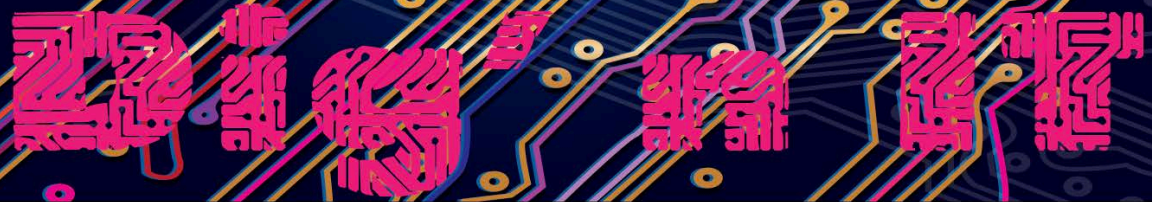# DIGITAL INNOVATION GENERATING NEW INFORMATION TECHNOLOGY

University of Idaho
Coeur d'Alene

Digital Innovation Summer Camp for *Girls*

July 22-26, 2013

Digital Innovation Generating New Information Technology

JULIE AMADOR
TERRY SOULE
UNIVERSITY OF IDAHO

ABOUT DIGN' IT

http://www.youtube.com/watch?v=CvOo21RsCCU&feature=youtu.be

Embed Video Here

PURPOSE

- By 2020, five of the top 10 in-demand jobs in the United States will be in Information Technology (Moeller, 2012).

- Companies across the nation are seeking a new type of employee; one that is computer savvy, familiar with computer coding, data, and augmented reality (Leber, 2013).

- The importance of technology and related careers is a key economic concern for individuals in Idaho.

- One respondent in a recent Post Falls survey noted, "Our economy depends on technology and innovation" (Storrs, Hormel. & Mihelich, 2012, p. 23).

- Parents throughout Idaho support increases to STEM education and acknowledged that more attention should be given to technology.

PURPOSE

- **Students in Idaho are interested in jobs in STEM fields,**

- **Between seventh and tenth grade, girls' positive attitudes toward mathematics and science drastically declined and their interest in careers involving mathematics and science decreased drastically as well (Idaho, 2013).**

- **Girls' attitudes "diminished at a far more substantial rate than for boys," highlighting the need to focus on girls and STEM disciplines (Idaho, 2013, p. 26).**

- **This gender difference is even present with adults;**

  - Data from Post Falls indicate that 27% of adult men and only 6% of women feel "very informed" about technology, therefore exacerbating the ever-present gender gap with respect to technology.

Digital Innovation Generating New Information Technology
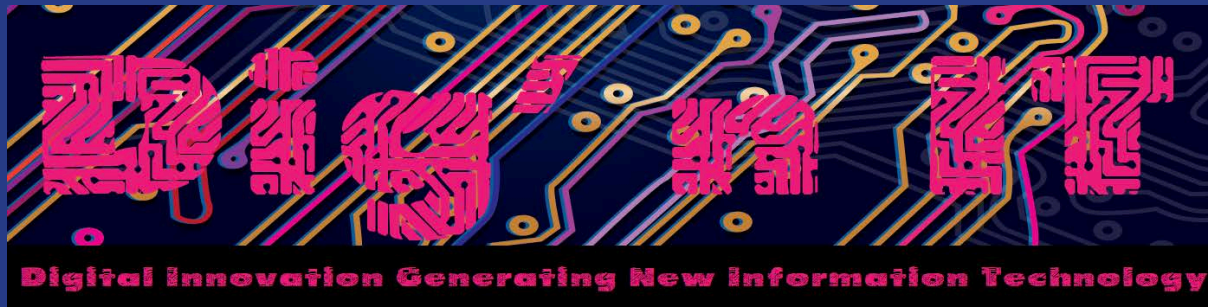
Project Overview: Aimed at increasing digital literacies and promoting technological careers for middle and high school girls.

