

A Mathematics Problem-Solving Adventure

In Search of the Secret Stone

Teacher's Guide and Solutions Booklet

Adventurers beware! Looking inside this booklet will reveal solutions and eliminate all of the fun of solving this adventure game. For teachers' eyes only!

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Adventure Maps (on four pages in center of booklet)

Contents of Package

- One double-sided self-booting Adventure Disk
- Teacher's Guide
- Student Booklet with Story Notes, Map Outlines, and Hint Sheets
- Quick-Start Card
- Blank storage disk for saving games

Equipment Needed

In Search of the Secret Stone is designed to be used on any computer in the Apple II family with at least 48K memory and one disk drive. A color monitor or TV receiver shows off the colorful graphics, but the program can be used successfully with a monochrome display.

The blank storage disk must be initialized with 3.3 DOS before students use it for saving their games. To do this, boot the System Master; then insert the storage disk, type INIT HELLO, and press RETURN. When the red light on the drive goes off, the disk is ready to use. Use this same procedure to initialize any blank disk for additional storage disks.

About *In Search of the Secret Stone*

In Search of the Secret Stone is an educational adventure game. Your students will begin a search—a treasure hunt of sorts—to find a rare stone, a gem of great scientific value. Each searcher will encounter a variety of mathematical problems to be solved. The story provides the motivational setting for these problem-solving activities.

As students attempt to put together the pieces of the big puzzle (finding the secret stone), they must solve several smaller puzzles. Each of these requires the use of some math computation, but the math is really secondary to the use of problem-solving skills: determining what data is needed, finding the data, analyzing the data, and discovering solutions. (A complete list of skills begins on page 32.) These problem-solving activities are highly motivating because they are presented in the context of the adventure. After solving one problem, the seacher has a piece of information that can then be used to help solve another puzzle.

It is important that students be allowed time in which to become acquainted with the program, especially if they have never seen or played an adventure game. They will need to learn how to move around, how to communicate with the characters, and how to gather information in each room. They may

be frustrated at first, but as soon as they learn how to get around there will be no stopping them! Remember that solving problems is always a trial-and-error process. Encourage students to explore the program until they are comfortable with it.

Suggestions for Using the Adventure

There are many ways to use this software in the classroom. Your choice will depend on the age of your students, their level of sophistication with computers, their math and problem-solving abilities, and the length of time available for each student to interact with the software. The adventure can be explored by individual students, but it is recommended that you encourage students to work in groups of two or three. The best results are usually achieved in this way.

Here are some suggestions for classroom use of program components:

1. For students who need the least help, give them the adventure disk, storage disk, blank paper, Introduction and Getting Started Sheets, and the Quick-Start Card (summary of the Getting Started Sheets). If these students are experienced adventurers, they will know how to map and to record clues.

2. For students who require a little more help, add the Map Outlines or Story Notes, or both. The Map Outlines give students a framework and starting point, plus a hint about space organization. The Story Notes provide additional information about the story, the characters, and the puzzles. They give a few starting points and hints for solving each puzzle.

You might find it helpful to prepare folders for the Map Outlines in the following way: Duplicate a copy of each Map Outline for each group of students. Glue the two "Main Map" sheets to the inside of a file folder. Glue the "Maze Map" to the back of the folder. Label the folder with the name(s) of the student(s). The students can then store their notes and activity sheets in the folder as they work through the adventure.

3. For students who need even more help, add the Hint Sheets. These sheets do take some of the problem-solving elements out of each puzzle, so use them only as needed. For example, some students may need only the first two sheets (Zandar's Puzzle and Wella's Puzzle) and then have the confidence to continue on their own.

4. Have the students with little or no adventure game experience take the Getting Started Quiz. This quiz provides practice with the information on the Getting Started Sheets.
5. Some students may need help organizing their information. Encourage them to use copies of the Explorer's Notebook pages. It may not be necessary for them to complete a sheet for each location in the adventure, but it will be helpful whenever there is a lot of data or many objects of interest.

