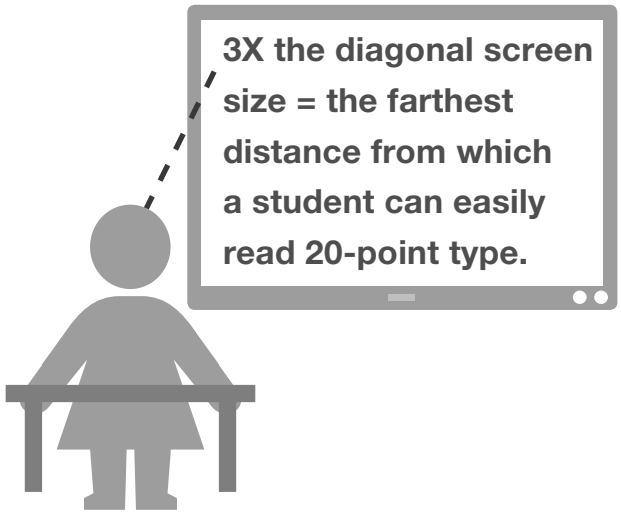
1. LED, LCD, What !#$



All displays are LCD; they are backlit by LEDs or CCFLs. LED backlighting provides a brighter picture and is more energy-efficient. Don't strain your brain over the acronyms – LCD/LED tends to be the better choice.

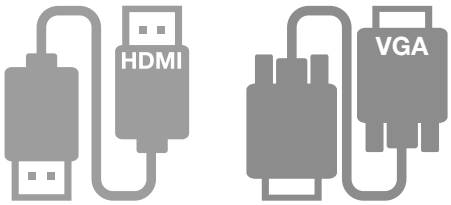
2. Does Size Matter?

Students should be able to easily read 20-point type from the farthest point away from the display in the classroom. To make that determination, use this simple equation: 3X the diagonal screen size = the farthest distance from which a student can easily read the text on the display. A 70 in. display can thus serve students as far away as 17.5 ft (5.3 m), and an 84 in. display can serve students as far away as 21 ft (6.5 m).

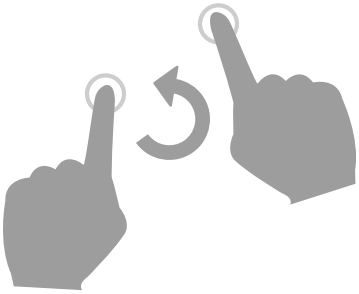


3. HDMI, VGA, Oh My!

Certain connections must be a given for your display to transmit and receive the necessary data effectively. So use this as your guide: 2 HDMI, 1 VGA, a stereo connection if you are using VGA, and a microphone port if you will be using a microphone.



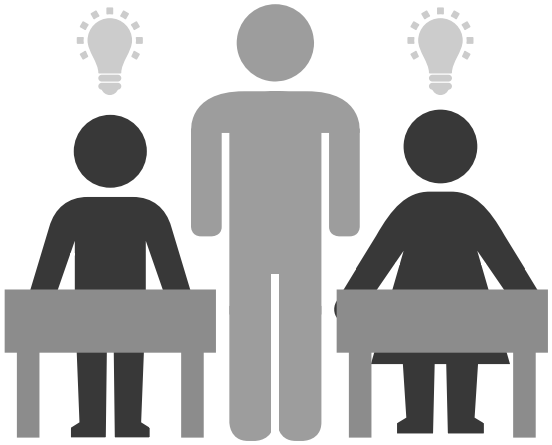
4. How Many Touch Points Do I Need?



Here's what touch points really mean to an educator. If an interactive flat panel display has 6 touch points, there can be as many as 6 students at the display, each using a single touch point (one finger or a stylus). Or, 3 students can each use 2 fingers to manipulate and move objects on the display. To find out how many touch points you need, ask yourself these two questions: How many students will I typically have working at the display? How many students can comfortably work at the display at the same time?

