



Living in Space

A LEGO® Education Program

Advanced WeDo 2.0 Robotics Program

Living in Space

LEGO® Education WeDo 2.0 Robotics Program

Elementary Robotics Program Overview:

This outline will provide students with STEM focused hands on activities to promote 21st century skills as well as design engineering and computer science. Each day, students will participate in team building activities and opportunities for physical activity as well as receive a mission briefing for daily challenges aligned to standards. Daily challenges will help students develop skills and knowledge to complete the culminating project, to design a base for tourists to visit in space.

Program at a Glance		
Day 1	Welcome to Space Academy Training How do astronauts prepare for living in space?	<ul style="list-style-type: none">• Satellite• Milo A and D
Day 2	Living in Space: Gravity How will gravity affect everyday tasks? Create a game you could play in space.	<ul style="list-style-type: none">• Pulling• Maker Activity: Create a game you can play in space
Day 3	Living in Space: Space Trash Why would recycling be helpful in outer space?	<ul style="list-style-type: none">• Sort to Recycle• Begin work on culminating project
Day 4	Living in Space: Communication How can messages be transferred from one place to another?	<ul style="list-style-type: none">• Send Messages• Begin work on culminating project
Day 5	Culminating Project	<ul style="list-style-type: none">• Wrap Up culminating project• Showcase

Prior to First Day of the Program:

1. Sort sets.
2. Place batteries in WeDo 2 Hubs.
3. Download and install the WeDo 2 software on devices to be used for the program.
4. Determine a naming convention for each set.

Suggestions include school initials and a number (Example: Millcreek Elementary robotics kits names could be MES1; MES2; MES3) Write the hub name on hub and on the set. Write name of set on the box and WeDo 2 hub.

5. Connect hub to iPad, Chromebook or computer and rename each hub on the computer to match the name you assigned to the set.
6. Gather any consumable materials needed for the week.
7. Make sure devices that will be used are fully charged, Bluetooth is enabled and students can access the software.
8. Determine a procedure for when a LEGO piece is dropped (everyone freeze; say LEGO down/LEGO found) and where to place LEGO pieces found that do not belong to the finder.



Living in Space Day 1

Welcome to Space

Big Question:

How do astronauts prepare for a space journey? How do they work together?

Materials needed for the day:

- WeDo 2 kits
- Devices with WeDo 2 software
- Chart paper
- Student journals (could be paper stapled together with students creating the outside of the journal using construction paper and other consumable materials)
- Various craft materials
- Pens
- Pencils
- Markers
- Team badge templates
- Book about astronauts

Outline of Day	Tasks	Time	Materials
9:00 - 10:30	Introductions	30 min	<ul style="list-style-type: none">• LEGO bricks
	Establishing group rules and expectations	15 min	<ul style="list-style-type: none">• Chart paper• Markers• Pens
	Team Building Activity	15 min	<ul style="list-style-type: none">• LEGO bricks
	Mission Briefing 1	5 min	<ul style="list-style-type: none">• None
	Partner selection, team name and team badge	25 min	<ul style="list-style-type: none">• Varies, based on the activity selected• Team badge templates• Markers• Pencils• Scissors

10:30 -10:35	Break		
10:35 -11:25	Astronaut Training (physical activity)	10 min	<ul style="list-style-type: none"> Varies, based on the activity selected
	Design a journal for record keeping	20 min	<ul style="list-style-type: none"> Student journals (see note in materials section) Markers Scissors Construction paper Other craft materials
	Reading and wondering about astronauts	20 min	<ul style="list-style-type: none"> Book about astronauts Student journals
11:25 - 11:30	Get ready for lunch		
11:30 - 12:00	Lunch		
12:00 - 2:10	Mission Briefing 2	5 min	<ul style="list-style-type: none"> None
	Challenge 1: Satellite	30 min	<ul style="list-style-type: none"> Student journals WeDo 2 kit Devices with software
	Readings and Wonderings	10 min	<ul style="list-style-type: none"> Book or article about satellites Student journals
	Break	5 min	<ul style="list-style-type: none"> None
	Milo, the Science Rover	35 min	<ul style="list-style-type: none"> Student journals WeDo 2 kit Devices with software
	Milo Part D: Collaboration	25 min	<ul style="list-style-type: none"> Student journals WeDo 2 kit Devices with software



2:10-2:30	Daily Debrief and Wrap Up	20 min	<ul style="list-style-type: none"> • Student journals
-----------	---------------------------	--------	--

Introductions

Time: 30 minutes

Materials:

- Loose LEGO bricks

Using the LEGO bricks, have students build a model that shows something they really like to do and one thing they really hope to learn at robotics program. When it is time to share, have students say their name and share their model. The teacher can record what the group hopes to learn on a piece of chart paper.

Group Rules and Expectations

Time: 15 minutes

Materials:

- Chart paper
- Markers

Using a piece of chart paper, establish group rules and expectations for the week as a class. You can have students sign the chart paper and then place the rules and expectations in a location that can be reviewed each day.

Team Building Activity

Time: 15 minutes

Materials:

- Loose bricks

Explain to students that each day will include some kind of team building challenge. Working together is an important skill and just like other skills, we can practice it to get better and better.

Build the tallest tower

Have students work in pairs. Make sure each group has the same bricks or give a constraint of using a specific number of bricks. Challenge students to build the tallest tower they can within 5 minutes. At the end of the 5 minutes, encourage students to reflect on:

- What was challenging?
- How did you overcome the challenge?
- What was successful?
- How did you work together?

- If you were to do this tower build again, what would you change?

Mission Briefing 1:

Time: 5 minutes

Materials: None

Your first task, new cadets, is to complete the following:

- *Determine a partner for training exercises*
- *Work with partner to determine a team name and design a team patch*
- *Design a journal for keeping important records this week*
- *Explore different ways astronauts prepare for a space journey.*

Partner Selection, Team Name and Team Badge

Time: 25 minutes

Materials:

