



## NGCP Hubsite Application Webinar




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### Webinar Goals

- Review NGCP Network Project Model
- Overview of Cryptoclub Project
- Overview of NGCP-CryptoClub Partnership
- Application process
- Questions and Discussion



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### Leveraging the Network and Serving Programs

WaterBotics – Texas Girls Collaborative Project  
National Science Foundation ITEST Scale-Up

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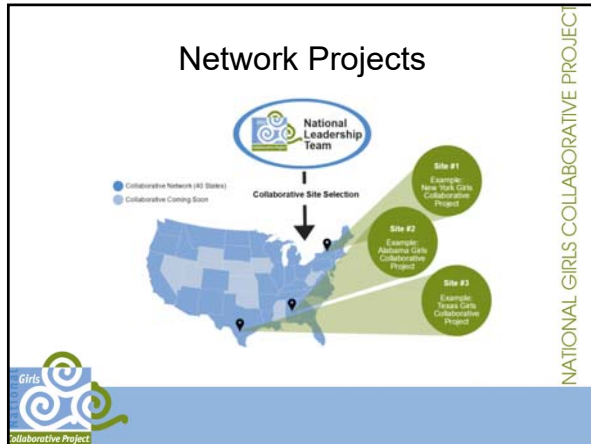
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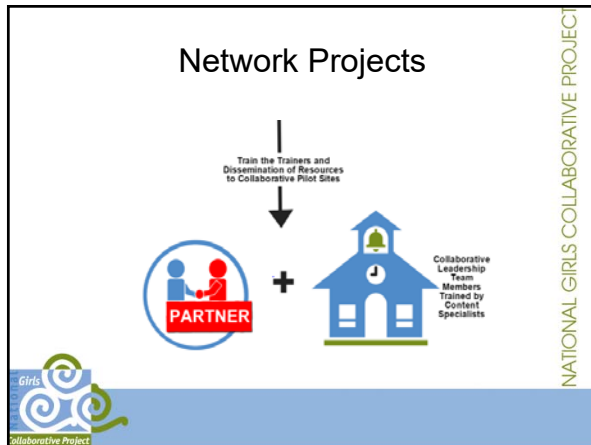
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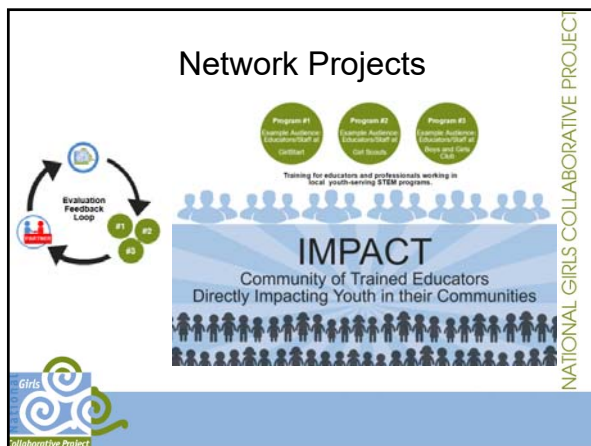
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### Network Projects


  
Inspire a girl to change the world








  
Smithsonian Latinoa Virtual Museum


  
SCIENCE ACTION CLUB

  
INVENTIONX

  
EmpowerHER

  
The Cornell Lab of Ornithology  
Empowering and Inspiring Nature




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### Hubsite Development Leads

**CryptoClub**  
 University of Illinois at Chicago/  
 University of Chicago

**NGCP**

  
Janet Beissinger

  
Bonnie Saunders

  
Karen Peterson

  
Casi Herrera

**EDC**  
  
Vicky Coulon


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### Goals of NSF Project

- Develop and support a network of 20 training sites
- Develop online professional development modules
- Develop a system of cryptography digital badges
- Release weekly cryptography challenges through our website and social media
- Develop an online multiplayer game with cryptography challenges


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## Project Team

**CryptoClub Project**

- Janet Beissinger
- Bonnie Saunders

**NGCP**

- Karen Peterson
- Casi Herrera

**Eduweb**


- Dave Schaller

**Collaborators**

- Lou Dibello (research)
- Henrique Cime-Lima (videography)

**Evaluators**

- Vicky Coulon
- Ginger Fitzhugh



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## Advisory Board

- Katie Davis, University of Washington
- Joan Freese, Twin Cities Public Television
- James Harold, Space Science Institute
- Sajna Ibrahim, University of Illinois at Chicago
- Andy Isaacs, University of Chicago
- Kemi Jona, Northwestern University
- Catherine Kelso, University of Chicago
- Steve Oxman, Devry Education Group



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In a CryptoClub Program, middle-grade students use math to make and break secret codes. Fits well in afterschool, where kids can work at their own pace.



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In some activities students move around actively



Treasure Hunt

Relay Race



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In other activities they sit more quietly and think about patterns that might help break a code.



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A favorite style of activity involves a jigsaw in which each team member solves part of message. Putting the pieces together reveals the whole message.



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In this picture, teachers from our summer workshop piece together parts of a secret message.

**Girls Collaborative Project**

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### Online Activities

Opportunities to apply and learn cryptography in a playful way

**CryptoClub.org**

**Girls Collaborative Project**

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We use secret codes as a hook for learning and applying mathematics



**Girls Collaborative Project**

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## Mathematics in Ciphers

- Caesar and Additive
  - Addition, subtraction, negative numbers
- Substitution
  - Data collection, decimals, percentages
- Vigenère
  - Factorization, common factors
- Multiplicative and Affine
  - Inverses
  - Division with remainder (modular arithmetic)
  - solving linear equations



See our [website](#) for more details and connections to the Common Core State Standards.

