

Leapfrog Program **Course Title: Math for Spies**

Course Description

There's more to being a spy than just wearing a disguise. Spies also have to be expert mathematicians. In this course, aspiring spies use math to create secret codes, plot the coordinates of enemy hideouts, and discover, through logical reasoning, the identities of other spies.

Essential Questions

- What kinds of secrets do spies keep? Why do they keep them?
- How do spies use math to keep or find out secrets?
- What strategies do spies use to create or crack secret codes, create or discover hideouts, and create or discover secret identities?

Outcomes

Upon successful completion of this course, students will have:

- a. discussed how math can be used to create or uncover codes
- b. analyzed stories of real and fictional spies to determine how they used math and logic skills to accomplish their goals
- c. created spy scenarios that require the use of basic math functions
- d. developed problem-solving strategies that can be used to decipher codes, discover locations on a map, and determine identities
- e. created and deciphered codes made up of patterns of numbers, shapes, or symbols
- f. applied logical reasoning to discover hidden information using games such as Guess Who? and Battleship

Instructional Strategies

On the first day of the course, students will take a pre-assessment that will demonstrate their level of knowledge about the topic. Based on the information gathered from this assessment, I will use flexible grouping to ensure students are being challenged at their level. For the introduction of each skill or concept, I will scaffold instruction from teacher-led to small group practice, and eventually to independent mastery. Students will also be asked to think critically when creating and solving codes.

Resources and Materials

Books

- a. Baese, G. *The Eleventh Hour*. Harry N. Abrams. Copyright 1993. ISBN# 9780810932654.
- b. Moss, M. *Nurse, Soldier, Spy: The Story of Sarah Edmonds, a Civil War Hero*. Abrams Books for Young Readers. Copyright 2011. ISBN# 9780810997356
- c. Noble, T.H. *The Scarlet Stockings Spy*. Sleeping Bear Press. Copyright 2004. ISBN# 9781585362301.
- d. Raskin, E. *Nothing Ever Happens on My Block*. Aladdin Publishing. Copyright 1989. ISBN# 0689713355.

- e. Wiese, J. *Spy Science: 40 Secret-Sleuthing, Code-Cracking, Spy-Catching Activities for Kids*. John Wiley & Sons, Inc. Copyright 1996. ISBN#047114620X
- **Web sites**
 - a. CryptoClub. <http://cryptoclub.math.uic.edu/indexmain.html>. Games and activities relating to math and ciphers.
 - b. CryptoKids. <http://www.nsa.gov/kids/>. NSA website designed to introduce kids to code-breaking.
 - c. Spy X. <http://www.scholastic.com/spyx/>. Scholastic.com site focused on a Spy series and activities.
 - d. Top Spy Secrets. <http://www.topspysecrets.com/>. Independent, kid-friendly site with information on becoming a spy, and spy missions – or puzzles – for children to solve.
- **Materials**
 - a. Calculator

Student Assessment

- **Pre-Assessment**
Students will complete an A-Z pre-assessment for vocabulary about spies. They will also be asked to complete a basic logic grid puzzle.
- **Documentation of Learning**
Throughout the week, students will keep a “Spy Notebook” to keep track of the various types of codes they use as well as secret messages they code and decode. Their Spy Cover and Legend Poster will be used on the final day as part of the “Spy Mission” they create.
- **Post-Assessment**
The post-assessment for this course will be the same as the pre-assessment in order for students to clearly see the knowledge they have gained. For the *Expo!* Activity, students will work with a small group to create a spy mission that they will help their parents “solve” on the final day of class.

Schedule

Date	Topic(s)	In-class Activities	How will you document learning for assessment?
July 5	Spy Identity and Skills	Analyze literary spies and create a spy cover, legend, and notebook Explore logic puzzles and games (Guess Who?, Battleship) and compare the strategies used for each	Pre-Assessment Spy Cover and Legend Poster Logic Puzzles Exit Card (Summary of learning)
July 6	Ancient Spies	Research codes used throughout history Create a Caesar cipher Use Caesar and Substitution Ciphers to make and break codes	Participation in discussion and exploration of historical codes Caesar cipher product Encoding and decoding work documented in Spy Notebook Exit Card (Summary of learning)

Date	Topic(s)	In-class Activities	How will you document learning for assessment?
July 7	Spies Today and Tomorrow	<p>Analyze how codes are used today by the CIA and FBI</p> <p>Use Multiplication, Affine and PigPen Ciphers to make and break codes</p> <p>Participate in whole-group “Spy Mission” by following clues, deciphering codes, and using logic to solve puzzles.</p>	<p>Solutions to codes and puzzles documented in Spy Notebook</p> <p>Active participation in whole-group “Spy Mission”</p> <p>Exit Card (Summary of learning)</p>
July 8	Spies on a Mission	<p>Learn the history of Samuel Morse and discuss the importance of Morse Code</p> <p>Use Morse Code to create secret messages</p> <p>Discuss scenarios that require spies and what kinds of clues spies follow</p> <p>Create a “Spy Mission” Scenario for parents to solve at <i>Expo!</i></p>	<p>Morse Code Recording</p> <p>Solutions to codes and puzzles documented in Spy Notebook</p> <p>Spy Mission Scenario (Written clues that follow a sequence)</p> <p>Post-Assessment</p> <p><i>Expo!</i></p>

CTD Statement on Third-Party Web Sites

Instructors are required to thoroughly review any third-party web sites they intend to use in their courses for inappropriate content. However, because web content continuously changes, CTD disclaims any responsibility for any of the content contained on third-party web sites used in course materials. If you become aware of anything that may be inappropriate, please notify CTD staff immediately.