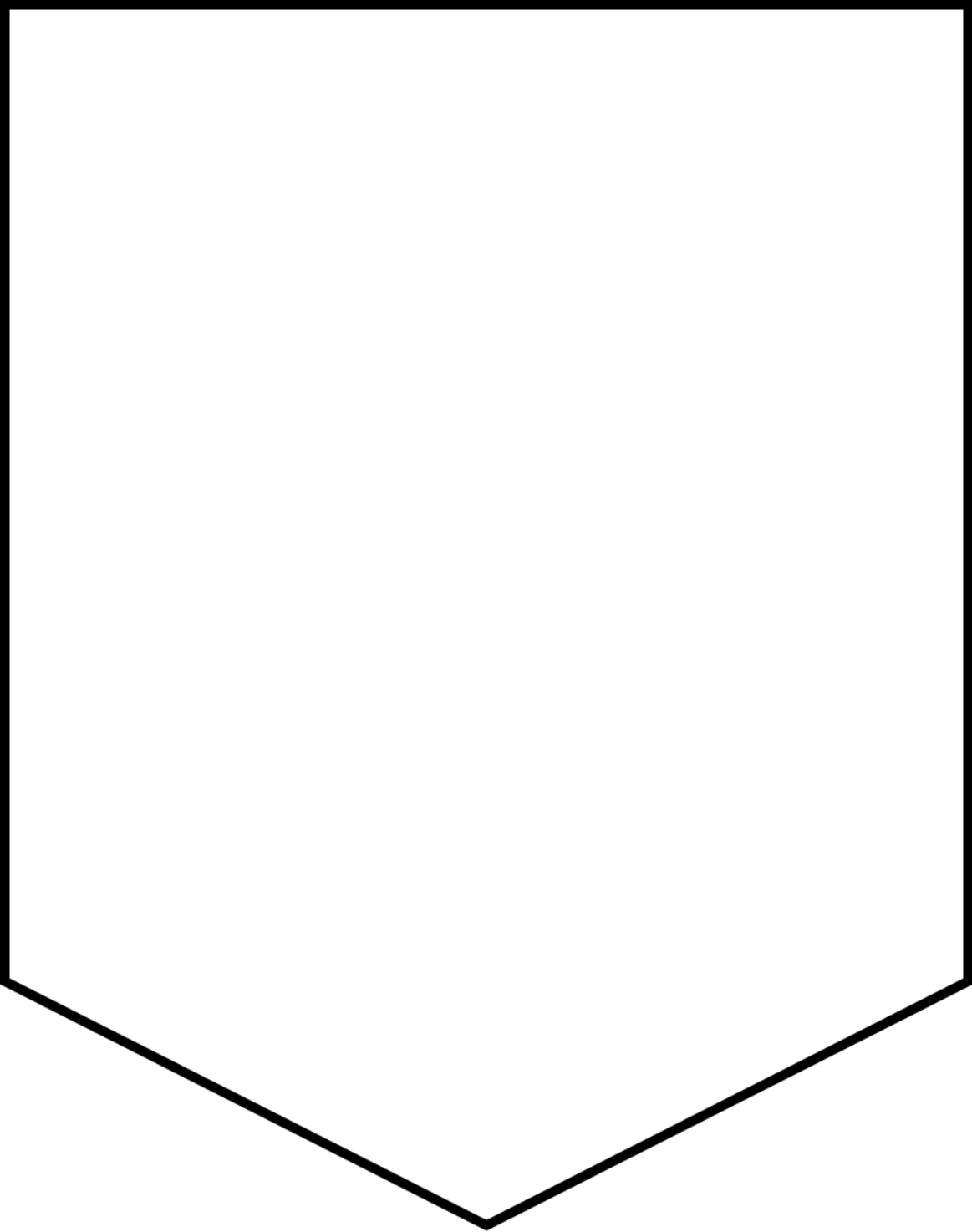
- Student journals (see note in materials section)
- Markers
- Scissors
- Construction paper
- Other craft materials

You can find suggestions for grouping or pairing students from various web resources. A simple web search for creative ways to group students may provide appropriate resources for you to review.

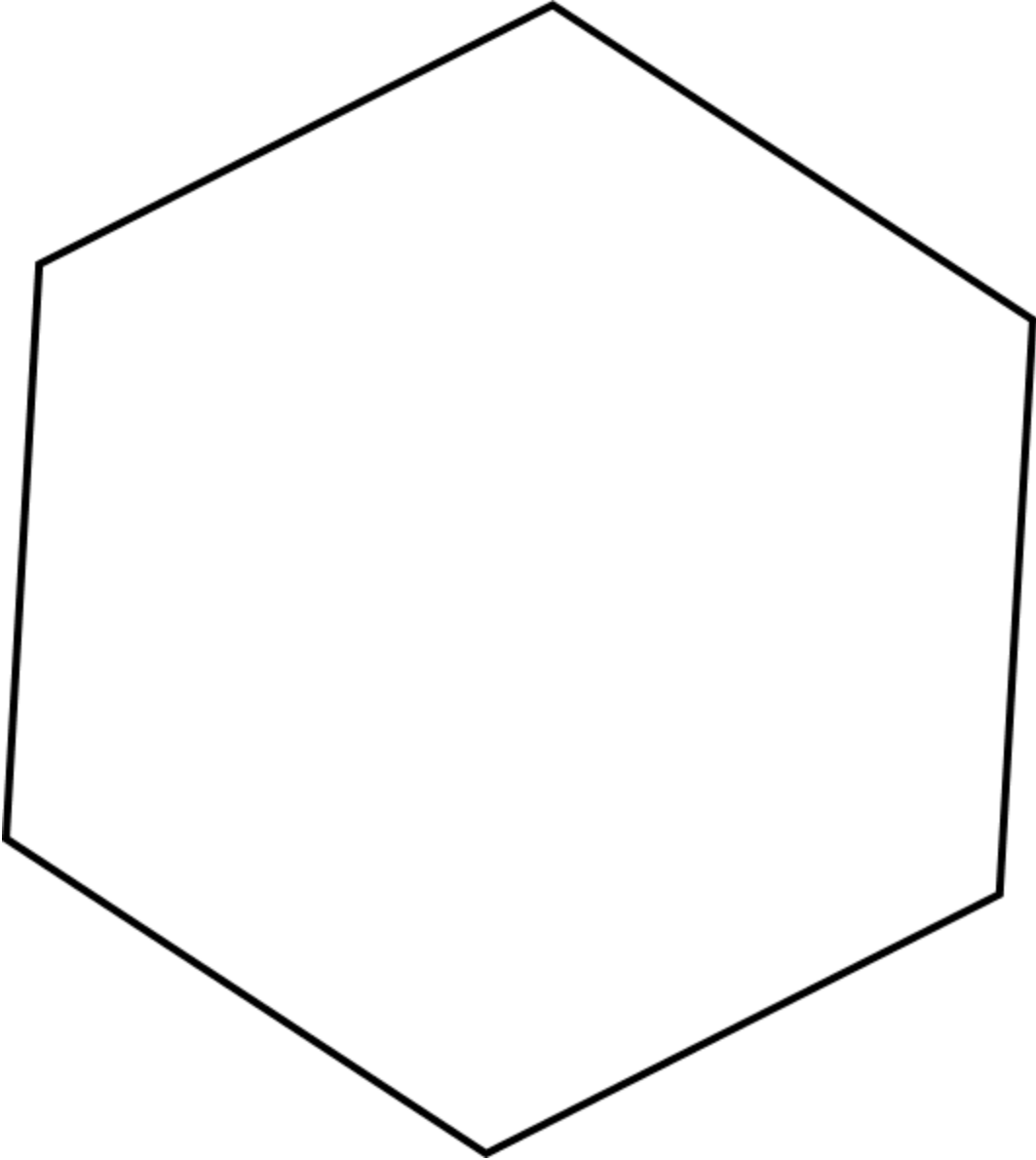
Once partners have been established, student teams can determine a name for their team and design a patch.

Note: While teams are working, assign each group a WeDo 2 kit to use for the week.

