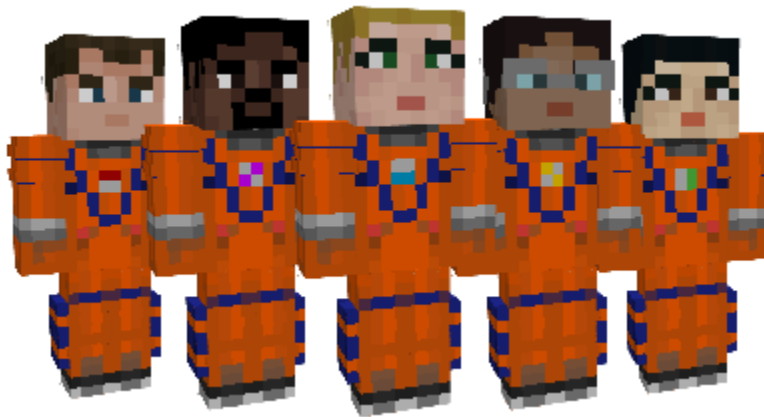




Artemis: Moon Base one Build Challenge



EDUCATOR GUIDE

This Educator Guide includes:

- Theme Overview
- Ways to Use this Learning Content
- Multiplayer Support
- Overview of Lesson
- Minecraft Visual Glossary
- Educational Standards
- Getting Started: Minecraft Education

[Education.minecraft.net](https://education.minecraft.net)

Theme Overview

Are you ready for lunar exploration, space explorers?!

Welcome to the frontier of lunar colonization and education! Moon Base One Build Challenge is an immersive Minecraft experience that puts you at the heart of humanity's efforts to thrive on the Moon. It offers a unique blend of creativity, survival skills, and scientific learning, all centered around building and maintaining thriving lunar colonies. Whether you're a solo pioneer or part of a team of astronauts, you'll face the exhilarating challenges of constructing sustainable habitats, managing vital resources, and collaborating to ensure the success of your lunar community.

Moon Base One was inspired by the National Aeronautics and Space Administration (NASA) Artemis missions to bring the excitement of lunar exploration and settlement into classrooms and homes around the world. This learning experience will provide students, ages 8-18, with an opportunity to construct a sustainable habitat on the Moon! This game can be played as a single player experience or as a multiplayer experience (see the "Multiplayer Support" on page 4 for more information).

This Educator Guide is designed to provide you with information to help you support game play for all students. This guide will provide you background information and helpful tips to help you feel comfortable and confident to utilize this learning content in your educational environment. Within this guide, you will find the necessary materials to lead an intentional experience to engage in dialog around lunar exploration and sustainable habitats, facilitate a successful in-game experience, and support student learning throughout game play. If you are ready, accept your build challenge on the Moon and get started!

Ways to use this learning content

How can this lesson be used?

Integrated into science classrooms	Moon Base One is connected to numerous science standards. You could easily look at your academic standards and use this learning content when you are teaching scientific process skills, Earth and space science standard, or physics. This learning content is a great way to model and simulate abstract science concepts such as gravity, force, and motion.
STEAM Labs or Digital Makerspaces	Who wouldn't love to use Minecraft in a fully integrated learning environment where everything from the furniture and technology to curriculum and assessment work together to support hands-on, minds-on learning?! The Artemis learning content could be used for student exploration through this applied technology.
Afterschool learning opportunities	After a full instructional day, students need something fun and engaging to provide motivation for learning. What could possibly be more fun and engaging than Minecraft Education! Not only will students love playing Minecraft, but they will also learn educational concepts and develop their skills in creativity, communication, collaboration, and critical thinking.
Summer camps	Are you planning or hosting a summer camp? Who doesn't love a space-themed camp?! This learning content could be included in a space exploration week of fun and learning! Students will also have the opportunity to learn about great careers at NASA!
Homeschool groups	You don't have to be exclusively at a school or part of a school district to utilize Minecraft Education. Homeschools, families, and other organizations can purchase and manage Minecraft Education through our commercial offer. You can find more information here .

Multiplayer Support

If you want to have students play together, this game, Artemis: Return to the Moon, supports a multiplayer experience.

Multiplayer is one of the most popular and effective ways to leverage Minecraft in the classroom. It's a great way to encourage collaboration, communication and problem solving as students work together on projects in a shared Minecraft world.

