Galaxy

Days 21-22

Name_____ Date _____ *Galaxy* Days 21 and 22

Daily Launch Day 21

Do Now: How Would It Be Different?

As you know, there is no gravity in space! This means that people and objects float around freely if there is nothing to hold them still… as you can see in the pictures at the bottom of the page.

Imagine yourself in a spaceship with no gravity. How would that change the following daily activities? Write your best guesses in the chart!

Daily Activity	How Would It Be Different in Zero Gravity?
Taking a shower	
Eating breakfast	
Getting a drink of water	
Working out	
Playing ball	
Bedtime	

Astronaut Winston Scott on a spacewalk in 1997
https://www.flickr.com/photos/nasacommons/9449355483

Astronauts and fruit on the International Space Station
https://www.needpix.com/photo/306854/astronauts-floating-fruit-space-weightless-spacecraft-mission-exploration-gravity

Name_____ Date _____ *Galaxy* Days 21 and 22

Daily Launch Day 22

Do Now: Planning for a Space Mission

Suppose you were invited to visit the International Space Station for a week to help with some science experiments. A local reporter comes to interview you about your upcoming trip! Write your answers to the interview questions below. (Use your imagination… there are no wrong answers!)

1. What are you most excited about as you prepare for this adventure?

_____

_____

2. What are you nervous about?

_____

_____

3. What will you take to remind you of home?

_____

_____

4. How do you expect living on the space station to be different from home?

_____

_____

5. What science experiments will you conduct on the space station?

_____

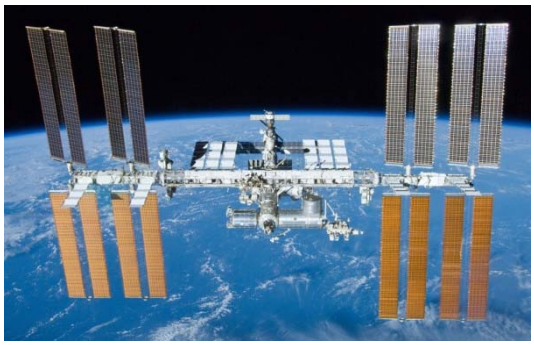
_____

6. What will you bring back from the space station to remember your trip?

_____

_____

The International Space Station



The International Space Station (ISS) as viewed from a departing space shuttle mission

The **International Space Station** (**ISS**) is a space station, or a habitable artificial satellite, orbiting around the Earth. It is a joint project of five different space agencies in the United States, Russia, Canada, Europe, and Japan. The ISS includes pressurized modules where people can live and work, a strong outer frame, solar panels to generate energy, and other components. Both American space shuttles and Russian rockets have been used to launch new components for the space station.

The first component of the ISS launched into orbit in 1998, and its first long-term crew arrived in November 2000. The station has had people living in it for almost twenty years! New components are added to the station every few years, and more are scheduled for launch in 2020. The ISS' orbit is between 205 and 270 miles (330 to 435 km) above the Earth. It maintains that altitude by reboosting, using the engines of one of its modules or of visiting spacecraft. It orbits the Earth 15.54 times per day. The ISS is the largest human-made object in orbit; it can sometimes be spotted by people on Earth.

In the early 1990s, U.S. government officials began negotiating with Europe, Russia, Japan and Canada to build a truly international space station. The first three sections, launched in 1998-2000, were the Zarya Functional Cargo Block, Unity Module, and Zvezda service module. On November 2, 2000, the first crew, Expedition 1, docked onto the ISS. It included U.S. astronaut William Shepherd and two Russian cosmonauts, Yuri Gidzenko and Sergei Krikalev.

Life in space: zero gravity!

Scientists living in the space station have to get used to all kinds of changes from life on Earth. It takes them only 90 minutes to orbit the Earth, so the sun looks as if it is rising and setting every 45 minutes. This makes it hard to decide when you should go to bed! The astronauts try to keep a 24-hour-schedule anyway. When bedtime comes, they strap themselves into sleeping bags that are stuck to the wall, so they will not float away in the middle of a dream.

In space there is no gravity (this is called *zero gravity*). One place where you can get an idea of what zero gravity feels like is in a swimming pool, because the water makes you float. However, in a pool you still push against the water as you move around. In zero gravity, there is nothing to push against, so you just float in the air. Another way that NASA astronauts experience zero gravity for a very short time is going in a plane that drops to earth very quickly. This training can make people quite sick at first!

Crew member Tracy Caldwell Dyson looks out a window on the ISS

Since the astronauts do not use their legs very much in zero gravity, they need exercise to keep from becoming too weak. Without gravity, astronauts can get big upper bodies and skinny legs, so the crew members get lots of exercise every day to stay healthy.