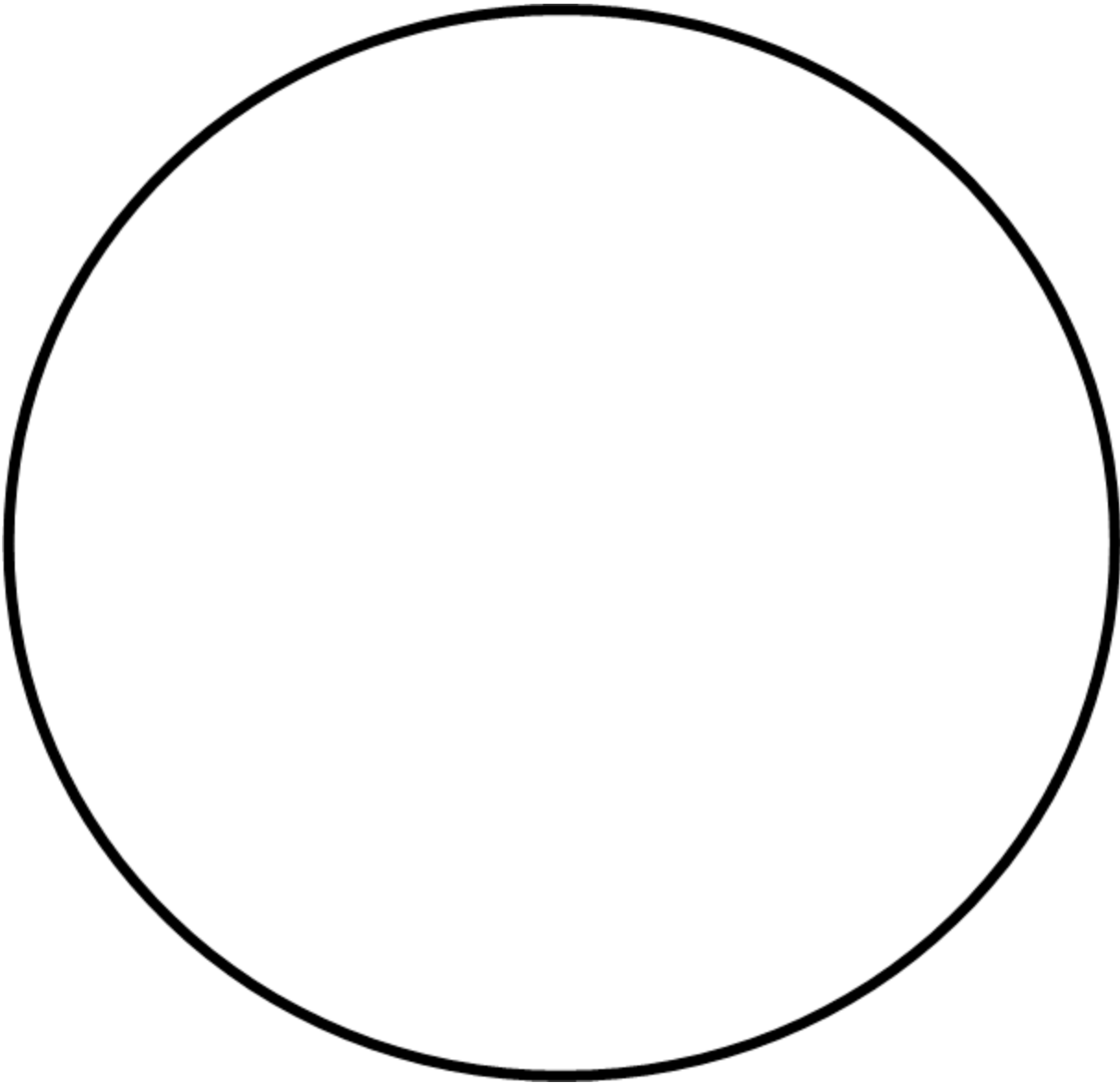
Badge Template



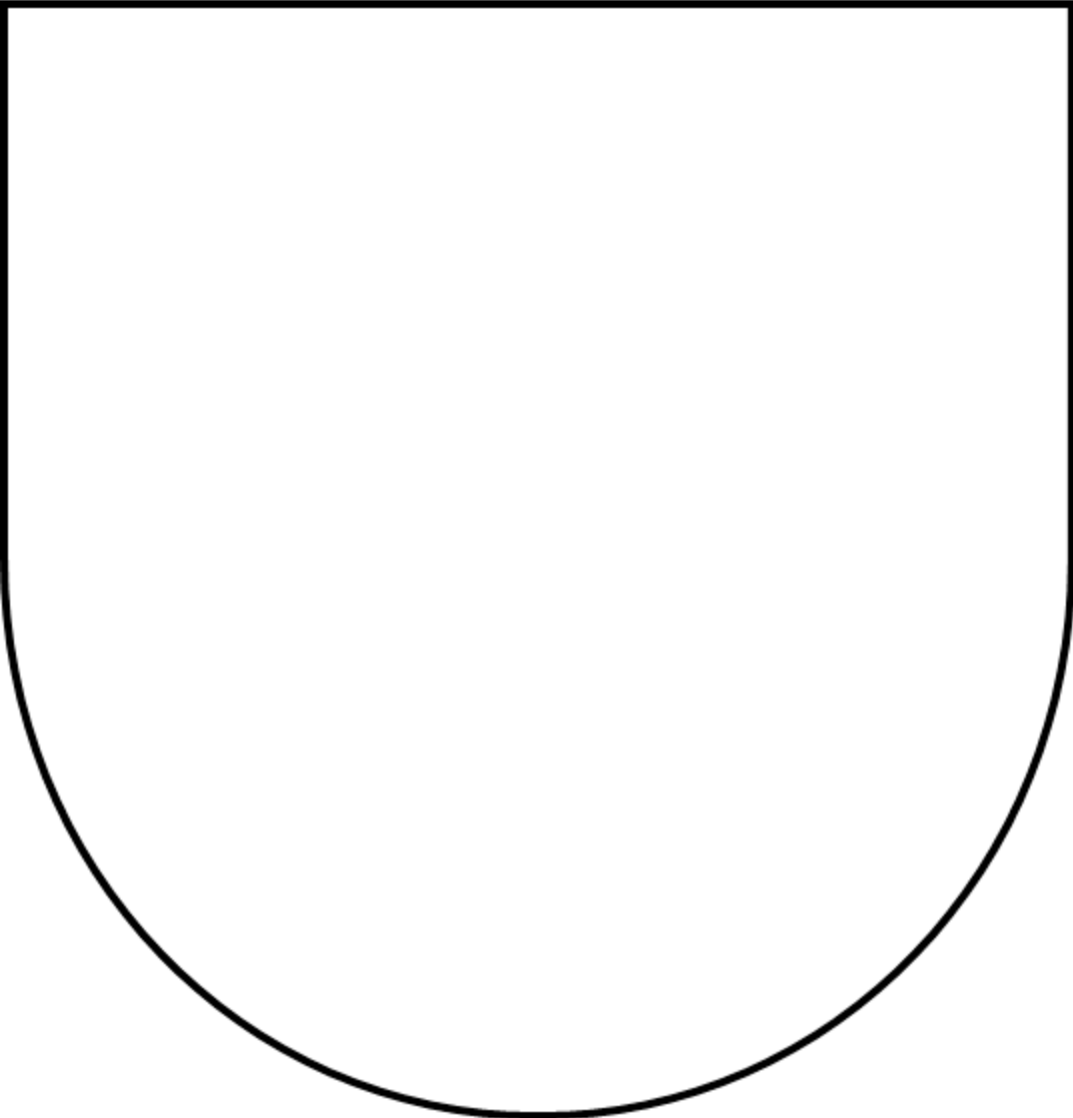
Badge Template



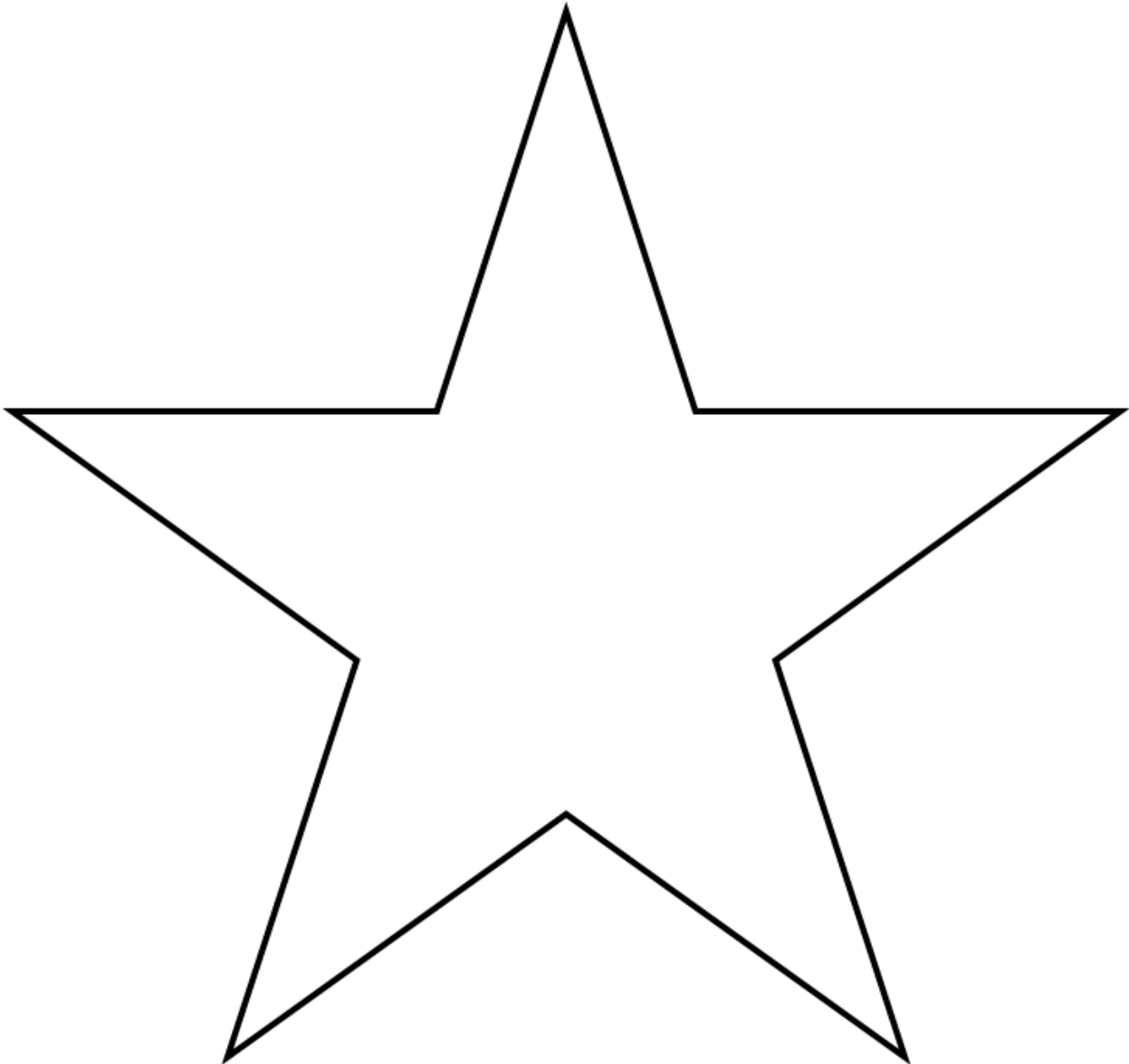
Badge Template



Badge Template



Badge Template



Break

Time: 5 minutes

Astronaut Training: Physical Fitness

Time: 10 minutes

Materials:

- May vary depending on what activity is selected

Take a minute to complete a short physical activity. You may find several ideas for short physical activities for students through a simple web search.

Design a Journal

Time: 20 minutes

Materials:

- Student journals (see note in materials section)
- Markers
- Scissors
- Construction paper
- Other craft materials

Have students create a journal to take notes, share wonderings, write reflections and collect ideas. Ideas for types of journals can be found online.

Readings and Wonderings

Time: 20 minutes

Materials:

- Book about astronauts or journal articles about astronauts

Read a book or a kid friendly journal article about astronauts and how they prepare for space through different types of training. Have students write things they wonder about astronauts in their journals.

Lunch

Time: 30 minutes

Mission Briefing 2

Time: 5 minutes

Materials: None

You have your team and have some background information about how astronauts prepare for work in outer space, you now have a new challenge. To be better prepared for the days ahead, you will need some basic training on the tools we will use this week.

Think about some of the tools people use to explore. To practice using our tools, we are going to examine satellites. How do satellites help us explore? What kind

*of information do they help provide? You will build a model of a satellite to explore programming a motor with WeDo 2.
Be sure to work together, take good notes and have fun.*

