# St Benedict's Journal of Science

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The Catholic Secondary School for West Suffolk

**Catholic School** 

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# Welcome to Volume 5 Number 2 (July 2021)

This *"Special Edition"* of the Journal of Science is a unique collaboration between the school's departments of Art and Science.

Too many people consider these two major subject areas to be somehow at odds, as though they are polar opposites, and are exclusive to each other. Nothing could be further from the reality: just as Science has shown us that the entities of mass and energy are merely two manifestations of the same thing, so Art and Science should be viewed as such. Not mutually exclusive, but inexorably bound together and thoroughly interchangeable.

We are the only species on Earth that has evolved to concern itself with two such notions as Art and Science, and it cannot be coincidental that our evolution is inextricably linked to both; indeed, the progression continues.

Look back at our views of Art and Science, say, 500 years ago and how we and they have evolved to the present day. Ponder, then, what the future might hold.

#### The following foreword is courtesy of Mrs C Chacksfield, Head of the Art Department:

Art students in Year 12 and Year 10 have been working hard to create an online exhibition of work. Inspired by NASA's galactic message in a bottle, the 'Golden Record', this is our record of life in lockdown.

We are pleased to have been guided by the expertise of Environmental Artist, Ruth Macdougall, who has created a number of fascinating art and science-based projects before joining us as a trainee teacher this term. Her expertise and insights have inspired the project's development and collaboration. From concertina books to found poetry and film, students have developed their skills and ideas in a wonderful range of different outcomes.

> The students' work is presented on a dedicated website: <u>http://www.goldenlockdown.wordpress.com/</u>

This website also highlights the work of some Year 10 students who have also been investigating art and science inspired by the Golden Record. The Year 10 investigations also encompass how origami is used by NASA to take enormous pieces of equipment, especially solar panels, into space.

We hope that the snippets here from the project give you a flavour of the students' investigations and ideas explored during lockdown. We are hugely thankful to Ruth for all her work, care and inspiration in bringing this project to life and wish her all the best for her new role at Sprowston Academy Norwich when she starts in September. And thank you of course to all the students who have used their time in lockdown to give us such rich ideas for our lockdown archive.



LEONARDO DA VINCI



Mrs Chacksfield rightly commends the contribution of Miss Ruth Macdougall that made the project such an outstanding success. Sadly, Miss Macdougall has left us now after her stint as a trainee teacher and we all wish her well at Sprowston Academy.

The Journal is therefore delighted to publish her personal message:

Launched in 1977, the Voyager has another 4 years of healthy life ahead of it. NASA even predicts that all things being well, their tracking antennas could continue to "talk" with the Voyager for another century or two... and so it floats ever further into deep space with our messages of hello.

"Friends of space, how are you all? Have you eaten yet? Come visit us if you have time." (Amoy) The world recorded in 1977 through sounds, music, images, and greetings was quite different to the one we know now. The record contains no moving images and if it were to be sent up today, it is unlikely that the contents would be on a golden record at all - more likely something with a halfchewed apple printed on it. And yet there is something inherently romantic about the golden record, this golden disc hurtling through space, waiting to be found, a lonely heart desperately seeking...

It has been acknowledged that the record had two audiences, that on earth and the potential audience in space, and so we tasked Yr 12 with creating their own Golden Records, documenting their lives through lockdown.

Collaboration and what this looks like has been a core question from the beginning of this cross curricular project. Polymaths the likes of Leonardo Da Vinci and Carl Sagan are very rare, and so the meeting of minds is necessary to broach the most interesting question – what if? We began by looking at the work of several artist/scientist duos: Dr Laura Cinti and Dr Howard Boland, Dr Victoria Vesna and Dr Jim Gimzewski, Anne Brodie and Professor Sam Parker. I first became aware of these duos whilst writing my Master dissertation titled, *Risk-Taking for Innovation, Models for art/science Interdisciplinary Research Collaboration*, and I have worked collaboratively with several organisations on water and climate issues of communication. The trust and equality evident in these collaborations was the key that the group took forward as they negotiated this new way of working under the added complexity of Lockdown. Students, Kirstein Paulo and Angela Garnace, were so productive as a duo that they have their own additional page on the website for the body of work they created.

