

OLAQ

OLA Quarterly

Volume 23
Number 4 *Sushi, STEM, or Goat Yoga:
Successful Library Programming*

4-6-2018

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Recommended Citation

Widdows, D. (2018). A New Use for the Makerspace. *OLA Quarterly*, 23(4), 26-29. <https://doi.org/10.7710/1093-7374.1920>

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OLA Quarterly is an official publication of the Oregon Library Association | ISSN 1093-7374

A New Use for the Makerspace

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If you want to elicit a groan and an eye roll from almost anyone in the field of education, you need only whisper two words: test prep. Standardized testing is a reality across the country, but even for those who can see its value, the testing is time consuming and can be soul-crushing for teachers and students.

As a former third grade teacher, I witnessed students' first experience with the Smarter Balanced Assessment Consortium (SBAC) tests. I watched a struggling reader stare at the same performance task for two hours, typing about two sentences over that time. I saw a similar scenario with one of my highest performing math students. Math was his strength and pride, so when he came to a question that he was not sure of, he tried it over and over again until I could see tears streaming down his face. Often this frustration stems from the student having no experience with this type of content. When a student asks for help, the only allowed response is "It is important that you do your best. Do you need to pause the test and take a break?" Every teacher who proctors SBAC tests has experienced these exhausting and emotionally draining days. We don't want to spend our days teaching to a test, but we want students to feel prepared and confident when facing new challenges, including testing.

At Warrenton Grade School, a Makerspace was established at the end of last year as a way to create opportunities for hands-on learning. It is housed in the art room, and teachers can bring their classes to work on projects. With this space available, we decided to bundle SBAC Test Prep with fun projects that keep the curriculum hands-on and simultaneously help students build background knowledge for performance tasks they will face.



We focused on Math Performance Tasks for these projects, because they are multi-step problems that include a combination of different math operations and skills using the same data. A sample performance task requires third graders to read and interpret a scaled bar graph about the number of cups of lemonade a person sold in July, manipulate this data set by adding and subtracting to find the amount sold in August, and choose an appropriate scale and create a pictograph with this new information (Sample items, 2018). We wanted to give students practice in solving these kinds of multi-step problems as well as collecting, analyzing, interpreting, and manipulating data in a way that was fun and engaging. We started with the lemonade stand item and adapted it to be about balloon cars, since this was something that we could design, build, and test easily in the Makerspace.

Our first students who experienced the Performance Task practice were third graders. Since the entire third grade participated, about 75 students, we had a diverse group at different levels of background knowledge, needs, and strengths. All four classes started by building balloon-powered cars. We provided the required materials along with modified directions from the Smithsonian Maker Lab book, but after that we provided very little input or direction. Students were responsible for the design of their car as well as its construction. Intentionally not helping the students can be hard for teachers, but encouraging students to think critically and to solve their own problems is what we strive for in the Makerspace. When a student expresses frustration that “My wheels won’t turn!” or “My car is broken!” our response is simply, “Fix it.” And usually they do. But they always, whether through success or failure, learn from their own experience. Once students finished building, they



Kyle and Sadie work on using balloons as power for their cars.



went to the testing area to see how their cars drove. When they saw that their car would only drive in a circle, or was tipping over, or not going anywhere, they had to identify the problem and attempt to fix it. Students often helped one another with this part, pointing out cardboard bases that were rubbing on wheels, or balloons that were not taped all the way down to their straw. It became a cycle of testing, identifying problems, making improvements, and then testing again. In itself, the Makerspace is a place that allows students to solve new problems without the help of an adult, thus giving them the opportunity to gain confidence in their own abilities.

After spending a class building, testing, and modifying their balloon cars, students then did official distance tests, measuring how far their cars would travel in the hallway and graphing the information over four separate trials of their car. This gave them practice with measurement and data collection that would be relevant to their upcoming SBAC sample items.

The next step was to present performance task items where students already had some background knowledge. We used our adapted sample questions about balloon cars and included measurements in inches, since that was how they measured distance in their own trials. Students completed this practice in class and were given immediate feedback by their teachers, something that they do not receive when practicing SBAC questions online. Some teachers also combined this practice with the original online sample items about the lemonade stand. Third-grade teacher Angie Horton noted that with this type of SBAC practice, her students were more prepared and positive than they had been without it. “The physical hands-on aspect of it was highly engaging,” she stated, “and the creation of the cars helped build prior knowledge that they were able to draw from in the math practice questions.”




Kylie and Jayce design and build the bases and bodies for their cars.



Following the third grade, fourth graders came through the Makerspace to create holiday ornaments out of clay, and some of the fourth-grade teachers also followed through with accompanying modified SBAC sample questions. Teacher Julie Thoma stated, “It was really helpful to my students because having done the hands-on piece of making the ornaments helped them make connections more than just reading about it.” She followed up the modified sample questions with an online practice test completed together as a class.

As teachers, we are responsible to our students to help them feel confident and prepared when facing challenges, including testing. Joining SBAC prep with Makerspace projects helps students to be more engaged in their practice and is a fun way for them to tackle new problems with confidence and resilience. I think it is also helpful practice for us as teachers—to allow students to struggle with the material rather than giving them help right away, and to be confident that they will make their own decisions and learn from them. In some ways, it seems as if Makerspace projects and SBAC testing prep could not be further apart, but we think they can be complementary and hope to continue doing more projects like these in the future.

The outcomes we are aiming for are not based as much on increasing student standardized test scores as they are on giving students the confidence and resilience to face difficult questions without giving up or feeling overwhelmed. The aim is to keep it both rigorous and fun. After testing starts this year, we will be able to get a feel from teachers and students about whether classes who practiced these strategies seemed more relaxed and prepared than previous classes. As we receive feedback, the Makerspace will continue to evolve to suit the needs of our students and our school. 

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