High School Internship: Five high school interns (June 17-August 2, 2013).

    -familiarized with technologically related careers

    -interned with local start-up companies

    -engaged in specific uses of technology such as   computer coding and programming.

Middle School Camp: Twenty-seven middle school girls (one week)

    -Computer coding and digital literacies

MIDDLE SCHOOL CODE CAMP

- **27 Middle School Girls**

- **Mornings programming with Scratch**

- **Afternoons activities and programming with Alice**

- **Ended with a Showcase Celebration for family, friends and sponsors**
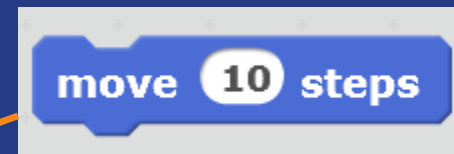
- **Goals: Fun, Educational**

SCRATCH (SCRATCH.MIT.EDU/)

Free, on-line or stand-alone

Sprite Based

Drag and drop, graphical programming language

SCRATCH PROS AND CONS

Free

Simple syntax

Very graphical

Easy to add media: draw sprites and backgrounds, add images and sound, etc.

Maintains a studio of projects for each user

Large on-line community emphasizing sharing and "remixing"

Can't build "real" programs

Limited to 2D graphics

Limited data structures and advanced computing concepts

CODE CAMP

Worked in teams

Built two projects:

       Scene – Multiple, interacting sprites

       Game – Moon lander, dodging/catching falling objects, etc.

Students added to generic scripts/programs

General structure

       10-20 minutes of "lecture"

       10-20 minutes of the project time (timed)

       Repeat

Showcase Celebration – presentations of their projects

"LESSONS"

Basics of programming

      Loops, variables, conditionals, input/output

Mathematics

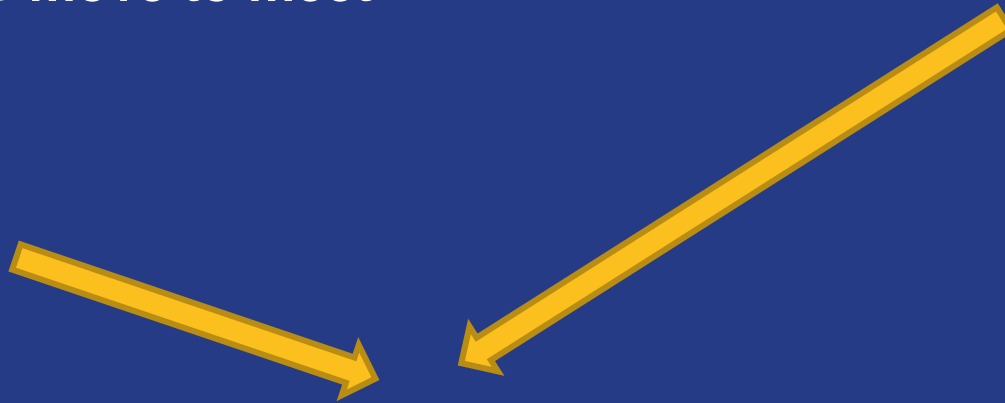   **Cartesian coordinates, vectors, simple equations, multi-dimensional thinking (x, y, time)**

Physics

      Position, velocity, acceleration, gravity

Engineering

      Designs and design decisions,

EXAMPLE - SCENE

Sprites A and B move to meet

Design choices:

