ISTE Student Standard 1:1 - Apply existing knowledge to generate new ideas, products, or processes

by Nathan Smith

This is an excerpt from a course on technology integration and innovation I’m developing for Utah State University’s College of Education & Human Services.

“If I have seen further than others, it is by standing upon the shoulders of giants.” - Isaac Newton

Creativity most often kicks in when we have a problem that is puzzling us. We ponder various options for solving it. We look around to see if others have found solutions. And sometimes, one or more of others’ ideas will click together into something entirely new. Or we will come up with a completely new idea on our own.

I love looking at what kickstart campaigners are creating. They often start with an existing idea or knowledge, and then take it even further. Let me share a few YouTube channels where these kinds of things are shown. Watch a couple of the videos! Do you see what I mean? Creative, new ideas based in earlier knowledge and inventions. Do they get you excited? Did you say, “I want one of those!” to any of the gadgets?

Now the big question. Can you encourage this kind of creativity for new ideas, products, or processes into your own classroom? Can you create an environment where creativity is encouraged?

YouTube Channel: The Future is Now - The Future Is Now showcases new inventions from the world’s most innovative minds. Keep up to date with the latest gadgets and technological advancements of modern times.


YouTube Channel: Welcome to the future! Future HD is a YouTube channel that is dedicated to showcasing all the latest tech gadgets, new inventions, innovations, and much more.
To assist students to solve problems by applying existing knowledge to new ideas, products, or processes, they often turn to project based learning experiences. Watch the video, “Introduction to Project Based Learning (PBL) Process,” to see an overview of project based learning.

Apple Computer released an excellent, free guide to help teachers implement this type of student experience - CBL (Challenge Based Learning) - Classroom Guide. Download it. It shares many ideas, strategies and techniques for successful implementation.

Edutopia - a George Lucas Foundation program and teacher resource also focuses on Project Based Learning, with many videos and other resources. Browse through this section of Edutopia for several ideas that would meet this standard. Choose at least two of the videos to watch. I’ll link to a few of the videos below...

- STEAM + Project-Based Learning: Real Solutions From Driving Questions
- Inquiry-Based Learning: Developing Student-Driven Questions
- Learning Beyond the Classroom Walls
- How a TEDx Mission Makes Learning Relevant To Students’ Lives
- 5 Keys to Rigorous Project-Based Learning
- Establishing Real-World Connections in Projects (Keys to PBL Series Part 1)
- Building Rigorous Projects That Are Core to Learning (Keys to PBL Series Part 2)
- Structuring Collaboration for Student Success (Keys to PBL Series Part 3)
- Facilitating Learning in a Student-Driven Environment (Keys to PBL Series Part 4)
- Embedding Assessment Throughout the Project (Keys to PBL Series Part 5)
- High School Teachers Meet the Challenges of PBL Implementation
- How Design Thinking Can Empower Young People
- Sparking Civic Engagement by Building in Public Spaces
- Constructing Sustainable Houses Develops Collaborative Skills
- How Making Robots Captivates Kids’ Imaginations

Below, I’d like to share another idea how to integrate technology into achieving this standard - both for students and for the teacher: TED, TEDEd, and TEDEd Clubs.

TED - TED is a nonprofit foundation devoted to spreading ideas, usually in the form of short, powerful talks (18 minutes or less). TED began in 1984 as a conference where Technology, Entertainment, and Design converged, and today covers almost all topics — from science to business to global issues — in more than 100 languages. Meanwhile, independently run TEDx events help share ideas in communities around the world.

Teachers often use TED talks to expose their students to new ideas and viewpoints that are relevant in society today. They then encourage their students to discuss and debate those viewpoints and offer ideas of their own. It often will be a springboard into doing research on other viewpoints on the same topic, and gathering data. Students can then use that scaffold to create something new that is relevant and meaningful to them, such as their own TED talk.

TEDEd Clubs - Bring TED to your classroom with TED-Ed Clubs! TED-Ed Clubs supports students in presenting their big ideas in the form of short TED-style talks. Some students may even end up on the TED stage! Want to learn how to start a TED-Ed Club?

Download the TED-Ed Club information packet

Have a question? Check out the FAQ or send them a message.
TED-Ed • TED-Ed is TED’s youth and education initiative. TED-Ed’s mission is to spark and celebrate the ideas of teachers and students around the world. Everything they do supports learning — from producing a growing library of original animated videos, to providing an international platform for teachers to create their own interactive lessons, to helping curious students around the globe bring TED to their schools and gain presentation literacy skills, to celebrating innovative leadership within TED-Ed’s global network of over 250,000 teachers. TED-Ed has grown from an idea worth spreading into an award-winning education platform that serves millions of teachers and students around the world every week.

TED-Ed Originals are their signature content: short, award-winning animated videos about ideas that spark the curiosity of learners everywhere. Every TED-Ed Original represents a creative collaboration between experts. Such experts may include TED Speakers and TED Fellows, as well as educators, designers, animators, screenwriters, directors, science writers, historians, journalists and editors. These original animated videos, paired with questions and resources, make up what we refer to as TED-Ed Lessons.