Go over a few general guidelines for using the WeDo 2 sets. (What to do if you drop a piece on the floor? Where do you put a piece you have found? What does sharing look like?)

Satellites

Time: 30 minutes

Materials:

- Books or journal article about satellites
- WeDo 2 kit
- Device with WeDo 2 software

Have students read a short article about satellites. They should investigate what satellites do and how they help exploration.

Have students complete the Moving Satellite activity.

Moving Satellite

This activity introduces building and coding using the motor. Students will program the model to make it turn for a set amount of time and then change direction.

Students will:

- Build a LEGO model.
- Connect the model and device.
- Program the motor to turn for a set amount of time.
- Program the motor to turn the other way.

Read the following story aloud or allow your students a few minutes to read it on their own.

Max and Mia listen to the news. They hear about satellites controlled by scientists.

Sometimes satellites need to move to avoid meteors.

They want to build their own satellite.

Max and Mia need your help.

Have students build and program the model.

Extensions:

Students can change the direction of the satellite by pressing once on the Motor This Way Block, or by dragging a Motor That Way Block into the program string.

Students can make the satellite turn for a longer period of time by changing the number shown on the Motor On Block.

See if four groups can coordinate their satellites to move forward and backward (clockwise and counterclockwise) together. Then have them offset by 1 or 1.5 seconds, so they fan from left to right.

After the lesson, have students take apart the satellite models and return pieces to correct places in the WeDo 2 kit.