5. It's the Software, Stupid!

At the end of the day, what are you really using these displays for? Teaching! That's why you want to make sure that the software that comes with it gives you more than drivers and a slide show. You want to select software that can actually enable and engage learning – software that offers collaboration opportunities, provides assessment, and integrates with mobile learning.



The Benefits of Interactive Flat Panel Displays for Education

Interactive flat panel displays, the next generation of technology available in the classroom, are driving group learning to a new level of relevance and engagement. The state-of-the-art touch displays allow all students – including those with disabilities – to become more engaged with the curriculum being taught. These interactive displays are the first major step in education for intuitive technologies that allow students to experience high definition imagery, touch, gestures, and engagement with the content, the learning, and each other.

" The rapid acceleration of 'intuitive technology' is providing a learning experience in which students interact with devices entirely through natural movements and gestures."

2014 NMC Horizon report

Below are some of the key benefits offered by interactive flat panel displays:

1. **Engagement is dramatically heightened** with high-definition display technology that offers vivid imagery, beautiful sound, and multiple touch and gesture interactivity.

2. **Collaboration is brought to a new level,** with the ability to have up to six different students or student/teacher combinations working together in real time on the display.

3. **Students with disabilities can enjoy real advantages.**
    - They are helped to feel more connected.
    - Students who are typically reserved tend to become more involved.
    - This technology can often help students to tune out distracting stimuli, and focus more on the task at hand.
    - Features such as closed caption display, second audio program, zooming, and adjustable wall mounts make classroom content far more available to students with disabilities.

4. **Increased involvement, self-confidence, and expression skills,** through opportunities for students to use the most current technology to create dynamic presentations for class, and to participate in truly collaborative learning.

5. **Benefits for kinesthetic learners,** helping them to learn more easily.
    - Kinesthetic learners are students who need to move – who have trouble sitting still at their desks. They appreciate the ability to get up and interact physically with this technology.

- Kinesthetic learners learn by doing. This technology provides real opportunities to be "doing things" at the front of the classroom display, versus just taking in a lecture from their desk.

6. **Meeting students where they are** in personal technology use. Many schools are behind the curve on technology adoption vs. students' own level of tech knowledge. Interactive display panels bridge that gap with their state-of-the-art visuals and highly interactive interface.

A View to the Future

The rapid acceleration of "intuitive technology" is providing a learning experience in which students interact with devices entirely through natural movements and gestures, according to the authors of the 2014 NMC Horizon report. Based on the research of the NMC team, intuitive technology is a long-range trend that will be commonplace in schools within five or more years. The authors state that "motion-based technology through smartphones, tablets, and even game systems allows learners to engage freely."[1] "Examples given in the report refer to children using multi-touch walls and interactive displays at museums, and teachers in Virginia using games with motion-based technology to improve the social and verbal communication skills of students with autism spectrum disorders", according to EdWeek's blog by Danielle Wilson on June 20, 2014.[2] Interactive flat panel touch displays provide some of the first steps in this new method of engaging students through gestures and touch, helping to seed the intuitive technologies of the future.

Collaborative Lessons

To highlight the collaborative benefits of interactive flat panel displays, this section provides a number of engaging interactive lessons, organized by subject area. All lessons meet the Common Core State Standards, include objectives, and even offer ideas for using them without classroom technology.

Please also visit mimioconnect.com/display to access many more free lessons and activities.

Science

Amphibians, Fish & Reptiles: Which Am I?

Objective

To sort animals correctly into their animal classification categories.

Description

Using the MimioDisplay™ touch display or a conventional whiteboard, create three columns: Amphibians, Fish, and Reptiles. Below the columns, randomly insert pictures of these three types of animals, plus several from different animal groups. Ask three students at a time to come to the front, and make each of the three responsible for one of the animal groups. They must then choose all of the images representing their group.

Using a MimioDisplay device, the students can drag the images to the appropriate column. If you are using a conventional whiteboard, ask students to draw arrows from the images to the correct column. If there are mistakes, the class can work together to correct the placements. Follow up the lesson with a discussion of the differences between each animal group and why they are classified as they are.

