

Cameras In Space Informational Packet

This packet is designed to help students practice text structure and review text features while teaching them more about the international space station. See the guide below to figure out what skills are covered:

Contents and Skills:

<u>Content</u>	<u>Skills Covered</u>
The International Space Station	<ul style="list-style-type: none">● Text structure review - Sequence focus.● Minor text features review - General text feature hunt
Cameras In Space	<ul style="list-style-type: none">● Text structure review - Description focus● Text features review - Questions about text features
Sally Ride EarthKAM	<ul style="list-style-type: none">● Text feature review - General text feature hunt● Text structure review - Cause and Effect
High Definition Earth Viewing	<ul style="list-style-type: none">● Text feature review - Bold words and glossary● Main idea and detail review
EarthKAM vs HDEV	<ul style="list-style-type: none">● Text structure review - Compare and Contrast
ISS-Above	<ul style="list-style-type: none">● Text structure review - Problem and Solution● Text feature review - General hunt, caption questions, heading review
Welcome Home	<ul style="list-style-type: none">● Text structure review - Sequence● Text feature review - Match the text feature

Other Pages In Packet -

- Sally Ride Mural Art - Art Project
- Using the HDEV to Improve Literacy - Writing and research activities.

The International Space Station

There is a space station orbiting our world. Some people call it an **engineering** marvel. This station is the **International** Space Station. Read on to learn more about this amazing station and what it is doing.

History of the ISS

The ISS (International Space Station) was started in 1998. The station is built from many **modules**. The first module was named Zarya, and was sent up by Roscosmos. Two weeks later, NASA sent up a module named Unity. These two modules created the start of the space station.

In July of 2000, the module called Zvezda was sent to the space station. Zvezda is the module that controls the space station's life support. Since then, many more parts have been added. In fact, the International Space Station is expected to last until 2028.



A scaled down model of the ISS hangs from the ceiling of the Houston Space Center.

Agencies Involved in The Space Station

Space Agency	Run by:
NASA	USA
Roscosmos	Russia
ESA	Europe
CSA	Canada
JAXA	Japan

Hard at Work

The ISS has a very important job. As it orbits, or circles around the earth, the Space Station has many experiments being done on it. The crew on the ISS do all sorts of important scientific **research**. They look at how plants can grow in space, how humans handle space, how cameras work in space, and more. The research done on the ISS will help us learn what we need to do to send humans to asteroids or even Mars.

Glossary

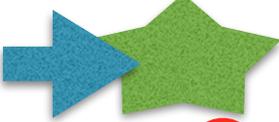
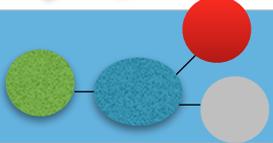
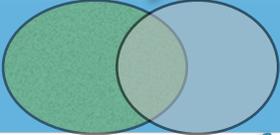
Engineering- Creating machines or technology. **International-** Involving more than one country.
Module- A part of a spacecraft. **Research-** The study of something to learn more about it.

Name: _____

The International Space Station

Text structure is the way information in a non fiction text is organized. Different text structures can help you understand what you are reading. There are five main types of text structures.

1) After reading “The International Space Station” what text structure do you think it uses?

Cause and Effect	When something makes something else happen.	
Description	Characteristics, features, examples	
Sequence	First, then, next, last, before, after...	
Compare and Contrast	What is alike and what is different.	
Problem and Solution	A problem and a way to fix it.	

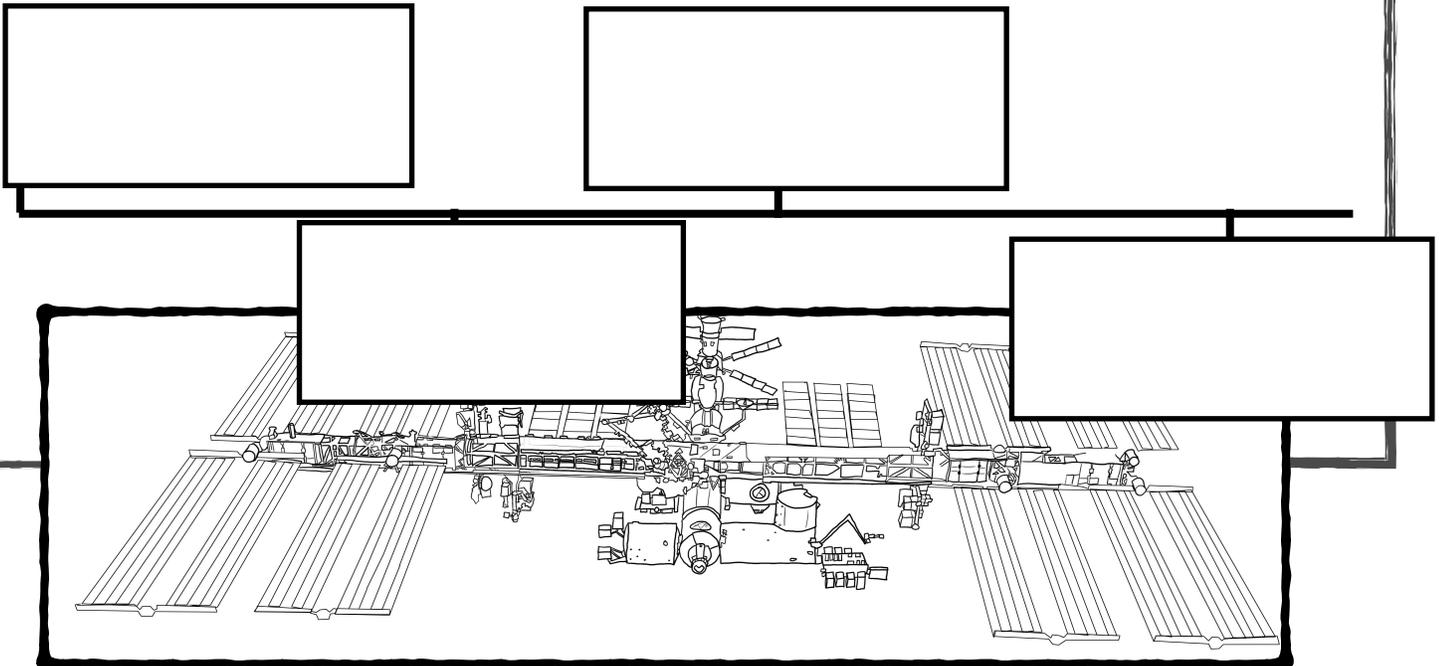
2) List three **text features** that can be found in the text:

1) _____

2) _____

3) _____

3) In the space below, create a timeline based on the text:



The diagram shows a detailed line drawing of the International Space Station (ISS) with its characteristic truss structure and large solar panel arrays. Several empty rectangular boxes are placed around the station to serve as a timeline for key events. There are four boxes above the station and two boxes to the right of the station, all connected to the main structure by thin lines.



Cameras on the International Space Station can get unique views of the earth.

Cameras in Space

Smile! The ISS is watching!

Did you know that there are cameras in space? The International Space Station has many experiments going on that involve cameras. Between **EarthKAM**, **HDEV**, and the other experiments, Earth is always being watched!

HDEV and EarthKAM

NASA has two experiments that use cameras and involve the **public**. The first is the High Definition Earth Viewing System (HDEV). The HDEV has four cameras around the Columbus module of the space station. The cameras show live video feed of the earth that anyone can watch. EarthKAM, meanwhile, is a project started by astronaut Sally Ride. Students around the globe can request EarthKAM to take photos. Those photos are uploaded onto their website for anyone to study and view.

Inside the Station

Those aren't the only cameras used in space. There are more than 14 different types of cameras found on the space station. Cameras are used to take photos and video of experiments, help with video **downlinks**, and capture cool moments. Whenever new crew arrives on the space station, a video is taken of them entering and being greeted by the current crew. You can watch many of these videos on NASA TV.



COOL FACT!

Did you know that students can tell earthKAM where to aim the camera? Your teacher can sign your school up for future missions from the EarthKAM website!

Words to Know:

- **EarthKAM**- A camera on the space station that students can request take pictures of earth.
- **HDEV**- Four cameras that provide live video of the earth.
- **Public** - Ordinary people who are not part of NASA.
- **Downlink** - A video chat between earth and the ISS.

Name: _____

Cameras In Space

Text features are details that help us understand a text. They are like clues in a story. They help you understand what you are reading. Here are some of those most common text features:

Illustrations/Photographs - Helps a reader see what something looks like.

Captions - Text that helps you know what an illustration is about.

Maps - Helps you understand where places are in the world.

Hyperlinks - Links to websites with more information on what you are reading.

Glossary - Tells you what bolded words mean in a text.

Bold Print / Italics - Shows you vocabulary words that are important to know.

1) What text structure does this article use? _____

2) How do you know that it used that text structure? _____

3) Why do you think the author decided to include the picture in the article?

4) If you had to change the caption for the picture, what would you have it say? _____

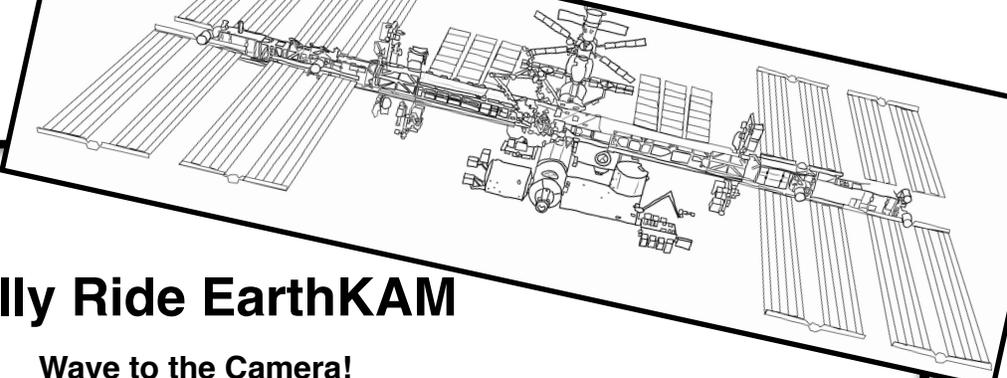
Name: _____

5) What text feature helps you know what is going on in a picture?

6) What text feature tells you what each section is going to be about?

7) What text feature helps you find the definitions for unfamiliar words?

8) In the box below, list as many things as you can find in the article that describe the cameras used on the space station:



Sally Ride EarthKAM

Wave to the Camera!

The **ISS** is a massive structure floating 330 miles above our heads. It orbits, or circles, the earth once every 92 minutes. While it's orbiting the earth, the ISS is hard at work completing experiments, gathering information, and... taking pictures!