Minecraft Education features multiplayer games that connect using picture-based join codes. All players in the same Office 365 tenant can host and join worlds together in the classroom. For most users, this means the part of your email address after the @ symbol matches that of the other players. A single multiplayer game can host a maximum of 40 players, and can connect players across [all supported platforms](#). Server-style multiplayer or a dedicated server is not possible at this time.

Here are the requirements for the best possible multiplayer experience:

- Multiplayer is possible for players within the same Office 365 tenant.
- Players should have the most [up-to-date version](#) of Minecraft Education
- All players need to be running the same version of Minecraft Education to be able to host and join worlds together.

[This article](#) will provide you with more in-depth information about hosting, join codes, troubleshooting, etc.

You can also watch [this video](#) to see how to host and join multiplayer sessions.

Although the Multiplayer experience was designed and optimized for classroom use where all players are on the same network, Multiplayer across different internet connections is possible by making some changes to your home network configuration. Visit the [How to Set Up a Multiplayer Game from Home Guide](#) to understand how to host a game that players on other networks will be able to join.

LESSON OVERVIEW - Artemis: Moon Base One Build Challenge

Overview of the Game Play

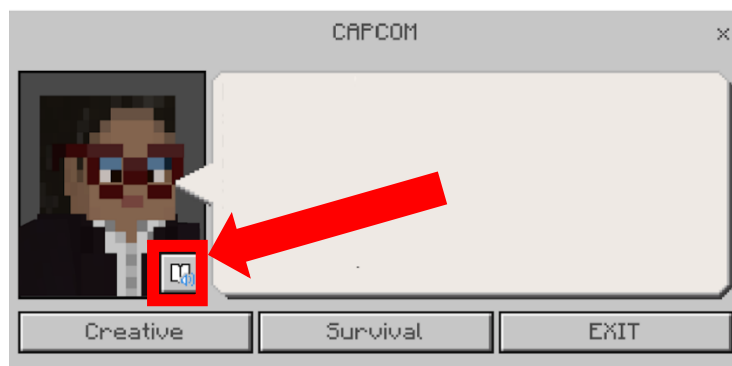
Welcome to Artemis: Moon Base One Build Challenge! When the game starts, players will spawn into Minecraft world.



Directly in front of them, they will see a non-player character (NPC), CapCom. They will need to interact with them to receive further information about the challenge.

Helpful Hint – How to use Immersive Reader

Immersive Reader is an integrated feature of Minecraft Education. It supports learners in reading or translating in-game text, including the character dialog. When a dialog box is opened, you will see an icon in the bottom right-hand corner of the NPC picture in the dialog box.

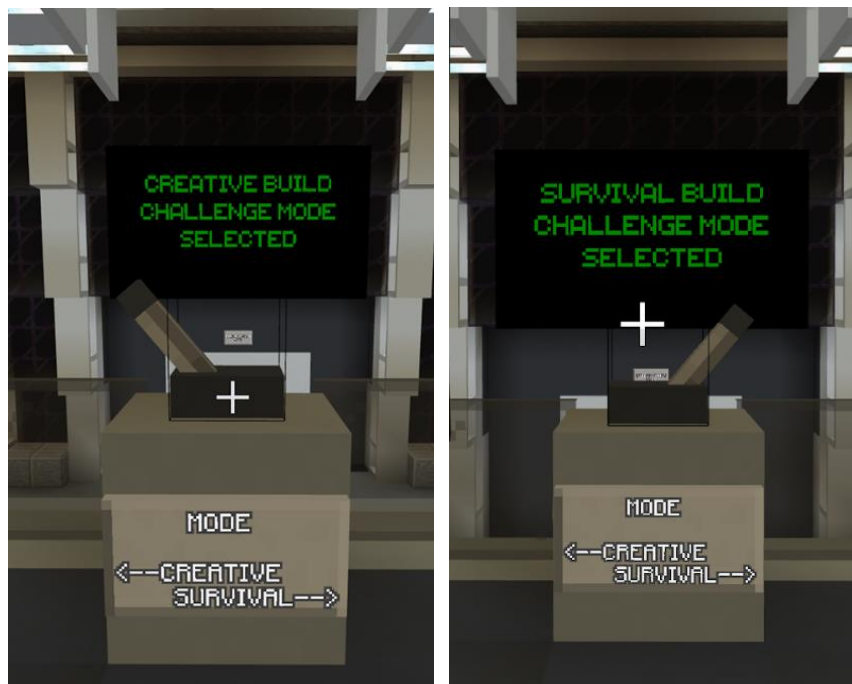


Helpful Hint – Game Modes in Minecraft

There are 2 game modes for this build challenge: creative and survival.

