Oak Park Elementary School District 97

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TO: **Members, Board of Education**
Dr. Albert Roberts, Superintendent

FROM: **Lisa Schwartz**

RE: **Project Lead the Way – Gateway to Technology**

DATE: **March 19, 2013**

The following report provides information regarding a proposal to adopt the Project Lead the Way Gate Way to Technology Program for Gwendolyn Brooks and Percy Julian Middle Schools. Joining me for the presentation will be Todd Fitzgerald, Tim Walsh, Adrienne Court and Brian Shinners.

Overview:
A team of District 97 staff including administrators and teachers has spent the last year and a half investigating and learning about the Project Lead the Way (PLTW) Gateway to Technology Program. Based on our research and the requirements of the International Baccalaureate program we feel the Gateway to Technology Program is a good fit for the two District 97 Middle Schools.

What is Project Lead the Way?

Project Lead The Way (PLTW) is the leading provider of rigorous and innovative Science, Technology, Engineering, and Mathematics (STEM) education curricular programs used in middle and high schools across the U.S.
STEM education programs like the one offered by PLTW engage students in activities, projects, and problem-based (APPB) learning, which provides hands-on classroom experiences. Students create, design, build, discover, collaborate and solve problems while applying what they learn in math and science.

The hands-on, project-based engineering courses for middle schools engage students on multiple levels, expose them to areas of study that they typically do not pursue, and provide them with a foundation and proven path to college and career success. The curriculum, delivered through PLTW's Virtual Academy, is provided free of charge to schools that register with PLTW. Classroom equipment -- computer software and kits for hands-on activities -- along with teacher training, which is required, are the main costs related to the program.

The PLTW curriculum is founded in the fundamental problem-solving and critical-thinking skills taught in traditional career and technical education (CTE), but at the same time integrates national academic and technical learning standards and STEM principles, creating what U.S. Secretary of Education Arne Duncan calls one of the "great models of the new CTE succeeding all across the country." PLTW was recently cited by the Harvard Graduate School of Education as a "model for 21st century career and technical education." (Source: www.pltw.org)

Need for such a program:
Currently, we have a technology program that is in need of updating. Students are entering the middle school with increased knowledge of technology and our existing program is no longer meeting all of our students needs and interests. Aside from the required Science and Math classes there are few options to engage students in STEM focused curriculum. We believe that by exposing all students to a variety of STEM classes, they will leave the Middle Schools better prepared for college and career readiness.

GTT Program Design:
The Gateway to Technology program is comprised of seven nine-week units of study. Districts choosing to offer the GTT program must commit to implement two foundation units. The two foundation units are:

Design and Modeling (DM)
In this unit, students begin to recognize the value of an engineering notebook to document and capture their ideas. They are introduced to and use the design process to solve problems and understand the influence that creative and innovative design has on our lives. Students use industry standard 3D modeling software to create a virtual image of their designs and produce a portfolio to showcase their creative solutions.

Automation and Robotics (AR)

Students trace the history, development, and influence of automation and robotics. They learn about mechanical systems, energy transfer, machine automation and computer control systems. Students use a robust robotics platform to design, build and program a solution to solve an existing problem.

These two units must be offered over the course of two years to some students to meet the PLTW program guidelines. The other specialization units that can also be offered include:

Green Architecture (GA)

In a world of reduced resources and environmental challenges, it is important to present the concept of "being green" to the next generation of designers and builders. In this unit, students are introduced to architectural plans, construction styles, alternative materials and processes, dimensioning, measuring and architectural sustainability. Students use a 3D architectural software program to create an environmentally friendly home using shipping containers.

Medical Detectives (MD)

Medical Detectives (MD) explores the biomedical sciences through hands-on projects and labs that require students to solve a variety of medical mysteries. Students investigate medical careers, vital signs, diagnosis and treatment of diseases, as well as human body systems such as the nervous system. Genetic testing for hereditary diseases and DNA crime scene analysis put the students in the place of real life medical detectives. The unit will be field tested spring 2013 and made available to the network for the 2013-2014 school year.

Energy and the Environment (EE)

Students investigate the impact of energy on our lives and the environment. They design and model alternative energy sources and participates in an energy expo to demonstrate energy concepts and innovative ideas. Students evaluate ways to reduce energy consumption through energy efficiency and sustainability.