Have students reflect in their journals:

- What was easy about this challenge?
- What was difficult about this challenge?
- What did I learn from this challenge?

Readings and Wonderings

Time: 20 minutes

Materials:

- Books or journal articles about exploration
- Books or journal articles about satellites
- Student journal

Read a book or a kid friendly journal article about exploration. Discuss what motivates people to explore tools used by explorers and how the tools work.

Have students record three things they learned about exploration and one thing they are still wondering.

Break

Time: 5 minutes

Mission Briefing 3

Time: 5 minutes

Materials: None

Now that you have investigated why people explore and some tools used for exploration, I am presenting you with a new challenge. I would like for you to investigate what scientists and engineers do when they cannot go where they want to explore. To help with your investigation, you are going to build and program a rover and complete several different activities with it.

Getting Started Project: Milo, the Science Rover

Time: 35 minutes

Materials:

- WeDo 2 kit

- Device with WeDo 2 software
- Student journal
- Camera or device to take pictures

Have students follow the lesson for Milo in the WeDo 2 software. During the explore phase of the lesson, students can brainstorm ways scientists and engineers explore places that are difficult to reach. Students can record ideas in their design journals.

Have students build and program Milo.

Wrap Up Milo, the Science Rover lesson with sharing out.

- Have a short discussion with your students about scientific and engineering instruments.
- Have your students describe how science rovers are helpful to humans. Students can document ideas in their Student journals.

Take pictures of the student teams with their science rovers next to the team badge created on Day 1. Pictures can then be incorporated into culminating project at the end of the program.

Have students reflect in their journals:

- What was easy about this challenge?
- What was difficult about this challenge?
- What did I learn from this challenge?

Notes for the Teacher

Students often ask if Milo, the science rover can turn. Encourage them to think through why Milo cannot. If you look carefully at how Milo is constructed, you will notice that both wheels are attached using one axle rod. Based on the way Milo is built, the motor will always turn both wheels at the same time.

Leave Milo built for next activity.

Getting Started Project, Part D: Collaborating

Time: 25 minutes

Materials:

- Milo model from previous activity from WeDo 2 kit
- Device with WeDo 2 software installed
- Student journals

Note: Student teams will need to be placed in pairs. If there is an odd number of student teams, you will need to make sure you have either an additional built Milo

for one team to use **or** you could have a group of three teams (6 students) with three students in each group.

Explore:

Now that your rover has found the plant sample, it is time to carry it back. But wait, it might be too heavy! Let's see if you can collaborate with another rover to move the sample forward together.

Have students complete Getting Started Project: Part D — Collaborating. Each team will need to work with another team to complete this activity.

Share:

Have students talk about their experiences:

- Why is it important to collaborate to solve a problem?
- Give an example of good communication among teams.

Have students reflect in their journals:

- What was easy about this challenge?
- What was difficult about this challenge?
- What did I learn from this challenge?

Extension ideas:

Have students complete a challenge to make a “Figure 8” around two objects. You can also make a race by letting a few students use phone timers or stopwatches to time each team as they complete the course. Other students can write the teams’ times on a chart.

WeDo 2 Clean Up

Have students take apart Milo and return pieces back to the kit. Ask students to take a quick inventory to check for the following pieces:

- Motor
- Tilt sensor
- Motion sensor
- Hub (powered off)

Make sure devices have been powered off and plugged in or stored for the next day.

Daily Debrief and Wrap Up

Time: 20 minutes

Materials:

- Sticky notes
- Student journals
- Pencils

- Pens
- Markers

Have students use sticky notes to write down three things they really enjoyed about the day. Have students use a different sticky note to write down one thing they are still wondering about. Place sticky notes in student journals.

Living in Space Day 2

Gravity

Big Questions:

How will gravity affect everyday tasks? How would gravity affect playing different kinds of games in space?

Materials:

- WeDo 2 kits
- Devices with WeDo 2 software
- Chart paper
- Student journals
- Various craft materials
- Pens
- Pencils
- Markers
- Bottles of water or sticky notes (see teambuilding activity)
- Books about gravity
- Books about gravity in space

Outline for Day	Tasks	Time	Materials
9:00 - 10:30	Welcome	5 min	<ul style="list-style-type: none"> • Student journals
	Team building activity	15 min	<ul style="list-style-type: none"> • LEGO bricks • Objects such as water bottles or • Packs of sticky notes
	Review Group Rules Chart	5 min	<ul style="list-style-type: none"> • Group Rules Chart
	Mission Briefing 1	5 min	<ul style="list-style-type: none"> • None
	Readings and Wonderings	10 min	<ul style="list-style-type: none"> • Books and/or articles on gravity

	Inventory Check	5 min	<ul style="list-style-type: none"> WeDo 2 sets
	Pulling	60 min	<ul style="list-style-type: none"> WeDo 2 sets Devices with WeDo 2 software
10:35 - 10:40	Break		
10:40 - 11:25	Pulling, continued	45 min	<ul style="list-style-type: none"> WeDo 2 sets Devices with WeDo 2 software Student journals
11:25 - 11:30	Get ready for lunch		
11:30 - 12:00	Lunch		
12:00 - 2:10	Astronaut Training (physical activity)	10 min	<ul style="list-style-type: none"> Varies, based on the activity selected
	Games in Space	100 min	<ul style="list-style-type: none"> Video for showing on culminating activity day
	Moon Base Work	20 min	<ul style="list-style-type: none"> Varies, based on Moon Base design
2:10 - 2:30	Daily Debrief and Wrap Up	20 min	<ul style="list-style-type: none"> Student journals

Welcome

Time: 5 minutes

Materials:

- Student journals

Welcome students back. Have students share their ideas about collaboration from Day 1 with a friend. Have each child share one or two characteristics mentioned by their partners (great listening activity). Create a compiled list of positive characteristics about collaboration on a piece of chart paper to share at the end of the week.

Team Building Activity

Time: 15 minutes

Materials:

- LEGO bricks

Have students work in groups of 4-6 students.

Build a Tower

Provide each group with a container of loose bricks. Have students work together to build the tallest tower they can that will hold the weight of an object. An object could be a water bottle or a pack of sticky notes. Objects need to be given to each group and they need to be consistent. Hopefully, students will apply some of the knowledge learned from Day 4 Robust Structures to the build.

Review Group Rules Chart

Time: 5 minutes

Materials:

- Group Rules Chart from Day 1

Quickly review the group rules and expectations created on Day 1 by the students. Highlight positive moments from previous day (times when students helped each other, asking great questions, teamwork, helping to clean up...)

Mission Briefing 1

Time: 5 minutes

Materials: None

Today we are going to investigate how objects move in space. First, we will need to explore a little bit about how objects move on earth. You will read about gravity and then build a pull robot to examine pushing, pulling and friction.

Readings and Wonderings

Time: 10 minutes

Materials:

- Books or articles about gravity and gravity in space
- Student journal

Read a short book or article about gravity and how it impacts life in space. Have students write down two wonderings they have about gravity in outer space.

Inventory Check

Time: 5 minutes

Materials:

- WeDo 2 set

Ask students to find their partner from Day 1.