Saving Games

Use the blank storage disk provided in this package (or another blank disk) for storing games. After the disk is initialized, follow these steps for saving games:

1. When you are ready to SAVE a game, keep the adventure disk in the drive and type SAVE. Follow the message that comes on the screen, as it instructs you to insert the storage disk and to press the spacebar.
2. This message will appear on the screen:

THERE IS NO DIRECTORY ON THIS DISK.
DO YOU WISH TO MAKE ONE (Y/N)?

Type Y. Then you will be asked to name the directory. Giving the directory a name will help you identify that disk, especially if several disks are being used for saving games. However, if you do not wish to give the directory a special name, simply press RETURN and the directory will automatically be named GAME.

If you do wish to name the directory, erase the name GAME. Press the ESC (ESCAPE) key and type a name for the disk directory, using up to seven letters. Press RETURN.

3. This message will appear on the screen:

SAVE AS GAME NUMBER (0 FOR NEW)

If there are no games saved on the disk, or if you are saving a new game, type 0.

(To save a game in place of an old game, type the number of the old game.)

4. This message will then appear on the screen:

PLEASE TYPE IN SOMETHING TO HELP YOU REMEMBER THIS GAME.

Type a short description of your game and press RETURN.

5. Insert the adventure disk, Side 2, when you are instructed to do so, and press the spacebar. You will return to the exact location in the game where you typed SAVE.

A directory is created only once for each disk. Each time you SAVE a game after the first one, you will begin with Step 3.

Be sure that your students understand two important reasons for saving games:

1. Saving a game at the end of a time period allows the adventurer to start the game the next period at the place it was saved. An adventure game is cumulative. The adventurer acquires objects, learns secrets, and solves problems. If the adventure were to be started from the beginning each time, the adventurer would not progress very far. The saved game feature allows a long adventure game to be used effectively in a classroom.
2. It is acceptable to save games as a safety device when "adventuring." Before trying something especially risky, or after having solved a puzzle or acquiring a very desirable object, it is wise to SAVE the game on the storage disk. If disaster strikes, the saved game can then be reloaded. The student will have to start again from there, but not from the beginning.

It is also important that students understand what is saved on the disk when a game is saved. Everything! All information about the game in progress is stored. This includes objects in inventory as well as information about conversations with characters, puzzles solved, or attempted solutions. When the game is reloaded, it starts up at this exact point. The player can continue, adding objects and collecting information. Two games cannot be combined, however. Always LOAD the most advanced game, continue playing, and then SAVE this game at the end of the time period. Each game saved will then supercede all previously saved games.

Special Secrets of this Adventure

Finding Safe Water

The level of water in the bottle on the right of the screen goes down, as the adventurer moves through the rooms. If the water runs out, the player is taken off by Shadow to his shack, nursed back to health by Marvin, and given a small amount of "safe" water to begin searching again. To avoid running out of water, it is necessary to locate a supply of "safe" water early in the game. To get "safe" water, FILL BOTTLE By the Falls. Any other water causes the player to get dizzy and finally pass out. But help arrives, in the form of Shadow, who rescues players in time of need. On the way to the shack, all objects collected by the player are dropped. These objects can be retrieved by searching the rooms near Shadow's Shack. LOOK; in each room, at Marvin, in the REEDS, and in the NEST.

Locating Shortcuts

There is a quick and easy way to move from one area in the adventure to another—a tunnel. The tunnel is called Down Under and can be reached from three different rooms. In By the Falls, the command is GO FALLS. From

the Chamber Room, after the chest is moved, the command is GO HOLE. From the Cave and Tree room, just south of Armando, the command is GO CAVE. Once inside the tunnel, the possible exits are E, W, and U. It is not possible to go Up unless the chest has been moved. By going Down Under the adventurer can quickly return to the falls and refill the water bottle from any area in the adventure. The beads are located Down Under and are only visible after the command LIGHT MATCH is given.

Collecting Objects

Important objects must be collected during the adventure. Sometimes an exchange is made, for example: OFFER BELT TO MARIA. Then automatically the tape will be in the player's inventory. Other times it is necessary to use the command TAKE to acquire the object. Sometimes there may be too many objects in the inventory, and the player will get a message that it is impossible to TAKE an object because he or she is carrying too much. Then the player should use the command PUT (object) to decrease the number of objects in the inventory.

