

THE BARTON SPRINGS SALAMANDER: A PROBLEM-SOLVING TEST

PART ONE

There are two parts to the problem solving test. If you decide to use both parts, it is recommended that you administer part 1 one day and part 2 the following day. Each part should take less than 20 minutes to complete.

Part 1 of the problem solving test is presented in “Email Message From Mia Salerno.” In this first part, students must list questions they need to have answered in order to make a decision about the best relocation site for an endangered species, the Barton Springs salamander. They are given information about the needs of the salamander, and some preliminary information about three possible locations. The following table provides a summary of the information given in the message:

The Needs of the Salamander	Lake LBJ	Balmorhea Springs	Blue Hole Creek
Deep water that moves quickly	Deep lake with fast wa		Swift flowing creek
Spring –fed pools	Fed by springs		
Water temperature between 50 and 68 degrees Fahrenheit			
Earthworms and brine shrimp for food	Rich in aquatic life	Has brine shrimp	
Rocky and sandy river bottom			Has sandy bottom
No leaves or rotting debris to pollute the water		Clean water	

Appropriate Questions

Students should ask questions designed to fill in the gaps in this chart, namely questions about each of the three locations that would help them to determine which of the locales would be the best home for the salamander. Any of the following questions should be scored as correct:

Lake LBJ

- What is the temperature of Lake LBJ?
- Does Lake LBJ have earthworms and brine shrimp?
- What is the bottom of Lake LBJ made of?
- Are there any leaves or rotting debris that pollutes Lake LBJ?

Balmorhea Springs

- Is Balmorhea Springs deep?
- Does Balmorhea Springs have fast moving water?
- What is the temperature of Balmorhea Springs?
- What is the bottom of Balmorhea Springs made of?

Blue Hole Creek

- Is Blue Hole Creek spring-fed?
- What is the temperature of the waters in Blue Hole Creek?
- Does Blue Hole Creek have earthworms and brine shrimp?
- Are there any leaves or rotting debris that pollutes Blue Hole Creek?

Students will word their questions differently and will occasionally combine two questions into one. Accept any reasonable variations. They may also identify other issues as needs of the salamander; accept any reasonable questions about how these locales meet these needs.

Inappropriate Questions

There are several types of questions students should not ask, and if included in the list, they should be scored as incorrect. The following categories are examples of inappropriate questions:

Questions about the Salamander: Students are told to ask questions only about the locales, but they may overlook these instructions. If they do, you may decide not to mark as incorrect questions that are pertinent to the solution. For example, if a student asks, “Does the salamander have any natural predators?” you should not mark this as incorrect, since it is relevant to the solution. However, you should not accept questions that are unrelated to the needs of the salamander. The following are some examples of inappropriate questions:

- What color is the salamander? (appearance is irrelevant to the solution)
- How long do salamander live?

- How many salamanders are going to be moved there?
- Why is it important for the salamander to live in water with a rocky and sandy bottom? (Students do not need this information in order to determine the best locale for the salamander.)

Questions that Have Already Been Answered: Students should utilize the information already given, rather than wasting time collecting it again. Refer to the chart above to determine if information has already been given. A few examples of inappropriate questions in this category are

- Does Lake LBJ have fast moving water?
- Is Balmorhea Springs unpolluted?
- Does Blue Hole Creek have a sandy bottom?

Questions about the Locales that are Unrelated to the Needs of the Salamander: Only questions that help students to determine which locale can best meet the needs of the salamander are relevant to the development of a solution. The following are examples of questions about the locales that are inappropriate:

- What color is the water at Lake LBJ? (The salamander does not need a specific color of water.)
- Is it nice at Balmorhea Springs? (In addition to being vague, this does not address a specific need of the salamander.)
- Can the salamander live at Blue Hole Creek? (This is the problem students are supposed to solve. They need to collect data to determine the best location, not ask a character to solve the problem for them.)

Grading Part 1

You will need to determine the most appropriate way to score this measure. The following is one suggestion, but you will need to adjust it to fit your students.

Automatically give students 30 points. Then, add 10 points for every appropriate question they list, and deduct 5 points for every inappropriate question. For example, if a student records eleven questions, six of which are appropriate and five of which are not, that student's score would be $30 + 60 - 25 = 65$. If another student records eight questions, seven of which are appropriate, that student's score would be $30 + 70 - 5 = 95$. Cap scores at 100 points, so that even if a student records ten appropriate questions and no inappropriate questions, his/her score would be 100.

Part 2 of the problem-solving test requires students to recommend one of the three locations as a new home for the salamander. Each of the three locales has some advantages, so there is no wrong answer. This part should therefore be scored not

for the correctness of students' choice but for their ability to present a rationale for their decision. It is recommended that you use a rubric to evaluate students' responses. The following are some items you may wish to include in your rubric, though you should adjust this to reflect whatever skills you have emphasized during Alien Rescue:

- Did the essay have a topic sentence?
- How many supporting details were given?
- Was the essay well written, convincing, and free of incorrect information?

The following two pages contain the reproducible "letters" for parts 1 and 2 of this problem-solving test.