

## Gifford Middle School (GMS) Letter of Idea

Name of Project: **Think Tank – A place for imagination, invention, and innovation. Focus - Science**

**About the project:** GMS has been working hard to not only improve student achievement on the state mandated science tests but, to better prepare our students for 21<sup>st</sup> century STEM related jobs. This project will allow us to create a “**Think Tank**”, or “makers space.” The **Think Tank** will be a space where students can make a connection between the content they are studying and the application of that content in authentic and relevant ways. They will make, create, and invent new things. The **Think Tank** will empower students, helping them move from receptors of information to constructive creators and innovators. Not only will working in the **Think Tank** promote skills such as critical thinking, problem solving, and design, but also behavioral competencies such as perseverance, adaptability, and organization.

**Amount requested:** \$9994.41

**Total Project Cost:** \$9994.41 from grant. Space for the **Think Tank** will be provided by GMS. It will be piloted in Mrs. Sleeper’s classroom. The long-term goal will be to move the Think Tank to room 1310, the STEM Lab. Donations will be sought for additional consumable supplies on an on-going basis.

**Target Population:** The targeted audience will be sixth, seventh and eighth-grade students in Mrs. Sleeper’s science classes. Eventually, the **Think Tank** will be open to the entire student population.

**Number of children to be served and grade level:** Approximately 123 sixth, seventh, and eighth grade students. Eventually, approximately 700 GMS students.

**Succinct Summary - Issue:** GMS students score the lowest on the Nature of Science (NOS) questions on standardized tests. The NOS standards deal with the tools and processes of science, the human element of science, and the domain of science and its limitations. NOS standards, particularly the scientific way of thinking, problem solving, and collaboration are important 21<sup>st</sup> century skills. This is not just a GMS problem. As Mrs. Sleeper learned at the United States Patent and Trade Office (USPTO) National Summer Teacher Institute, a NASA/JPL study, conducted to find out why newly hired scientists and engineers were not as successful problem solvers as retiring workers, discovered that younger hires had not “played with their hands”. They had not taken things apart to see how they worked or built something new. They did not know how to “tinker.” As a result, they were not adept at the kind of problem-solving NASA, and other employers, sought.

**The Change:** The Think Tank will provide students with a space where they can explore a wide range of science concepts, learn to use tools and materials (“tinker”), collaborate with each other, and develop creative projects. Students will have the opportunity to develop their independent thinking skills as they work to solve problems. The creation of physical artifacts will help them to build real world connections to what they are learning in class. By allowing students to experiment, take risks, and tweak their own ideas, we will be giving them permission to trust their own thinking. They will iterate from their own “failures” to achieve success. They will naturally develop a growth mindset. They will have the hands-on problem-solving experience necessary for success in the future and will increase their understanding of the NOS.

**The Action:** The materials requested for the **Think Tank** will be ordered and placed in space provided by GMS. The materials selected for the **Think Tank** were chosen from suggested supply lists compiled by the Makerspace Newsletter (makerspace.com) and from lists developed by the USPTO for the National Summer Teacher Institute. Mrs. Sleeper, a Nature of Science Teacher Ambassador for the National Center for Science Education, will design open ended projects utilizing these materials, that align to our standards-based curriculum with particular emphasis on the Nature of Science. Students will then have the opportunity to work on a range projects from 3-D printing to e-textiles, to rockets, to paper circuits, etc. The **Think Tank** will be open during 7<sup>th</sup> grade lunch and on Tuesday’s after school for students to complete projects.

**Oversight:** Science Teacher, Melissa Sleeper will initially provide oversight of the **Think Tank**. Additional oversight will be provided by Tosha Jones, principal. The long-term goal is to have teachers, across all disciplines, involved in overseeing and using the **Think Tank**. For example, a student might use e-textiles and conductive thread to light up the outfit they made for a 3-D character they designed and printed based on a story they read in language arts.

**Monitoring Progress and Results:** Student scores on the nature of science portions of standardized tests will be monitored. All participants will be required to keep a project notebook documenting their thinking. An Innovator’s Fair will be held to showcase student work.

**Volunteers:** Community volunteers will be sought to help mentor students as they work in the **Think Tank**. Local “experts” will be invited to share their skills and passions with our students. Volunteers will be needed in the **Think Tank** on Tuesdays (the day there is a late bus) after school. Additional volunteers will be needed to help organize materials and supplies. The day and time for these volunteers will be arranged on an as needed basis.

**Budget:**

Item	Cost	Item	Cost	Item	Cost
Makey Makey Classroom	699.95	Afinea H800 3D Printer	1699.00	Walmart Simplicity Sewing Machine	150.00
Keva Planks	449.95	Filament Asst. Colors (15)	479.85	Little Bits Workshop set	1999.00
Keva Contraptions (2)	99.90	Pitsco R2-K Rocket Classroom	450.00	HF 3” Clamps (10)	29.90
Drone Classroom Kit	999.99	Elin Scan-SE 3D Scanner	1399.00	HF Rubber Mallets (2)	5.98
E-textile Basics Lab Pack (2)	399.90	HF Tool Kit w/4 drawers (2)	93.98	HF Hammers (6)	18.00
Walmart Mini glue gun (12)	42.48	HF Screwdriver sets (2)	11.98	HF Floor parts storage rack (2)	169.98
SSWW Wiggly Eyes	14.49	Amazon LED Lights	38.97	SSWW Bag of Tiles	41.99
SSWW Cutting Mats (12)	229.90	Coin Li Batteries (200)	34.00	SSWW Embroidery Floss	29.99
SSWW Mega Craft sticks	54.99	SSWW Glue (3)	50.97	SSWW 72 Bristle Brushes	35.99
SSWW Felt Pack	30.29	SSWW Air dry clay	35.99	Paper Circuit Starter Kits (2)	198.00
				<b>Total</b>	<b>\$9994.41</b>

**HF-Harbor Freight. SSWW – S&S Worldwide Arts and Crafts. OT Oriental Trading.**

Lynch, M. (2017, January 21). *10 Reasons to Create Makerspaces in Your School*. Retrieved from The Tech Edvocate: <https://www.thetechedvocate.org/10-reasons-to-create-makerspaces-in-your-school/>