The STARBASE Monthly Newsletter

February 2013

DISCOVER DoD STARBASE TODAY

A Department of Defense Youth Program

Minnesota's Piece of the STARBASE Legacy

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LOOKING AT STARBASE THEN & NOW

MINNESOTA'S PIECE OF THE STARBASE LEGACY

From Minnesota's start to a glimpse at today.

Roger Delgehausen, current and original STARBASE Minnesota board member, recently sat down with STARBASE staff to discuss the beginnings of STARBASE Minnesota. Delgehausen retired from the Minnesota Department of Education and then served an additional three years in the Minnesota National Guard, wrapping up a nearly 40 year career in which he enlisted as a private and retired as a brigadier general. In the spring of 1993, Delgehausen was told about the pilot STARBASE program at Selfridge Air Force Base in Michigan when he received a call from Assistant Adjutant General BG Joseph Kazek.

Based on the pilot's positive reviews, Delgehausen immediately began to develop a funding proposal and vision for a STARBASE program in Minnesota. Just a few months later, eager students from the east side of St. Paul filled two small classrooms that were allocated by the 133rd Airlift Wing in what was once a 1950's ammunitions storage facility.

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HISTORY

From those humble beginnings, STARBASE Minnesota has now grown to six classrooms serving over 3,300 students a year. With the help of Congressman Ellison and minor military construction funding along with corporate classroom sponsorships, STARBASE Minnesota is now operating from a newly renovated 14,000 square foot facility with uniquely designed classrooms dedicated by the base for STARBASE.

Delgehausen noted, "One of the keys to success is setting a high standard of excellence." This conviction has continued for over 20 years as STARBASE Minnesota is recognized as a premiere STEM program and leader in innovation in STEM education in the state of Minnesota. Under the leadership of Executive Director Kim Van Wie since 1999, this STARBASE site recognized the need to continuously evaluate and improve their program and engage in partnerships with STEM industry and other STEM-education providers to expand services and the capacity of STARBASE to strengthen students' academic and long term success.

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From the early years of providing tours of C-130s and Northwest Airlines' Maintenance facilities (since merged with Delta) to now involving scientists and engineers from over 20 local STEM corporations — such as 3M, BAE Systems, Boston Scientific, Cummins Power, General Mills, Medtronic, Microsoft, St. Jude Medical, Seagate, Stratasys, and others — the responsibility of helping to prepare our future scientists, engineers, and technicians is shared through collaboration and commitment with strong community partners. In addition to local STEM corporations who provide volunteer, in-kind, and financial support, STARBASE Minnesota led the development of a coalition of over 250 STEM

HISTORY

practitioners and policy makers. Members of this expanding Minnesota STEM network are creating STEM hubs around the state and linking arms to create STEM pathways, childhood through adulthood, from one STEM organization to the next, while helping to improve the "buzz" about STEM and appeal of STEM careers.

The historical and current work of STARBASE Minnesota has put the organization in a unique position for affecting positive change in students' perceptions of themselves as engaged STEM learners and future scientists and engineers. In a recent longitudinal study of former STARBASE students conducted by Wilder Research in St. Paul, nearly 10 years after participating in the program, 83% of former STARBASE students reported STARBASE helped them understand STEM better, and 79% reported it increased their interest in STEM. This one-of-a-kind experience creates a lasting impact that cannot be replicated by the schools.

Just as compelling is the effect that STARBASE has on educators who, after participating in STARBASE, are encouraged and motivated about their own role in STEM education and in applying what they learned at STARBASE in their own classrooms. In addition, STARBASE helps train the next wave of STEM educators by partnering with area colleges and universities to provide field and student teaching experiences at STARBASE.

Through these efforts, future teachers are able to experience a model STEM education program and all its possibilities before they set out into the teaching world armed with

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the knowledge and first-hand experience that a hands-on, integrated STEM model is the most effective approach to teaching these disciplines. "While students are first and foremost our primary audience", says Van Wie, "educators play a critical role in building off the learning and enthusiasm of STARBASE back in their classrooms and in their changed approaches to teaching methods and strategies they've learned through their participation at STARBASE. There's a ripple effect to our work at STARBASE that becomes exponentially wider by the educators we impact spreading across classrooms, schools, districts and communities for years to come."

When asked about the future of STARBASE, Delgehausen paused for a moment and said, "The legacy of STARBASE might be that in another 20 years it will have had a profound impact on public education in Minnesota and together with the other STARBASE sites, an impact on public education across the nation."

