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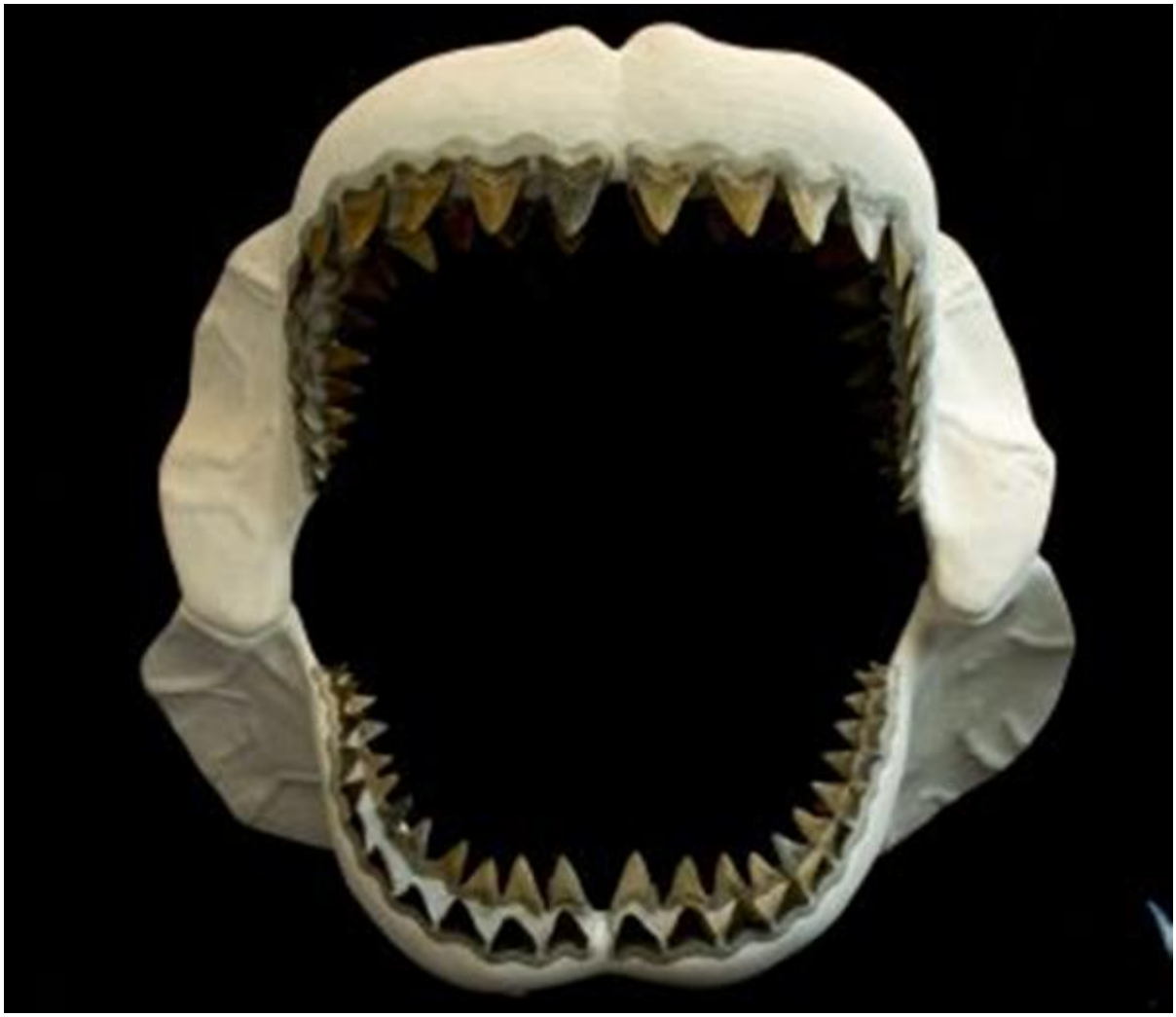
Florida's iDigFossils program uses giant 3D printed shark teeth to get kids into STEM subjects

