

Real World Externships

for teachers of Mathematics, Science and Technology



Funded by National Science Foundation Grant #DRL-1031784
along with investments by Iowa business and industry partners and
the State of Iowa through the Governor's STEM Advisory Council.

The Externships basics:

- Five-to-six week summer partnerships between teachers of math, science & technology and local businesses and agencies.
- Teachers apply what they teach in classroom to real-world challenges by contributing to company operations.





- Created to address the requests of Iowa students “When am I ever going to use this?”
 - Relevance, real-world application
- [Launched in 2009 with 10 Externs](#)
- Beyond student internships- impact the teachers to inspire the students
- Not just a job shadow- hosts put the teachers to work

Benefits

- *Businesses of Iowa*
 - High level projects, unique point of view
 - Build connections to schools
 - Build STEM literacy in their community
- *Teachers of Iowa*
 - Content application, classroom relevance
 - What do students need to be STEM ready graduates?
 - content skills, employability skills and technological literacy
- *The students of Iowa*
 - *Inspired teachers inspire students*



Jessica Vasquez, Science teacher,
Harding Middle School

Making it Happen

- *The Match*
 - Teachers are carefully selected for local hosts based on interest and skills.
 - Program coordinates initial meeting
- *The Externship*
 - Max \$4,500 stipend to teacher (\$150/day for up to 30 days), program routes contributions via tax-deductible foundation
 - 1 hour graduate credit via University of Northern Iowa
 - Continual guidance by program mentor
 - Communication with host
 - Classroom implementation
 - [Blog](#)
 - [Brainstorm with other teacher externs](#)



*Jenna Noble, Science teacher,
George-Little Rock High School*

Hear it from the teacher externs...

1. Tell us about it! What did you do at your Externship?
2. What specific assets do you think you provided to your host? Short and long term.
3. What have you shared with your students about your host, workforce jobs or the work environment?
4. How has your Externship impacted your classroom?
5. What 21st Century skills do you think the students are gaining as a result of your Externship?
6. Questions from the group?
7. Question to group and panel: what would YOU like to see teachers/businesses doing more of in the classroom to help students prepare for the 'real world'?

Evaluation Outcomes: Classroom

- 92% of teachers reported their teaching improved because of the Externship experience
- 93% of teachers reported they can better prepare students for expectations encountered in a work setting.

“Technology and problem-solving are so much a part of the modern world. This experience has allowed me to bring that kind of thinking back to the classroom.”



Kevin Herdegen, Math teacher,
Pella Christian High School

- **Student Impact ultimate and most important outcome:**

Building STEM Interest

Evaluation Outcomes: Business Impact

- Businesses report to benefit from cost or resource savings, new knowledge or completed projects
- The benefit to the teacher, students or community were important valuable outcomes to businesses.
- Hosts recognized the potential of the program to enhance the STEM employment pipeline in Iowa.

"[The externs] bring a fresh set of eyes to our business and can offer solutions we may not have even considered... They in turn get real life experiences they can take back to the classroom with real life examples that kids can relate to."
– Hy-Vee, Inc.



*Dirk Homewood, Math teacher,
Cedar Falls High School*

Examples of Past Externship Projects

in Engineering, Manufacturing and Technology fields

Type of Business	Business Name	Extern Experience Description
Engineering/ Manufacturing	Accumold Diamond Vogel Paints HNI Corporation Innovative Lighting, Inc. International Automotive Components John Deere Pella Corporation POET Procter & Gamble Rockwell Collins Vermeer	<ul style="list-style-type: none"> · Equipment warranty analysis · Value stream mapping and statistics · Computer simulation/virtual reality evaluation · Asset audit · Lean manufacturing principles · Cost burden analysis · Quality analysis · Work protocols analysis · Six Sigma
Technology/ Mathematical Modeling	Alliant Energy CIVCO Medical Solutions Clipper Windpower Ellison Technologies Hy-Vee, Inc. Principal Financial Group Sudenga/Diversified Technologies Inc.	<ul style="list-style-type: none"> · Produce efficiency spreadsheets · Data collection of production cycle times to develop capacity model · Produce customer proposals using Excel and VBA code · Cost burden analysis

***What are Business Partners saying
about Real World Externships?***

“It was an excellent decision...our extern did a lot of research and created an amazing database that we had wanted to do for several years but had not found the time. Not only did she do this, but she came up with graphs for figuring out some future costs that will help us immensely in marketing our services.”

