**SENDING A MESSAGE INTO THE UNKNOWN**

**ACTIVITY 1-7**

**GRADE LEVEL: 4-9**

**Source:** This activity is from the book *Project Haystack: The Search for Life in the Galaxy* (1997, Teachers Idea Press), part of the *Life in the Universe Series* of activity books from the SETI Institute for grades 3-9. For more information on purchasing the books, contact Teachers' Idea Press, P.O. Box 6633, Englewood, CO 80155; 800-237-6124. The activity is ©1997 by the SETI Institute, 2035 Landings Dr., Mountain View, CA 94043. Contact the Institute's Education Office for permission to use or reproduce this activity beyond your own school.

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**What's This Activity About?**

Four spacecraft from Earth are leaving the Solar System and carry messages from humanity. Constructing such a “message from Earth” can be an instructive activity and lead students to think more about issues of interstellar communications and the issue of “who speaks for Earth.”

**What Will Students Do?**

Students construct a “message” in the form of a collage of pictures showing life on Earth. A different group of students is then asked to interpret the message “sent” by the first group. Follow-up activities allow an extension across the curriculum, and lead students to think about the issue of how humanity will want to portray itself when we make contact with another intelligent species.

**Tips and Suggestions**

- For this activity to be a success, students should have access to a wide-ranging variety of pictures. This means putting some effort into getting a good selection of old magazines in the months or weeks before this unit.
- If your students tend to “peek” at the answer for such problems, it might be useful to give each poster (message) and accompanying explanatory paragraph a number, and then separate them before the receiving group gets them. You can then give the key to each receiving group only after they have had a chance to think about the meaning of their message.

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**What Will Students Learn?**

**Concepts**

- Communicating across cosmic distances
- Messages without words
- Ambiguities of communication

**Inquiry Skills**

- Observing
- Explaining
- Inferring
- Reasoning
- Describing

**Big Ideas**

- Models and simulations
- Interactions
- Communication
Overview

Students select 10 pictures from magazines to create collage messages depicting the human experience and planet Earth. The students then exchange these collage messages with one another and try to understand them. In general, students consider the questions: Who should speak for Earth and what do we want to tell other civilizations about ourselves?

Introduction

In 1977, NASA launched two Voyager spacecraft to fly by the outer planets in our Solar System. Since scientists and engineers knew that Voyagers’ paths would carry them out of the Solar System and (eventually) among the stars, they placed an audio-video record on board the craft with the “sights and sounds of Earth.” The disk contains 118 photographs, 90 minutes of music from around the world, and greetings in almost 60 languages. Like a “message in a bottle” set adrift by a ship-wrecked sailor, the record is a token of humanity’s existence, sent into the dark ocean of space.

As you might imagine, the committee charged with selecting the images and music for the Voyager record had intense and fascinating discussions on what to include. (You can read the whole story in the book Murmurs of Earth by Carl Sagan, et al. 1978, Random House. The book is long out of print, but you can often find a copy at a larger library or a used bookstore; it is well worth searching out.) In this activity, students undertake a more modest version of that committee’s work.

Materials (for a class of 30)

- Magazines with a good selection of pictures
- Selection of different kinds of computer clip art
- (optional) Black paper decorated with “stars” for bulletin board

For each team:

- Scissors
- Glue or tape
- Large Sheet of butcher paper
- Notebook paper

For each student:

- “Sending a Message into the Unknown” Worksheet (included here on page 66)
- Pencil

Getting Started

1. Plan ahead so that you have enough magazines for all your classes. A week or so before you begin, have students bring in old magazines with lots of pictures. Be sure to mention that these will not be returned to them. Scan them for appropriate content, looking for a multicultural representation. The pictures should show all aspects of life on Earth: landscapes, people, wildlife, technology, and aspects of civilization.
2. Prepare a place in the classroom where messages to “intelligent extraterrestrial life” can be posted. Optionally, create a bulletin board covered with black paper decorated with stars to represent “deep space.”

3. Copy the “Sending a Message into the Unknown” Worksheet for each student.

Classroom Action

1. Introduce this activity by presenting this idea to students: People are sometimes discouraged because it takes time and hard work to understand a message. It took years to decode the Egyptian hieroglyphics. Extraterrestrials who find our messages on the Pioneer or Voyager spacecraft may have to work hard to understand these messages. But they would be strongly motivated to do so (just as we would be if we received such an obvious message) and they would be greatly rewarded if they made the effort. This activity will give them some inkling of what it is like to decode a message.