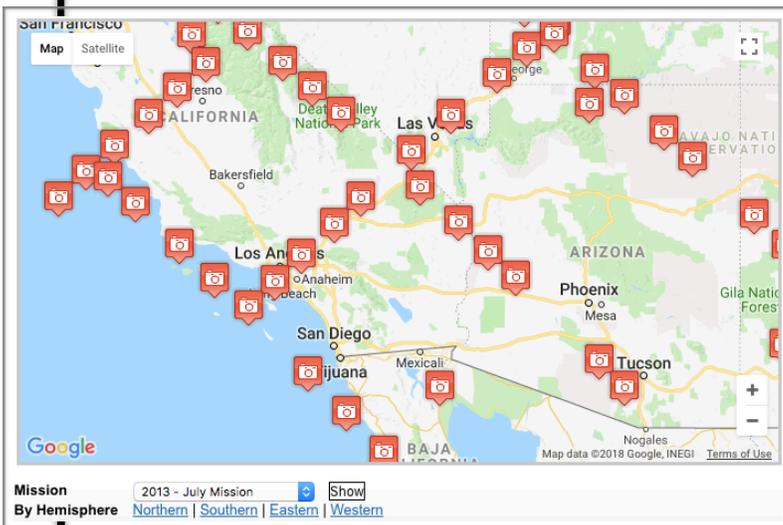
Say Cheese

NASA wanted to encourage more students to be interested in space. To do this, they created the Sally Ride EarthKAM program. EarthKAM stands for "Earth Knowledge **Acquired** by Middle school students". Students in middle school can request EarthKAM to take pictures of specific places on earth. The images are placed in a collection that anyone can look at.

Who Was Sally Ride

The Sally Ride EarthKAM is named after (and started by) Dr. Sally Ride. She was the first woman from America to go to space. She started the EarthKAM program in 1995. At the time, it was called KidSat, and the camera flew on different shuttle missions. Then, in 2001, the camera moved to the International Space Station where it now has its home. Now the EarthKAM has four missions **annually**.

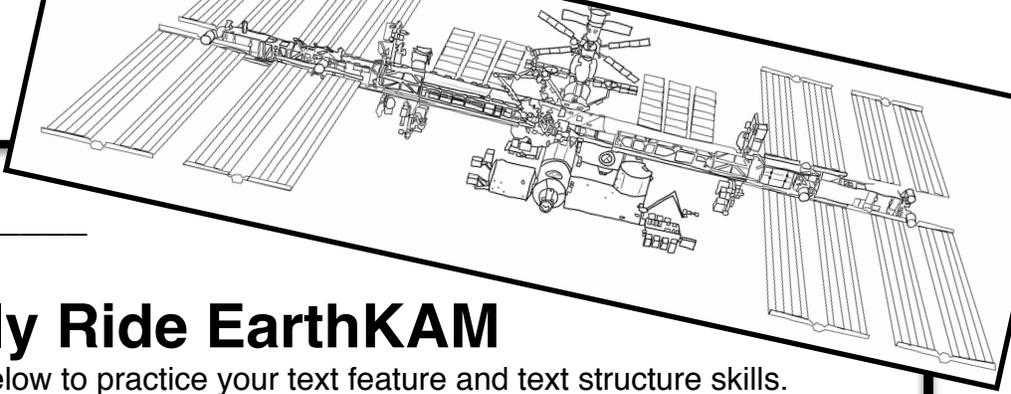
Want to be involved in the Sally Ride EarthKAM program? Even though the program is meant for middle schoolers, all ages are welcome. Ask your teacher to go to the Sally Ride EarthKAM website and register your school for the next mission!



To find a map of EarthKAM pictures, visit:
<https://www.earthkam.org/ek-images/locations>

Words to Know:

- **ISS** - International Space Station
- **Acquired** - To gain or get something/
- **Annually**- once every year.