– Pella Corporation

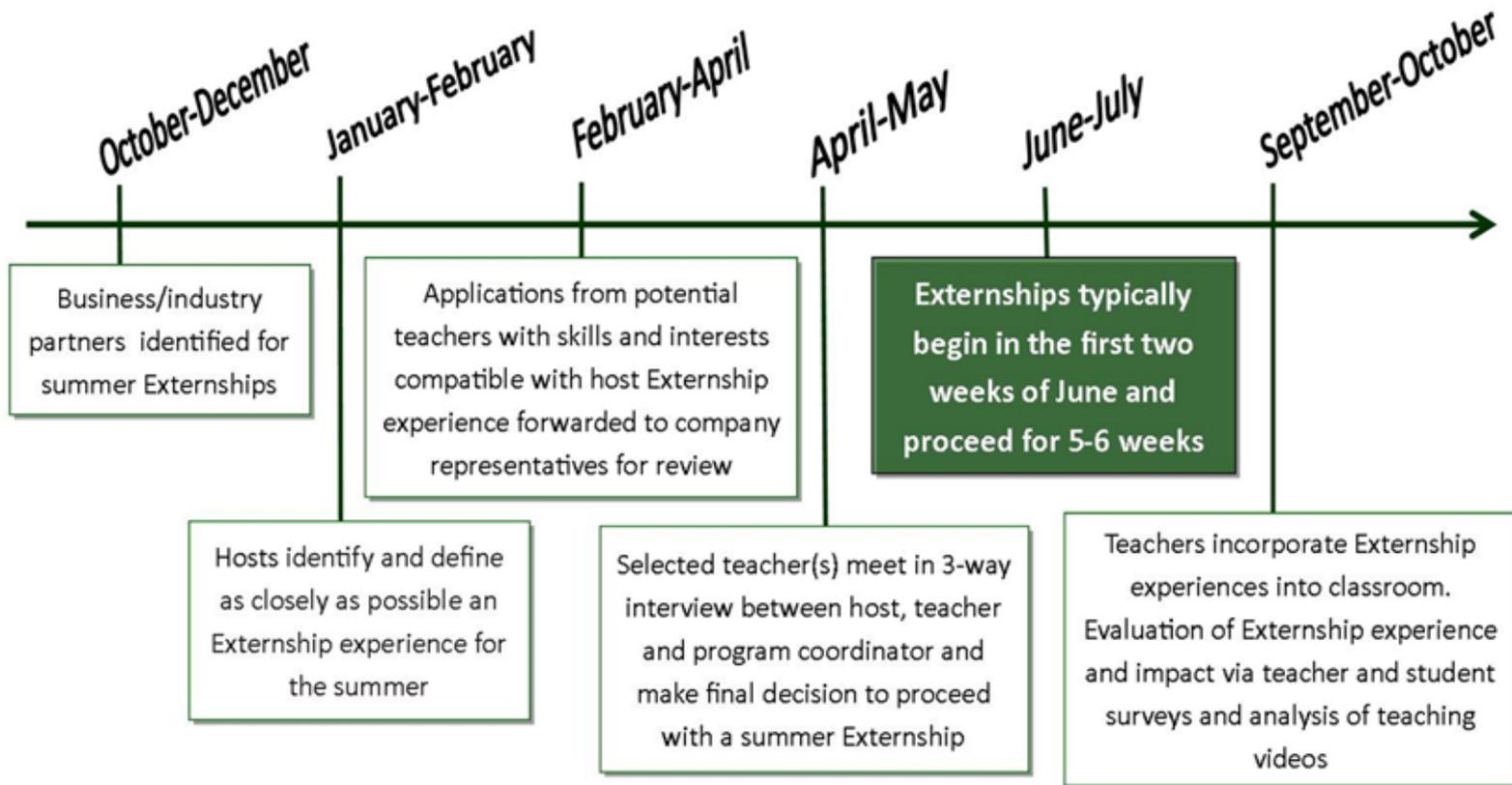
“All of our externs have seemed to really grab hold of various ways to use their Diamond Vogel Paint experience in their teaching – that is a big reward.”

– Diamond Vogel Paints

“The program offers great publicity for the companies involved. It’s also a great way to form a connection with the local school system and community. Employers benefit from a different perspective and valuable tools can be provided through the extern.”

– Hagie Manufacturing

Making it Happen: Timeline



Questions?



*Jenna Noble, Science teacher,
George-Little Rock High School*

*2012 Extern, **Sudenga/Diversified Technologies***

Jenna implemented a recycling program to reduce waste and impact on the environment. She also helped organize part of the moving inventory to be easier to access and find when it is needed. She learned the science and skills involved in this type of manufacturing, including welding, paint, robotics and CNC programming.

*2012 Extern, **Clipper Windpower***

Andrew created a functional database on a Microsoft SQL Server to replace a cumbersome Excel document that was currently being used to store project proposal data. Andrew extracted the Excel data and input it to the newly constructed database. He was then able to create organized reports for the data.

*Andrew Boone, Math teacher,
Cedar Rapids Jefferson High School*



*Ricardo Martinez, Math teacher,
Colo-Nesco Learning Center*

*2012 Extern, **Innovative Lighting***

Ricardo worked at on projects with Quality Control presenting to employees about safety when dealing with the machines. In engineering he learned Federal guidelines on light intensity and how to test lights in the company's photometric lab. He was able to see the geometry behind the optics of LED lights along with calculations to verify lights are powerful as manufacturers claim.