Creative	Survival
In creative mode, you will have access to all the available blocks in the game. You will not be affected by Moon physics. You will not need to worry about survival necessities such as food, water, or oxygen.	In survival mode, you will have a lunar simulation where you need to consider survival aspects. You will experience Moon physics, must utilize tools and items, and manage your food, water, and oxygen supply. You will also have to collect and create new items to help you build and survive.

Players will need to select their game mode by switching the lever to the desired game mode: left (creative mode) or right (survival mode). You will also be able to see what game mode is selected by viewing the screen posted in Mission Control.



In addition to the selection of game mode, this challenge can be played as a single player experience OR a multiplayer experience.

Helpful Hint – How to use Join Codes to Host Multiplayer

If you are hosting the game, follow these steps:

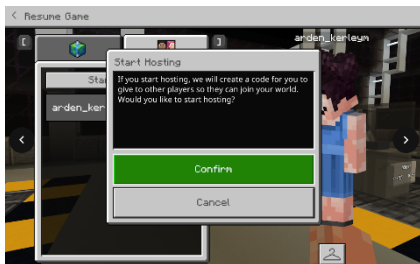
Step 1: Pause the game. Click on the Friends tab.



Step 2: Click "Start Hosting".



Step 3: Click "Confirm" to start hosting.



Step 4: Provide the join code to other players who will be joining your team.

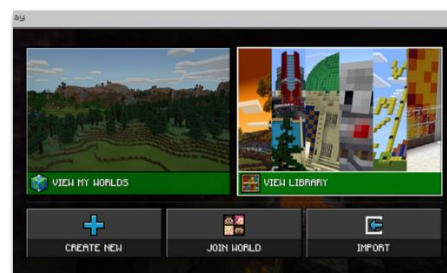


If you are joining the world, following these steps:

Step 1: Select "Play".



Step 2: Select "Join World".



Step 3: Enter the join code.



Step 4: Confirm that it's the correct world you are trying to join.



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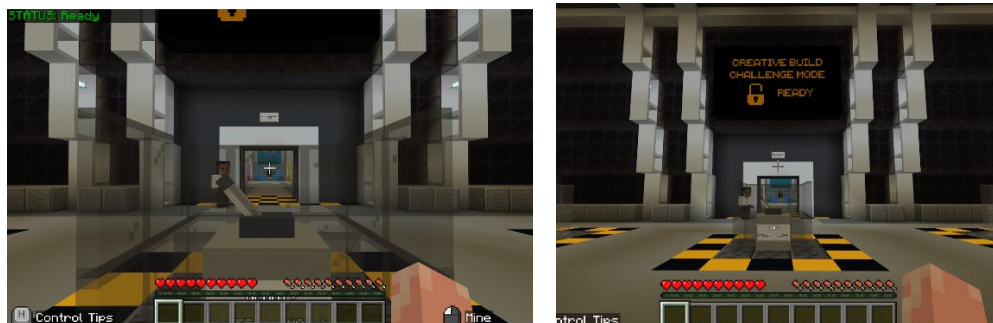
Once players join a world, they should be able to see each other on their screens and their names under the join code.

Beginning Game Play

Players will need to walk down the stairs and signify they are ready to begin the challenge.



Once they switch the lever from “NO” to “YES”, the doorway will open for the players to continue to the Team Selection Room.



Players should continue through into the Team Selection Room.



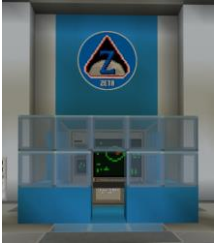
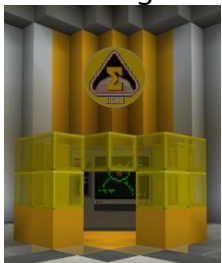
NOTE: Once the first player passing through the threshold into the Team Selection Room, it will trigger a dialog box. The dialog box will explain that continuing to proceed will lock the game mode for all players in the world. This can NOT be changed once the player has confirmed the final selection for the game mode.