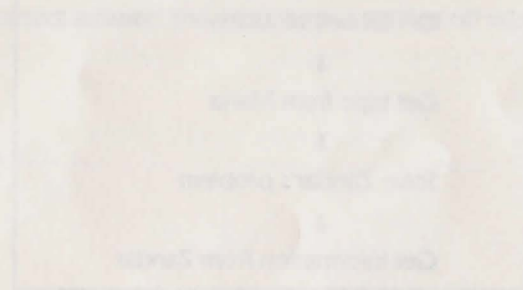
Solving Problems for the Hermit Brothers

Two hermits, Harry and Herman, appear in the adventure. Both hermits have

a reward for the player who can successfully answer a set of problems. Harry's problems involve adding a series of numbers which flash on the screen. For the first two problems, the player must press the spacebar when the total reaches 50. For the next two problems the total changes to 100; and for the last two, the total is 150. It is necessary to answer all the problems correctly in order to get the reward, which is a key. For Herman Hermit's problems, all four operations are used. A complete problem sequence is flashed on the screen, and the player is asked if the total is over 50, 100, or 150. The reward for correctly answering all the problems is 6 gold coins. For either hermit, if an answer is incorrect the player can begin the sequence over and keep trying until he or she is successful.

Puzzle Solutions

Each of the following sections begins with one possible path to the puzzle solution. There are no "right" paths, however, so allow students to discover their own paths as they explore the adventure. Suggestions for getting necessary data follow, along with the range of answers accepted in the program.



Zandar's Puzzle

TALK to Maria and Zandar



Find Maria's belt in the reeds,
at the Iguana's home



OFFER belt to Maria



Get tape from Maria



Solve Zandar's problem



Get information from Zandar

First get the tape so that you will be able to MEASURE the rocks at Zandar's Fire. COUNT and MEASURE the rocks. There are 36 rocks, each about one foot long. Make a diagram to help estimate the diameter of the circle. Answers accepted are 11 and 12.

Information from Zandar for correct answer: '...you need 3 measuring tools, special oil for Gorf, and a reward of prime importance for Col. Gaylord.'

Penalty for incorrect answer: The adventurer is carried off and left in the maze.

Wella's Puzzle

Use tape to collect data



Use TALK and ASK with Maria,
Wella, and Pedro



Solve Wella's problem



Get gold from Wella
(1 gold coin for each bundle)

Wella may disappear, unless the adventurer TALKs to him. Then Wella stays until he gets help. ASK Maria about reeds (they weigh 4 ounces a foot), MEASURE the reeds (this number varies), TALK to Pedro at the bridge (a man and 2 llamas crossed the bridge safely), and ASK Wella about llamas (his llama weighs 200 pounds, a strong llama can carry half its weight). If the bundles weigh over 100 pounds, the llama stumbles and falls.

Wella is a continuous source of gold, if he can be found beside his bundles. After he crosses the bridge, he will then appear randomly. The length of the reeds varies, while the other parts of the problem remain the same.