Tip: You make this lesson more challenging by adding in less obvious images, such as a lobster, tadpole, and eel.

Science

Creating Chemical Compounds

Objective

To combine metal and non-metal elements of the periodic table to create chemical compounds.

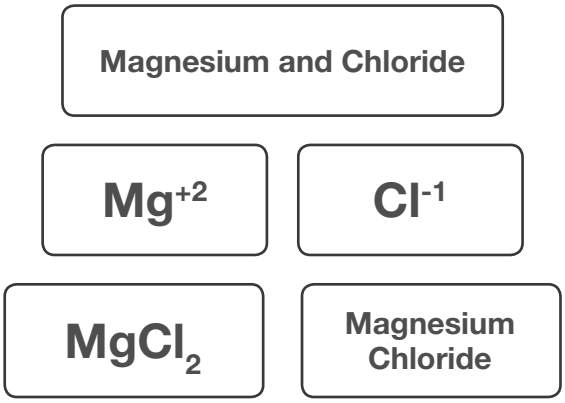
Description

Using the MimioDisplay touch display, the MimioProjector™ interactive projector, or a conventional whiteboard, draw a single box at the top of the display, two boxes underneath the single box, and two more boxes underneath them. Add the periodic table at the bottom of the display. Begin the activity by showing an example (see below).

Then, divide the class into teams of two students. Each team should choose cloned elements of the periodic table: one student chooses a metal and the other chooses a non-metal. They should use the pen tool to write the elements' names in the top box. In the second set of boxes they should work together to write the symbol and ion charge of each of their elements. And in the third set of boxes, they should write the correct chemical formula and name of the compound.

Using class feedback, students can check for correctness.

Example



Science

Animal Cell Organelles by Color

Objective

To color each animal cell organelle based upon the color key provided.

Description

Using the MimioDisplay touch display, MimioProjector interactive projector, or a whiteboard, create a large outline drawing in black of animal cell organelles. Then create a color key with the list of cell organelles (see suggested organelles and colors below).

Have two students come to the front and take turns identifying and coloring one cell organelle at a time, using the color key as a guide. After one structure is colored, the other student should describe its function. Repeat with other student groups until all structures are covered. Discuss any errors as a class.

Extension

Have students draw and label additional structures that are not present on the diagram (e.g., lysosomes, centrioles, microtubules). Students could also use the pen tool and circle organelles that are also found in plant cells, to use for a comparison.

Color Key

Cell Membrane - brown	Ribosomes - green
Nucleus - pink	Rough Endoplasmic Reticulum - dark blue
Nucleolus - orange	Smooth Endoplasmic Reticulum - light blue
Mitochondria - red	Golgi Apparatus - black
Vacuoles - yellow	Cytoplasm - gray

Tip: Choose the Highlighter tool. Then click on the Color Picker tool. Once the Color Picker tool is active, select an appropriate color for one of the cell organelles. The Highlighter will now have the selected color, allowing students to color the correct organelle.

Math

Algebra Problem-Solvers

Objective

To showcase students solving algebra problems, followed by class discussion.

Description

Create a set of algebra practice problems, or use the sample problems shown below. Have multiple students come to the front of the classroom: six students if you have a MimioDisplay touch display; two students if you are using a MimioProjector interactive projector; or one student at a time if you have a MimioTeach interactive whiteboard. (If you are using a conventional whiteboard, the number of problem solvers will depend on how many your whiteboard can accommodate comfortably.)

Ask each student to solve one algebra problem by using the Mimio stylus or other input device. Once the students have arrived at their answers, use the Zoom tool to focus in on each problem, and ask the problem solver to explain his or her process and reasoning. As a class, discuss any misconceptions that led to errors.

