

# Athenian Secret

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A simulation of a Greek treasure hunt requiring fundamental arithmetic operations, logic, and problem solving



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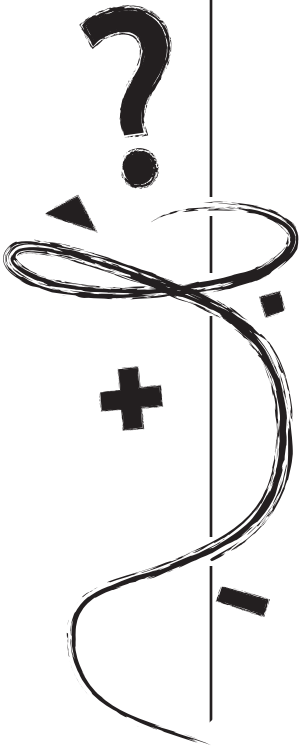
# WELCOME TO ATHENIAN SECRET

A Simulation of a Greek Treasure Hunt Using  
Pre-Algebraic Skills, Fundamental Arithmetic  
Operation, Logic, and Problem Solving.

Your classroom becomes Athens, Greece, more than  
2000 years ago. Your students travel through the  
city solving problems and searching for clues to the  
*secret formula*. They work together as a cooperative  
team in their quest to be Master Mathematicians.

*Athenian Secret* student teams solve various  
mathematical puzzles earning Greek drachmas,  
according to level of difficulty. Your students  
learn algebraic skills and the value of addition,  
subtraction, and logic, while having the  
enjoyment of discovering the magic  
puzzles to be found in various  
Athenian historical buildings.

The simulation also helps familiarize  
students with mathematicians,  
Greek gods, goddesses, and some  
background of ancient Greece. This  
experience can be expanded to increase  
interest in ancient Greece through  
geography, history, art, literature, music,  
and the Olympics.



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## Purpose & Overview

### What is *Athenian Secret*?

This is a unique simulation that takes students on a special journey to an ancient Greek city. The purpose is to create a positive and exciting learning experience using cooperative team work while solving mathematical puzzle problems.

The journey begins when the students are assigned to teams. Using the Greek alphabet and mathematical symbols, each team chooses a logo symbol and designs a Greek flag for their team. To create interest, fill a jar with coins and have the teams estimate how many coins you have placed in a jar. The team closest to the actual number has the privilege of picking the first **Key to the City Card**. This card will direct all teams to a beginning location on the **Map of Old Athens**. As the travelers enter various buildings, they solve the corresponding problems. Successful solution of each problem earns **Drachmas** which are graphed on a chart.

Students experience the excitement of a race against their classmates as the teams compete to come up with the most coins and the secret formula. Clues enable teams to decipher the secret message which is necessary in order to win.

*Athenian Secret* may be used in conjunction with world history or mythology units or stand on its own. It is an invitation for students to work cooperatively while practicing problem-solving and critical-thinking skills.

### What do students learn?

*Athenian Secret* was designed to incorporate Common Core State Standards. The content focus of this unit is pre-algebra with lots of practice using basic operations and critical thinking. Students will also have practice working together as a team. Specifically, students will be involved with the following:

#### **Knowledge**

- Developing awareness of finding unknowns
- Understanding how patterns effect outcomes
- Learning about some of the early Greek mathematicians and philosophers
- Becoming familiar with an ancient Greek city, Old Athens
- Discovering information about some Greek gods and goddesses
- Learning about the Greek money system and measurements

### **Skills**

- solving problems
- using fundamental operations
- thinking critically
- developing spatial relations
- applying measurement
- applying logic
- practicing estimation
- cooperating and working as a group to achieve goals

### **Attitudes**

- positive feelings toward math and problem solving
- satisfaction relating to accumulation of **Drachmas**
- excitement in scurrying around Old Athens trying to discover the secret formula before the other teams
- appreciation for others as part of group participation

### **Problem Solving**

Problem solving abilities are a key to mathematical understanding. What happens to students who are involved in group learning, use manipulatives or other pictorial strategies, and have received instruction about using strategies? They show higher achievement in mathematics and have a wider variety of strategies to use in solving problems. Because of this goal, *Athenian Secret* was written with a wide variety of problem-solving opportunities.

Page 9 of the **Student Guide** has some guidelines, "**Solving Group Problems**," for your students to use as they approach the problems.

### **How are students organized?**

Combine students in pairs or groups of 3 or 4. We recommend that you group your students *heterogeneously*. Select at least one capable student for each team. Heterogeneous grouping involves lower-ability students and challenges them to utilize problem-solving techniques of higher ability students.



