



TEACHERS' GUIDE

COMMUNICATION

Background

Communication is critical to astronauts working in space. Each planned activity that is carried out on a space mission has a series of very specific steps. These steps are found on task cards. If you ever have the opportunity to view pictures of the the inside of a space shuttle, or the International Space Station, look for the task cards attached to the walls. It is very important that there are accurate instructions written on the task cards and accurate verbal communication between astronauts on spacewalks, astronauts inside a space vehicle, and Mission Control on Earth.

Overview

In teams of two, students each design a simple object using Lego® bricks. They then create a set of instructions for making their object. They take turns giving verbal instructions to their partner for the construction of their object. During the construction, students are in constant one-to-one verbal contact with their partner.

Key Question

How can we create clear and effective instructions to complete a task?

Objectives

- Create a series of sequential directions to complete a task.
- Use task cards to build a structure.

Materials & Preparation

Each student needs:

- Two identical sets of 10-20 Lego bricks of a variety of shapes and colors (must have four 2 x 4 button Legos, four 2 x 2 button Legos). The remaining can be your choice.
 - Instruction template sheets
1. Students must work in pairs.
 2. Give every student a set of Mission Control task cards and Space Station task cards.
 3. Have pairs of students sit next to each other with some sort of border set up between them so that they cannot see each other's work.

4. Working individually, students make a 'module' from the Lego blocks and write down the stages for its construction into Mission Control taskcards numbered 7, 8, 9, 10.
5. As students complete their instructions, they need to cut the cards and make them into a manual.
6. Assign one student to use the Mission Control task cards and the other student use the Space Station task cards.
7. Mission Control will transmit instructions for building a structure.
8. Once students have completed building a structure, have them switch roles and build the structure that the other teammate created.

Management

This activity is prepared individually and completed in pairs and will take one class period.

The emphasis on clear unambiguous communication is important to the Mission. In order to match the task to students' capability, you can vary the complexity of the shape of the Lego module: a 2-dimensional shape with simple bricks for some students through to a complex 3-dimensional shape with a wider variety of bricks for others. To give students a start, you may find it helpful to discuss what to call the various blocks and to use the example set of instructions. Selecting a distinctive colour for each type of block gives a powerful additional cue for less-able students.

Reflection & Discussion

1. How clear were your instructions?
2. How well could your partner carry out your instructions?
3. How do you make sure your instructions can be understood?
4. What sorts of things go wrong if communication is unclear?

Further Activity

Design a space probe with building blocks, then write instructions for making the space probe.





STUDENT WORKSHEET

COMMUNICATION

Mission Control Task Cards



Getting Started

- Your job in Mission Control is to transmit instructions for constructing the Lego module you have designed.
- Build a structure using the Legos. On Mission Control task cards 7-10, write instructions for building your structure.
- Choose who will be Mission Control and who will be Space Station. Follow the appropriate task cards in order to build the structure. After building the first structure, change jobs so that you have the opportunity to perform both tasks.
- When you 'send' a message to your teammate, please use the proper procedures. Say only what is given in this manual. Clear communication is vital to the success of your mission.

When your teammate informs you that these steps are complete, turn to the next card.

MISSION CONTROL • TASK CARD 1



Test Run: Instructions for Building the Example Lego Module

- When you 'send' a message to your teammate, please use the proper procedures. Say only what is given in this manual.
- Send a verbal message to your teammate. You should say:

Space Station, this is Mission Control:
Do you have the Lego blocks as follows?
4 blocks each with 2 rows of 4 buttons '2 x 4 blocks'.
4 blocks with 2 rows of 2 buttons '2 x 2 blocks'.
Are you ready to begin? OVER.

- When your teammate informs you that these steps are complete, turn to the next card.