Jun 15, 2017 | By David

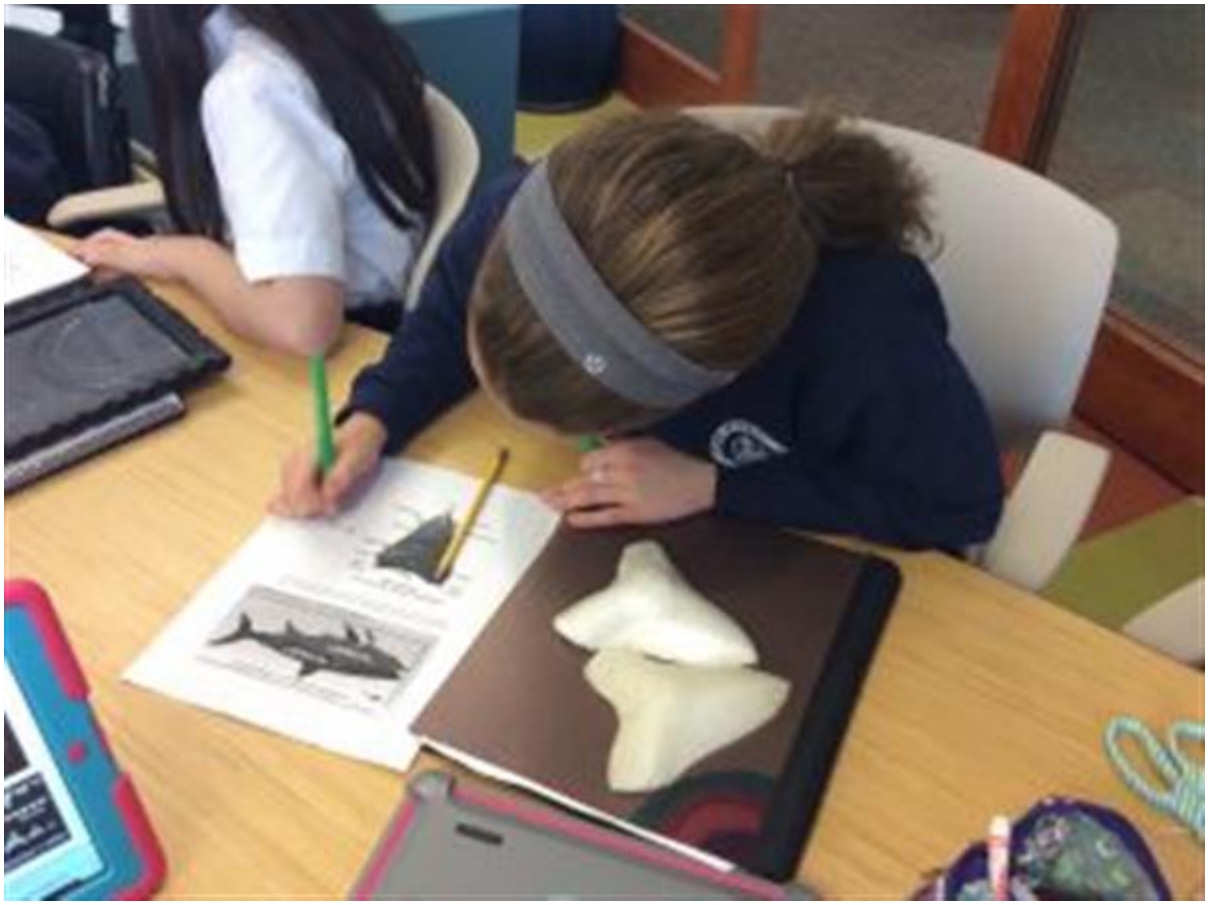
A new educational curriculum established by the University of Florida and the Florida Museum of National History is using 3D printing technology to bring kids closer to our pre-historic forebears. The program is known as iDigFossils, and a report in *Paleontological Society Special Publications* titled "3-D Fossils for K-12 Education: A Case Example Using the Giant Extinct Sharkcarcharocles Megalodon" suggests that it is having great success.



Getting kids more interested in STEM subjects has long been a major priority for educators around the world, and this is even more important today with challenges like climate change and food shortages that will be affecting future generations. Interactivity is often the most effective way of stimulating kids' interest in what can sometimes seem like dry, abstract subject matter.

3D printed replicas of the Florida Museum of National History's digital collection are a major part of the iDigFossils teaching plans, as they allow kids to get their hands on such fascinating items as dinosaur bones and the teeth of a Megalodon, the largest shark ever to exist on our planet.

This tactile approach engages their minds in a bigger variety of ways, hopefully encouraging the things that are most important for grown-up scientists: a sense of curiosity, inquisitiveness, and skepticism.