Flight and Space (FS)

The rich history of aerospace comes alive through hands-on activities, research, and a presentation in the form of a short informational video. Students explore the science behind aeronautics and use their knowledge to design, build and test an airfoil. Custom-built simulation software allows students to experience space travel.

Magic of Electrons (ME)

Through hands-on projects, students explore the science of electricity, behavior and parts of atoms, and sensing devices. Students acquire knowledge and skills in basic circuitry design and examine the impact of electricity on our lives.

Science of Technology (ST)

How has science affected technology throughout history? To answer this question students apply the concepts in physics, chemistry and nanotechnology to STEM activities and projects.

GTT Program/IB Program Alignment
The IB MYP program has a Tech Design requirement as one of the eight programs of study. Tech Design is defined by IB as course concerned with solving problems in an effort to stimulate students' ingenuity and to encourage them to combine intellectual talents and practical skills. In particular, students are encouraged to display ingenuity and creativity in devising practical solutions to given tasks. Students use the design cycle to:

- investigate
- design
- plan
- create
- evaluate

District 97 Vision for GTT Program
All Middle School students will participate in the GTT program for one trimester a school year. The below chart illustrates what the course sequence may look like:

Year of Implementation	Grade 6	Grade 7	Grade 8
Year 1 2013-14	Design & Modeling	(Elective Choice) Design & Modeling	(Elective Choice) Design & Modeling
Year 2 2014-15	Design & Modeling	Automated Robotics Green Architecture	(Elective Choices) Design & Modeling Automated Robotics Green Architecture
Year 3 2015-16	Design & Modeling	Automated Robotics Green Architecture Medical Detectives	Automated Robotics Green Architecture Medical Detectives Advanced Robotics

Beginning with the 2013-14 school year, all 6th grade students will experience the full IB program of study, thereby taking classes from all eight subject areas, including tech design. The initial GTT plan is for 7th and 8th grade students to have the option of taking the GTT classes as electives as the IB program progresses to all grades of students participating in all eight subject areas in 2015-16.

The GTT program also embodies the Common Core State Standards with expectations of developing students who:

- research, analyze, create, and communicate
- are digital creators, who communicate in print, orally, and digitally
- work as individuals and team members

Program Costs – Year 1

Description	Unit Cost	Quantity	Total
Two week training for Design & Modeling in July 2013	$1175	4 Teachers	$4,700
Annual Participation Fee	$750	2 (One per school)	$1,500
Design Modeling Equipment – One Time Cost	$500	6 classroom sets	$3,000
Consumables (Print Shop)			$300
		Total:	**$9,500**

Program Costs Year 2

Description	Unit Cost	Quantity	Total
Annual Participation Fee	$750	2	$1,500
Training: Automated Robotics & Green Architecture	$1,175	4 Teachers	$4,700
Automated Robotics Equipment One Time Cost	$6000	2	$12,000
Green Architecture Equipment One Time Cost	$400	4	$1,600
Consumables – Print Shop			$1,200
		Total :	**$22,000**

Program Costs Year 3

Description	Unit Cost	Quantity	Total
Annual Participation Fee	$750	2	$1500
Training Green Medical Detectives	$1,175	2 Teachers	$2350
Medical Detectives Equipment One Time Cost	$1000	2	$2,000
Advanced Robotics Equipment One Time Cost	$6000	2	$12,000
Consumables – Print Shop			$1,2000
		Total :	**$17,850**

Computer Costs:

Description	Unit Cost	Quantity	Total
Student Laptops * Meet the GTT Specs	$1,600	28 x 4 = 112 (2 Labs per building)	$179,200
Teacher Laptops (Same specs as students)	$1,600	4	$6,400
Printer	$600	2	$1,200
		Sub-Total	$186,800
Less Planned Computer Replacement Costs & Teacher provided computers			($94,000)
		Total:	**$92,800**

The labs at both Middle Schools have been scheduled to receive new computers. The specifications for the computers required for the GTT program are higher than the computers we typically provide in the labs. Teachers who teach the program are also required to have the same computer. This laptop would be their main teacher device.

Summary:

It is our recommendation that the Board of Education support the implementation of the Project Lead the Way Gateway to Technology Program for both District 97 Middle Schools. This program will provide all of our students with a hands-on, project-based program that will engage them on multiple levels, exposes them to areas of study that they typically do not engage in on a regular basis, and provide them with a foundation and proven path to college and career success in the STEM related fields.