The player(s) will then move into the Team Selection Room. In this room, there are five different teams and missions. Players can interact with the computers to learn more about the team's destination and mission. The players should join the team that interests them the most.



Team Missions

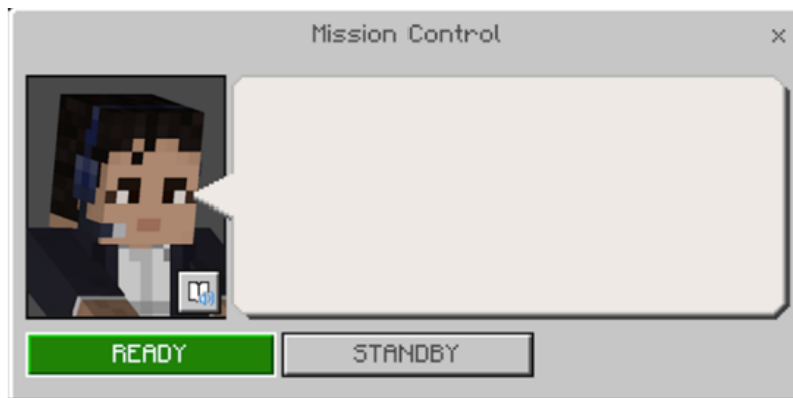
Team Alpha 	Team Alpha's mission is to establish a base high in the Moon's mountains. The terrain is treacherous, but this unforgiving biome offers a unique opportunity for exploration.
Team Delta 	Team Delta's mission is to create a settlement in the foothills of the lunar surface. The landscape is a medley of mesas and valleys that can provide excellent resources but may prove a challenge for construction!
Team Zeta 	Team Zeta's mission is to develop a community in a crater on the Moon. Thousands of celestial impacts have created these depressions. Team Zeta has chosen one large enough to offer shelter and defenses yet not deep enough to freeze the systems.
Team Sigma 	Team Sigma's mission is to construct a base inside of one of the Moon's ancient lava tubes. The tubes offer protection from surface hazards, but also limit sunlight, making this a cold and dark expedition.
Team Omega 	Team Omega's mission is to build a base in the lunar lava fields. The flat lands here are surrounded by gorges where lava once flowed, making it an ideal location for a long-term outpost.

Players should join their desired team to begin their mission.

After the select their team, players will be teleported in their team room. When all players are ready, someone should launch the mission by interacting with the button.



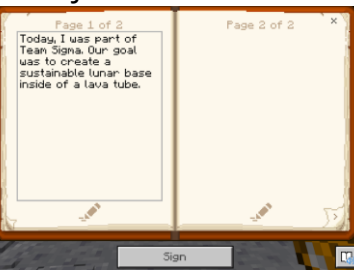
A dialog box will appear, and they will need to select the “READY” button to launch their mission.



Players will watch a cinematic about their launch to the Moon!



Players will spawn into their Moon mission. They will already have 4 items in their hotbar upon arrival.

Slot 1 - Optical ComLink 	This is your radio to communicate with Mission Control. You will be able to ask for HELP, HINT, or MISSION. The HELP button will provide them with assistance about supplies, orders, or recipes. The HINT button will provide them with about the world and/or mission. The MISSION button will provide them with a time check, the ability to override, or to declare an emergency to leave the mission.
Slot 2 – Astro-Cam 	This is a camera. You will be able to take pictures of anything you would like during your Moon mission.
Slot 3 – Photo Storage Device 	Your photos taken with the Astro-Cam will show up here. You can add captions to label your photographs.
Slot 4 – Journal 	You will have a journal to capture your thoughts, learnings, and even wonderings about your Moon mission!