Small group



### Cooperative Learning

Students working together in teams have the opportunity of achieving a common goal. A part of the learning process is pooling knowledge, creating group spirit, and providing encouragement to each other. A team can achieve more than a single individual. All students are involved and accountable and they learn leadership and communication skills. Sharing ideas often leads to more solutions than with a single individual effort. Encouraging students to rely on themselves and one another will help them to develop responsibility and to gain confidence and independence. Page 9 in the Student Guide gives some hints about how students can work and contribute together.

Team skills are valuable and spending time on them while engaged in a simulation can have a ripple effect that positively enhances a classroom environment.



#### Teaching tip

Students learn to care about each other's growth and knowledge.



#### Teaching tip

Students who work successfully in activity groups show positive feelings about their class as a community.

### How much time is required?

12 sessions of 30 to 45 minutes each



The mathematical portion of the simulation is designed to last 12 sessions of 30 to 45 minutes each. This can vary at your discretion.

### How will learning be assessed?

#### Monitoring

**Teacher Observation Checklist** (See page 58): Using an observation checklist helps keep track of student's progress while working on problems. Check for student understanding, creative thinking, and how students work together as a team. Also, make sure they are recording their work.

**Questioning:** An important aspect of successful problem solving is teacher questioning. Here are three types of questions you will find helpful to ask:

1. **Clarifying.** What is the problem? What is being asked? What are the important parts?
2. **Process.** How can you work it out? Will manipulatives help? What about charts or pictures?
3. **Follow-up.** What are the different methods used? Was one strategy more efficient than another? If one of the variables was changed, how would that affect the answer? Can you see a pattern?

### ***Journals***

Individual student journals give you an opportunity to assess student thinking. Page 9 lists all the puzzles and gives you sample journal prompts for many of the puzzles.

### ***Team work***

Using self and group process forms will help keep track of student involvement.

### **Why use *Athenian Secret*?**

Here are some of the ways this simulation will support student learning:

#### ***Differentiation***

This unit has a broad range of problems from which to choose based on the ability and grade levels of your students. Having students work in teams supports lower ability students and focuses higher ability students.

#### ***Motivation***

Working together, students are inspired to solve problems and make their way to the Secret Formula solution. The satisfaction of solving problems will encourage students to solve each successive problem.

#### ***Flexibility***

Choose the puzzles that students will be working on so they match the dynamics of your class. You can shorten or lengthen the unit depending on your schedule. If you choose, some of the work can be completed as homework, helping your students' families see the curriculum and work together in a home setting.

#### ***Ease of Use***

Almost everything you need is contained within this unit. You will need to copy the puzzles or transmit them to students from the enclosed CD.

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## Components

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The Athenian complete package includes:

- **Teacher Guide:** This has daily directions, and reproducibles for **Key to the City Cards, Puzzles**, assessment tools and **Drachmas**
- **Student Guides**
- **Map of Old Athens**
- Chart for displaying **Drachmas**

## Getting Started

Read through the **Teacher Guide** and **Student Guide** to make certain you understand what is going to happen and what you must do in advance to ensure the simulation will be a success.

### Decisions to make

1. **Organizing teams.** We recommend pairs or 3–4 members on each team. Be sure you balance math abilities as much as possible. (The section on Cooperative Learning on pages 2 & 3 in this Teacher Guide provides more information.) Decide if you wish to designate one student as “leader,” rotate that role, or just let the students work it out together.
2. **Choosing puzzles.** The puzzles included in *Athenian Secret* have been paired with the buildings on the map. (See the building name in the bottom corner of each puzzle.) This Teacher Guide contains several bonus puzzles for you to duplicate for those teams who finish early and wish to accumulate extra drachmas. The bonus puzzles are generally more challenging. For upper grades you may choose to use some of these in place of “daily” puzzles. You may want to supplement those found in this Guide with other materials. If you do choose to use some of your own puzzles, be sure you match them with appropriate buildings.
3. **Secret Formula Clues.** Decide how many clues to give teams depending upon how long you want the simulation to last and how difficult the task was or how well it was completed. When students receive a clue, they will put the letters over the appropriate numbers until the puzzle is solved.
4. **Class Discussion.** Decide when you will want to have a class discussion about the Greek mathematicians, gods, and goddesses and important Greek vocabulary.
5. **Integrating your curriculum.** If you are a teacher who enjoys integrating curricula areas, consider expanding the materials in this Teacher Guide which deals with the gods and goddesses. For example, you might wish to incorporate some extra study of Greek art or have students write illustrated reports on Greek mathematicians or gods/goddesses, architecture, literature, music, or the Olympics.

**Other simulations about Greece.** If you enjoy teaching about Greece and sense that your students would enjoy further study in this area, check your Interact catalog or contact Interact directly for Student Guide samples.



Small group