Name: _____

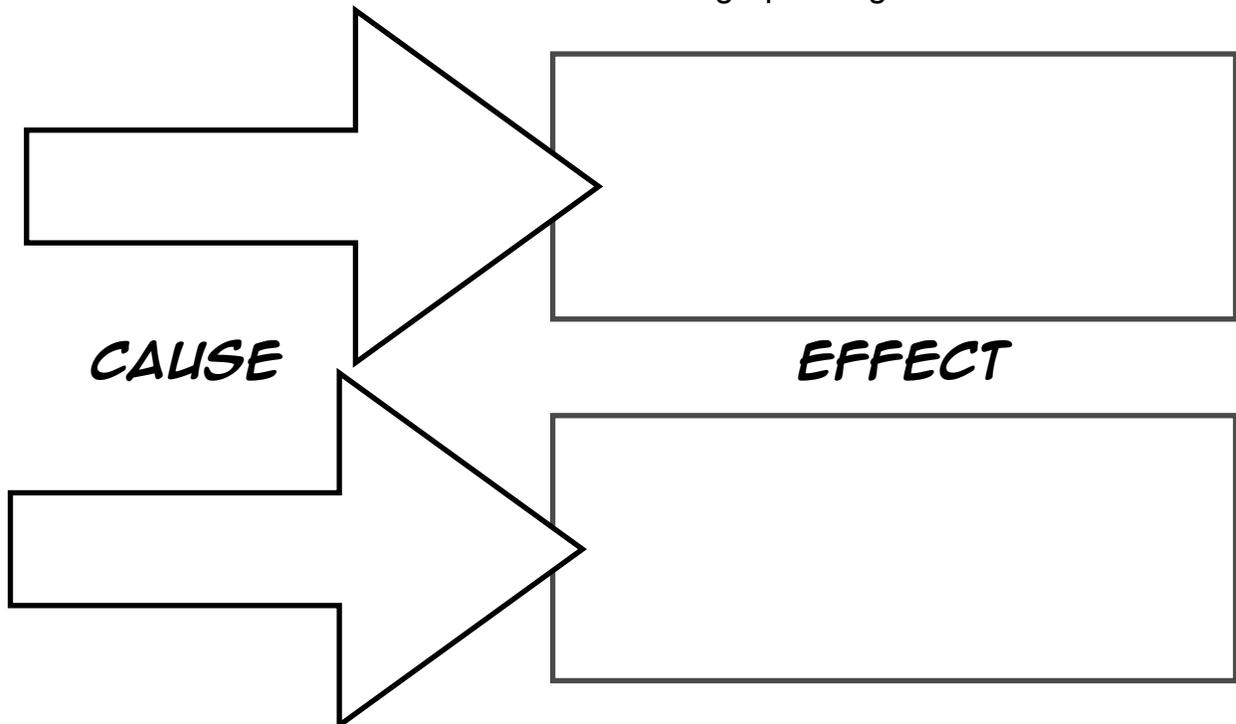
Sally Ride EarthKAM

Complete the challenges below to practice your text feature and text structure skills.

1) List three text features you saw on this page:

<i>TEXT FEATURE</i>	<i>HOW DOES IT HELP ME?</i>

3) Find two causes and their effects to fill out the graphic organizer below:



High Definition Earth Viewing

How cool would it be to watch earth from the International Space Station? To see clouds and oceans pass by 220 miles below you? Thanks to NASA's **HDEV** experiment, people around the world can have this experience.

The Experiment

The HDEV cameras were sent to space in 2014. They are **mounted** on the outside of the International Space Station on the Columbus **module**. The goal of the experiment is to see how space can degrade, or damage, video cameras. There are four cameras being used in the experiment.



The HDEV Cameras sometimes catch cool things. In this view, you can see the solar panel of a Dragon spacecraft!

The Cameras

The cameras **cycle** between four different views. From some cameras you can see the curve of the earth. From others you can even see parts of the spacecraft attached to the International Space Station. From their spot on Columbus, one camera looks forward, one looks straight down at earth, and two look backwards. When the cameras **cycle**, one has to turn off before the next camera can turn on.

Views of Earth

Even though the experiment is testing how space affects cameras, it also has another job. People all around the world can use it to watch the earth from space. Anyone can go to <https://eol.jsc.nasa.gov/ESRS/HDEV/> and watch the view. Thanks to the HDEV, you can feel like an astronaut too!

Glossary

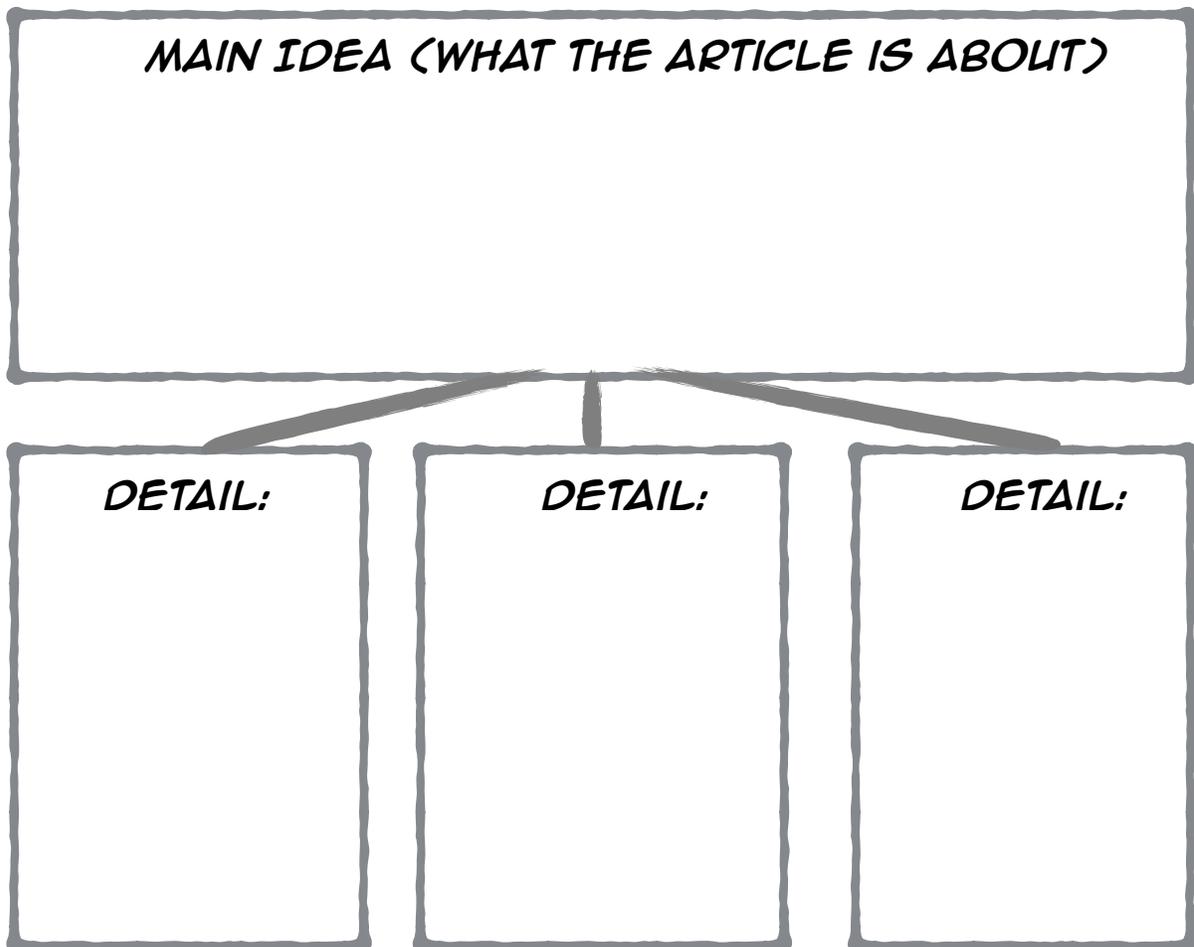
HDEV - High Definition Earth Viewing. **Cycle** - Move between. **Mounted**- Placed on to something. **Module** - A part of a spacecraft that can be on it's own. The Space Station has many modules.