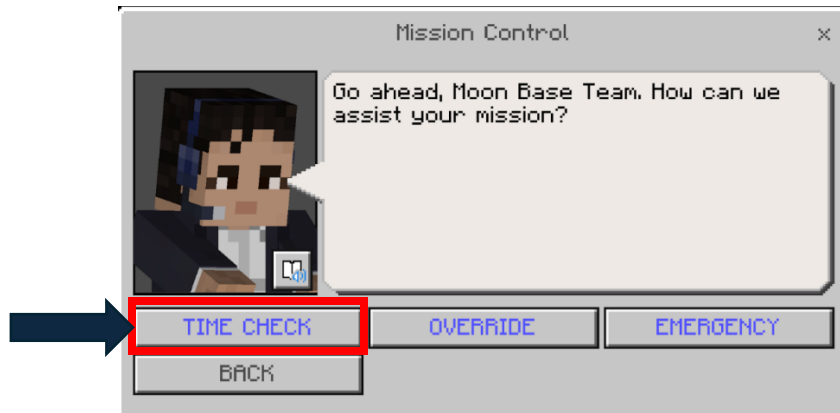
Once the player(s) are ready to build, they can begin their mission – to build a base on the Moon. They will need to build their base inside of the designated perimeter.



Player(s) will have a designated time to complete their Moon base build. The time will be showcased in 5-minute intervals.



Player(s) also can use their Optical ComLink and ask for a time update if desired.



Moon Base One Build Challenge – ADDITIONAL INFORMATION

CREATIVE MODE

Players in Creative Mode will not have to worry about lunar conditions. Water, food, and oxygen will not impact their game play. They can also fly.

Helpful Hint – How to fly

Keyboard/Mouse	Touch Device
• Double tap on the [SPACE] bar to fly • Hold down the [SPACE] bar to fly up • Hold the [SHIFT] key to fly down • Double tap the [SPACE] bar to drop back down to the ground	Use the arrows to move up and down. 

Players can use the supplied prefab building materials or any block/item they would like. Since they are in Creative Mode, they have access to the full inventory.

Helpful Hint – How to access and use the inventory

To open inventory, press the “E” key.	You can use the keyword search to find specific materials (or even search by color or item type).
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Once you find a material, you can select the material and then drag and drop it into your hotbar. 	You have nine active slots in the hotbar. You can use the numbers (1-9) to select something in your hotbar. 

Player(s) should build their Moon base in the allotted amount of time.



SURVIVAL MODE

In Survival Mode, players will have to pay attention to some unique aspects during their lunar mission. Their movement will be impacted by the lunar conditions. In addition, the player(s) will need to consider their oxygen, food, and health.

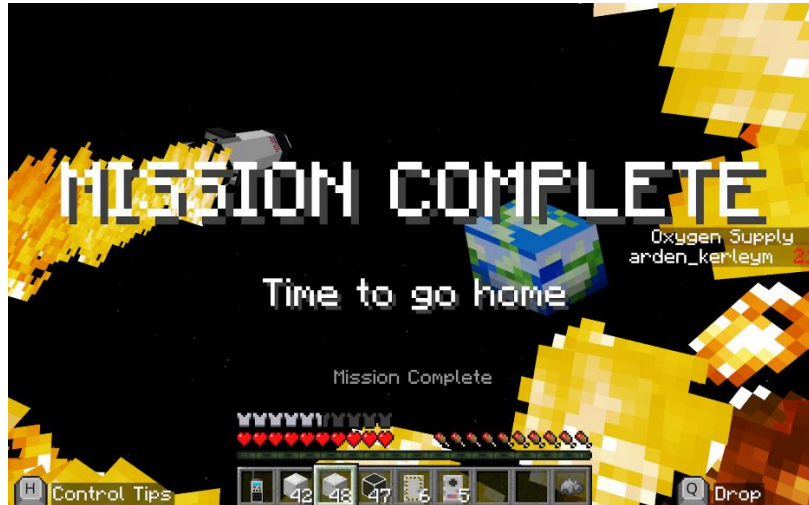


To help players to be successful in their game play, some critical items have been provided. On the lunar surface, player(s) will find some assorted chests.

