Investing in
student achievement...

...through STEM education.

A STEM INITIATIVE K-12

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PROJECT LEAD THE WAY
PLTW

Educational Partners

Education Foundation for Billings Public Schools

Founded in 1988

Projects:

- Saturday Live
- Classroom Grants
- Partners in Education
- Reading Rocks
- Manages scholarships, endowments
- Special Projects

Billings Public Schools

Founded 1888

- Enrollment: 16,281
- 44.5% of Elementary students qualify for free or reduced lunch
- 53.1% of Elementary students in pilot schools qualify for free or reduced lunch

Phillips 66 Signature Community Initiative Grant

- Needs Assessment
- Great Opportunities
- Bridge Needs & Opportunities
- http://youtu.be/keygHEMX4ho

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Why is STEM Important?

U.S. Department of Labor

- Today, 70% of jobs require a solid foundation in STEM
- By 2018 – 1.2 million job openings in STEM fields
- 2012-2022 Projections – 75% of the fastest growing jobs are in STEM occupations

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Montana

- 4 of 5 fastest growing occupations require STEM knowledge
- Shortage of medical occupations personnel
- By 2018, 30% of jobs wil require associates degree or certification – currently 27% of Montanans hold one of these
- By 2015, Montana 4th grayest state in U.S.

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Billings Industries See Skills Deficits in:

- Critical thinking skills
- Problem solving
- Collaboration
- Communication

Billings Public Schools Assessment:

Current elementary science text books: 1996 publication date

2013 – 4th Grade Science Proficiency: 67% BPS, 70% MT

2013 – 4th Grade Math Proficiency: 66% BPS, 67% MT

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Vision, Mission & Goals

Our Vision: As a leader in STEM education, Billings Public Schools will prepare and inspire life-long learners from kindergarten through graduation. By learning collaboration, communication, and innovative thinking skills, our students will enter society career- and college-ready, equipped to meet the challenges of a global economy.

Our Mission: The mission of STEM education in Billings Public Schools is to provide active learning, relevant to real-life, where students are given a chance to apply what they know, identify a problem, find unique solutions, and lead their own learning. The delivery of STEM education will be:

- Sustainable
- Equitable
- Aligned with more challenging standards

This will be accomplished through

- On-going, intensive professional development
- Effective teaching practices
- Proven, research-based curriculum
- Community partnerships between schools, businesses, and community organizations, to provide:
  - mentors
  - funding
  - connection between education to the work place

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65%

Of scientists and graduate students in a 2010 study stated that *their interest in science began before middle school.*

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Who Likes Science?

- 68% of 4th grade boys report liking science
- 66% of 4th grade girls report liking science
- By 5th grade this changes

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How do we change this?

- Engaging curriculum
- Project, activity and problem based activities
- Real world applications
- Aligned to Montana educational standards in Mathematics, Science, Language Arts, Technology

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Project Lead the Way Meets ALL of Our Criteria

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What makes a PLTW classroom different?

PLTW classrooms:

- Launch critical thinking
- Challenge students to make mistakes
- Integrate technology in the classroom
- Encourage teachers and students to learn together