Sample Problems

3p - 2 = -29	5n - 9 = -9	3x + 6 = 15
(p = -9)	(n = 0)	(x = 3)
4r + 7 = 15	12r + 4 = 100	5x - 10 = 15
(r = 2)	(r = 8)	(x = 5)

At the end of each activity, ask these questions to increase engagement and learning:

What was the main thing you learned today?
Tell me two questions you still have.
What else would you like to know about this topic?[3]

Math

Counting with Coins

Objective

To practice combining coins to equal a stated amount.

Description

Using the MimioDisplay touch display, the MimioProjector interactive projector, or a conventional whiteboard, create three columns and write an amount less than $1.00 at the top of each column. Beneath each amount, show images of these five coins: fifty-cent piece, quarter, dime, nickel, penny. Then have two or three students come to the board and ask them to indicate the correct combination of coins to equal the amount at the top of each column. When the students have finished, ask the class to check the answers for correctness.

Extension

Tell the student team to add up all of their coins for the three amounts and then indicate which coins they would need to match this new total. Challenge them by asking them to solve this problem using the smallest number of coins possible. Check and discuss as appropriate.

Pair up students in the class before the front-of-the-room activity. Then call on the pairs to discuss or ask questions about the lesson. Working in pairs helps shy students become more bold and comfortable with speaking to the class.[4]

Language Arts

Forming Contractions: Not and Is

Objective

To learn how to form contractions from two words that include the word “not” or “is.”

Description

Using the MimioDisplay touch display, the MimioProjector interactive projector, or a conventional whiteboard, create two rows of four boxes that contain two lines each. In the top row of boxes, write contractions with “not” or “is” on the second line: e.g., hadn’t, it’s, can’t, wasn’t. On the first line in the bottom row of boxes, write two words that can form a contraction: do not, that is, should not, would not.

Explain the rules of contractions with “not” and “is,” and give examples (see Rules, below). Have two students come to the front and ask each to fill in the blank lines on four of the boxes (one half of the board). When they have finished, have both students create a list of other contractions with “not” and “is.” Other students can be encouraged to help as needed.

Rules

Contractions with not: If “not” is part of the two words that make up the contraction, you will leave out the the o in “not” and replace it with an apostrophe. Example: do not = don’t.

Contractions with is: If “is” is one of the two words that you want to turn into a contraction, you will leave out the i in “is” and replace it with an apostrophe. Example: that is = that’s.

Language Arts

Vowel Sounds Sort: Long or Short?

Objective

To sort words with short and long vowel sounds into the correct category.

Description

Using the MimioDisplay touch display, MimioProjector interactive projector, or a conventional whiteboard, create five boxes – one for each vowel. Divide each box vertically and label the halves “long” and “short.” At the bottom of the board, randomly list 10 words – five with long vowels and five with short vowels (see the suggested list below). Have two students come to the front and take turns writing the words in the correct box. Students should also model aloud each short and long vowel sound for the class. Discuss as a class any errors.

Extension

As an extension, create a blank page. Have two or three students come to the front and assign each of them a vowel. They should then work to make lists or draw pictures of short and long vowel words. Students can discuss their choices with other classmates and make adjustments as needed.

Sample Vowel Words

Long a - Spade	Short i - Fin
Short a - Bat	Long o – Stone
Long e - Cheese	Short o - Popcorn
Short e - Red	Long u – Cube
Long i – Bike	Short u - Cup

Social Studies

Map Puzzle Competition

Objective

To learn to recognize countries or the 50 U.S. states by their physical shape, and position them correctly on a map.

Description

Use this activity as a class competition in recognizing countries or states and their locations on the map. Using the MimioDisplay touch display, the MimioProjector interactive projector (limited to two students), or handouts, create a map of one region of the world, with the countries or states named. Hidden under a box on the display, put the shape of every country or state – you may vary the colors of the shapes, but do not name them.

Teachers using handouts will need to put the shapes on a separate page, well scrambled, and have students cut out the shapes before beginning the exercise. Divide students into teams of two or three and have each team work together to sort and place as many shapes as possible in the correct position in one minute. The group with the highest number wins.