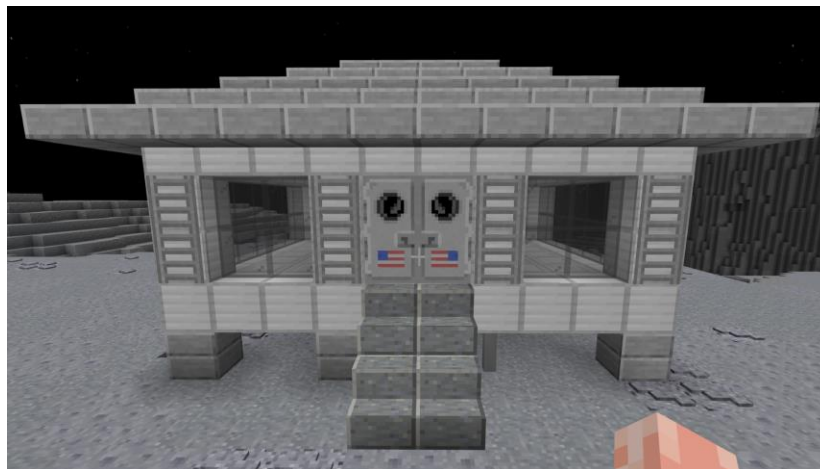
This chest will have food and water for the player(s).	
This chest will have tools for the player(s).	
This chest will have building and construction supplies for the player(s).	
This chest will have oxygen, medicine for their health, and flags for the player(s).	

Conclusion of Game Play

Once the time for building has concluded, players will be prompted with a “MISSION COMPLETE” screen and they will be teleported back to Mission Control.



Players will return to the Mission Debriefing Room. This is a great opportunity to reflect on your experience, talk with your peers, update your journal, share your photos, and swap stories!



You can also view others' builds by utilizing the screens in the Mission Briefing Room. Select the button to view an aerial view of each team's build.



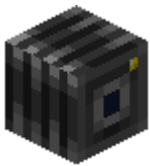
Welcome back to mission Control – The lunar exploration doesn't have to end here!

- Try another team missions! Remember – there are five missions in total.
- If you played in creative mode, then try playing again in survival mode – or vice versa.
- Consider checking out the other Artemis missions if you have not played them:
 - [Artemis: Return to the Moon](#)
 - [Artemis: Rocket Build](#)

MINECRAFT VISUAL GLOSSARY

Astro-Cam

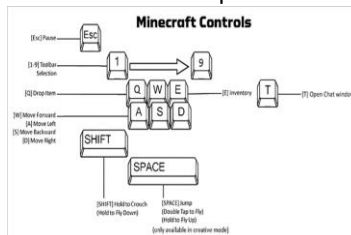
an entity that is capable of capturing images in a Minecraft world (i.e., camera that can take photographs)



Controls

(keyboard)

keyboard buttons that help you move around and complete tasks



Controls

(touch)

the touch pad that helps you move around and complete tasks



Creative MODE

game mode allows players to fly and have access to unlimited inventory; no visible health or hunger bar



Chest

a block used to store items in Minecraft



Dialog

a written conversational exchange between the player and NPC



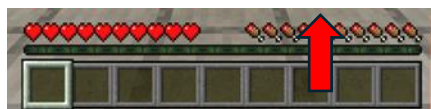
Health Bar

a row of hearts above the hotbar to show your health status



Hunger bar

a row of ham shanks above the hotbar to represent hunger



Hotbar

a selection bar that appears at the bottom of the player's screen; consists of nine active inventory slots



Immersive Reader

a tool to help players in reading or translating in-game text



Inventory

the pop-up menu that contains all of the blocks and items



Join Code

the special picture-based code to connect players in a multiplayer game



MINECRAFT VISUAL GLOSSARY

Journal

an item used by players to store and edit text; after the player "signs" the journal, the text will be permanently saved



Lunar Rover

a space exploration vehicle designed to move across the Moon



Mission Control

the facility that will manage your lunar missions in Minecraft



Multiplayer

the ability to play in a Minecraft world with peers from the same tenet



NPC

non-player character



Optical Comlink

the radio to communicate with Mission Control during the lunar mission



Oxygen

these tanks will allow players to breathe and operate successfully while on the Moon



Oxygen Level

the amount of oxygen available to the player (will be shown as the "oxygen supply on screen")



Photo Storage Device

the storage device for your photos taken with the Astro-Cam



Spawn Point

the location where a player begins game play



Survival Mode

the game mode where players will be affected by lunar physics and manage your food, water, and oxygen supply



x-Emu Helmet

the special inventory item (unique to this game) that will allow you to breathe and operate on the Moon



Educational Standards – Science

Next Generation Science Standards (NGSS) – United States

Elementary (Grades 3-5)