High Definition Earth Viewing

- 1) What does the word cycle mean? _____
- 2) How do you know? What text feature gives you the answer to question 1?

- 3) What is the goal of the HDEV experiment? _____

- 4) Use the chart to identify the main idea and details from this article:



EarthKAM vs HDEV

EarthKAM

The **ISS** travels around the globe, letting cameras get different views.



EarthKAM was a program started in 1996. The program lets students point a digital camera at different areas around earth. Students can submit requests for pictures to be taken in different places around the **globe**. Those images are posted on the Sally Ride EarthKAM site, where students can study them. The camera is on the ISS, allowing it to get images of anywhere it passes over.

HDEV

The HDEV, or High **Definition** Earth Viewing system, started on April 18, 2014. The experiment is used to see how space will damage cameras. Four cameras are attached to the International Space Station. Those cameras are pointed at the earth. Anyone can watch the video from the cameras live online. The cameras only work when the Space Station is pointed at daylight. When they pass into the dark side of the earth, they turn off.

Oh So Similar

Even though both experiments are very different, they also have some things the same. Both experiments are found on the **ISS**. Both experiments deal with camera technology. Also, the video and pictures from both experiments can be looked at by anyone with internet access and are run by NASA. Both experiments try to help

scientists better understand how different objects work in space.

Both experiments are used to help educate students and people about space. Both have websites where more details can be found:
HDEV - <https://eol.jsc.nasa.gov/ESRS/HDEV/>
EarthKAM - <https://www.earthkam.org/>

Words to Know:

- Globe** - The earth.
- ISS**- International Space Station.
- Definition**- How sharp or good an image is.

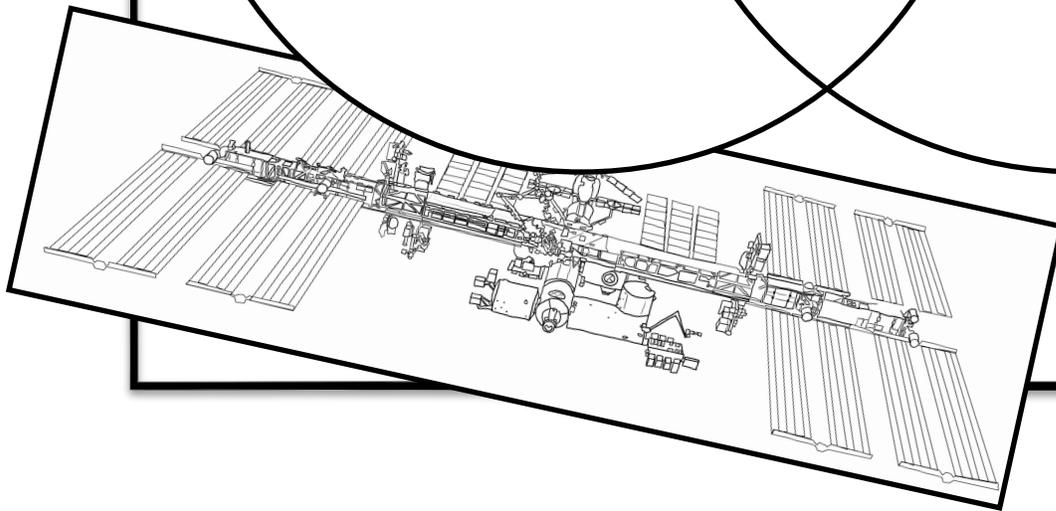
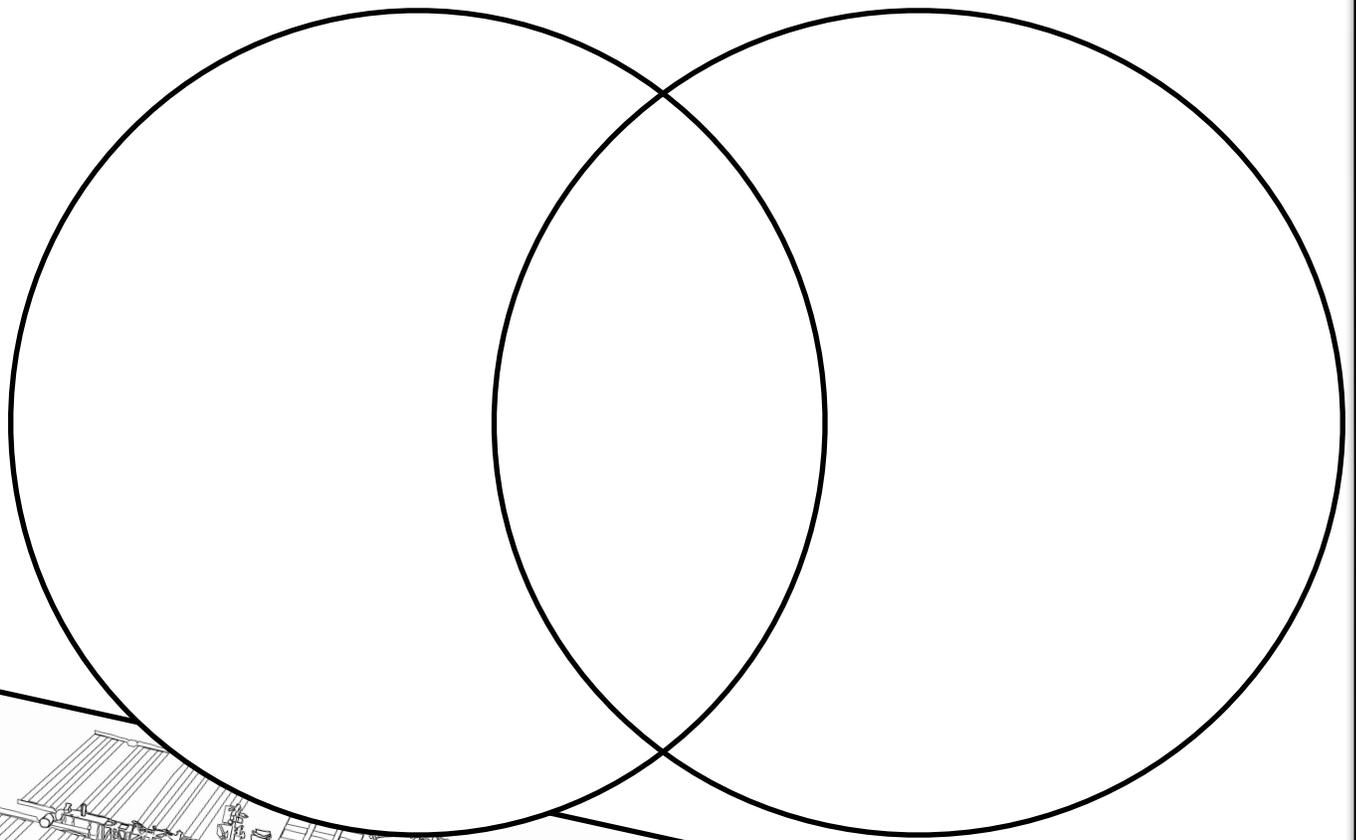
EarthKAM Versus HDEV