Have students place all elements from one compartment in the tray onto the lid of the box. Then, using the paper insert in the kit (the one that is placed under the lid of the box) have students count and replace pieces back to the compartment. Teams should be able to complete one compartment in five minutes. If pieces are missing, have students search other compartments, look to see if the piece is stuck in or on another piece in the bottom of the bin or check the LEGO lost and found area in your classroom.

Pulling Lesson

Time: 60 minutes

Materials:

- WeDo 2 sets
- Devices with WeDo 2 software
- Objects to test the pull robot

Complete the pulling lesson from WeDo 2.

Questions for discussion:

- What are some ways you can make an object move?
 - To make it move, pull or push it, or, more generally, apply a force to it.
- Can you explain friction? Is it easier to pull something on a normal surface than on a slippery one?
 - This question refers to friction. It is easier to move an object on a slippery surface than on a rough one.
 - Depending on the mass of an object, it can also be more difficult to move the object on a slippery surface because there is less grip to push or pull.

Predict what will happen if the pull force is greater in one direction than the other.

- This answer should be based upon students' predictions in the beginning. This means that at this point, your students' answers can be incorrect. Following the lesson, students should be able to discuss the fact that the motion of the object will be in the direction of the greatest push or pull force.

Other questions to explore:

- How does gravity affect the motion of objects in space?
- Is there friction on the moon?

Break

Time: 5 minutes

Pulling Continued

Time: 45 minutes

Materials:

- WeDo 2 sets
- Devices with WeDo 2 software
- Objects to test the pull robot

Continue the lesson on pulling. If time allows, have students modify the pull robot and have a tug of war contest. (see Investigate More in lesson plan for details).

Have students answer the following questions in their Student journals:

- Predict how the pulling robot might behave on the moon. What are some things you would need to think about when designing a moon based pull robot?
- What was easy about this challenge?
- What was difficult about this challenge?
- What did I learn from this challenge?

Lunch

Time: 30 minutes

Astronaut Training: Physical Fitness

Time: 10 minutes

Materials:

- Various depending on what activity is selected

Take a minute to complete a short physical activity. You may find several ideas for short physical activities for students through a simple web search.

Mission Briefing 2

Time: 5 minutes

Materials: None

Now that you understand a little more about how objects move on earth, we are going to investigate how objects move on the moon. You will need to read a little more about gravity and how it affects the movement of objects.

Next, your team will work to design a game that can be played in space on the moon base. It could be a game on earth that is modified to accommodate the change of how objects move on the moon or it can be a completely new game. You will need to include the WeDo 2 robot in your game design in some manner as well as some additional craft materials (no glue, please).

When you are ready, we will take a short video to document your game in order to share it on the last day of the program with family and friends.

Games in Space

Time: 100 minutes

Materials:

- WeDo 2
- Devices for WeDo 2
- Craft materials (no glue)
- Moon base foundation (optional if students want to use as scenery for game)
- Device to take video
- Student journals

Engage: You may spark interest by showing various video clips of games played in the US (baseball, basketball, hockey, football, etc.). You may also located videos or images of how games are played on the International Space Station to share with students.

Ask students how gravity on earth affects the motion of these objects in the games.

Working in pairs, have students create a game for playing at the moon base.

Students need to consider these things:

- Name of the game
- Number of players
- Rules of the game
- How the game is won
- How the game would be different when played on the moon versus played on Earth

Students will need to include the WeDo 2 in the design (can use either motor or sensors or both) as well as other materials provided.

Once students have designed their game, video tape a demonstration. Videos can be looped in a presentation software program to share at showcase.

When finished, have students reflect in their Student journals:

- What was easy about this challenge?
- What was difficult about this challenge?
- What did I learn from this challenge?

Moon Base Work

Time: 20 minutes

Materials:

- Device for research

- Bulletin Board paper
- Various craft materials

Place three student teams together for the culminating project. (6 students total)

Introduce the moon base project to students. Have students research the surface of the moon. In groups, have students create a moon surface for the final project. Students can use a large piece of bulletin board paper, Construction paper, markers, crayons, etc. The surface needs to be large enough for demonstrating different tasks for the showcase. On the moon surface, students will design a moon base. The moon base must be ready for showcase on Day 5.

Note: Your base will need to service the following:

- Up to 5 tourists at a time
- Two full time staff
- Areas for shuttle landing
- Area to store rovers and shuttles
- Area for space trash and recycling
- Area for food and other basic needs
- Area for work space and communication hub
- Areas for entertainment and physical activity

Daily Debrief and Wrap Up

Time: 20 minutes

Materials:

- Student journals
- Markers
- Crayons
- Colored Pencils

Take a minute to clean up the room from the day. Take apart the created games and WeDo 2 structures. Turn off hubs. Return all of the supplies to their place in the classroom. Be sure to plug in devices for the next day. Once the room is clean, have students write the following reflection in their Student journals:

Ask students reflect on the day and select their “super hero moment”- a time during the day when they accomplished something great! Have students design a cape in their Student journals and write their “super hero moment” underneath.

Living in Space Day 3

Space Trash

Big Question:

Why would recycling be helpful in outer space?

Materials:

- WeDo 2 kits
- Devices with WeDo 2 software
- Chart paper
- Student journals
- Various craft materials
- Pens
- Pencils
- Markers
- Index cards
- Book and/or articles about recycling

Outline of Day	Tasks	Time	Materials
9:00 - 10:30	Welcome	5 min	<ul style="list-style-type: none"> • Student journals
	Team building activity	15 min	<ul style="list-style-type: none"> • LEGO bricks
	Review Group Rules Chart and activities from yesterday.	5 min	<ul style="list-style-type: none"> • Group Rules Chart
	Mission Briefing	5 min	<ul style="list-style-type: none"> • None
	Readings and wonderings about recycling	10 min	<ul style="list-style-type: none"> • Various books and articles on recycling
	Inventory Check	5 min	<ul style="list-style-type: none"> • WeDo 2 sets
	Sort to Recycle	60 min	<ul style="list-style-type: none"> • WeDo 2 sets • Devices with WeDo 2 software

10:35 -10:40	Break		
10:40 -11:25	Sort to Recycle, Continued	35 min	<ul style="list-style-type: none"> • WeDo 2 sets • Devices with WeDo 2 software
	Astronaut Training (physical activity)	10 min	<ul style="list-style-type: none"> • Varies, based on the activity selected
11:25 - 11:30	Get ready for lunch		
11:30 -12:00	Lunch		
12:00 - 2:10	Mission Briefing	5 min	<ul style="list-style-type: none"> • None
	Moving Materials	60 min	<ul style="list-style-type: none"> • WeDo 2 sets • Devices with WeDo 2 software
	Break	5 min	
	Moving Materials, Continued	35 min	<ul style="list-style-type: none"> • WeDo 2 sets • Devices with WeDo 2 software
	Moon Base work	25 min	<ul style="list-style-type: none"> • WeDo 2 sets • Devices with WeDo 2 software • Craft Materials
2:10 - 2:30	Daily Debrief and Wrap Up	20 min	<ul style="list-style-type: none"> • Student journals

Welcome

Time: 5 minutes

Materials: Student journals

Welcome students back. Have students share their superhero capes from Day 2 with a friend. Have each child share one or two characteristics mentioned by their partners (great listening activity).