Making a lesson into a contest or race activity often gets students more engaged in the material and builds a sense of teamwork.

Social Studies

Civil War Pictionary

Objective

To review major concepts and terms of the Civil War by drawing pictures according to the rules of Pictionary.

Description

Prepare cards with a Civil War concept or term on each one (see suggestions below). Divide the class into two teams: The North and The South. Ask one student from each team to come to the front and prepare to represent a Civil War concept or term in a drawing on the MimioDisplay touch display or a conventional whiteboard. Pull a random card for each of the two students, and tell them they have just one minute to complete their drawing.

Meanwhile, the seated team players will attempt to determine what concept or term their team member's drawing represents. Each correct answer earns a point for the team. Repeat with different sets of students from each team, until there are no cards left. The team with the most correct answers will be declared the winner of the war...aka game.

Sample Concepts and Terms

Seceded, Southern States, Confederacy, Union, Abraham Lincoln, Jefferson Davis, Slavery, Fort Sumter, Border States, Robert E. Lee, First Battle of Bull Run, Ulysses S. Grant, Battle of Shiloh, Emancipation Proclamation, Battle of Gettysburg, Gettysburg Address, William Tecumseh Sherman, Appomattox Court House, John Wilkes Booth

Mix up the skills practiced in various subjects so students can understand the value of learning across all areas. This can help to motivate students to become more comfortable with their least favorite subjects.

Art

Which Art Style and Which Artist?

Objective

To study various works of art and match the correct art style with the artist.

Description

For this activity you will need reproductions of eight paintings representing various art styles (see the suggested list below). Using the MimioDisplay touch display, the MimioProjector interactive projector, or a conventional whiteboard or flipchart, present the art work in four rows of two. Next to each painting, put two boxes – one for the art style and one for the artist's name. At the bottom of the display, randomly list the art styles and the artists' names. Have two students come to the front. One student will work on the left-side images, while the other student works on the right-side images. Give students a time limit to correctly complete the activity. Discuss as a class any errors.

Extension

Create a new page and select two or three students to come to the front. Assign each student a specific art style. Have them write the name of the art style in an area of the page and then list at least three defining characteristics of that style.

Sample Art Styles and Artists

Expressionist - Paul Klee
Abstract - Piet Mondrian
Cubist - Pablo Picasso
Impressionist - Vincent van Gogh
Post-Impressionist - Paul Gauguin
Surrealist - Salvador Dali
Post-Impressionist - Henri Matisse
Impressionist - Claude Monet

Interactive Flat Panel Display: A Tool for One Purpose

No matter what you are teaching with – an interactive flat panel display, a conventional whiteboard, or a simple piece of paper – they are all tools for one purpose: to educate. While traditional tools can capably communicate knowledge and ideas, the interactive flat panel display more easily engages today's students and creates countless opportunities for exciting collaborative learning. This technology connects with our students in ways they are now accustomed to, and helps them be better students today and better prepared for tomorrow. The collaborative nature of the devices encourages students to work together interactively and seamlessly with other technology in the classroom, and builds competencies they will need for the rest of their lives.

In the end, the interactive flat panel display has the same purpose as all the teaching tools in the classroom, but it is one of today's most state-of-the-art choices for truly collaborative and engaging learning.

References

[1] http://cdn.nmc.org/media/2014-nmc-horizon-report-k12-EN.pdf

[2] http://blogs.edweek.org/edweek/marketplacek12/2014/06/intuitive_technology_use_and_hybrid_learning_are_predicted_education_trends.html?qs=interactive+displays

[3] http://www.worksheetlibrary.com/teachingtips/cooperativelearningtips.html

[4] http://www.usciences.edu/teaching/tips/spal.shtml

Many of the icons in this piece are provided from flaticon.com

Download samples of the collaborative lessons in this guide at mimioconnect.com/display.

Learn more about all of our Mimio products at

mimio.com or **877.MY.MIMIO**.

mimio®