To make this challenge more manageable, the students chose a theme to focus on for each new media that they encountered. The themes were habitat, journey and senses. Some students chose to work with the same theme throughout whilst others moved between themes. The playful, sometimes abstract approach to sound, moving image and text is testament the spirit of this group, who in the toughest of times have managed to create a message worth hearing. Creative minds cannot be locked down. We hope you enjoy this special edition of the Science Journal and thank editor, Jonathan Gregory, for this opportunity.

"Hello to the residents of far skies." (Persian)

# Ruth Macdougall

www.ruthmacdougall.work

**EDITOR'S NOTE:** the two quotes that Miss Macdougall used in her foreword are from those used on the actual Voyager "Golden Record". In fact, similar messages were recorded in a total of 55 different languages.

The story behind the creation of the "interstellar message" is chronicled in the book, "*Murmurs of Earth*", by Carl Sagan, et al. Unfortunately, not much information is given about the individual speakers. Many of the speakers were from Cornell University and the surrounding communities. They were given no instructions on what to say other than that it was to be a greeting to possible extra-terrestrials and that it must be brief!

# The following introduction outlines the project in the students' own words as published in the 'Our Project' section of their website:

#### WE ARE A LEVEL ART STUDENTS FROM ST BENEDICT'S CATHOLIC SCHOOL IN BURY ST EDMUND'S

In January 2021 we returned to Lockdown and the indefinite prospect of working from home. To fully contemplate the hurdles and opportunities that this isolation from our teachers and friends imposed, we were challenged to step outside our comfort zones, look skyward and consider life on earth as we knew it and as we know it now.

In 1977, renowned cosmologist and writer, Professor Carl Sagan, led a team tasked to create a Golden Record of life on Earth, containing greetings, music, sound recordings and images. Their Golden Record was fixed to the side of the Voyager spacecraft and launched into space in the hope of introducing us to any inquisitive extra-terrestrials who may find it.

Inspired by this intergalactic message in a bottle (which is still travelling through space) we sought to explore our lives through lockdown, responding to the themes of Habitat, Senses and Journey. Collaboratively and individually, we explored these themes through sound, text, image and moving image. This website showcases the best of our work and the journeys we went on as we explored our isolation through multiple lenses during this Golden Lockdown.

#### **ARTISTS WHO HAVE INSPIRED US:**

- Karl Baden
- Karl Bossfeldt
- Anne Brodie
- Janet Cardiff
- Laura Cinti and Howard Boland
- Dogma 2005 film makers
- Hamish Fulton
- Ben Gest
- Douglas Gordon
- Gail Albest Haliban
- Harvey and Ackroyd
- Cristobal Leon
- Katie Paterson
- Bruce Naumann
- Man Ray
- Hannah Starkey
- Sam Taylor Wood
- James Turrell
- Victoria Vesna
- Bill Viola
- Jeff Wall
- Gillian Wearing
- Irina Werning



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As to present each student's work in full would merely duplicate what is already available on their website, the Editorial Board decided to give students the further opportunity to use the written Journal as a means of enhancement, creating a statement by giving an overview of their work as well as selecting key images. Where students included a personal "Artist Statement" on their website, this has been included in the Journal.

The order in which the students are presented in the Journal is not intended as an "order of merit" – it is merely the order in which they are listed on their website.

As the students' work was inspired by the cosmologist, CARL SAGAN, and the "VOYAGER GOLDEN RECORD" that he designed, we have included a number of editorial articles regarding Sagan and associated work in space and cosmology.

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## CARL SAGAN – a biography

Carl Sagan (1934 - 1996) played a leading role in the American space program from its very beginning. He was a consultant and adviser to NASA beginning in the 1950s – he briefed the Apollo astronauts before their flights to the Moon.

Carl was born in New York City on November 9, 1934. He described himself as a childhood science fiction addict who became fascinated by astronomy when he learned that every star in the night sky was a distant Sun. He was always encouraged by his parents to research answers to his innumerable questions about science. His scientific curiosity led him to earn four degrees in physics, astronomy and astrophysics from the University of Chicago.

In his role as a visiting scientist at the Jet Propulsion Laboratory (JPL) in Pasadena, Calif., Carl helped design and manage the Mariner 2 mission to Venus, the Mariner 9 and Viking 1 and Viking 2 trips to Mars; the Voyager 1 and Voyager 2 missions to the outer solar



system and the Galileo mission to Jupiter. Carl's research helped to solve the mysteries of the high temperature of Venus (a massive greenhouse effect), the seasonal changes on Mars (windblown dust) and the reddish haze of Titan (complex organic molecules).