3. Forces and Interactions 5-PS2-1 Motion and Stability: Forces and Interactions		
Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
Planning and Carrying Out Investigations Planning and carrying out investigations to answer questions or test solutions to problems in 3–5 builds on K–2 experiences and progresses to include investigations that control variables and provide evidence to support explanations or design solutions. - Plan and conduct an investigation collaboratively to produce data to serve as the basis for evidence, using fair tests in which variables are controlled and the number of trials considered. - Make observations and/or measurements to produce data to serve as the basis for evidence for an explanation of a phenomenon or test a design solution.	PS2.A: Forces and Motion - Each force acts on one particular object and has both strength and a direction. An object at rest typically has multiple forces acting on it, but they add to give zero net force on the object. Forces that do not sum to zero can cause changes in the object's speed or direction of motion. - The patterns of an object's motion in various situations can be observed and measured; when that past motion exhibits a regular pattern, future motion can be predicted from it. (Boundary: Technical terms, such as magnitude, velocity, momentum, and vector quantity, are not introduced at this level, but the concept that some quantities need	Cause and Effect - Cause and effect relationships are routinely identified. - Cause and effect relationships are routinely identified and used to explain change. Patterns - Patterns of change can be used to make predictions.

Connections to Nature of Science Scientific Investigations Use a Variety of Methods - Science investigations use a variety of methods, tools, and techniques. Science Knowledge is Based on Empirical Evidence - Science findings are based on recognizing patterns.	both size and direction to be described is developed.) PS2.B: Types of Interactions - Objects in contact exert forces on each other. - The gravitational force of Earth acting on an object near Earth's surface pulls that object toward the planet's center.	
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Educational Standards – Science

Next Generation Science Standards (NGSS) – United States

Middle School (Grades 6-8)

MS-PS2 Motion and Stability: Forces and Interactions		
Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
Constructing the Explanations and Designing Solutions - Apply scientific ideas or principles to design an object, tool, process or system. Engaging in Argument from Evidence - Construct and present oral and written arguments supported by empirical evidence and scientific reasoning to support or refute an explanation or a model for a phenomenon or a solution to a problem.	PS2.A: Forces and Motion - For any pair of interacting objects, the force exerted by the first object on the second object is equal in strength to the force that the second object exerts on the first, but in the opposite direction (Newton's third law). (MS-PS2-1) - The motion of an object is determined by the sum of the forces acting on it; if the total force on the object is not zero, its motion will change. The greater the mass of the object, the greater the force needed to achieve the same change in motion. For any given object, a larger force causes a larger change in motion. (MS-PS2-2)	Cause and Effect - Cause and effect relationships may be used to predict phenomena in natural or designed systems. (MS-PS2-3),(MS-PS2-5) Systems and System Models - Models can be used to represent systems and their interactions—such as inputs, processes and outputs—and energy and matter flows within systems. (MS-PS2-1),(MS-PS2-4) Stability and Change - Explanations of stability and change in natural or designed systems can be constructed by examining the changes over time and forces at different scales. (MS-PS2-2) Influence of Science, Engineering, and Technology on Society and the Natural World

		The uses of technologies and any limitations on their use are driven by individual or societal needs, desires, and values; by the findings of scientific research; and by differences in such factors as climate, natural resources, and economic conditions. (MS-PS2-1)
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Educational Standards – Science

Science Programmes of study – National curriculum in England

Key Stage 2

Working Scientifically – Years 3 and 4 - asking relevant questions and using different types of scientific enquiries to answer them - setting up simple practical enquiries, comparative and fair tests - gathering, recording, classifying and presenting data in a variety of ways to help in answering questions - recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables - using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions - identifying differences, similarities or changes related to simple scientific ideas and processes
Working Scientifically – Year 5 and 6 - planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary - using test results to make predictions to set up further comparative and fair tests - reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations
Earth and Space – Year 5 - describe the movement of the Earth, and other planets, relative to the Sun in the solar system - describe the movement of the Moon relative to the Earth

describe the Sun, Earth and Moon as approximately spherical bodies
Forces – Year 5 - explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object - identify the effects of air resistance, water resistance and friction, that act between moving surfaces