Use vectors: turn *a*, forward *p*

Use Cartesian coordinates: glide to *x,y*

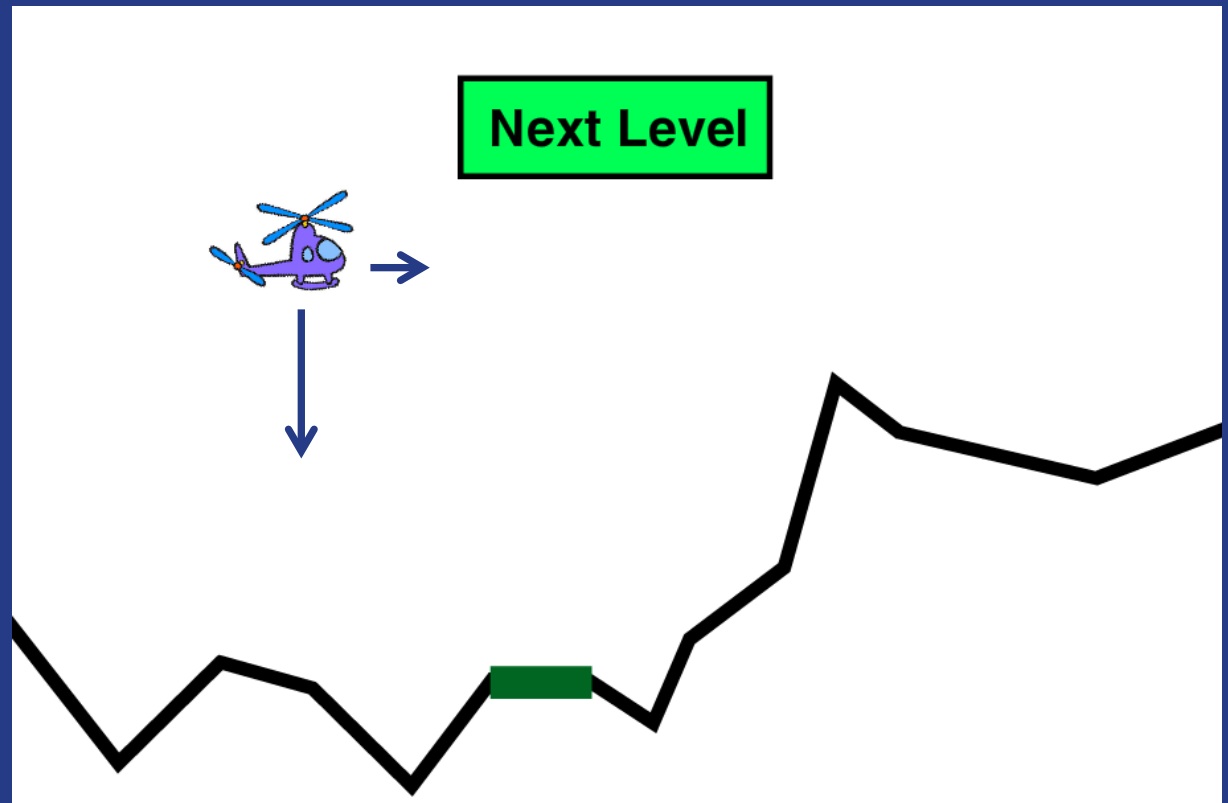**How long should it take? Will they arrive at the same time?**
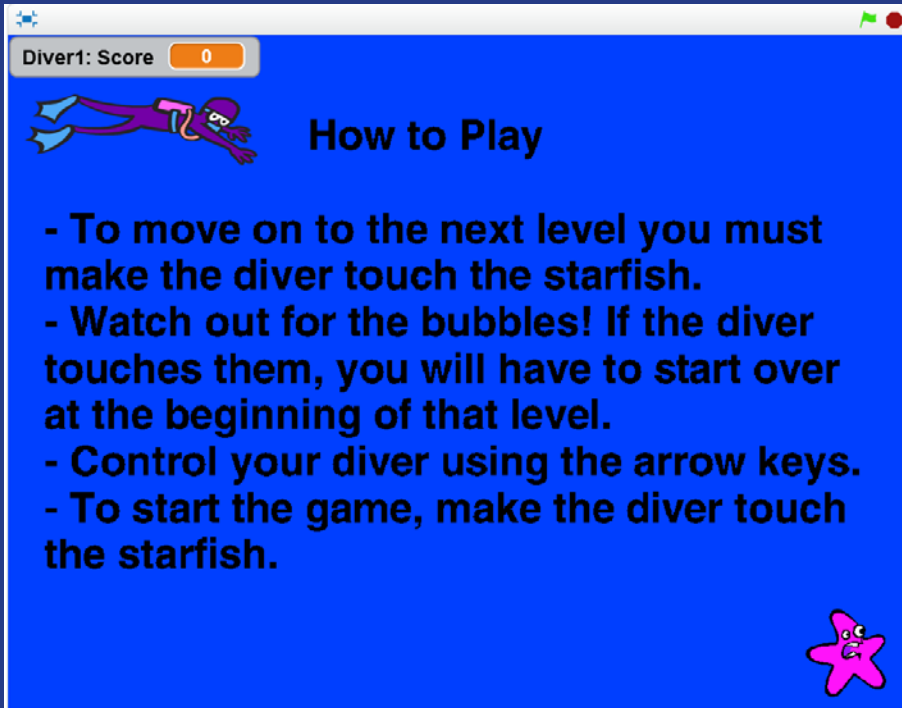
STUDENT SCENE