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## Implementation

- Field tested in 2012 in 30 national sites including public and private schools, 21<sup>st</sup> Century programs, YMCAs, Boys and Girls Clubs.
- 250 educators have been trained.
- 3000 students have participated.
- Appeals to both girls and boys.
- Students of all ability levels have participated.



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## Quotes from Students

"What I liked the most is that it made me better at math and I learned how to do more math things. We all had fun together and I got to make new friends."

"I liked it because it was something new. It was something I hadn't heard about. Yeah, it was really cool – a new experience."



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## Quotes from Teachers

"It was valuable for students to see over and over that there wasn't one formula to solve each puzzle or crack each code—that they had to employ a variety of strategies and consider the reasonableness of their answers along the way."

Some students "enjoyed being experts at something they [might not] have been selected for or assigned to had it been a club based on math performance."



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## Voices from a CryptoClub [\(video\)](#)



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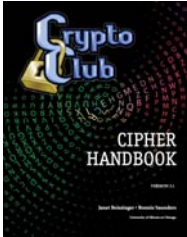
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## Our Materials



Student book



Teacher's guide



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**Cryptography Theme**



**Cipher Tools**



**Adventure Games**



**Tools for Teachers**

**CryptoClub.Org**

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**CryptoClub – NGCP Partnership**

**Goal:** to develop a network of hubsites that support CryptoClub leaders to teach cryptography in their regions.

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**NGCP-CryptoClub Reach**

- 20 CryptoClub Hubsites (Collaboratives)
  - Two Trainers in each Hubsite
  - 40 CryptoClubs leaders
  - Reaching 400 students per Hubsite with 16-20 sessions
  - Project will reach 8000 students total

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## Benefits to NGCP-CryptoClub Hubsites

- A CryptoClub network in your Collaborative
- Access to National CryptoClub community, webinars, and the blog
- \$1000 grant to provide trainings and materials
- Travel and lodging for two Trainers for 3-day Trainer Workshop
- \$200 grant to present at a professional conference



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## Requirements for CryptoClub Hubsites

- Recruit 20 CryptoClub programs each year
- Identify Two (2) Trainers
- Attend 3-day Trainer Workshop in Chicago in April 2017
- Train and support Club Leaders for participating CryptoClub programs
- Participate in and support evaluation activities
- Give at least one presentation at a professional conference
- Submit items to the CryptoClub blog



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## Evaluation

- Surveys of youth, Club Leaders, and Trainers
  - Demographic data
- Interviews with selected Club Leaders, and Trainers
- Observation of selected Club Leader Trainings
- Cryptography assessment of students



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## Presentations

- May be given by anyone associated with your collaborative that can make an appealing case for implementing CryptoClub
- Topics are left to the Hubsite
- Examples and suggestions of presentations will be shared on Community Calls
- Presentations at any local, state or national workshops and conferences are encouraged



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## Requirements CryptoClub Programs

- Support a minimum of 10 middle-grade students for 16-20 sessions
- Provide a CryptoClub Cipher Handbook for each student (\$12 per book)
- Participate in evaluation activities
- Provide computers with Internet service for at least a quarter of the sessions



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## Requirements of Trainers

- Attend a 3-day Trainer Workshop in Chicago on April XX, 2017
- Train 20 CryptoClub leaders during the summer of the first year and another 20 the next year
  - Leader trainings are approx. 2.5 days
- Participate in monthly NGCP webinars hosted by the NGCP-CryptoClub team



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## Qualifications for Trainers and Leaders

- **CryptoClub Trainers** should be comfortable teaching mathematics at the high school level. **No prior cryptography knowledge is required.**
- **CryptoClub Leaders** should be comfortable with mathematics at the middle-grade level and should believe that working with secret messages can be fun. **They do not need to be math teachers.**



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## Year 1

Applications due	December 15, 2016
Selection of Hubsites completed	January 15, 2017
Kickoff webinar	End of January TBA
3-day Trainer workshop	April XX, 2017
Follow-up webinars	Third Thursday of each Month 10am PST   1PM EST
Leader Training Workshops at Hubsites	June - August 2017
CryptoClub Programs in session	September 2017- April 2018
Evaluation activities	ongoing

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## Year 2

Leader Training Workshops at Hubsites	June - August 2018
CryptoClub Programs in session	September 2018- April 2019
Evaluation activities	ongoing

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## How to Apply

A Collaborative interested in becoming a CryptoClub Hubsite should submit the following materials to Casi Herrera ([cherrera@ngcproject.org](mailto:cherrera@ngcproject.org)) by December 15, 2016:

- Letter of intent from Collaborative Lead
- For each Trainer:
  - CV or resume
  - Brief statement of interest that highlights experience in mathematics
  - Letter of support from her/his organization



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## Letter of Intent

- Name of Primary Contact Person
- Provide the names of two individuals from your collaborative network and why you feel they are qualified to be trainers
- Explanation of your workshop facilities
- How will you be able to fund your workshops?
- How will you meet the enrollment expectations?
- How will your programs will be able to provide books?



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## Questions and Discussion



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