Maze Secrets

TALK to Peter and the Guard



Find 2 "true" clues



TALK to Marla



Find herbs for Marla



OFFER herbs to Marla

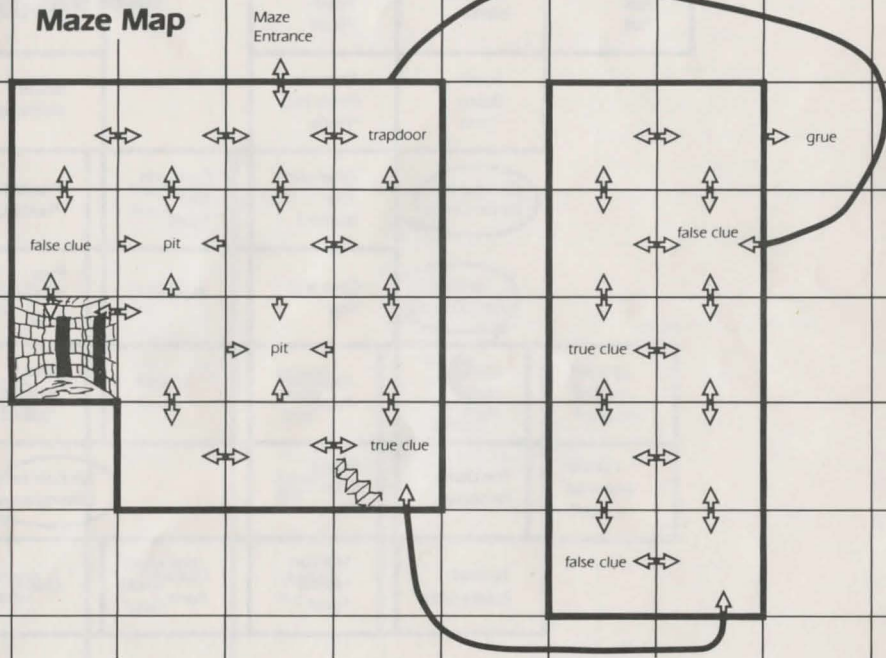


Get lens (magnifying glass)
from Marla



READ 2 "true" clues

Maze Map

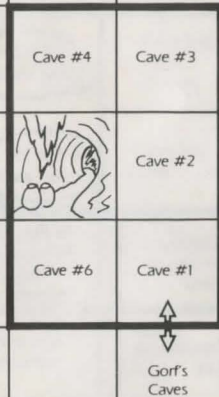


	Tanya Tanner		
Samara's Hut *oil	Samara's Island	East Beach *boat	Tor's Treehouse
	South Beach *boat	Armando's Reeds Inc. *reeds	Below Treehouse

Adventure Map

	Go cave to Down Under	Cave and Tree (tunnel)	Cave and Tree *gold	Flowers *herbs	Gorf's Lair	Shadow's Shack				
		Cave and Tree	Flowers	Paco *thermo- meter	Gaylord's Post	Volcano Rim		Go falls to Down Under		
Marla's Herbs *lens	Valencia *scale			Bella's Baskets *basket	Harry Hermit *key	Lolly Llama	Peter's Perch	Iguana's Home *belt	By the Falls *water (tunnel)	Nest by Stream *matches
The Llama Herdsman	Ramos' Rope Corp *rope		Go hole to Down Under	Chamber Room (hole)	Sloth Crossing		Zandar's Turf			Maria's Meadow *tape
Turland (password)	Herman Hermit *gold	Outside Ruins	Guard	The Ruins	Proud Peter	Wella and Llama *gold	Zandar's Fire			
					Mountain Path	Rickety Bridge				

Map of Gorf's Caves



Peter and the Guard both give clues about the maze and about the writing in the maze. Peter says to '... look for triangles $\frac{1}{4}$ the size of rectangles, then you will know the clues are true.' The Guard says that there are 2 levels in the maze and warns the adventurer to beware of false clues. After finding the correct triangles, the writing will be too small to read without a lens.

Leave the maze and search for Marla's Herbs. ASK Marla about herbs and also about flowers. Find the flowers with petals that total the prime 17. TAKE the herbs, OFFER them to Marla, get the lens, and READ the writing in the maze. Here are the 2 "true" clues:

True Clue #1: Over 300 bananas are on a magic tree. Go to this one and set the gold free.

True Clue #2: The magic tree is near a cave which measures 5' high. You must dig down 3', go quickly now and try.

Treasure Hunt

Get 2 "true" clues from maze



Do problems for Harry Hermit



Get key from Harry Hermit



Get shovel from chest By Ruins



Find right location for digging



DIG 3 times for gold

To get the treasure, or gold, first find the clues that give the information about where to dig, and then get the right tool for digging. Do Hermit Harry's problems in exchange for a key. Go west past the Guard with the key, UNLOCK the chest by the ruins, and TAKE the shovel inside. COUNT the bananas on the trees and MEASURE the caves, to find the right location. DIG where there are 432 bananas on a tree and the cave entrance measures 5 feet. The reward is 24 gold coins.

Turland's Puzzle

OFFER gold to Bella



Get basket from Bella



OFFER basket to Valencia



Get scale from Valencia



Use scale to get data



Solve Turland's puzzle



Get password from Turland

Acquire gold by digging, or by doing Hermit Herman's problems, or by helping Wella cross the bridge. Buy a basket from Bella and OFFER the basket to Valencia in exchange for the scale. Now WEIGH the bunches of bananas (this number varies). TALK to the herdsman to find out the number of llamas assigned to today's shipment (this number varies). ASK the herdsman about llamas. He will say that the llamas travel 15 miles a day unloaded. Every 20 pounds they carry slows them down 1 mile per day.