EXAMPLE - LANDER

Ideas:

- **Vectors**

- **Position, velocity, acceleration**

- **Gravity**

- **Variables**

- **Conditionals**

- **Input**

- **Modular designs/solutions**

STUDENT GAME

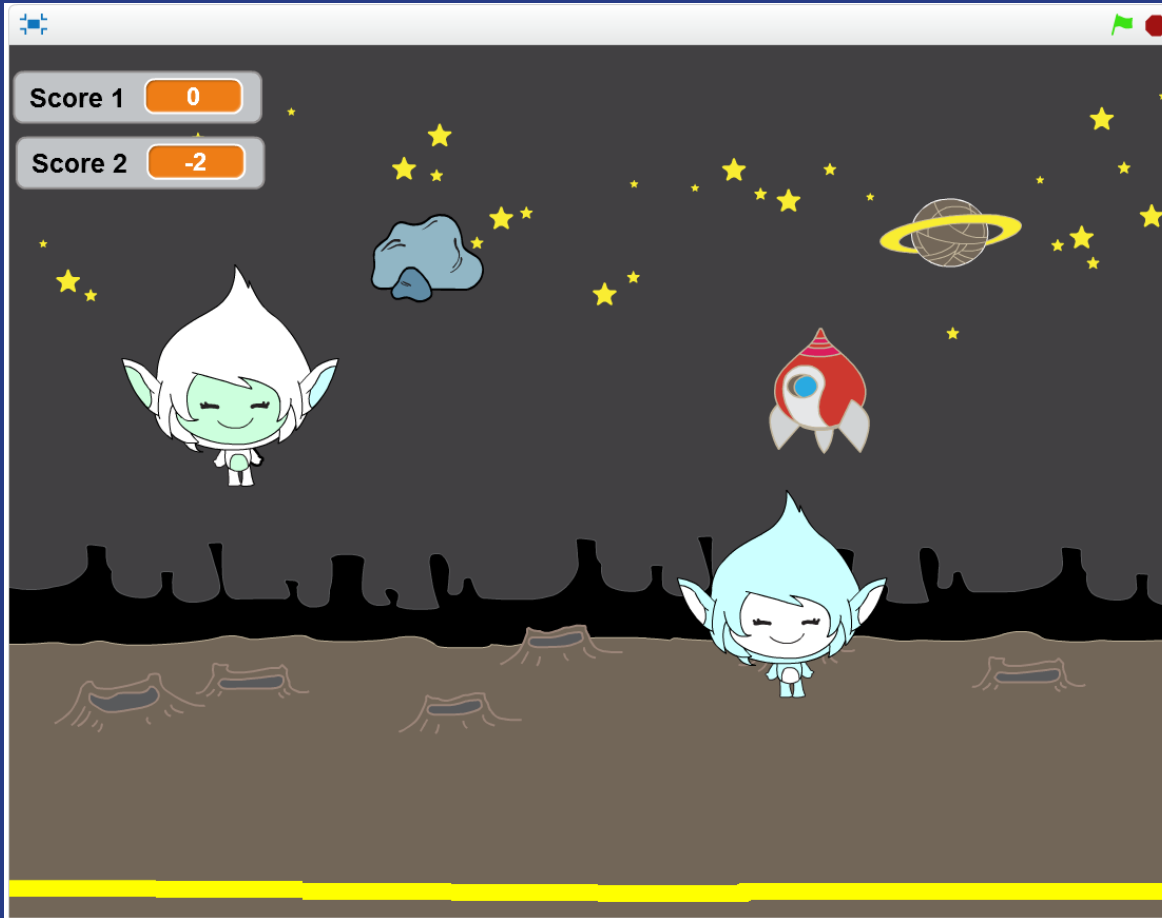Diver1: Score   0

How to Play

- To move on to the next level you must make the diver touch the starfish.
- Watch out for the bubbles! If the diver touches them, you will have to start over at the beginning of that level.
- Control your diver using the arrow keys.
- To start the game, make the diver touch the starfish.

core   1

Good job!

STUDENT GAME

WHAT WORKED (AND DIDN'T)

- **Scratch worked well**

- **Projects appealed to the students**

  - Joke scenes, dance videos, complex games
  - Students chose which to focus on

- **Programming concepts were well understood**