Flight Engineer John Phillips floats inside the ISS Destiny laboratory (Photo: NASA)

Eating in space is hard, too. Since water and other liquids do not flow down in space, if you spilled some milk in a space station, it would float around everywhere! Liquids ruin high-tech equipment, so astronauts have to be very careful. They drink by sucking water from a bag, or from a tube stuck to the wall. If they put their food on plates, it would just float away, so they have to eat it from pouches. Most of the food is dried, because crumbs floating around could also ruin the equipment. Sometimes fresh fruits and vegetables are sent to the station, but this is expensive and difficult, so they carry most of their food with them when they go.

What does a space toilet look like? Now you know!

Using the bathroom in space

Actually, in space, the *bathroom* should probably be called the *restroom*, because you really can't take baths there. Instead, astronauts use squirt guns to take a shower! One person squirts himself with a gun while other people outside use a water vacuum to get rid of all the water that floats out of the shower. This is quite hard, so astronauts usually wash with a wet cloth. Toilets can be another problem. There is no gravity to make the toilet flush work, so the toilet must be attached to the astronauts to gently suck away the waste.

Spacewalks

When the outside of the ISS needs repairs or maintenance, crew members do spacewalks. Before leaving the ship, they put on protective spacesuits that cover every part of the body, along with air tanks so they can breathe. They leave through a special portal so the space station doesn't lose air pressure. They are attached to the station by a tether so they don't float away in space.

Astronaut Scott Parazynski repairs a damaged solar panel on the ISS

The ISS serves as a research laboratory where crew members conduct science experiments in a low-gravity space environment. They can also test spacecraft systems and equipment required for missions to the Moon and Mars. The space station is expected to be used until 2030.

This article was developed by ALFA Lab staff. Unless otherwise noted, images and content are adapted from Kiddle Encyclopedia.

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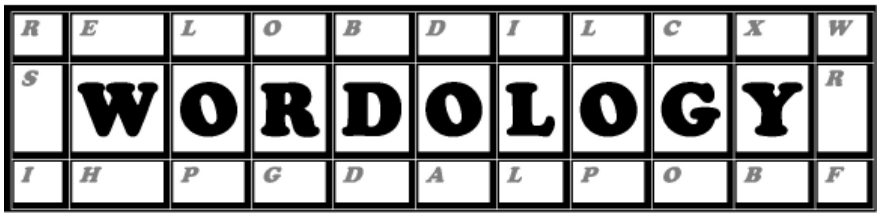

Wordology Activity #1: Synonym Hunt

Instructions: A **synonym** is a word that means the same or almost the same as another word. **Rewrite** each sentence without changing its meaning. Choose a synonym from the Word Bank to replace the underlined word or phrase in each sentence.

1. Each <u>working part</u> of the engine must be tested before it is used.
2. The plane flew at a <u>height</u> of 5000 feet above ground.
3. If we don't keep our dog tied on a <u>lead</u>, he might jump over the fence.
4. This week, engineers launched another <u>orbiting object</u> to go around the Earth.
5. My sister likes to <u>do</u> cooking experiments when we are home alone.
6. Please use the special <u>doorway</u> to enter the garden from the side.
7. I'm not sure whether this is a <u>working</u> camera or just a toy.
8. If you don't do regular <u>upkeep</u> on your car, it may need expensive repairs later.

<u>Word Bank</u>

satellite	pressurized	portal	altitude	module
tether	component	functional	conduct (v.)	maintenance

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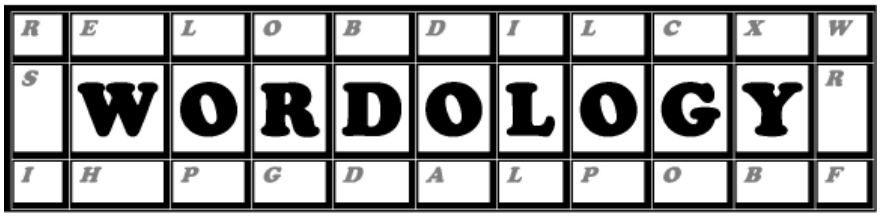
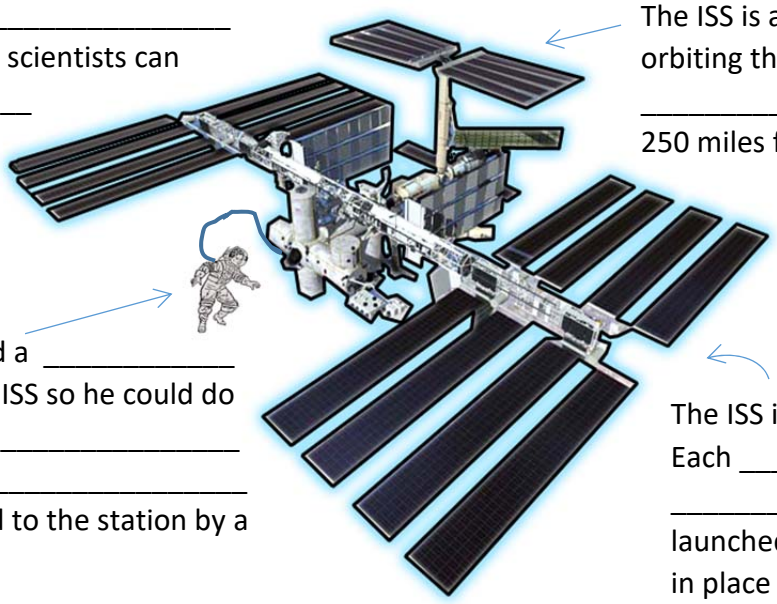