Team Building Activity

Time: 15 minutes

Materials:

- LEGO bricks

You will need identical sets of bricks. For example, if you have 5 groups, you will need 6 sets of identical bricks — one for the model build and one set for each team.

Relay Race

- Introduce the relay race activity as described below.
- Create teams of 4-5 participants.
- Build and hide a model consisting of 12-15 LEGO bricks, you decide how it looks – remember, it should not be too easy to copy!
- Give the participants approximately 10 minutes to complete the activity.

Remember to say/cover the following points:

- Work in teams of 4-5.
- The facilitator builds a model of 12-15 bricks and hides it at the far end of the room, behind an obstacle.
- Teams line up and one from each team runs to see the model.
- When the team member returns to the base, he/she can place one brick, then the next team member runs, etc.
- A team member can only place one brick **or** remove one brick.
- The aim is to copy the hidden model as fast as possible.

Tip: Variation - The teams cannot talk while working on building the model.

Review Group Rules and Expectations

Time: 5 minutes

Materials:

- Group Rules Chart

Quickly review the group rules and expectations created on Day 1 by the students. Highlight positive moments from Day 1 (times when students helped each other, asking great questions, teamwork, helping to clean up...)

Mission Briefing

Time: 5 minutes

Materials: None

Today we are going to investigate how we deal with materials in space like our trash. What will we do with the things we use up? How will we move materials around? First, we will need to explore a little bit about what we can do with our trash. You will read a little bit about recycling and then build a pull robot to examine ways we can sort, recycle, and move materials around.

Readings and Wonderings

Time: 10 minutes

Materials:

- Short book or article on recycling
- Student journal

Read a short book or article about recycling.

Have students write down two reasons why it might be important to recycle at their moon base.

Inventory Check

Time: 5 minutes

Materials:

- WeDo 2 set

Ask students to find their partner from Day 1.

Have students place all elements from one compartment on the lid of the box. Then, using the paper insert in the kit (the one that is placed under the lid of the box) have students count and replace pieces back to the compartment. Teams should be able to complete an inventory of one compartment in five minutes. If pieces are missing, have students search other compartments, look to see if the piece is stuck in or on another piece in the bottom of the bin or check the LEGO lost and found area in your classroom.

Sort to Recycle Lesson

Time: 60 minutes

Materials:

- WeDo 2 sets
- Devices with WeDo 2 software

Complete the Sort to Recycle Lesson.

Break

Time: 5 minutes

Sort to Recycle, Continued

Time: 35 minutes

Materials:

- WeDo 2 sets

- Devices with WeDo 2 software
- Student journals

Wrap Up initial lesson. If time allows, have students either design further solutions or complete the collaboration suggestion from lesson plan.

Astronaut Training: Physical Fitness

Time: 10 minutes

Materials:

- Materials may vary depending on what activity is selected.

Take a minute to complete a short physical activity. You may find several ideas for short physical activities for students through a simple web search.

Lunch

Time: 30 minutes

Mission Briefing

Time: 5 minutes

Materials: None

Moving materials is a necessary function because we as people need certain materials to survive and use different materials in our everyday lives. Living at the moon base will mean storing materials that we need when we are not using them. We will need to be able to move materials around as needed for our daily lives.

This morning, you will investigate ways we transport and assemble materials. You will be building a model to help explore communication.

Moving Materials Lesson

Time: 60 minutes

Materials:

- WeDo 2 sets
- Devices with WeDo 2 software

Break

Time: 5 minutes

Moving Materials, Continued

Time: 35 minutes

Materials:

- WeDo 2 sets
- Devices with WeDo 2 software
- Student journals

Moon Base Work

Time: 25 minutes

Materials:

- Team moon bases they have been working on
- Various craft materials

The surface needs to be large enough for demonstrating different tasks for the showcase. On the moon surface, students will design a moon base. The moon base to have it ready for showcase on Day 5.

Note: Your base will need to service the following:

- Up to 5 tourists at a time
- Two full time staff
- Areas for shuttle landing
- Area to store rovers and shuttles
- Area for space trash and recycling
- Area for food and other basic needs
- Area for work space and communication hub
- Areas for entertainment and physical activity

Daily Debrief and Wrap Up

Time: 20 minutes

Materials:

- Student journals
- Markers
- Crayons
- Colored Pencils

Let's Give a Shout Out!

Have students trace their hand in their student journal. On their journal hand, have students give themselves a shout out for the day for any achievement.

Take a minute to talk about why positive feedback from our friends is good for us and encourages us to work even harder. Have students share some comments that would be positive to tell a friend in class.

Have students trace their hand again in their student journals. Have students pair up and give each other shout outs in their journals for things they noticed.

Living in Space Day 4

Communication

Big Question:

How can messages be transferred from one place to another?

Materials:

- WeDo 2 kits
- Devices with WeDo 2 software
- Chart paper
- Student journals
- Various craft materials
- Pens
- Pencils
- Markers
- Book and/or articles about communication

Outline for Day	Tasks	Time	Materials
9:00 - 10:30	Welcome	5 min	<ul style="list-style-type: none"> • Student journals
	Team Building Activity	15 min	<ul style="list-style-type: none"> • LEGO bricks
	Review Group Rules Chart	5 min	<ul style="list-style-type: none"> • Chart paper with group rules
	Mission Briefing	5 min	<ul style="list-style-type: none"> • None
	Readings and Wonderings	10 min	<ul style="list-style-type: none"> • Various books and articles on communication
	Inventory Check	10 min	<ul style="list-style-type: none"> • WeDo 2 sets
	Send Messages Lesson	60 min	<ul style="list-style-type: none"> • WeDo 2 sets • Devices with WeDo 2 software

10:35-10:40	Break		
10:40-11:25	Moon Base Work	45 min	<ul style="list-style-type: none"> • WeDo 2 sets • Devices with WeDo 2 software • Craft Materials
11:25 - 11:30	Get ready for lunch		
11:30 - 12:00	Lunch		
12:00 - 2:10	Astronaut Training (physical activity)	10 min	<ul style="list-style-type: none"> • Varies, based on the activity selected
	Mission Briefing	5 min	<ul style="list-style-type: none"> • None
	Space Exploration	60 min	<ul style="list-style-type: none"> • WeDo 2 sets • Devices with WeDo 2 software • Craft materials
	Break	5 min	
	Space Exploration, continued	35 min	<ul style="list-style-type: none"> • WeDo 2 sets • Devices with WeDo 2 software • Craft materials
	Moon Base Work	20 min	<ul style="list-style-type: none"> • WeDo 2 sets • Devices with WeDo 2 software • Craft Materials
2:10 - 2:30	Daily Debrief and Wrap Up	20 min	<ul style="list-style-type: none"> • Student journals

Welcome

Time: 5 minutes

Materials:

- Student journals

Welcome students back. Take a minute to have students read over their shout outs from the previous day. Then have student high five each other with a positive word to start of the morning.