- **Celebration showcase was a positive motivator**

- **Teams worked well together**

- **Lots of short "lectures" and short blocks of coding time kept students interested**

- **Needed a more formal design process**

- **More incorporation of external media (images, sounds, etc.)**

- **Non-coding concepts may not have been as well understood**

- **Need method to track and encourage on-going/post-camp projects**

RESOURCES

Scratch (scratch.mit.edu)

> **On-line tutorials**

> **Shared projects**

> **Remixing**

http://www2.cs.uidaho.edu/~tsoule/ (Dig'n IT link)

> **Sample projects**

Contact me (tsoule@cs.uidaho.edu) for lesson plans

INTERNSHIP

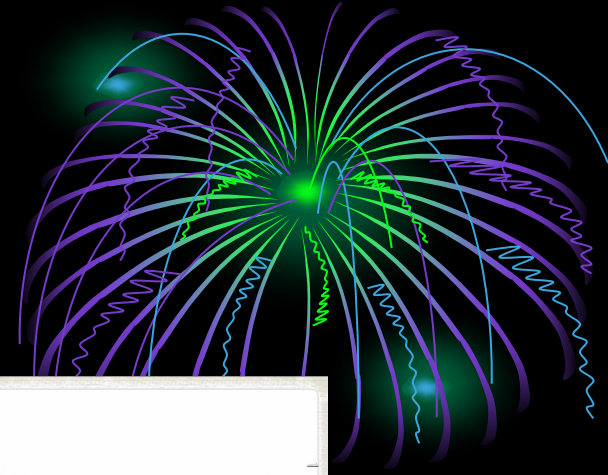# My Internship Experience

By: Darcy Green

Overview of my summer

❖ **Took pictures**
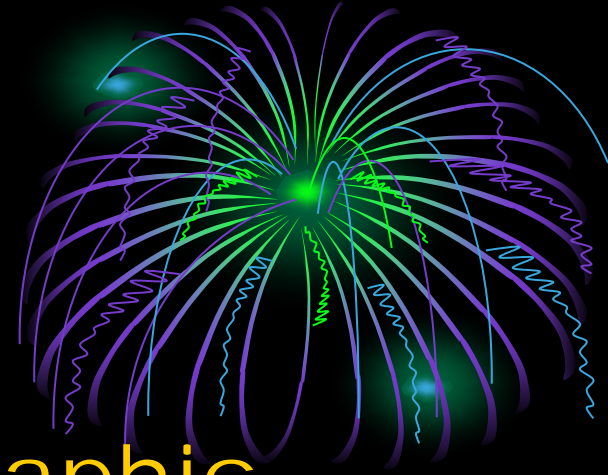
❖ **Business Tours**