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CURRICULUM EXPANSIONS

A review of more newly published STARBASE curriculum pieces!

With the finalization of the new Basic Measurement lesson plans, outlined in January's edition of *Discover STARBASE Today*, 11 more lessons plans were recently published to the STARBASE website. These changes ranged from updating lessons into the new curriculum format to brand new lessons that were recently approved and published. In order to keep STARBASE sites up-to-date with these changes to our curriculum, new curriculum expansions will be outlined In *Discover STARBASE Today*. Below is an overview of the changes that were recently made by curriculum area.

NEW CURRICULUM ITEM	TYPE	ABSTRACT
E3.1.1.1. Physics: A. Newton's Three Laws of Motion		
Introduction to Newton's Second Law (Note: Parent lesson was revised to add new appendices and update document to the new format.)	Parent Lesson	This parent lesson provides a basic introduction to Newton's Second Law of Motion, predicting and determining the acceleration of an object when given the variables of mass and force. This introductory information prepares students for their work with the chosen appendix.
Appendix A: Newton Launcher (Note: Updated document to the new format.)	Appendix to Introduction to Newton's Second Law	This activity presents students the opportunity to investigate Newton's Second Law by conducting a series of trials using spheres of different masses and a photogate to measure acceleration. Conducting these different trials will allow students to recognize the relationships between force and mass.
Appendix B: Trebuchet	Appendix to Introduction to Newton's Second Law	This activity presents students the opportunity to investigate Newton's Second Law by conducting a series of launches using a trebuchet and different counterweights. Conducting these different launches will allow students to recognize the relationships between force and mass.

CURRICULUM UPDATE

NEW CURRICULUM ITEM	TYPE	ABSTRACT
Appendix C: Impact Cars	Appendix to Introduction to Newton's Second Law	This appendix allows students the opportunity to investigate Newton's First Law of Motion, an object in motion or at rest will stay in motion or at rest unless acted upon by an outside force. Students will conduct an investigation to observe the effects of force and motion on objects during two different activities.
E3.1.1.2. Chemistry Sciences: B. Physical and Chemical Changes		
Introduction to Physical and Chemical Changes	Parent Lesson	In this introductory lesson, students will gain the background information necessary for the more in depth considerations of physical and chemical changes offered in the accompanying appendices. Students will have the opportunity for a hands-on examination of straightforward examples of both physical and chemical changes.
C. Unknown Substance Analysis	Appendix to Introduction to Physical and Chemical Changes	This appendix offers instructors an activity to further introduce students to the physical and chemical changes and endothermic and exothermic processes. Students conduct two hands-on experiments to hypothesize potential outcomes, observe the processes in action, and collect data that allows them to draw conclusions.
E3.1.1.3. Technology: A. Innovations		
Small Will Help All	Lesson Plan	This lesson provides an opportunity for students to work through the innovation process by using common materials to design, test, and redesign a water filter. Lesson allows for simple integration and reiteration of the engineering design process.
E3.1.1.5. Mathematics: B. Measurement		
Basic Measurement-Length	Required Lesson Plan	This required lesson provides the background information necessary for students to understand how to measure length. Within this lesson, there are two options for activities to give each student hands-on experience with this skill. The first option is to have students complete the activity included here. The second option allows the instructor to choose an activity from the list of approved hands-on activities contained in lessons throughout the STARBASE curriculum.

CURRICULUM UPDATE

NEW CURRICULUM ITEM	TYPE	ABSTRACT
Basic Measurement-Liquid Volume	Required Lesson Plan	This required lesson provides the background information necessary for students to understand how to measure liquid volume. Within this lesson, there are two options for activities to give each student hands-on experience with this skill. The first option is to have students complete the activity included here. The second option allows the instructor to choose an activity from the list of approved hands-on activities contained in lessons throughout the STARBASE curriculum.
Basic Measurement-Mass	Required Lesson Plan	This required lesson provides the background information necessary for students to understand how to measure mass. Within this lesson, there are two options for activities to give each student hands-on experience with this skill. The first option is to have students complete the activity included here. The second option allows the instructor to choose an activity from the list of approved hands-on activities contained in lessons throughout the STARBASE curriculum.
Engineering Measurement Training	Lesson Plan	This lesson provides hands-on opportunities for two of the three objectives related to the measurement core curriculum area. Using a real-world natural disaster scenario, students will measure the length, area, and mass of a bandage box and calculate the volume of the box. Along with the introductory material available in each of the "Basic Measurement" lesson plans, students will be introduced to the metric measurement system and will work through the activity as a group, in pairs, and individually.