2. Hand out the “Sending a Message to the Unknown” Worksheet to each student. Tell students that they will be divided into groups and that each group will have 30 minutes to put together a selection of only 10 magazine pictures that best describe Earth and its inhabitants. Suggest that teams might first want to come to agreement on the message they wish to convey. The Voyager spacecraft had a limited amount of room for photographs, and the team that chose the music and pictures to go on the Voyager record was only given six weeks to complete its task. Even more astounding is the fact that CD-ROM and optical disk technology had not yet been invented, so the technical problem of putting pictures on a phonograph record also had to be dealt with. Giving students a limited amount of time to do this activity simulates the pressure on the group that was asked to complete this Herculean task.

Tell students that their collections of pictures will become collage messages to be put aboard an imaginary space probe. This probe will fly by some nearby planets and moons, and then drift off into deep space in the same manner that the two Voyager (and Pioneer) spacecraft have done. Their picture collections must show the most important facts about being human and living on Earth because if the space probe ever is intercepted by intelligent life somewhere in the cosmos, these pictures will be all that the extraterrestrials will have for learning about us.

Teams should sequence their 10 pictures in any way they wish (e.g. in a chronological order to provide an historical perspective) on butcher paper. The only rule is that they may not write anything on the butcher paper. Extraterrestrials cannot read English. Allow students to create and define symbols to use, such as numbers and scaling units.

3. Now divide the class into teams of three to four students each. Give each team a pair of scissors, a sheet of butcher paper, and glue or tape. Give each team a selection of different kinds of magazines (e.g. natural history, teen, sports, auto, news, ethnic). This task can become quite difficult for students who cannot agree on which pictures to choose. Stress that individuals in teams should work cooperatively, with some give and take. Then “start the clock” and have teams make their collage messages.

Have team members write a brief paragraph on their “Sending a Message to the Unknown” Worksheet summarizing the message that they are trying to convey with their pictures, and how they think an extraterrestrial would interpret their message. One team member should copy this paragraph to notebook paper. This notebook paper copy will be hidden behind the collage message after it is completed; it should not be written onto the collage message itself. Have team members write their names under the paragraph explaining their message.
At the end of the 30 minutes (be strict about the time limits – and give a 5-minute warning), have teams fold up their notebook paper paragraphs, seal them shut with tape or glue, and attach them to their collage messages. The collage messages themselves should be rolled up carefully, and taped securely. Collect the collage messages, or have students pin them to the bulletin board covered with black, star-filled paper.

4. Have students complete the “Sending a Message to the Unknown” Worksheet in class or as homework.

**DAY 2:**

**Materials**

*For each team:*
- Collage messages from Day 1
- (optional) Tape recorders and blank cassette tapes

*For each student:*
- “Did You Get Our Message?” Worksheet (included here on page 67)
- Pencil

**Getting Ready**

1. If you will be doing the optional taping activity (#3 under “Classroom Action”), have students bring in tape recorders and blank cassette tapes.

2. Copy the “Did You Get Our Message?” Worksheet for each student.

**Classroom Action**

1. Reassemble the class into their teams from Day 1. Tell students that they will now play the roles of extraterrestrials who have intercepted a spacecraft carrying some sort of message – that is, each team will now receive a collage message from another team. If you have more than one class, perhaps exchange collage messages between classes. Hand out the collage messages or have student teams “intercept” a collage message from the “deep space” bulletin board (where you tacked up the messages on Day 1). Each team’s challenge is to see what kind of sense (if any) they can make of their message.

2. If you will be using tape recorders, go to step 3, below. Hand out “Did You Get Our Message?” Worksheet to each student. Teams should now break the first seal and unroll their collage message, but they must not open the sealed notebook paper paragraph yet.

   Teams must put themselves in the place of the intelligent life that has found the collage message and attempt to figure it out based only upon the pictures. Remind students that they know nothing about the Earth. They must decide what the collage message is trying to convey. Have students answer the question on their “Did You Get Our Message?” Worksheet as they determine this. (Note that this worksheet does not have a teacher’s key because student responses will vary; accept all reasonable attempts.) Next, teams should break the seal on the notebook paper paragraphs and read the written description to see how their interpretation compares.

3. (Optional Activity with Tape Recorders) For recording first impressions, place a tape recorder near each team. Have teams turn on the tape recorders when they open the first seals and begin talking about what they think the collage message means. The tape recorders will record their spontaneous
discoveries, first ideas, and first impressions. At the end of 10 minutes (or less), the tape recorders should be turned off. Now have students answer the questions on their “Did You Get Our Message?” Worksheets. Teams should then break the seal on the notebook paper paragraphs and read the accompanying written descriptions to see how their interpretation compares.

Choose one (or more) of the recordings at random and play it for the class. Have the team that created the collage message respond – did they get across what they wanted? If not, what message did they wish to communicate?