Wordology Activity #2: Fill in the Blanks

Instructions: This picture represents the International Space Station. Use the definitions given below to help you choose words to label the illustration. Write each word in the correct blank.

The ISS includes _____ labs where space scientists can _____ experiments.

The ISS is a _____ orbiting the Earth at an _____ of about 250 miles from the ground.



This astronaut used a _____ to come out of the ISS so he could do repairs and _____ on it. He wears a _____ suit and is attached to the station by a _____.

The ISS is made of many sections. Each _____ or _____ was launched from Earth and then put in place as a part of the station.

Definitions

satellite – an object that orbits the earth or another planet

altitude – distance from the surface

component – one part of a complex system

pressurized – with air pumped in to create a comfortable pressure level

module – a section of a larger whole

functional – able to do or support specific tasks or processes

maintenance – upkeep

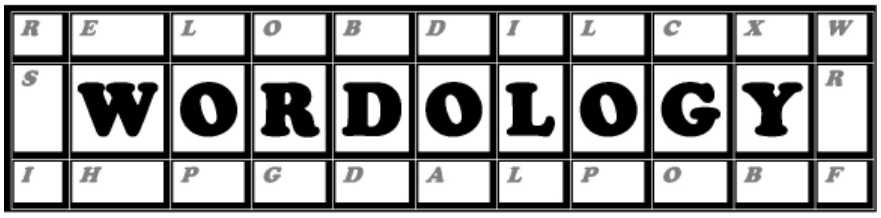
portal – a special entrance or doorway

tether – a cord, rope, or chain to keep something attached

conduct (v.) – to carry out or do

Images: https://www.hiclipart.com/free-transparent-background-png-clipart-ypnci; https://www.needpix.com/photo/854584/astronaut-rocket-space-spaceman-space-stuff

Name_____ Date _____ *Galaxy* Days 21 and 22



Wordology Activity #3: Space Station Mission Report

Instructions: You are an astronaut! Imagine that you visited the International Space Station for a special mission. Write your mission report in the space provided, using at least five of the vocabulary words listed below.

ISS Mission Report Name: _____

Mission Goals: _____Date of Mission: _____

_____

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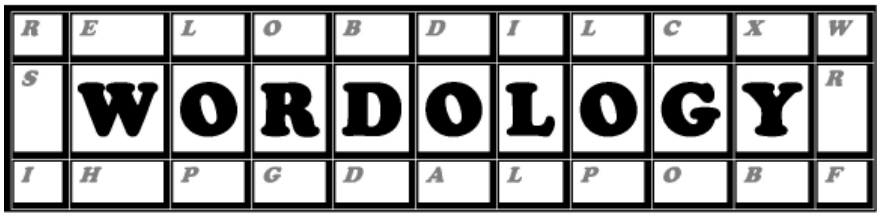
Word Bank

satellite	pressurized	portal	altitude	module
tether	component	functional	conduct (v.)	maintenance

Galaxy Days 21 and 22 Name_____ Date _____



Composing Meaningful Sentences

If you complete your chosen Wordology activity, take the remaining time at this station to write Meaningful Sentences using the vocabulary words listed below. (Remember, a Meaningful Sentence is a sentence that shows that you know what the word means!) Read and discuss your sentences with your teammates.