SEEKING STARBASE ALUMNI

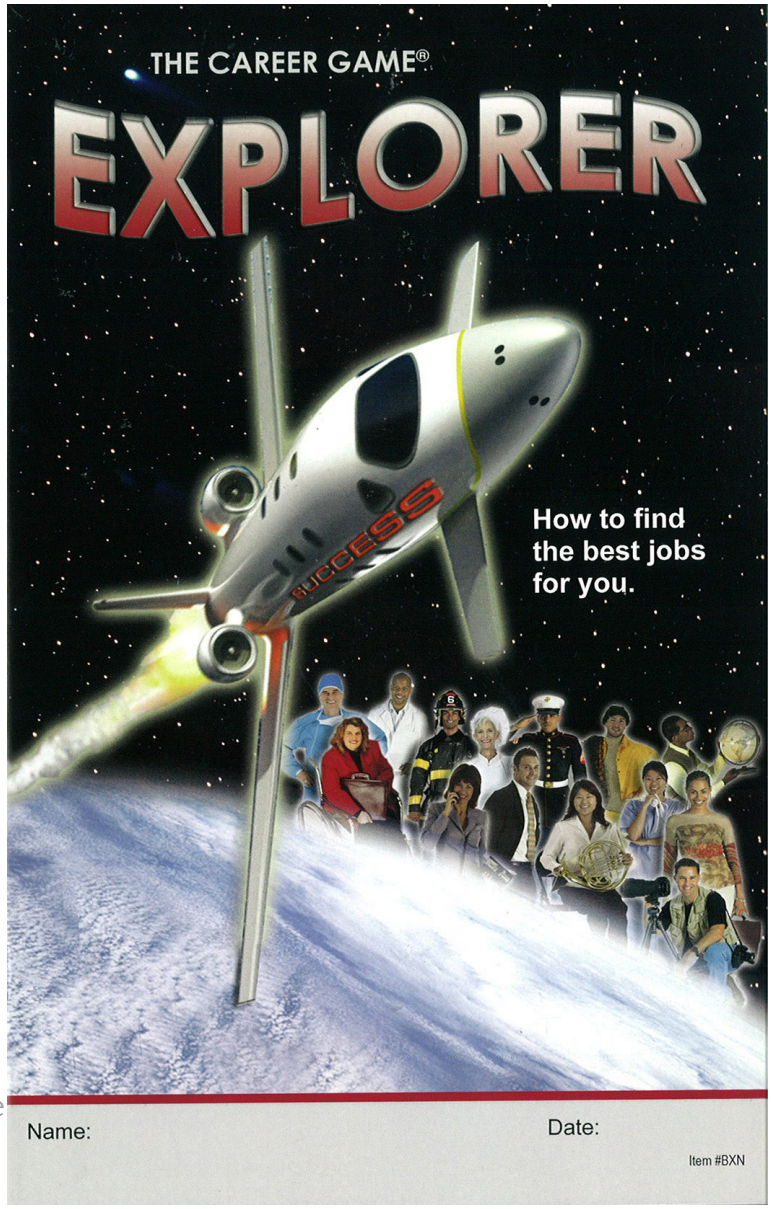
To commemorate the 20th anniversary of the DoD STARBASE Program, we are looking for STARBASE graduates who have gone on to STEM careers, hopefully in part from the influence of their STARBASE experience. We are happy to showcase any STARBASE alumni, but we are especially interested in finding graduates from the original 1993/94 classes. Please send any information about a STARBASE alumnus to Ernie Gonzales, at ernie.gonzales@osd.mil.

STEM CAREER EXPLORER

Sharing STEM Career activity ideas.

STEM career exploration is an important core component of the STARBASE program. It allows students to gain a realistic perspective about the STEM opportunities available to them.

Recently, several members of STARBASE staff around the country shared a little bit about an activity their programs use toward the two hours available in the STARBASE schedule for STEM career instruction.



This activity demonstrates a connection between the content currently being taught in the STARBASE classroom and future career possibilities in STEM by showing students that STEM careers are available in areas that enhance their interests and their strengths. STARBASE's hands-on approach introduces students to new interests that they were previously unaware fit into STEM. This activity also allows students to use booklets and software that are not available in most public elementary schools.