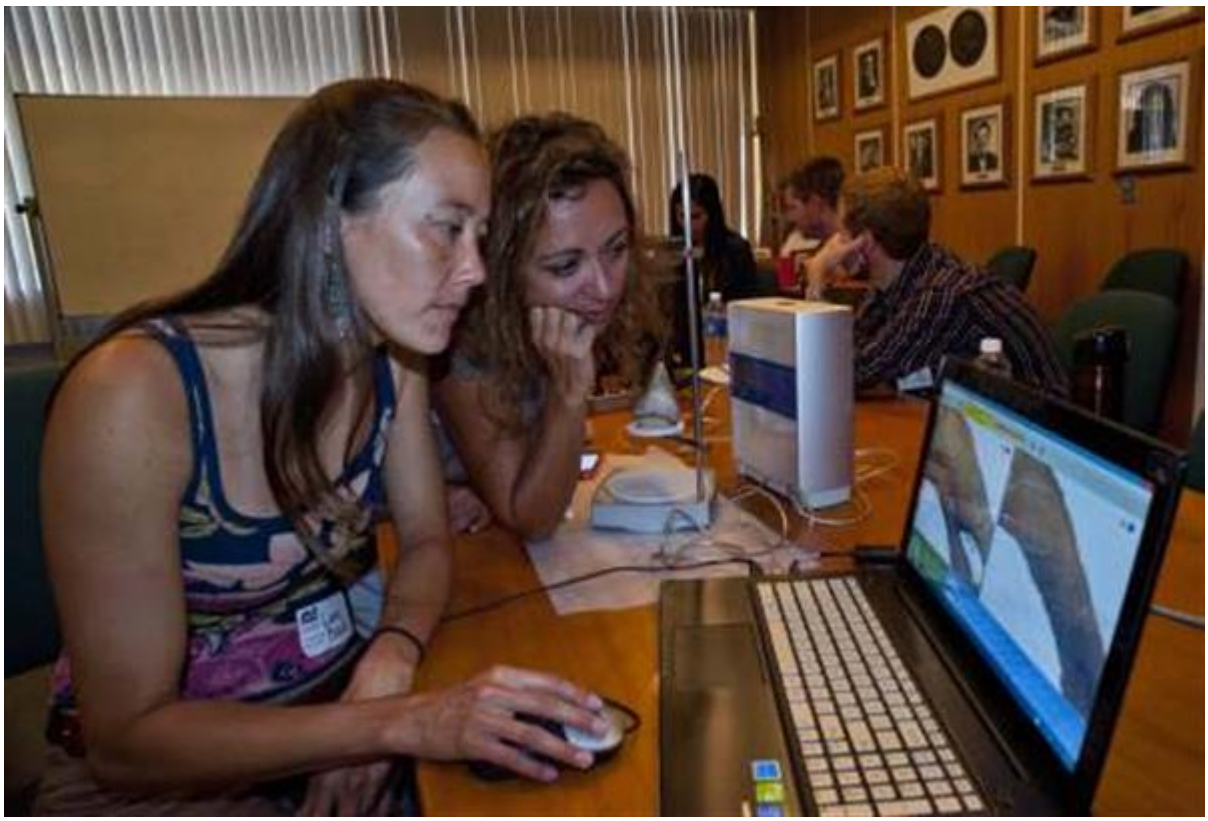


Claudia Grant, Florida Museum doctoral student and iDigFossils project coordinator, was a student who struggled with science in high school, so she is particularly well placed to know what kind of STEM educational program might work best.

“One of the advantages of using this approach is that we can engage kids who are totally uninterested in science or who often get left behind in traditional STEM classes,” she says. “These lessons help show kids that don’t consider themselves ‘science people’ that their skills are still important. When you see how this works in the classroom, it’s compelling.”

Grant put the iDigFossils program together with several researchers from the museum, principal investigator Pasha Antonenko of the College of Education, Victor Perez of the department of geological sciences, Corey Toler-Franklin of the department of computer and information science and engineering, as well as Aaron Wood from Iowa State University

Students in the U.S. often lag behind their peers from other countries in basic science literacy and proficiency. This is what inspired recent educational reform initiatives such as Next Generation Science Standards (NGSS), and Common Core State Standards (CCSS). These and other efforts to close the gap have struggled, however, due to how difficult it can be for teachers to meet their criteria of cross-disciplinary learning. iDigFossils is able to address this problem directly.



A focus on paleontology means that the combination of traditionally separate STEM disciplines is much easier to achieve. “Science is a collaborative, multidisciplinary process, and it should be taught that way,” Grant said. “Crossing disciplines can be tough, so we wanted to create curriculum that would empower teachers to do that while teaching the topics they need to teach and meeting NGSS and CCSS objectives.”

Paleontology is ideal as it incorporates elements of biology, environmental science, geology, oceanography, and anthropology. Not only is it a great combination of disparate disciplines, it is also seen as natural "gateway" science for kids because of its obviously appealing subject matter.

The aforementioned Megalodon was used as part of a case study of the iDigFossils program’s effectiveness. Students from different schools in Florida and California were asked to 3D print a set of 46 Megalodon teeth from scans of real fossils. They then had to use them to investigate two separate questions: How can fossil teeth reveal a shark’s total body length, and how do scientists use modern sharks to understand sharks like Megalodon, which dominated the oceans 23 to 2.6 million years ago?

Independently, the students were able to make the discovery that equations based on great white sharks’ tooth crown height do not yield accurate estimates of Megalodon’s body length.

A survey of 26 students who completed the Megalodon lesson suggests that a large majority of them felt like the hands-on activities were an effective method of instruction. According to one student, “Having access to a 3D printer allowed us to grasp things differently. Being able to physically hold something in your hand … is definitely very engaging. I have never been to a science class where everyone was so engaged with what was going on.”

Another important lesson that the kids picked up from the group work, according to Grant, is that a scientist doesn’t have to be an expert at everything: "Where you have a weakness, that’s when you recruit a collaborator with a corresponding strength,” she said.

We reported earlier in the year on a survey that suggested **3D printing technology is still** being underutilized in education, despite its obvious benefits, particularly for STEM subjects. The positive results of this program should encourage other educators, and we will hopefully see this situation changing in the future, perhaps with more institutions like the Florida Museum of National History also lending a hand.

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