1) What text structure does this article use? _____

2) What Key Words let me know that it is this text structure: _____

3) How else can I prove that it is this text structure? _____

4) Complete the Venn Diagram below to compare the EarthKAM and the High Definition Earth Viewing System:

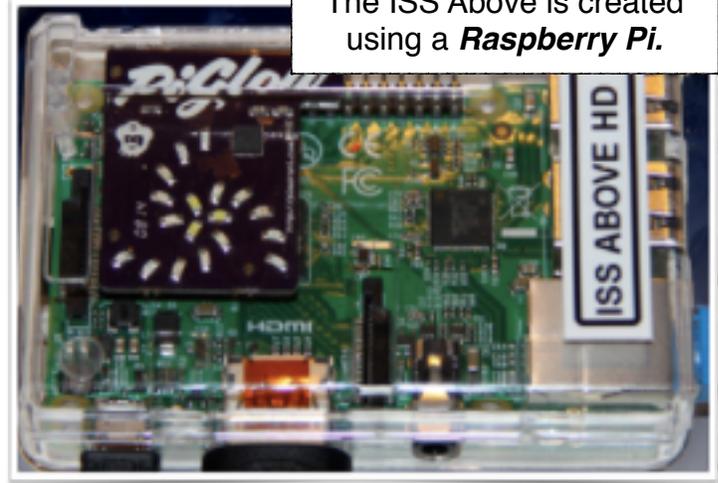


ISS-Above

The Challenge

There was a challenge. The International Space Station had started its High Definition Earth Viewing experiment (**HDEV**). The Experiment allowed anyone to watch the earth from special cameras on the space station.

However, in order to watch it you had to be on the Space Station's HDEV website. So what about people without computers? Or schools where the computer is needed for other reasons?



The ISS Above is created using a **Raspberry Pi**.

Solving Problems

Liam Kennedy is an inventor who was inspired by the ISS. He loved

learning everything he could about the **International** Space Station. He wanted to make something that would let people watch the HDEV easier and know that an amazing marvel of technology was above them.

He knew that the HDEV feed was not easy for everyone to watch, so he came up with a solution. He created the ISS-Above.

Creating the ISS-Above

The ISS-Above allows anyone with internet and a tv to watch the ISS as it passes above the light side of the earth. Mr. Kennedy sells it to anyone that wants to bring the HDEV into their living room, and also works to get more ISS-Aboves into schools around the world.



Any TV can be used with the ISS-Above.

To hear more about why Liam Kennedy created the ISS-Above, check out this link: <https://www.youtube.com/watch?>

Words to Know:

HDEV- High Definition Earth Viewing. **International**- Involving more than one country.
Raspberry Pi - A tiny computer that can be programed to do many different things.

Name: _____

ISS-Above

1) What text structure does this informational text use? _____

2) How do you know? _____

3) In the space below, find 5 text features and list them:

Text Feature	What it looks like:

3) Take a look at the picture. The picture is from a day when Liam Kennedy, creator of the ISS-Above, was giving lesson ideas to a teacher so she could use the ISS-Above in her classroom. If this picture were added to the nonfiction text, what would be a good caption for it?