Team Building Activity

Time: 15 minutes

Materials:

- Sets of identical LEGO bricks (Each pair of students will need the same set of 6 bricks. Sets may vary among groups.)

Pair students together (see Day 1 for ideas on pairing students).

Designate one student as Mission Control and one student as Moon Base.

Back to Back

Students will sit back to back. Mission Control students will build something using the bricks they have without letting their partners see. When build is complete, Mission Control will communicate to Moon Base the steps to build the exact same model without looking at them. Moon Base may ask questions. The goal is for the students to have the same model.

Review Group Rules Chart

Time: 5 minutes

Materials:

- Group rules chart from Day 1

Quickly review the group rules and expectations created on Day 1 by the students.

Highlight positive moments from Day 1 (times when students helped each other, asking great questions, teamwork, helping to clean up...).

Mission Briefing

Time: 5 minutes

Materials: None

Communication between people has always been a fundamental part of our existence. In establishing a base on the moon, communication will be critical for keeping in contact with mission control on earth.

This morning, you will investigate ways we send information. You will be building a model to help explore communication.

Readings and Wonderings

Time: 10 minutes

Materials:

- Short book or article on communication (Morse code or something similar)
- Student journal

Read a short book or article about communication.

Have students brainstorm different ways we communicate today.

Inventory Check

Time: 5 minutes

Materials:

- WeDo 2 set

Ask students to find their partner from Day 1.

Have students place all elements from one compartment on the lid of the box. Then, using the paper insert in the kit (the one that is placed under the lid of the box) have students count and replace pieces back to the compartment. Teams should be able to complete an inventory of one compartment in five minutes. If pieces are missing, have students search other compartments, look to see if the piece is stuck in or on another piece in the bottom of the bin or check the LEGO lost and found area in your classroom.

Send a Message Lesson

Time: 60 minutes

Materials:

- WeDo 2 sets
- Devices with WeDo 2 software

Complete the WeDo 2 lesson, Send a Message.

Break

Time: 5 minutes

Moon Base Work

Time: 45 minutes

Materials:

- Team moon bases they have been working on
- Various craft materials

The surface needs to be large enough for demonstrating different tasks for the showcase. On the moon surface, students will design a moon base. The moon base to have it ready for showcase on Day 5.

Lunch

Time: 30 minutes

Astronaut Training: Physical Fitness

Time: 10 minutes

Materials:

- Materials may vary depending on what activity is selected.

Take a minute to complete a short physical activity. You may find several ideas for short physical activities for students through a simple web search.

Mission Briefing

Time: 5 minutes

Materials: None

With our moon bases almost complete, it is time to think about exploring and how we will allow tourists to experience the landscape of the moon. You need to create a space exploration vehicle that can be used to tour the moon. Consider the surface of the moon and how you will need to move around.

Space Exploration Lesson

Time: 60 minutes

Materials:

- WeDo 2 sets
- Devices with WeDo 2 software

Begin the WeDo 2 lesson, Space Exploration.

Break

Time: 5 minutes

Space Exploration Lesson, Continued

Time: 35 minutes

Materials:

- WeDo 2 sets
- Devices with WeDo 2 software

Complete the WeDo 2 lesson, Space Exploration.

Moon Base Work

Time: 20 minutes

Materials:

- Team moon bases they have been working on
- Various craft materials

Daily Debrief and Wrap Up

Time: 20 minutes

Materials:

- Student journals
- Markers
- Crayons
- Colored Pencils

Have students draw a light bulb in their student journals. Inside the light bulb have students write one or two things they discovered about themselves during the program.



Living in Space Day 5

Culminating Project

Let's Share What We've Learned!

Outline for Day	Tasks	Time	Materials
9:00 - 10:30	Welcome and team building activity	10 min	<ul style="list-style-type: none">LEGO bricks
	Review Group Rules Chart	5 min	<ul style="list-style-type: none">Group Rules Chart
	Mission Briefing	5 min	<ul style="list-style-type: none">None
	Showcase overview and expectations	10 min	<ul style="list-style-type: none">None
	Culminating Project: Group Work	60 min	<ul style="list-style-type: none">WeDo 2 setsDevicesCraft materials
10:35 - 10:40	Break		
10:40 - 11:25	Culminating Project: Set up for Showcase	45 min	<ul style="list-style-type: none">WeDo 2 setsDevicesStudent projects
11:25 - 11:30	Get ready for lunch		
11:30 - 12:00	Lunch		
12:00 - 1:30	Showcase	90 min	<ul style="list-style-type: none">Student projects
1:30 - 2:30	Daily Debrief, Clean Up and Program Wrap Up	60 min	<ul style="list-style-type: none">WeDo 2 setsCertificates of Completion

Welcome

Time: 5 minutes

Materials: Student journals

Welcome students back. On a piece of chart paper, draw a really large light bulb. Have students write positive things they discovered about themselves during the program.

Team Building Activity

Time: 15 minutes

Materials:

- LEGO bricks

Build Something That...

- Work in groups of 4-5.
- Place the bricks in front of you.
- The teacher will name a category and your group will build an 2-3 items that belongs in this category.
- When done building, please explain why this item belongs in the category.

Build something that:

- *can fly*
- *is an animal*
- *can be used for transportation*
- *you can have for lunch or dinner*

Tip: Ideas for other categories include a movie, cartoon characters, buildings, and so forth.

Mission Briefing

Time: 5 minutes

Materials: None

Today, your mission is to share what you have learned and built with others. You will need to be prepared for our guests. Working in your large teams, you will need to do the following:

- *Make sure your moon base is complete.*
- *Have designated areas for each pair to demonstrate their project on or near the moon base.*
- *Be prepared to answer questions from our guests.*

Note: As a group you might brainstorm potential questions for students to answer.

Showcase Overview and Expectations

Time: 10 min

Materials: None

Go over your expectations for the showcase in the afternoon so students are prepared for guest.

Culminating Project: Group Work

Time: 60 minutes

Materials:

- WeDo 2 sets
- Devices with WeDo 2 software
- Craft Materials

This is time set aside for groups to work on culminating project – the moon base.

Break

Time: 5 minutes

Culminating Project: Set up for Showcase

Time: 45 minutes

Materials:

- WeDo 2 sets
- Devices with WeDo 2 software
- Craft materials

Allow time for students to get ready for guests after lunch.

Have each pair of students display their team badge near the moon base

Note: Each moon base should have three badges since three pairs of students were working together on the finished projects.

Lunch

Time: 30 minutes

Showcase

Time: 90 minutes

Materials:

- Student work

Students should be set up and ready when guests arrive.

Other materials you might have on display:

- Charts you've created during the week
- Video of space games



- Pictures

Daily Debrief, Clean Up and Wrap Up

Time: 60 minutes

Materials:

- Student projects
- Certificates

Have students disassemble their WeDo models.

Make sure kits have the hub, motor, sensors and kits are in good order.

Make sure devices are powered off and stored.

Have students clean up materials from the showcase.

Students can take home their journals.

Present each student with a certificate of completion.