Carl was often described as "The scientist who made the Universe clearer to the ordinary person." He helped to popularise science through the writing of hundreds of articles and over two dozen books. He won a Pulitzer Prize in 1975 for his book "The Dragons of Eden." His television series "**COSMOS**" was one of the most watched shows in public television history. It was seen by more than 500 million people in 60 different countries.

Carl taught and conducted research at Harvard University. In 1968, Carl became a professor at Cornell University where he was also the director of the Laboratory for Planetary Studies. He was well known as a pioneer in the field of exobiology, which is the study of the possibility of extra-terrestrial life. He was among the first to determine that life could have existed on Mars. And he constantly appealed to NASA to extend its exploration of the Universe.

Carl suffered from a rare bone marrow disease called myelodysplasia. Complications from this disease caused the pneumonia which ended his life on December 20, 1996. He was 62.

As a cosmologist Sagan not only studied the evolution of the Universe, but he pondered the profound question: *"Are we alone in the Universe?"* 

With his great friend, Frank Drake, in the 1960s Sagan conceived how we might search for radio transmissions from other civilisations in our Galaxy. This became a program known as SETI – search for extra-terrestrial intelligence.



Sagan's famous quote reproduced here is typical of his depth of thought...and his humour!

## ELIZA WHIFFIN

"El arte es libertad ser capaz de doblar las cosas que la mayoría de la gente ve como una linea reacta".

Hola! I am Eliza Whiffin, born 2004 in the United Kingdom, I am an artist who works in a variety of media, mainly portraits. My work is quite realistic. Given the challenge (as I have been given in this project), I love to incorporate a large array of art movements and styles to my own work and (trust me) it's definitely not perfect and mistakes are made during the making process of my work but I carry on through these learning opportunities, which help me build my work to where I want them to be. My artwork can isolate the movement of humans and/or objects. By doing so, new structures are created which reveal an inseparable relationship between time and change. Through this I seek to achieve clarity of content and a meaningful approach towards conceptual and minimal art.

Now, for this project, I have incorporated the skills I have acquired in other fields, to create an unusual moving image piece and a gratitude-filled text piece to contribute to "Our Golden Lockdown". Espero que lo disfrutes mi obra!

# LA TRANSFORMACIÓN DE LA MANZANA







This is my Art and Science project that shows the transformation of an apple when exposed to oxygen. I was inspired to do this after watching Sam Taylor Wood's "Still Life".

The reaction had after oxygen exposure is called enzymic browning; this is an oxidisation reaction that takes place in most fruit and vegetables that causes the food to turn

For apples: when exposed to oxygen, the enzymic phenolase change the phenols (found in the cells) into melanin- a pigment that gives humans the colour of their hair, eyes and skin. The enzymic phenolase acts as a catalyst and causes the fruit to overripen, giving it the brown colour. Being sliced also makes the apple break down with age.

Although this browning can cause waste, without it we would not have tea or chocolate.

But there are some ways to prevent the browning; firstly, the acid from lemon juice and secondly, water and sugar. They both create a barrier that stops the oxygen exposure.

# ORLA TULLY

My Name is Orla Tully and I am an aspiring artist currently studying art at school and have been inspired by the lockdown to create artwork based on the journey and experience of lockdown. The main media I use is photography, pencil and paint and I am continuously experimenting with other media as I continue to learn and explore different areas of art. Through the project of the golden record I have explored video, photography, typography and researched into the theme of art and science introducing me to artists like Katie Paterson, Robert Montgomery and Cavan Huang who have inspired me during this project.



Within my text work, I explore the theme of light, which is inspired by Cavan Huang and city lights inspire his work. In my work, I used bright warm colours like orange and yellow to reflect my theme of light and this use of repetition of colour throughout my work linked all my studies together. In Cavan Huang's text art, his words are scattered and create a very chaotic piece of work. Therefore, in my work I tried to reflect the chaos with a palette knife, using old scrabble pieces, cutting out letters from old newspapers and splattering paint across my work.



#### **DANIELLE-ELYSEE TABIOS**



A Quick Introduction ...