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Word Bank

satellite	pressurized	portal	altitude	module
tether	component	functional	conduct (v.)	maintenance

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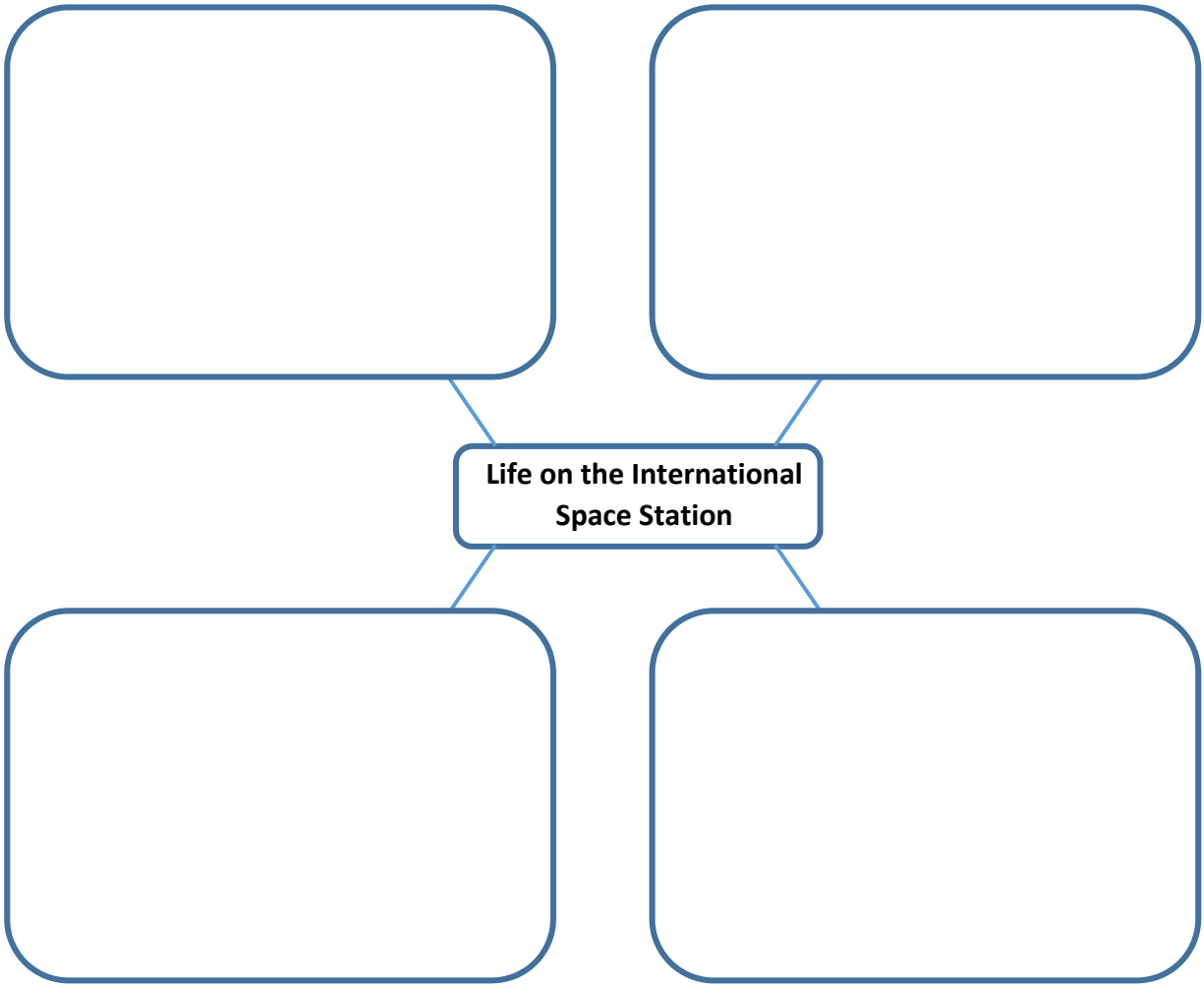
COLLABORATION STATION

Collaboration Station: Create a Graphic Organizer

***Instructions*.** With a partner, take turns reading the paragraphs of "The International Space Station" inside the shaded blue boxes. These paragraphs tell about life on the International Space Station. When you finish reading, discuss ways you could use a graphic organizer to remember the information. Then, create a graphic organizer using the format below. (It does not have to be the same as your partner's!)



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Media Madness

Media Madness: Ask NASA—What Is the International Space Station?

Instructions: Watch the video at the following link. As you watch, take notes in the space below. Then, answer the question at the bottom of the page.

https://www.youtube.com/watch?v=6MR-qaDaG6w

My Notes on the International Space Station

What are some ways that you think the International Space Station has helped people prepare to go further into space?

_____

_____

_____

If you finish early, you may want to watch one or more of the following videos:

Tennis in Space: https://www.youtube.com/watch?v=uE4k4P1nKuk

How to Wash Your Hair in Space: https://www.youtube.com/watch?v=kOIj7AgonHM

Running in Space: https://www.youtube.com/watch?v=_ikouWcXhd0