So, these are just a few ideas about how to meet this ISTE standard. There are literally thousands of others. I would be interested in hearing about some of yours. Contact me at Nathan.Smith@usu.edu.

Nathan Smith is Director of Technology Integration for the College of Education and Human Services at Utah State University. In that role, he also directs The Adele & Dale Young Education Technology Center (The YETC) located in room 170 of the Education Building on Utah State University’s main campus. The YETC is a combination student open-access computer facility, a K-12 curriculum materials library, a NASA Regional Educator Resource Center for Utah, and a technology training center. He has worked in this position for the past 24 years.

Nathan serves on the Board of Directors for the Utah Coalition for Education Technology (UCET). He works with the newsletters, emails, and blogs for UCET.

A former elementary school teacher, Nathan teaches students of every age from young children to senior citizens. He taught 4th, 5th, and 6th grades at the Santa Clara Elementary School in Santa Clara, Utah for twelve years. Now he teaches undergraduate and graduate students at Utah State University.

Over the last several years, he has had the opportunity to work extensively with groups of international teachers through the IREX/TEA program sponsored and funded through the U.S. State Department. In 2011, he was invited by the U.S. State Department to go to Amman, Jordan to train high school teachers from Jordan and Lebanon in the use of technology in education, and to share open education resources with them.

He is pictured below with his wife, Phyllis. They have seven children. Nathan also is an artist and photographer. You can view his art and photography online.
A call to invention: DIY speaker edition - William Gurstelle: Watch how much fun this man is having making products - in this case - speakers. Speakers out of yogurt cups, tostidos, coffee cup lids, and potato chips. Amazing! Imagine how engaged your students would be doing this while learning about electromagnetism, electric fields, resistance, and more? Click the image to view the video!
As we prepare our students for their future, science and technology are moving so fast it’s hard to visualize what that future may be. On this page of the newsletter, I’d like to share two videos with you that will amaze you. The video above, “The Bionic Man” details the story of a gentleman who lost both his arms in an electrocution accident when he was a teenager. New prosthetic limbs are allowing him to return to a more normal life.

New technologies are pushing the frontiers of bionics. Watch this incredible video by Hugh Herr, where he describes the amazing advances that have been made recently. I get excited thinking about our current students becoming pioneers in this field.

Hugh Herr is building the next generation of bionic limbs, robotic prosthetics inspired by nature’s own designs. Herr lost both legs in a climbing accident 30 years ago; now, as the head of the MIT Media Lab’s Biomechatronics group, he shows his incredible technology in a talk that’s both technical and deeply personal — with the help of ballroom dancer Adrianne Haslet-Davis, who lost her left leg in the 2013 Boston Marathon bombing, and performs again for the first time on the TED stage.
NearPod - a 1-to-1 Student Engagement Platform

https://nearpod.com/

NearPod.com is a education platform with various pricing levels - including a free version. Using this platform, teachers can create lessons that include text, images, video, immersive VR (virtual reality), interactives, and more. Once the lesson is created, the teacher can invite students to join the lesson in real time. Students go to NearPod.com and login with a PIN number the teacher has provided them. Their device joins the group, which the teacher controls from his/her device. Teachers have control over the pace of the lesson, and can see which students are interacting. Teachers also see student responses to questions, providing immediate formative assessments. Teachers can monitor and measure both individuals and entire class results.

The NearPod website says the platform provides the following benefits:

- Easily Create Interactive Classes: Simply upload a pdf or start a new presentation and add interactive features
- Download Ready-To-Use, Css Aligned Lessons: Find free and paid interactive multimedia presentations from distinguished educators
- Engage And Amaze: Multimedia content captures students’ attention, keeping them focused and minimizing off-task behavior
- Share Content And Assessments In Real Time: Include quizzes, polls, slideshows, videos and other activities in your lessons
- Monitor Your Students: Observe classroom activity and easily control students’ devices
- Use Nearpod For Distance Learning: Your students can join your Nearpod session from anywhere

NearPod is multiplatform, meaning that it will work on any device. I can think of multiple classroom scenarios and equipment settings this could be used in effectively.

It is available on the app store, Google Play, Nearpod Web App, and the Windows Store.

Check out these self-paced guides to learn more about Nearpod:

- **Getting started**: Discover how to use Nearpod to engage your students and gain insight into their learning.
- **Creating a Presentation**: Learn how to create an interactive engaging lesson from scratch, or from your existing teaching resources.
- **Advanced Techniques**: Learn how to differentiate, combine interactive activities, and flip your classroom with Nearpod.
Free Education Webinars From NASA Educator Professional Development

The NASA STEM Educator Professional Development Collaborative at Texas State University is presenting a series of free webinars open to all educators. Join NASA education specialists to learn about activities, lesson plans, educator guides and resources that bring NASA into your classroom. Registration is required to participate. To register, simply click on the link provided beneath the webinar description.

