

# *Alien Rescue*

## Sample Lesson Plans

### Day 1

#### **Main Task:**

Watch the Opening Scenario and become acquainted with the virtual environment.

#### **Class Discussion:**

You may be tempted to provide "warm up" activities for students, such as telling them about the problem presented in *Alien Rescue* or discussing relevant vocabulary. Resist. Problem-based learning begins with the problem presentation. Students must sort the problem situation out for themselves and will acquire vocabulary naturally as they attempt to communicate about the problem.

*Alien Rescue begins with students viewing the opening scenario. This can be accomplished in three ways:*

#### **Method 1:**

If you have access to a computer attached to an overhead or a television, show the opening scenario to the entire class simultaneously. After they have seen the opening scenario, students should return to their computers and log on.

#### **Method 2:**

Select four to six students scattered around the class and have them login to their computers. Other students watch as they do so. When prompted "Do you want to see the Opening Scenario?" they click "Yes." Students can watch the opening scenario on any of the computers playing it.

#### **Method 3:**

If you have enough headphones for everyone, you can ask students to watch the opening scenario on their own computers. Note: this is not a good option if you cannot provide headphones. Since students will start at different times, the resulting noise will make it difficult to focus on the problem situation.

#### **At Their Computers:**

Students should spend the remainder of the day exploring the virtual environment. Allow students to discover as much as they can on their own, and encourage them to share their discoveries with their neighbors. In this way, knowledge about the program will circulate around the class without any direct instruction on your part.

#### **Teaching TIPS:**

When the students use Alien Rescue for the first time, click the "Click here to register" link on the login page. On the registration page, the students can create their own username and password. The students will need the unique code that we provide you for the Class Code. Once their account has been created, the students will be able to login immediately.

### Day 3-5

#### **Main Task:**

Discuss students' ideas about the process they will use to solve this problem. Discuss the

value of collaboration and encourage it in class. Identify the needs of each of the alien species.

**Class Discussion:**

While class discussions during *Alien Rescue* should be flexible and build on students' comments and interests, in these early days you may need to direct the flow of conversation. Try to make sure to address the following issues during days 3 - 5:

1. *Problem Statement.* If you gave the writing assignment, let students share their statements. If not, make sure that students all understand the nature of the problem. Get students to describe what a solution will look. Also, if there were unanswered questions from previous discussions, ask students to share any pertinent information they discovered.
2. *Problem-Solving Process.* Ask students how they think they will go about solving the problem. Get them to identify steps they will use in the process. Explain the importance of having a plan so as to work effectively and not waste time doing things that are not helpful. Encourage students to consider what they will do before they actually log on.
3. *Collaboration.* Bring up the story of Dr. Frankenstein and the monster he created. Ask students if they can describe how he worked. Bring out of the discussion the idea that he worked almost alone, with only Igor to help him. Ask students if this is how scientists normally work. Get them to recognize that scientists usually work together, and explain how important it is for scientists to publish their findings. Get students to identify reasons for scientists to work together.
4. *The Way Scientists Work.* As students discuss problem-solving and collaboration, explain that this is similar to how real-life scientists work. Explain that as they work on *Alien Rescue*, students are going to work the way scientists do.
5. *Aliens' Needs.* Support the students in coming up with a list of the needs of each species. You may want to put a chart on the white board and devise a plan whereby students take turns filling in needs. Help students to refine these lists by asking them to review the list for one species together. To do so, get students to look for items in the list that may not represent needs. For example, if one item about the Jakala-Tay is "has a long tail," students should be able to argue that the appearance of a species is not relevant to what they need in a new home. Encourage students to review their notes and make changes based on these lists.

6. *Science Topics*. A few topics will naturally arise as learners deal with making sense of what they learn about the aliens. Try to let these questions arise naturally in class rather than introducing them yourself, but make sure they are addressed at some point during the program.

**At Their Computers:**

Allow students to work as they see fit. Circulate among students, asking them what they are doing and their reasons for doing it. Some students will not have answers. Ask them to stop for a moment and think of a plan before they proceed, or ask a neighbor what he or she is doing. Do not tell them what to do, even if that means they are not very productive. A major goal of *Alien Rescue* is to encourage student ownership of their work, which they cannot do if you tell them what to do.

**Day 9-11**

**Main Task:**

Continue to develop hypotheses and test them by launching probes. Continue to interpret data gathered from probe missions and apply findings to the problem. Discuss the design of probes and the types of tools scientists use to gather data.

**Class Discussion:**

Discussions will vary based on the topics students bring up. Try to touch on the following topics during these days.

1. *Students' Problem Solving Process*. If students completed the writing assignment above, be sure to discuss the steps they listed. If you chose not to make that assignment, elicit the same steps through discussion. Explain to students that we become better problem-solvers by reflecting on how we solve problems.
2. *Effective Design of Probes*. Many students will have had malfunctions in the probes they have launched. Ask if any of them have figured out what caused these malfunctions. Ask students why NASA frowns on malfunctions and get them to recognize how costly mistakes can be and the importance of learning from them. Introduce the idea of constraints - reasons why you cannot do certain things and must do other things. Get students to identify some of the constraints in building probes.
3. *Data from Control Room*. Ask students about the data returned from their probes and how they interpret it.
4. *Science Topics*. Continue this from previous days. Some possible questions you could ask are
  - What are the Galilean moons, and why are they called that?

- Why is a magnetic field important to a world?
- Some worlds have a lot of craters while others don't. What cause craters? Why don't some worlds have craters? What do we know about a world when we see a lot of craters on it?

**At Their Computers:**

Students should be launching probes and analyzing data most of the time, though they will still be using other program features flexibly as they see fit. Now that they have gotten some funding, things tend to become less hectic. You will need to continue to give funding, but you should have more time for extended one-on-one interactions with students. You may want to use this time to get students who are normally quiet during class discussions to articulate their reasoning for their work.

**Day 15****Main Task:**

Finalize entries in the recommendation form and submit it. Teacher leads discussion of students' solutions.

**At Their Computers:**

During the first twenty minutes of class, have students log on and make sure they have submitted their recommendation forms. If they do not, you will have no record of the rationales they wrote. Therefore, tell students to make sure they select a world for each species, then submit the form even if they have not completed writing the rationales.

*Most students can finish in this amount of time, but if not, you will need to decide if and how to provide students additional time with the program.*

*Ask students to review which world they chose for each species, as you will discuss it after they have logged out of the program.*

**Class Discussion:**

Prior to class, make sure you have studied the elimination chart provided in Appendix E: The Problem Solution. In particular, make sure you understand how to use the elimination chart, and are comfortable enough with it that you can use it easily during the class discussion. Save twenty minutes to discuss students' solutions. This should be a fun class. Call on one student to pick which species to discuss. Allow students to call out their solutions, then tell them which worlds are the best choices and which ones are acceptable, but less ideal. If some students have selected a world that is clearly a poor choice, make sure that the problems with that world are pointed out. Continue with the other species until all are done.

Throughout this discussion, make sure that you communicate that there is no single right answer for each species. Rather, there are multiple good choices, as well as many not-so-good and downright poor choices. Make sure that the quality of a choice is judged by the ability to support it with facts, not by personal preferences.