Educational Standards – Science

Science Programmes of study – National curriculum in England

Key Stage 3

Working Scientifically Scientific attitudes - pay attention to objectivity and concern for accuracy, precision, repeatability and reproducibility - evaluate risks. Experimental skills and investigations - ask questions and develop a line of enquiry based on observations of the real world, alongside prior knowledge and experience - make predictions using scientific knowledge and understanding - select, plan and carry out the most appropriate types of scientific enquiries to test predictions, including identifying independent, dependent and control variables, where appropriate Analysis and evaluation - interpret observations and data, including identifying patterns and using observations, measurements and data to draw conclusions - identify further questions arising from their results.
Physics Motion and forces Describing motion - speed and the quantitative relationship between average speed, distance and time ($\text{speed} = \text{distance} \div \text{time}$) - the representation of a journey on a distance-time graph - relative motion: trains and cars passing one another. Forces - forces as pushes or pulls, arising from the interaction between two objects - moment as the turning effect of a force - forces: associated with deforming objects; stretching and squashing – springs; with rubbing and friction between surfaces, with pushing things out of the way; resistance to motion of air and water - forces measured in newtons, measurements of stretch or compression as force is changed - non-contact forces: gravity forces acting at a distance on Earth and in space, forces between magnets and forces due to static electricity. Balanced forces

- opposing forces and equilibrium: weight held by stretched spring or supported on a compressed surface.

Forces and motion

- forces being needed to cause objects to stop or start moving, or to change their speed or direction of motion (qualitative only)
- change depending on direction of force and its size.

Educational Standards – Science

Australian f-10 Curriculum - Science

Year 3 Science involves making predictions and describing patterns and relationships (ACSHE050) • making predictions about change and events in our environment • considering how posing questions helps us plan for the future
Year 4 Forces can be exerted by one object on another through direct contact or from a distance (ACSSU076) • observing qualitatively how speed is affected by the size of a force • exploring how non-contact forces are similar to contact forces in terms of objects pushing and pulling another object Science involves making predictions and describing patterns and relationships (ACSHE061)
Year 5 The Earth is part of a system of planets orbiting around a star (the sun) (ACSSU078) • identifying the planets of the solar system and comparing how long they take to orbit the sun • modelling the relative size of and distance between Earth, other planets in the solar system and the sun Scientific knowledge is used to solve problems and inform personal and community decisions • describing how technologies developed to aid space exploration have changed the way people live, work and communicate
Year 7 Change to an object's motion is caused by unbalanced forces, including Earth's gravitational attraction, acting on the object (ACSSU117) • investigating the effects of applying different forces to familiar objects • investigating common situations where forces are balanced, such as stationary objects, and unbalanced, such as falling objects • exploring how gravity affects objects on the surface of Earth • considering how gravity keeps planets in orbit around the sun
Year 8 Energy appears in different forms, including movement (kinetic energy), heat and potential energy, and energy transformations and transfers cause change within systems (ACSSU155) • recognising potential energy is stored energy, such as gravitational, chemical, and elastic energy • investigating different forms of energy in terms of the effects they cause, such as gravitational potential causing objects to fall and heat energy transferred between materials that have a different temperature

Year 10

The motion of objects can be described and predicted using the laws of physics (ACSSU229)

- gathering data to analyse everyday motions produced by forces, such as measurements of distance and time, speed, force, mass and acceleration
- recognising that a stationary object, or a moving object with constant motion, has balanced forces acting on it
- using Newton's Second Law to predict how a force affects the movement of an object
- recognising and applying Newton's Third Law to describe the effect of interactions between two objects

How to Get Started – Minecraft Education

Minecraft Education offers a unique learning platform where students can engage in creative builds and various game elements.

If you are licensed to use Minecraft Education through your O365 EDU account, download directly at aka.ms/download or reach out to your IT department for assistance. More information on deployment and license assignment can be found at aka.ms/meedeployguide.

Here's how to get setup:

1. First, [check here](#) to see if your school account is eligible.
2. If you do not have a valid O365 EDU account, you can still [download](#) and try a free demo on Windows, Mac or iPad.
3. [Download](#) Minecraft Education for Windows, Mac or iPad.

Once you are set-up with Minecraft Education, you should:

- Learn about Artemis: Moon Build One Challenge with this video: aka.ms/MoonBaseOneVideo
- Use this Educator Guide and corresponding classroom presentation.
- Play through Artemis: Moon Build Challenge One to get a better understanding of the lesson and how to navigate through the Minecraft world.