**Planetary Missions -- NASA, We’re Out There: Peering Beneath Jupiter’s Clouds With NASA’s Juno Mission**

Audience: Pre-service, In-service, Home School and Informal Educators of Grades 5-9

Event Date: June 6, 2016, at 4 p.m. EDT

Discover how NASA’s Juno mission will peer through Jupiter’s clouds and investigate what’s in its core. Jupiter, its moons and its interactions with other bodies in the solar system will be discussed. Discover how to use NASA activities to talk about forces and motion, composition, and energy. Bilingual resources will also be presented. Activities in this webinar will address Next Generation Science Standards ESS1, ESS2 and PS2. Register online to participate. [https://www.etouches.com/182525](https://www.etouches.com/182525)

**Planetary Missions -- NASA, We’re Out There: Is There Any Life Out There? Extremophiles**

Audience: Pre-service, In-service, Home School and Informal Educators of Grades 6-12

Event Date: June 9, 2016, at 6 p.m. EDT

Students come to class filled with questions about life on other worlds. They have seen fantastic scenarios presented on television and in films; they have read and heard about exploring and the expansion of human presence in the solar system; they have followed the drama of space missions involving astronauts and robots. The answers to the questions that arise out of these experiences are often complex and multidimensional. How can teachers meaningfully address such questions? Register online to participate. [https://www.etouches.com/137580](https://www.etouches.com/137580)

**Space Launch System QM-2 Test Question-and-Answer Session**

Audience: Pre-service, In-service, Home School and Informal Educators of Grades K-12

Event Date: June 16, 2016, at 4:30 p.m. EDT

Participants in this webinar will get an overview of the solid

**Mars Survival Kit: Lessons and Activities to Guide Your Exploration of Mars!**

NASA is embarking on a journey to Mars! Are your students ready to join in the adventure? Spark excitement in your classroom with the Mars Survival Kit.

The Mars Survival Kit is a collection of educational activities for students in grades K-12. Each educational activity includes a brief description, as well as information about how the activities and lessons align to the Next Generation Science Standards.

Start your classroom’s journey to Mars at [http://go.nasa.gov/1NnZ0Rg](http://go.nasa.gov/1NnZ0Rg).

To learn more about NASA’s Journey to Mars, visit [http://www.nasa.gov/topics/journey-tomars/index.html](http://www.nasa.gov/topics/journey-tomars/index.html).

**NASA App**

The NASA App showcases a huge collection of the latest NASA content, including images, videos on-demand, NASA Television, mission information, news & feature stories, latest tweets, ISS sighting opportunities, satellite tracking, Third Rock Radio and much more.

Learn More

Get the iOS (iPhone/iPad/iPod touch) App
Get the Android App
Get the Amazon Fire OS App

![NASA App](image)
rocket boosters for the Space Launch System and the QM-2 (Qualification Motor-2) test firing scheduled for June 28, 2016. A question-and-answer session with an expert about the SLS and its boosters will be an integral part of this experience. Register online to participate. https://www.etouches.com/181163

**Planetary Missions -- NASA, We’re Out There: Modeling Our Solar System**

Audience: Pre-service, In-service, Home School and Informal Educators of Grades 5-8

Event Date: June 16, 2016, at 6 p.m. EDT

Explore our solar system with NASA STEM activities and missions. This webinar will investigate classifying, graphing and scale models to help participants better understand and visualize our sun, planets, asteroids and other objects as a true system. Register online to participate. https://www.etouches.com/181689

For a full schedule of upcoming webinars, visit [http://www.txstate-epdc.net/events/](http://www.txstate-epdc.net/events/).

Please direct questions about this series of webinars to Steve Culivan at stephen.p.culivan@nasa.gov.

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**CK-12 PLIX Textbooks**


From their website: “CK-12 is a non-profit organization that creates and aggregates high quality, curated STEM content. Our library includes over 5,000 awesome math and science concepts and FlexBooks with multiple modalities for all learning types including: videos, images, reading, simulations, real world applications, activities, flashcards, study guides, assessments and more!”

All the CK-12 resources are free to teachers and students!

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**Michael Bodekaer:**

**This virtual lab will revolutionize science class**

TEDxCERN - 11:26 - Filmed Oct 2015

9 subtitle languages

View interactive transcript

One of the rapidly expanding technologies that could have an impact on schools is virtual reality. Watch the TED talk above to see how one inventor wants to improve science education.
Dr. Ruben Puentedura developed the SAMR model as a way for teachers to evaluate how they are incorporating technology into their instructional practice. You can use SAMR to reflect upon how you are integrating technology into your classroom. Is it an act of Substitution? Augmentation? Modification? Or Redefinition? Click the video below to watch it!

CK-12 Brain Flex Summer Practice App for Math & Science

http://goo.gl/Ae2jsI

Free summer practice app. Thousands of students have already joined to build their math and science skills with daily practice.

- Invite students to get a head start or review concepts they missed.
- Utilize free math and science practice daily, which students can do anytime, anywhere.
- Track your student’s progress over the 8-week challenge. Have a look at their program flyer (PDF) for more information.

Introduction to the SAMR Model
How Technology is Changing the Way Children Think & Focus

By Jim Taylor, Ph.D.

Are your children prepared to think and focus for success in the 21st century?