Finally, this activity provides career investigation to students in elementary school at a level that they understand. Career decisions usually do not become important to the K-12 curriculum until students enter high school, but early exposure aids in academic path selections in Middle and High School. Personal investigations into future careers make this booklet a useful tool in bringing an awareness and thoughtful preparation for this age range.

STEM CAREER ACTIVITY IDEAS

Below is feedback about how this career tool is utilized at four different STARBASE sites around the country.

STARBASE Robins

At STARBASE Robins, this resource is used over the course of the STARBASE experience. Students complete the information in the Career Game Explorer booklet in about 15 minutes every class meeting. Instructors will read out the questions asked in the booklet to the whole group, and students individually fill out their own answers.

The questions aim to obtain information in the following areas: what you enjoy, what you do well, what makes you proud, your very most important things, people you admire, explore your room, and your favorite places. Students will then complete a brief interest inventory and calculate the areas to discover their highest scores.

Based on the areas scored highest, students explore applicable careers. To round out the activity, students can go to the Counselor Tools on the computer to read even more about careers in their strong areas, the job outlook, and required schooling. STARBASE Robins also send home a The Career Game ticket with a personal internet identification number so each child can access the same information at home.

STARBASE Kingsley

The Career Game Explorer booklet begins by asking questions that help students recognize the thoughts, feelings, and events that hold clues to their future. This is followed by a series of color-coded activities designed to identify individual personality types. There are wide screen spreads of likely careers, color-coded to match each student's list of favorites. The remaining pages offer inspiration, motivation, and ideas for introductory career planning.

STARBASE Kingsley uses the workbook in class with their students. They do not use the "web tickets," mainly due to the time involved; however, they do believe it would be a nice addition to the activity if a site had the time. Along with this, they do a brief introduction to Engineering Fields that they obtained from Celeste Baine, a biomedical engineer and the Director of the Engineering Education Service Center.

STARBASE Kingsley finds that both the Explorer Workbook and Engineering Fields activities take about 45 minutes in their schedule.

STARBASE Hartford

STARBASE Hartford believes that the Career Game Explorer book is great way to introduce the idea of what skills are and how they relate to careers. In the interest of time, they typically only do the section where the students check off what their interests/skills

are and let them tally them to see what "type" of person they are and how that might line up with possible careers in the future. They allow the students the time to talk about possible careers with others in the same category, which puts them in touch with students that have the same interests. The teachers rotate through and talk a bit about STEM with each group and how it relates to their specific group.

Throughout the activity, teachers stress that the students' interests and skills may change/expand as they grow older. The results of this activity are certainly not a list of careers that students HAVE to choose from or a list of all of the careers that are available to them. The students really enjoy learning about the types of careers out there, and STARBASE Hartford finds utilizing this activity sometimes helps students to ask better questions when their military personnel come out and talk about careers in the military.

STARBASE-Atlantis Newport

STARBASE-Atlantis Newport has been using the Career Game Explorer booklet as one of their STEM lessons. They have found that it is a great way to get the kids thinking about their future and how they can begin planning for their future right now. Using the Career Game Explorer booklet puts the planning in the students' hands and gets them thinking. The information is presented in a very kid-friendly way, and the variety of careers used as examples puts something in reach for everyone. Several of the visiting teachers and parents have also expressed that they like this portion of their program.

At STARBASE-Atlantis Newport, they begin by opening up a discussion about jobs and the importance of finding a meaningful job. They also explain to the students that one of the main reasons that the STARBASE program exists is because our country needs "STEM smart" people. After this general discussion, they introduce the Career Game Explorer booklet and tell the students that by answering some questions and completing an interest survey, they will be able to collect some data on themselves, similiar to what they might do when they are older if they are looking for a new career direction.

The site allots time everyday, 15 to 30 minutes, to complete this activity. They also try to encourage students to think before putting a check in a box. For example, one interest topic is "use tools." Some students may simply skip this choice because they think of tools as something a builder or mechanic uses. They ask them to think about the topic in a broader sense using themselves as examples.

Ultimately, STARBASE-Atlantis Newport tells the kids that they hope the Explorer booklets help them to plan and to set goals so that they can find a career that makes them happy, makes them feel that they are doing something important and meaningful, and, most of all, makes them want to get up and go to work each day and do the best job they can.

More information about this tool is available at www.careergames.com.