As an artist I am passionate about being able to portray my own desired world of nonsense, enjoyment and playful scenes into reality, in hopes they will provoke your interest in perceiving the world through a different lens. My artworks are heavily inspired by the anime genre, which is known to be visually rich, and has the potential of bringing one's imagination to life.

This Golden Lockdown project allowed me to explore new media via digital animation, which worked hand-in-hand with the digital and hand-drawn aesthetic that the anime genre offers.

This project was indeed an interesting challenge, as an artist especially. Staying at home during this project immediately shut down a range of media opportunities, limiting the outcomes my project could've gone. Despite the limitations, this allowed me to step out of my comfort zone and try something completely new. As a result, this led me to try out a more modernised media of digital art, specifically; digital animation.





Shots from my project:

One particular aspect of 'The Golden Record' that intrigued me, was its' sole purpose of being able to communicate with extraterrestrial. When personally interpreting this concept, it became my selected theme of "voicing a story". The idea of communicating my own desired intentions to the viewer.



Scene from an anime:

My past/present artworks are heavily inspired by the anime genre, which is known to be visually rich, and has the potential of bringing one's imagination to life, thus I really wanted to include

an anime characteristic forward. But why? Anime is a Japanese cartoon designed to advocate creative stories enticing the viewer emotionally, and visually. Perhaps you can relate, though personally quarantine had been a

difficult time; isolation; human depravation; limited social interactions, it was tough. During these problematic times, I've managed to pull through with the help with the story-captivating world of anime. So I really wanted this project to be heavily influenced by that particular genre.

In addition to other inspirations, I coincidentally scrolled through my social media page and found the idea that ended up structuring the plan for my project. This post was a video presenting a 3D illusion on a billboard display, there were coloured dancing figures appearing to come out of the screen, and it was this illusion, that clicked an idea within my brain, "What if anime characters could come to life?"... Thus began my journey of executing my thoughts.



# THE VOYAGER STORY

On 2<sup>nd</sup> March 1972 and 5<sup>th</sup> April 1973, NASA launched the space probes **PIONEER 10** and **PIONEER 11** respectively. These were the first space probes to travel through the Asteroid Belt beyond Mars and on to the outer planets. Pioneer 10 flew by Jupiter, followed by Pioneer 11 which also travelled on to fly by Saturn. Their velocity would then take them beyond the Solar System and out into interstellar space.

Both Pioneer craft carried a gold-plated plaque, known as the "Pioneer Plaque". On the plaque a man and woman stand before an outline of the spacecraft. The man's hand is raised in a gesture of good will. The physical makeup of the man and woman were determined from results of a computerized analysis of the average person in our civilization. The key to translating the plaque lies in understanding the breakdown of the most common element in the universe - hydrogen. This element is illustrated in the left-hand corner of the plaque in schematic form showing the hyperfine



transition of neutral atomic hydrogen. Anyone from a scientifically educated civilization having enough knowledge of hydrogen would be able to translate the message. The plaque was designed by Dr. Carl Sagan and Dr. Frank Drake and drawn by Linda Salzman Sagan.

The Pioneer missions would be followed by **VOYAGER 1** and **VOYAGER 2**. Confusingly, Voyager 2 was launched first, on August 20, 1977; Voyager 1 was launched on a faster, shorter trajectory on September 5, 1977. The reason was that Voyager 1 was put on a faster trajectory to Jupiter and so, although being launched 2<sup>nd</sup>, would arrive at Jupiter first.

#### **VOYAGER – THE GOLDEN RECORD**

With the example of the "Pioneer Plaques" before them, NASA placed a more ambitious message aboard Voyager 1 and 2, a kind of time capsule, intended to communicate a story of our world to extra-terrestrials. The Voyager message is carried by a phonograph record, a 12-inch gold-plated copper disk containing sounds and images selected to portray the diversity of life and culture on Earth.



The information in the upper right-hand portion of the cover is designed to show how pictures are to be constructed from the recorded signals. The

top drawing shows the typical signal that occurs at the start of a picture. The picture is made from this signal, which traces the picture as a series of vertical lines, similar to ordinary television (in which the picture is a series of horizontal lines). Picture lines 1, 2 and 3 are noted in binary numbers, and the duration of one of the "picture lines," about 8 milliseconds, is noted. The drawing immediately below shows how these lines are to be drawn vertically, with staggered "interlace" to give the correct picture rendition. Immediately below this is a drawing of an entire picture raster, showing that there are 512 vertical lines in a complete picture. Immediately below this is a replica of the first picture on the record to permit the recipients to verify that they are decoding the signals correctly. A circle was used in this picture to ensure that the recipients use the correct ratio of horizontal to vertical height in picture reconstruction.