Turland will reward whoever correctly solves today's challenge with a secret password. The password will vary from game to game. Turland also reveals that the oil needed for Gorf is on Samara's Island, '...first find Tor.'

A Visit with Tor

MEASURE Marvin



Get rope from Ramos with gold



OFFER rope to Marvin



Climb rope



Get to Tor's Treehouse



TALK to Tor for information about beaches



ASK Tor about boats



LOOK plans after giving Tor the password

To reach Tor, buy rope from Ramos' Rope Corp. The right amount of rope is ten times Marvin's height, about 20 feet. OFFER the rope to Marvin, then CLIMB the rope to Tor. TALK to Tor, who warns '...beware of mud and cold currents; only sail your boat when the water measures more than 20 degrees above freezing.' ASK Tor about boats, or LOOK Tor, to discover that Tor has plans. LOOK plans, and Tor will ask for the password. Then Tor will let you LOOK plans, which specify a boat that weighs between 200 and 250 pounds.

Samara's Puzzle: Getting to Samara

TAKE matches from nest,
at Nest by Stream



LIGHT match Down Under



TAKE beads from Down Under



OFFER beads to Paco



Get thermometer from Paco



Explore beaches



Get reeds from Armando's
Reeds Inc.



BUILD boat



MEASURE water temperature



SAIL boat

Get the thermometer from Paco by OFFERing beads from Down Under. Then explore the beaches and find out where Armando should deliver the reeds. LOOK water to find out that South Beach is the beach without muddy water. Then examine Armando's reeds, in order to buy the right amount.

There are 20 reeds to a bundle. Each reed is 5.5 feet long and weighs 4 ounces. Purchasing either 8 or 9 bundles will result in a boat weighing between 200 and 250 pounds. Armando will deliver the reeds to either beach, but South Beach is the right one. After BUILDing the boat, MEASURE the temperature to make sure it is at least 20 degrees above freezing (32 degrees Fahrenheit). Then SAIL the boat to Samara's Island.

Penalties for incorrect answers; the adventurer's boat will sink if it is not the correct weight, the boat will sink in the mud at the wrong beach, and the adventurer will be carried by cold currents to Turland, if the temperature of the water is too cold. If the adventurer is carried to Turland, any objects in the inventory are still safe.

Samara's Puzzle: On the Island

SAIL safely to Samara's Island



TALK to Samara



Visit Tanya



Solve Samara's problem



Get oil for Gorf

Samara will ask for help in deciding how many hides Tanya should use to make a rug for the floor of Samara's hut. MEASURE the hut floor, which is 17' by 20'. Then visit Tanya and ASK her about her hides, which are all about 2' by 4'. Samara warns that the rug should not be too big, so acceptable answers are 41 or 42. Solve the problem with simple calculations or with a diagram.

Penalty for incorrect answer; the adventurer is set adrift and washes ashore by Turland. The boat is destroyed, but any objects in the inventory are safe.

Gaylord's Puzzle

Get information from Zandar and Lolly



Go to Gaylord prepared



OFFER gold to Gaylord



Gaylord takes you to Gorf

To get help from Gaylord, it is necessary to "come prepared." Zandar will tell the adventurer who solves her problem that being prepared means having '... 3 measuring tools, oil for Gorf, and a reward of prime importance for Gaylord.' Lolly adds hints about the reward: Gaylord likes primes that end in 7, and a good reward would be over 11 and under 20. Go to Gaylord with the tape, the scale, the thermometer, the oil for Gorf, and a reward of 17 gold coins for Gaylord. OFFER gold to Gaylord and, when he asks how much, tell him 17.

Gorf's Puzzle

OFFER oil to Gorf



Get the puzzle to solve from Gorf



Explore Gorf's caves



Find Gorf's secret number



Secret Stone!