Caption:

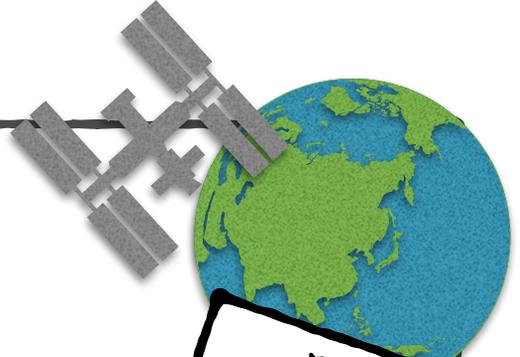
4) What is the problem that Liam Kennedy tried to solve? _____

5) What is the solution that Liam Kennedy found? _____

6) Read the paragraph below:

Many students around the USA now use ISS-Aboves in their classroom. In 2017, Liam Kennedy got a grant. A grant is when a group gives you money to do something. Kennedy got a grant that let him give 100 ISS-Aboves to schools around the country. He even started a group that made new lessons for teachers to use in class with his ISS-Above.

What would be a good heading for this paragraph?



Welcome Home

Arriving At the Space Station

It's time for a new mission to start on the **International** Space Station. Three crew members have returned to earth. Three new crew members head up to the station. They arrive to a warm welcome from the remaining crew... and **stream** it live for the whole world to see on NASA TV!

Fun Fact!
The International Space Station is 254 miles above the earth!

Arriving To Their New Home

When new crew go to the International Space Station, they usually follow a series of events. First, the crew gets ready to go. They fly up on a Soyuz rocket launched by Russia's Roscosmos. Then, the crew has to work hard to dock with the ISS. Usually it takes a couple days before the Soyuz rocket is ready to dock. Next, the rocket docks with the International Space Station. By this time, the crew is probably ready to get off the Soyuz! Finally, the hatch is opened, and the new crew members come on board.

The crew members already on board are there to great the new crew. The welcome is filmed live, and the **public** is able to watch it on NASA TV.

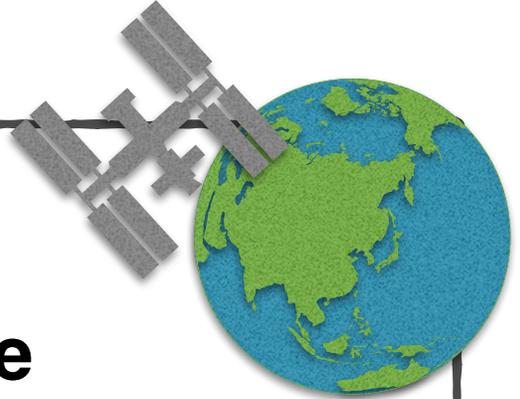
Words to Know:
Stream - To send video over the internet.
International- Involving more than one country.
Public - People who do not work for NASA.

NASA TV

NASA TV lets the public watch all sorts of space related tv. Whenever new crew arrives, you can watch their welcome through NASA TV. They also show spacewalks, rocket launches, educational documentaries, and more. NASA TV is an educational channel. It tries to teach the public about space with its shows. NASA TV has three channels. One is for public use. Another is for media, or news channels.

TV Schedule	August 12	Eastern U.S.	NTV-3 (Media)
1:00 p.m.	NASA TV Programming		
5:00 p.m.	 NASA Television Video File News Feed A daily newsfeed about the latest news on NASA missions, programs, activities and science developments.		
6:00 p.m.	NASA TV Programming		

Nasa TV has constant programming. It can be watched for free at:
www.nasa.gov/multimedia/nasatv



Name: _____

Welcome Home

Arriving At the Space Station

1) What text structure does this text use? _____

2) How do you know? _____

3) Write in what each text feature is in the text:

Welcome Home
Arriving At the Space Station

It's time for a new mission to start on the International Space Station. Three crew members have returned to earth. Three new crew members head up to the station. They arrive to a warm welcome from the remaining crew... and stream it live for the whole world to see on NASA TV!

Fun Fact!
The International Space Station is 284 miles above the earth!

Words to Know:
Stream - To send video over the internet.
International- Involving more than one country.
Public - People who do not work for NASA.

Arriving To Their New Home
When new crew go to the International Space Station, they usually follow a series of events. First, the crew gets ready to go. They fly up on a Soyuz rocket launched by Russia's Roscosmos. Then, the crew has to work hard to dock with the ISS. Usually it takes a couple days before the Soyuz rocket is ready to dock. Next, the rocket docks with the International Space Station. By this time, the crew is probably ready to get off the Soyuz! Finally, the hatch is opened, and the new crew members come on board. The crew members already on board are the first to greet the new crew. The welcome is filmed live, and the public is able to watch it on NASA TV.

NASA TV
NASA TV lets the public watch all sorts of space related tv. Whenever new crew arrives, you can watch their welcome through NASA TV. They also show spacewalks, rocket launches, educational documentaries, and more. NASA TV is an educational channel. It tries to teach the public about space with its shows. NASA TV has three channels. One is for public use. Another is for media, or news channels.