The drawing in the lower left-hand corner of the cover is the pulsar map previously sent as part of the plaques on Pioneers 10 and 11. It shows the location of the solar system with respect to 14 pulsars, whose precise periods are given. The drawing containing two circles in the lower right-hand corner is a drawing of the hydrogen atom in its two lowest states, with a connecting line and digit 1 to indicate that the time interval associated with the transition from one state to the other is to be used as the fundamental time scale, both for the time given on the cover and in the decoded pictures.

Electroplated onto the record's cover is an ultra-pure source of uranium-238 with a radioactivity of about 0.00026 microcuries. The steady decay of the uranium source into its daughter isotopes makes it a kind of radioactive clock. Half of the uranium-238 will decay in 4.51 billion years. Thus, by examining this two-centimetre diameter area on the record plate and measuring the amount of daughter elements to the remaining uranium-238, an extra-terrestrial recipient of the Voyager spacecraft could calculate the time elapsed since a spot of uranium was placed aboard the spacecraft. This should be a check on the epoch of launch, which is also described by the pulsar map on the record cover.

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## EVIE PORTER – my golden lockdown

My name is Evie Porter and I study art in sixth form at St Benedict's Catholic School. I enjoy working with different media such as acrylic paint, watercolour, biro and photography. After being introduced to 'The Golden Record' and exploring different themes of journey, habitat and senses, I have been able to find an interest in mediums and artists I haven't yet heard of or were necessarily fond of. I experimented with art and science by working with image, sound, text and moving image. I found that I was most fascinated in images and I developed my interest by taking photographs of my surroundings, especially throughout lockdown to show the small changes in the environment around me. I documented my daily walks and later edited these images by using vibrant colours to give an unusual effect, which could possibly link to extra-terrestrial beings in space if my images were selected for 'The Golden Record'. A quote that I like is ''Imagination will often carry us to worlds that never were. But without it we go nowhere." by Carl Sagan, it motivates me because I aim to give a message through my artwork and as the intention of the Golden Record was to communicate the story of our world to extra-terrestrial beings, I want to be able to share my own thoughts and messages to other humans/beings but through my own work.



After being introduced to 'The Golden Record' and exploring different themes of journey, habitat and senses, I have been able to find mediums and artists I had not yet heard of or were necessarily fond of. I found that I was most fascinated by images and I developed my interest by taking photographs of my surroundings, especially throughout lockdown to show the small changes in the environment around me. I documented my daily walks and later edited these images by using vibrant colours to give an unusual effect, which could possibly link to extra-terrestrial beings in

space if my images were selected for 'The Golden Record'.

Whilst working with images, I took photographs of my daily walk throughout lockdown. There was very little change to my indoor environment and so I took photos of outside. As my theme was habitat and journey, I started to take a similar picture at the end of different roads to show the journeys that are taken each day, or the journeys that we are no longer able to make due to the

pandemic.

I researched Daniella Jones, a self taught artist whose work involves the combination of habitat and people. I recreated one of her paintings as this explored a vibrant and colourful habitat. Other artists I researched whilst looking into images were Ben Gest, Hamish Fulton and Jamie Livingston. I also looked at working with text, sound and moving image. I found



images were my favourite to work with as I had more opportunity to work in ways in which I enjoy, such as painting with acrylic.



'The Golden Record' has influenced my interests in art hugely and after creating our own, I have developed passions for mediums that I wouldn't have thought of working with before this project. In the future, I would like to work more with photography and image. My main focus throughout this project was to create a meaning for my work and for anyone who views this to reflect on how much of an impact the pandemic has had and whether we will ever go back to normal.