MISSION CONTROL • TASK CARD 2





STUDENT WORKSHEET

COMMUNICATION

Mission Control Task Cards

<p style="text-align: center;">○ ○</p> <ul style="list-style-type: none">• Send' the following message to your teammate. You should say: Space Station, this is Mission Control: We will now construct the first section of the Lego module. Place a 2x2 block, a 2x4 block and another 2x2 block to make a line. OVER.• You may be asked to repeat instructions. Do so quickly. Wait until your teammate tells you to proceed before moving to the next card.	MISSION CONTROL • TASK CARD 3
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<p style="text-align: center;">○ ○</p> <ul style="list-style-type: none">• When your teammate is ready to proceed, send this message. You should say: Space Station, this is Mission Control: Place two 2 x 4 blocks exactly on top to lock the bottom row together. OVER.• Turn to the next card.	MISSION CONTROL • TASK CARD 4
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STUDENT WORKSHEET

COMMUNICATION

Mission Control Task Cards

<p>○ ○</p> <ul style="list-style-type: none">• When your teammate is ready to proceed, send this message. You should say: Space Station, this is Mission Control: Now add a 2x2 block, a 2x4 block and another 2x2 block to form the top row and complete the module. OVER.• Turn to the next card.	MISSION CONTROL • TASK CARD 5
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<p>○ ○</p> <ul style="list-style-type: none">• When your teammate is ready to proceed, send this message. You should say: Space Station, this is Mission Control: The assembled module should be a rectangle three blocks high and eight buttons long. Is this correct? OVER• Repeat previous instructions as necessary.	MISSION CONTROL • TASK CARD 6
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STUDENT WORKSHEET

COMMUNICATION

Mission Control Task Cards

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Write instructions for building structure in the spaces on taskcards 7, 8, 9, and 10.

- Send a start-up message to your teammate. You should say:

Space Station, this is Mission Control.
Do you have the following Lego bricks?

OVER.

- After your teammate replies, turn to the next card.

MISSION CONTROL • TASK CARD 7

○ ○

- Send a message to your teammate. You should say:

Space Station, this is Mission Control.

OVER.

- After your teammate replies, turn to the next card.

MISSION CONTROL • TASK CARD 8





STUDENT WORKSHEET

COMMUNICATION

Mission Control Task Cards

<p style="text-align: center;">○ ○</p> <ul style="list-style-type: none">• Send a message to your teammate. You should say: <p style="padding-left: 40px;">Space Station, this is Mission Control.</p> <hr/> <hr/> <hr/> <hr/> <p style="padding-left: 40px;">OVER.</p> <ul style="list-style-type: none">• After your teammate replies, turn to the next card.	MISSION CONTROL • TASK CARD 9
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<p style="text-align: center;">○ ○</p> <ul style="list-style-type: none">• Send a message to your teammate. You should say: <p style="padding-left: 40px;">Space Station, this is Mission Control.</p> <hr/> <hr/> <hr/> <hr/> <p style="padding-left: 40px;">OVER.</p> <ul style="list-style-type: none">• Congratulations! Your team has successfully built a structure. If you have not yet changed roles (i.e., Mission Control and Space Station), do so now. Repeat the steps on the task cards.	MISSION CONTROL • TASK CARD 10
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STUDENT WORKSHEET

COMMUNICATION

Space Station Task Cards

<p>○ ○</p> <p><i>Taking instructions from Mission Control</i></p> <ul style="list-style-type: none">• Your job in the Space Station is to construct a Lego module with guidance from Mission Control. You have all of the materials necessary to build the Lego module and your team-mate in Mission Control has all the necessary instructions.• You will have one-to-one contact with your team-mate in Mission Control.• You will need to follow the step-by-step instructions transmitted by your team-mate and construct the Lego module according to those instructions.• When you send a message to your team-mate, please use the proper procedures. Say only what is in this manual.• Make sure you have all the necessary materials. You will need the correct Lego bricks.	SPACE STATION • TASK CARD 1
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<p>○ ○</p> <p><i>Communication protocols:</i></p> <p>READY: When your team-mate asks if you are ready to begin, 'send' your reply. You should say: Mission Control, this is Space Station: I am ready to begin. OVER.</p> <p>HELP: Follow the instructions carefully. If you need the instructions repeated, send a message to your partner. You should say: Mission Control, this is Space Station: Repeat that instruction. OVER.</p> <p>PROCEED: When you have completed an instruction, send the following message. You should say: Mission Control, this is Space Station: I have completed those instructions. Proceed. OVER.</p>	SPACE STATION • TASK CARD 2
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