After reaching Gorf, OFFER the oil to him. Then Gorf will describe his puzzle to be solved. The solution is a 3-digit palindrome (a number that reads the same backward or forward) that is also a prime. Explore Gorf's caves (there are 6 caves), and in each cave WEIGH JAR, MEASURE TEMPERATURE, and MEASURE CAVE. Add the 3 numbers for each cave, and find the cave with a 3-digit palindrome that is also a prime. The secret number will be one of several possible numbers (191, 313, 353, 383), randomly generated when the game begins. Return to Gorf and TALK to him. The right number takes the adventurer to the secret stone!

Math Skills from *In Search of the Secret Stone*

A. Estimation, Mental Math, and Number Theory

1. Make visual estimations. For example:

Locate a triangle within a rectangle. The triangle is $\frac{1}{4}$ the size of the rectangle.

2. Estimate the diameter of a circle, given the perimeter.
3. Make estimations using the metric system.
4. Make estimations based on weight, length, and temperature.
For example:

Determine a length of rope, the depth of a hole, the distance across a ravine, and the area of a floor.

5. Identify prime numbers. For example:

Find a 3-digit palindrome that is also a prime number.

6. Use mental math in a timed situation. One set of problems flashes numbers to be added. The adventurer presses the spacebar when the total exceeds 50 (or 100, or 150). In another set of problems, all four operations are used and the adventurer is asked after each problem if the total exceeded 50 (or 100 or 150). In each set of problems, computation becomes progressively more difficult.

B. Problem Solving

1. Map the area to be explored. The exits from each location are shown with the location title.
2. Map the maze and caves. The exits are not shown.
3. Manage the water supply. This involves estimating when the water will run out, figuring out how to get a fresh supply of "good" water, and finding shortcuts to the safe water supply.
4. Solve the puzzles. The various math exercises are grouped within ten larger problem-solving situations. Some of these puzzles are more complex than others, but all require these problem-solving processes:

- a. Formulating the problem
- b. Selecting strategies for locating and collecting relevant data
- c. Analyzing the problem and selecting solution strategies
- d. Finding a solution
- e. Verifying the solution

Here is a summary of the skills used in the ten puzzles:

Zandar's Puzzle - The searcher must locate a measuring tool and decide what information is missing, take the right measurements, and then estimate the diameter of a circle.

Wella's Problem - Here the adventurer must estimate how much the bridge can hold and how much Wella's llama can carry. The searcher can gather information about the weight of the bundles and the weight of the llama by asking questions.

Maze Secrets - To solve this problem the searcher must make visual estimations, map, interpret information, take measurements, and identify prime numbers.

A Treasure Hunt - Here the adventurer must take measurements, interpret word problems, and do mental math in a timed situation.

Turland's Puzzle - This is a time/distance problem, based on the weight of Turland's load, the number of llamas carrying the load, the speed at which the llamas travel, and the distance to the destination.

A Visit with Tor - The searcher must take a measurement, estimate how much rope must be purchased, and collect relevant data.

Samara's Puzzle: Getting to Samara - The problem solver must determine water temperature, beach conditions, how many bundles of reeds to buy, and how to set sail.

Samara's Puzzle: Getting to the Island - This is a simple area problem. The problem solver must figure out how many hides of a given measurement will fit on Samara's floor. A diagram can be used to solve this problem.

Gaylord's Puzzle - Here the adventurer must interpret clues to identify a prime number and come to Gaylord prepared.

Gorf's Puzzle - The problem solver must look for a 3-digit palindrome which is also a prime, take measurements, and add three numerical values for each of Gorf's caves. The correct total leads the searcher to the secret stone!

Trouble-shooting

On occasion you may encounter difficulties with the *In Search of the Secret Stone* diskette, either immediately after purchase or at a later date. To minimize the possibilities of such errors, your diskette has been "write protected" so that you cannot accidentally destroy the program. However, through use or handling beyond your control, data may be destroyed or become garbled.

The most frequent symptom of a damaged diskette is that the program will not load, meaning that the title page will not appear on the screen. If this occurs the first time you try the diskette, it is possible that your disk drive is not in perfect alignment to read the programs from the diskette. Try switching disk drives if you have more than one, or try the diskette on another Apple. If all of this fails, return the original disk to Creative Publications, Customer Service, 5005 West 110th, Oak Lawn, IL 60453 or call 800-624-0822 (Illinois call 800-435-5843) for a free replacement. If the disk has been physically damaged, include \$10.