❖ **Worked side by side iShoutOut**

❖ **Helped run a middle school girls camp**

❖ **Much more**

2030 Vision

iShoutOut

- ❖ **Learned more about graphic design**
- ❖ **Tried out new things**
- ❖ **Going on a sales call**
- ❖ **Connections are a big thing to help out the community.**
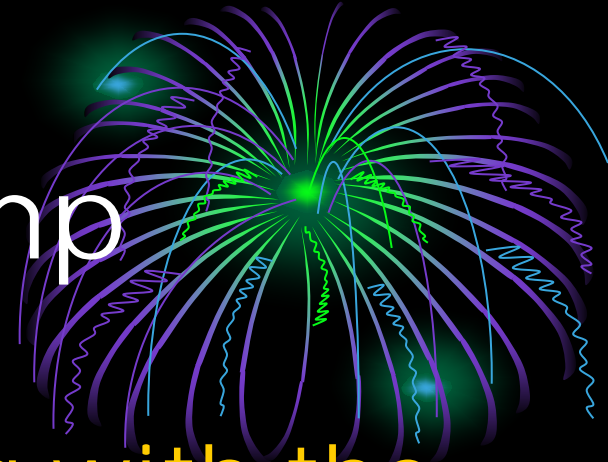
Business Tours

- ❖ **Inland Learning**
- ❖ **Triple E Technologies**
- ❖ **Auto ID Specialties**

Dig n' IT Camp

It was a great time being with the kids and seeing what all they could do. This was a great thing that should be continued in the next years to come.
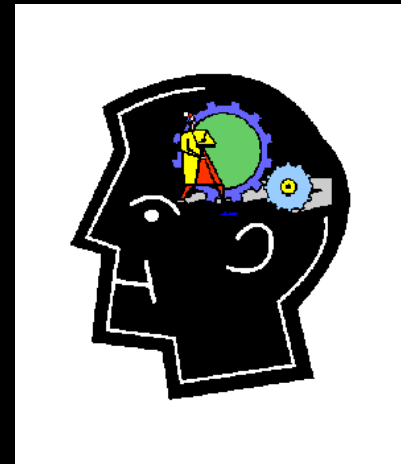
Meaningful Experience

The most meaningful experience I encountered was being a mentor to the middle school girls.

Top 3-5 Things I learned

❖ **There are many things beyond my view of life.**

❖ **Connections are key**

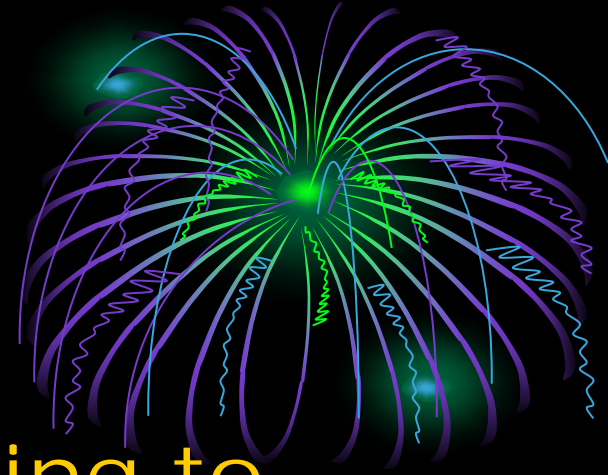❖ **How technology is growing bigger every year**

My future

❖**This internship has really opened doors for me in the future to begin and try out new experiences.**

Thank you

- **I really appreciate getting to know everyone and having this experience and giving me the opportunity.**

INTERNSHIP

"Through the Dign' IT internship program, I was able to learn about the jobs that are out there involving technology. I was able to speak with actual web designers and software developers about the specifics of what they do and how they ended up where they are. I want to work in computer science, but I'd never been able to speak with people in the industry before, so it was amazing to have the opportunity to do so. It was also a great experience working with the girls during the Dig' n IT camp and seeing how smart and creative they all were and how the camp was helping to get them interested in the technology that I love."