4. Be sure to leave time for discussion once the activity is done. Did the extraterrestrials understand the messages or not? Students will find that there are problems in communication. Pose a few questions: Why do you think a breakdown of communication happened? What would you do differently to improve communication? How many of the messages got across? Take a quick class survey. Which messages were more successfully understood? Why were they understood? Which messages were too difficult? Why? How could the messages be improved? If you were able to repeat this exercise, could you send a clearer message?

Would it be harder for true extraterrestrials to understand a message from Earth than for Earth students to understand a message sent by other Earth students? What effect does sharing a common culture have? What would it be like if students in the United States made and exchanged collage messages with students in other countries?

What might we have in common with intelligent extraterrestrials? (Try to steer the class toward unambiguous, universal concepts, such as mathematical operations, prime numbers, the structure of hydrogen and carbon atoms, or the properties of the electromagnetic spectrum. We have the physical universe in common, which may provide a basis for communication. In the case of the messages attached to Voyager, the extraterrestrials could also learn about engineering principles and materials used by humans by examining the Voyager spacecraft itself. Natural phenomena such as rocks, clouds, and oceans are likely to have extraterrestrial counterparts.)

GOING FURTHER

Activity: Who Am I?

As a homework project, have students assemble picture collages of their lives that could tell a stranger about who they are and what is important to them. Their collages might include pictures of their hobbies, family, and much else. Limit collages to 10 pictures. Have students share their collages before the class.

Multidisciplinary Studies: Social Science

Ask students who should “speak” for Earth when information is put onto a spacecraft that will be leaving our Solar System (and that may someday be intercepted by an intelligent civilization). Should the message be only about the country sending the spacecraft? (The Voyager team decided early in the game that the sights and sounds of the whole planet must be included, not just the U.S.) Such questions could also be addressed in social science classes, and it might provide an opportunity to team up with another teacher. There are many historical-social issues here for students to ponder. Should we tell extraterrestrials about war, hunger, and disease, or pretend we live in harmony with one another? (Just as we are careful to put our best face forward on a “first date”, should be portray our best features in our first messages?)
The Voyager record, an audio and video disk, that was sent aboard the two Voyager spacecraft. Each craft has now left the realm of the planets and is moving into the space between the stars.

Activity: Multilingual Greetings

Have students create an audiovisual or written greeting from their school that could be included in a message sent out of the Solar System. For example, greetings could be given in all the languages that are represented at your school. This is a marvelous multicultural activity. Have students write and/or act out a greeting that they would like to convey to an alien civilization among the stars.

Activity: Writing a Letter

As a homework assignment, have students write a letter to someone (grandparent, community leader, artist, etc.) asking what they think a message from Earth should contain. Or, have students conduct a phone interview and write up their findings. Have students share their letters of reply or their write-ups with the class. If your school has the ability to log on to the Internet, link up your students with a class in another state or country working on a similar assignment.

Activity: A Message Though Time

People carve their “I was here” message in hundreds of ways during the brief time they inhabit Earth. People have put messages on walls of caves, in monuments, onto pages of books, in photographs and elsewhere. Have students research the great monuments that are meant to send a message to our descendants. Humanity has always sent such messages to the future in the form of tombs, inscriptions, works of literature, and so forth. Have students decide upon a suitable monument that will send a message about their school into the future. Or have students make a time-capsule message to be opened after five years—perhaps even bury the time capsule for future excavation.
SENDING A MESSAGE INTO THE UNKNOWN – WORKSHEET

Name: ____________________________
Date: ____________________________

1. In what ways do you think our ancestors have tried to leave their “I was here” message for future generations to know what their lives were like?

__________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________

2. How are we, who live today, leaving our “I was here” message for future generations?

__________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________

3. In the space provided below, write a paragraph that explains what the message that you made with your group tries to convey, and how you think an intelligent extraterrestrial would interpret it. **Important:** One person from your group needs to write this paragraph down on a separate sheet of notebook paper for use on the next class day.

__________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________
Did you get Our Message? – Worksheet

Name: ________________________________
Date: ________________________________

1. Open a picture message that was created by another group and study it for a few minutes. Do not open the sealed written message taped to its back yet. In the space below, write down what you think the team was trying to say.

__________________________________________________________________________________
__________________________________________________________________________________
__________________________________________________________________________________
__________________________________________________________________________________

2. Now break open the sealed message and read the other team’s description of what they were trying to say with their set of pictures. How does what you wrote compare with what they were trying to convey with their pictures?

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__________________________________________________________________________________

3. How could a clearer message be sent? What could be done to improve the chances of communicating with an extraterrestrial intelligence?

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