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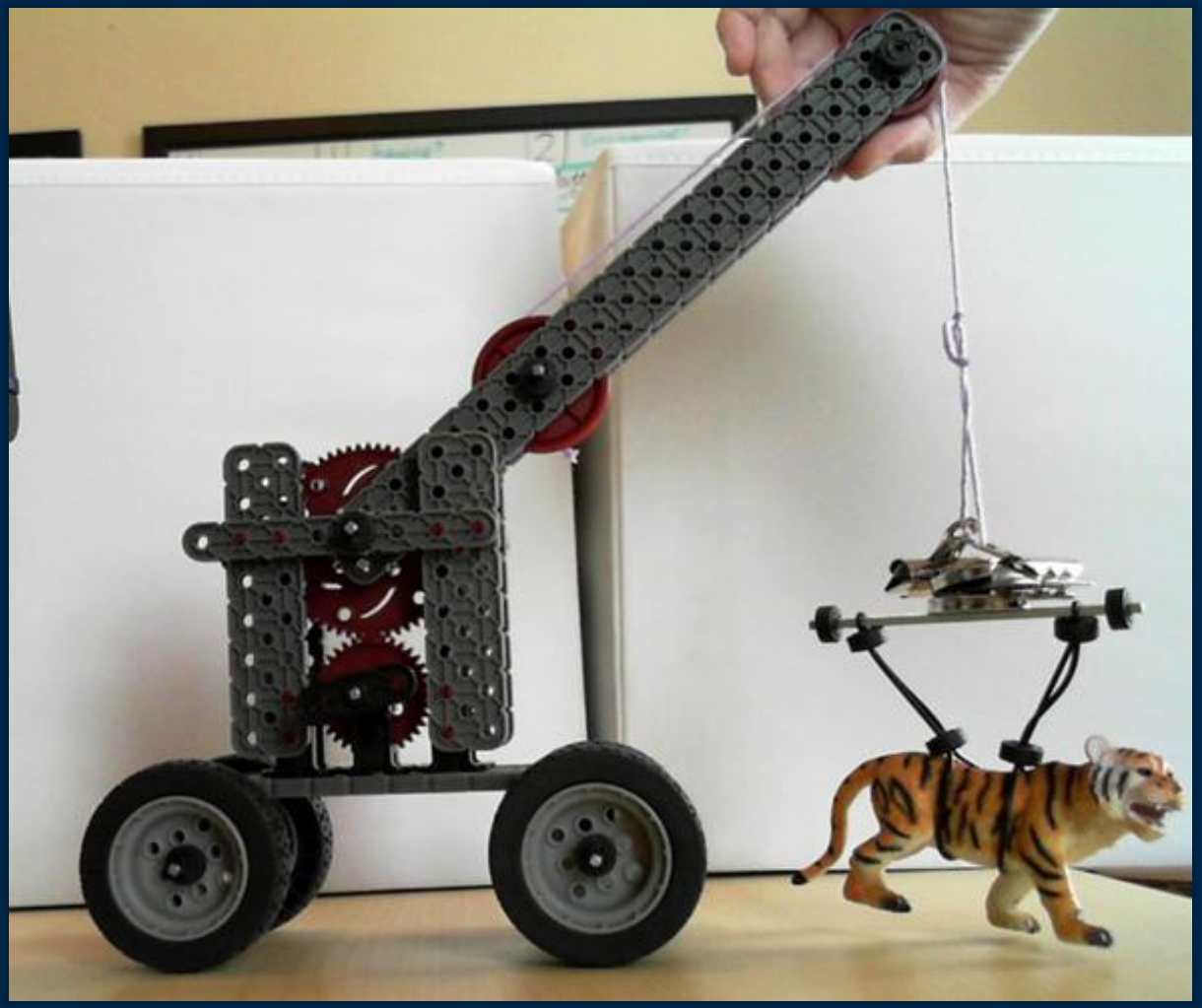
Animal Rescue Activity



Aligned to 3rd grade standards

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The 5 Cs of PLTW Elementary

- Critical Thinking
- Collaboration
- Communication
- Creativity
- Curiosity

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PLTW Elementary Pilot Modules

Working title	Standards alignment
Structure and Function	Kindergarten
Pushes and Pulls	Kindergarten
Waves: Light and Sound	1st grade
Observing the Earth, Sun, Moon, and Stars	1st grade
Matter and Materials Science	2nd grade
Engineering Design: Dispersing Seeds	2nd grade
Motion and Stability: Science of Flight	3rd grade
Motion and Stability: Forces and Interactions	3rd grade
Energy: Collisions	4th grade
Energy: Conversion	4th grade
Robotics: The Power of Automation	5th grade
Robotics: Challenge	5th grade

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High-Quality Professional Development

PLTW three-phased approach fully supports elementary STEM teachers:

Readiness Training

- On-demand and live-online
- Focus on core knowledge/skill

Core Training

- 2.5 days in-person training for the program
- Focus on pedagogy and activity, project, problem-based learning

Ongoing Training

- On-demand and live online by module
- Focus on pedagogical-content knowledge by module

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TECHNOLOGY TRAINING CENTER

- Over 100 hours of teacher training out of the school day
- Over 350 hours of teacher training during the school day
- Teachers Integrating Learning Technology
- Current Technology
- Space, space, space
- Larger impact area
- Technology Club for students & educators
- Student Workshops
- Community Opportunities
  - Parents
  - Grandparents
  - Training Facility
- Project Lead the Way
  - Readiness Training
  - Core Training
  - Ongoing Training
- Program Sustainability & Quality

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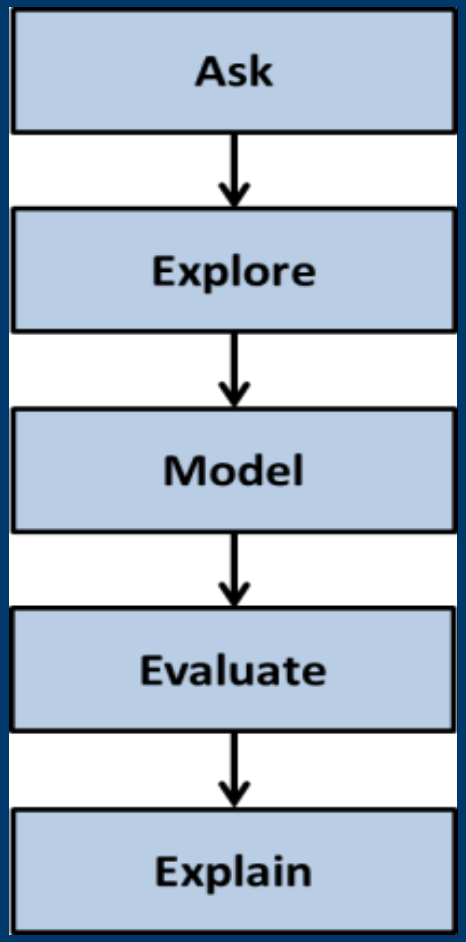
The Design Process for Elementary



Launch critical thinking

I want to change the world, and make it a better place. I truly believe that if I stay involved in STEM classes I will be able to do this.

- Eli Sutherland, Project Lead the Way Pre-Engineering Senior, Billings Career Center Student

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Challenge students to make mistakes

One of the single most important factors to a quality healthcare system in our community is a quality school system that provides our youth with a robust education that prepares them for careers and college upon graduation.

Dr. Deborah Agnew, Pediatrician & Chief of Primary Care, Billings Clinic

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Integrate technology in the classroom

It is so important for our students to learn the process of innovative problem solving, collaboration, effective communication, and the design process at an early age. These skills will follow them from elementary to middle to high school.

-Terry Nelsen Bouck, Superintendent, Billings Public Schools

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Learn together

It'll be exciting for me to go through the training and be able to share with kids that … ***I took a risk and I'm able to share what I've learned with them****.*

- Linda Auch, 4th grade teacher, Arrowhead Elementary

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What will it cost?

Cost Description	Expense	Total Costs
Year 1 Training Center PLTW Kits (Grades 4 and 5) 5 30-station iPad Lab with covers Grants Management (overhead)	 $ 57,480 $147,020 $ 71,350 $ 1,000	 $276,850
Year 2 4 Elementary School PLTW Modules K-5 4 30-station iPad Lab with covers Grants Management	 $175,850 $ 57,080 $ 1,000	 $233,930
Year 3 Elementary School PLTW Modules K-5 30-station iPad lab with covers Middle School PLTW Equipment, Supplies, Materials Grants Management	 $ 43,970 $ 14,270 $180,000 $ 1,000	 $239,240
Total Phillips 66 3-Year Request		$750,020

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