-Samantha July 31, 2013

"This has opened my eyes to bigger things."

-Darcy August 1, 2013

INTERNSHIP

"This was such an once in a life time opportunity. It was an extraordinary experience for a seventeen year old to see all the different aspects of businesses and *was life changing experience**. This internship helped to open my eyes to new opportunies."*

-Amber August 1, 2013

"Through this internship experience *I have learned a lot about myself**. I have especially learned to manage my anxiety with public speaking."*

-Megan August 2, 2013

'This internship has offered me many great new opportunities, and I have seen the *many different job opportunities* *that computer science can bring."*

-Annie August 1, 2013

DIG'N IT

Digital Innovation Generating New Information
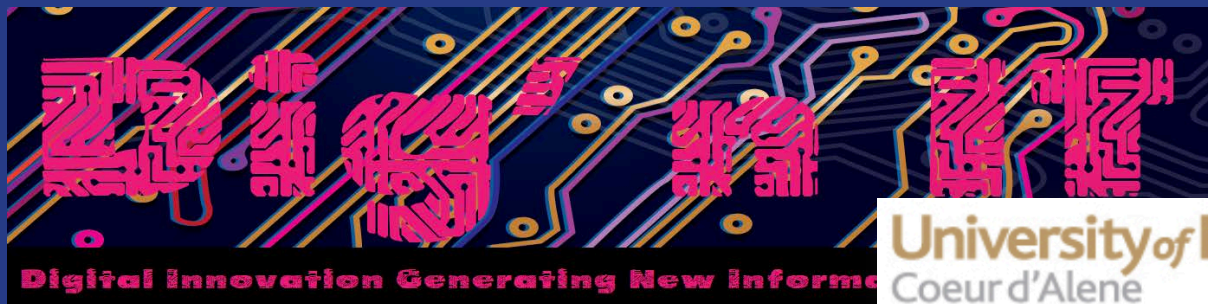
Summer 2014:

Internship

Middle School Camp

Email: julianaa@uidaho.edu

Teacher Coding Workshop

Email: Idaho Regional

Mathematics Center

irmc@uidaho.edu

University of Idaho
Coeur d'Alene

Coding, Computer Science and Math!

June 24-26, 2014

9am – 3:30pm

University of Idaho - CDA

To register or for more information please email the Idaho Regional Mathematics Center at irmc@uidaho.edu.

- Limited space
- Earn PD Credit
- Stipends Provided
- Bring your own device
- Lunch provided
- Learn basics of computer science - Scratch, Net Logo, and processing

Learning to code is all the rage these days, but not in one place that matters the most – our classrooms.

Rather than requiring students take a stand alone coding courses to graduate, why not incorporate coding and computer science practices into classes like math, science and even English? Learning programming and computer science builds problem-solving skills and critical thinking

Drum up excitement for coding in your math classroom. Attend this workshop and learn the fundamental concepts of computer science in relation to mathematics: proofs, sets, functions, algorithms and velocity, acceleration, gravity, friction, etc. Programming is an effective medium for understanding these concepts -modifying gravity or friction affects the motion of characters within programs.

Sponsored by the Idaho State Department of Education, the Idaho Regional Mathematics Center and University of Idaho is offering this interactive, three-day professional development workshop for middle and high school math teachers. Incorporate these concepts into your math class next fall!

IDAHO
REGIONAL MATHEMATICS CENTERS

QUESTIONS OR COMMENTS

Julie Amador
jamador@uidaho.edu

Terry Soule
tsoule@cs.uidaho.edu