Nasa TV has constant programming. It can be watched for free at: www.nasa.gov/multimedia/nasatv/

4) In the space below, fill out what happens when new crew is heading to the International Space Station:

First _____

Next _____

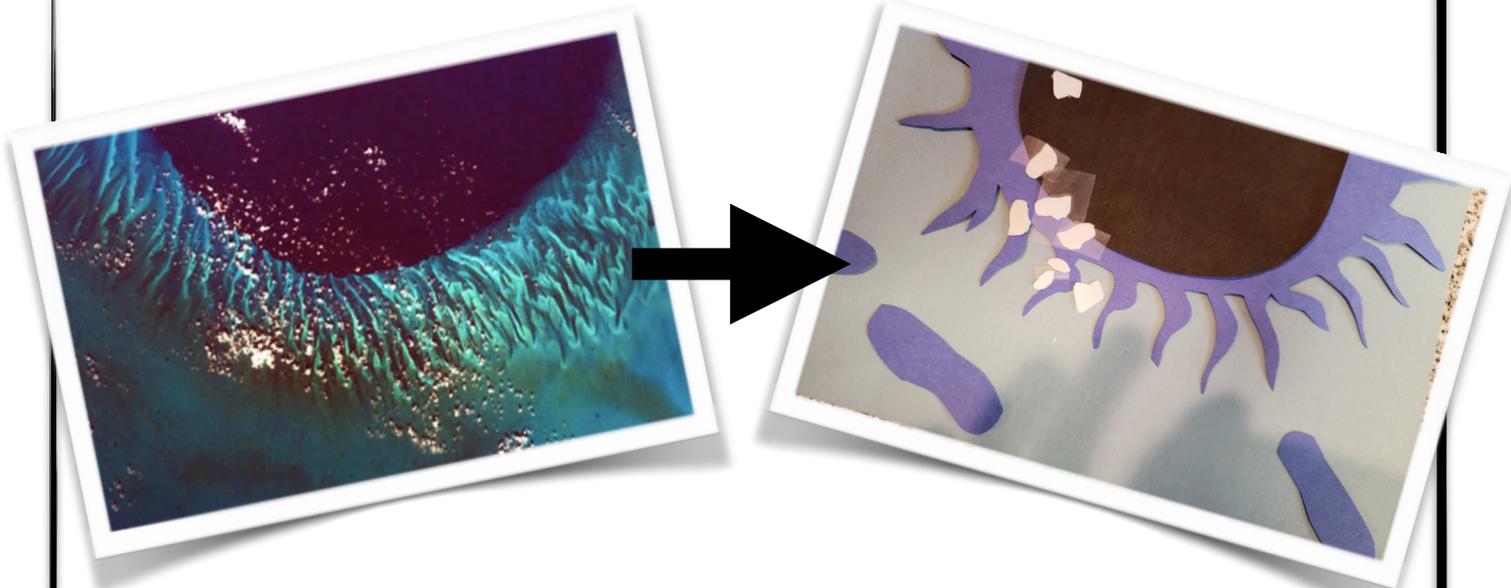
Then _____

Finally _____

Sally Ride Construction Paper Art

The Project: Students create construction paper murals inspired by images from the Sally Ride EarthKAM project.

Supplies Needed: Construction Paper, Glue, Scissors, Creativity!



Directions: Print out 3 to 5 images from the Sally Ride EarthKAM. Distribute them among your class. Students are then challenged to recreate the image using only construction paper.

Extensions:

- **Label the Parts.** Use images from EarthKAM's favorites collection. These images have labels for each part. Students must then find the image and label each part in their own image.
- **Find it on a Map.** For each image used, provide students with the continent or ocean it was taken in. Students must then find the image on a map of the world.

Inspired By: Cubism

Cubism was a type of art started in the early 20th century. The art style was pioneered by Pablo Picasso. In cubist art, objects are broken up, analyzed, and rebuilt in a more abstract form. Some cubist art even tries to

show an image from multiple viewpoints.

Cubism was one of the most influential art styles of the 20th century. The image depicted is "Factory At Horto De Ebro" by Pablo Picasso.



Using The HDEV to Improve Literacy in The Classroom

What in the world is that?

Often there will be unusual things in the HDEV feed, prompting students to ask what it is. This is a great opportunity for an impromptu opinion essay writing activity. Instead of telling students, have them write an essay about what they think it is and why. Then you can assist students in researching what it might be.

Example: Last year we had what the kids swore was an alien pizza in one of the cameras. They wrote very compelling essays to convince me of what it was. Then we researched and learned it was a solar panel on a visiting craft.



Tracking Storms

Every so often you will see a storm or something else unique. This is a great chance to make note of where on the map it was, then track it. Whenever the HDEV feed is nearing that area, have students pull out their "storm books" to write and draw observations in. They can watch as the storm grows or shrinks over time. and compile written observations to help them. This is a great time to introduce vocab that will let them be more accurate in their recordings.

Read the News

Often when new craft dock with the ISS, parts of them can be seen on the HDEV feed. The students will often ask about these new additions, providing a great chance to pull out recent news articles about them to read with the class and practice literacy skills using real world news.

If It Were Mine

Have students write a narrative story about what would happen if they had control of the HDEV cameras for a day. If they could point the cameras anywhere and use whichever camera they wanted, what would they do?

Credits, Sources, and Resources

- Informational Text and activities created by Michelle Mohrweis.
- Images taken by Michelle Mohrweis.
- Special thanks to Liam Kennedy for images of the ISS-Above.
- Sally Ride EarthKAM Logo - Property of Sally Ride EarthKAM and NASA

More Information can be found on the following sites:

HDEV - <https://eol.jsc.nasa.gov/ESRS/HDEV/>

EarthKAM - <https://www.earthkam.org/>

Cameras In ISS - https://en.wikipedia.org/wiki/List_of_cameras_on_ISS

ISS-Above - <http://www.issabove.com/>

CASIS - <https://www.iss-casis.org/>

Keep an eye on my blog for more postings. Also, please feel free to email me if and let me know if there is any content you would like to see me cover!

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Email - mmohrweis@gmail.com