Work from Ben Gest and Jamie Livingston

## **KIRSTEIN PAULO**

Through exploring the theme our scientific journey, I found the influential and compelling meaning of word play, having been inspired by President Carter's printed message 'we cast this message into the cosmos' found within the Golden Record. I then decided to look at the noteworthy language used by some of the World's leading political leaders, the American presidents. Whilst Carter's intriguing message was inspiring, I also found great inspiration in the works of the word play artists, Patrick Brill and Raymond Hains. From this an idea of conveying a political or historical message was sparked which concludes my efforts in producing and exploring historical and political language worthy of cosmological journeys. My titled project, A journey through history's dividing line is a journey back to the past specifically the 60s when divided society and opinions was the norm. The 60s is the decade when everything happened. By looking back in history, we acknowledge strange times and uncertainty much like today with our experiences through this unpredictable year, but the one certain thing we take from the past, present and future is that the "wheel is still in spin" as we all know these are "strange days indeed". Our Golden Record showcases our lockdown experience, and although the work presented here isn't a direct experience of the 60s it is based off of its unpredictable days where everything truly did change. Much like our experience of the numerous lockdowns which triggered great change in our livelihood's. So, in a similar way I felt that this would be prominent for our record in revealing how unpredictable our future has always been and how everything we are experiencing becomes our history for better or worse sadly.

The following images presented on this page are from a series of digital posters I composed based on the inspiration of our scientific/historic project.







I also collaborated with a friend, Angela Garnace - the work made by the two of us can also be found on our Golden Lockdown website.

# **SOPHIE MOSS - My Golden Lockdown**

Hi my name is Sophie, an aspiring British artist and currently a studying A Level art and design. I work in a variety of different mediums such as paint, Berol, watercolour, pencil, photography and video- which I've had the chance to experiment with more during this project especially photography and video, which I will continue to explore as it's something different for me. When I create art it's an escape from the real world, a chance to slow down from the fast moving pace of reality. I get joy from it, not only for myself, but for my audience who will hopefully enjoy my art as much as I did when making it. When I was introduced to the golden record I liked the idea of incorporating journey into my artwork as I can take it in many directions. Journey is quite a broad theme and so my artwork is rooted in narrative.



Within this project, I explored many new Medias that I hadn't worked with before such as moving image and sound, which I really enjoyed experimenting with. I liked the idea of incorporating the theme of journey as it's such a broad theme so hopefully you will be able to see some of this within my artwork. Some of my work within this project below:



In the images below and at the top of the page show my own work which I have captured the journey of my sister entering the water and how her expressions alter accordingly. I did three videos all with different lighting conveying different emotions, for example when I view the video with red lighting I feel danger. The images above are installations completed by artist Bill viola, which was my inspiration for the video I created (which can be seen on my page on the website)





To view more of my art pieces that I have completed, in the golden record project, where I have also experimented with text and sound visit our website.

## LAUREN McLEOD – my Golden Lockdown page

"Art is not what you see, but what you make others see". These words from Edgar Degas perfectly introduce this project.

My name is Lauren McLeod and I'm an aspiring student artist based in Bury St Edmunds, Suffolk. Art has always been a passionate hobby of mine, and I feel that this 'Golden Record' assignment has given me the freedom to explore new areas within my own work as well as the art industry overall. With the different aspects of this task, sounds, text, images and moving images, being related to various medias, objects, groups of artists and environments, it's been a creative and helpful way for me to experience new methods outside my comfort zone that will now support my work within the near future.

I made the decision to relate my pieces, 'Expeditions of Human Life', the decorated poem, the Mona Lisa ekphrasis poem, and 'The Everlasting Change', to the theme of 'Journeys'. I also included my own interests in literature and art to explore ideas about travelling, transportation, individual circumstances, different destinations as well as the impact that certain journeys have on those involved. I feel that my strengths lie in painting and drawing, but this opportunity has challenged me to improve my skills in other areas.

I've really enjoyed this recent journey I have been on with my work, and I hope that this unique version of the Golden Record has an effective voyage into the vast universe of art.



The Golden Lockdown project is something we, as a group, have been pursuing for a few months now. Each person has their very own page on the website that presents all the work and experiments we've done throughout the process.

We all focused on the same few themes; habitat, journey and senses, but interpreted the concepts in our own way and produced unique pieces of work regarding the chosen topic.

On my personal page of the 'Golden Lockdown' website, I have displayed what kind of artist I am, what my preferred media is and what my work is all about, what things I incorporated into my ideas and what experiments I carried through to deduce a final product. On the web page, you can clearly see all the different pieces I have made, and how I reached the final product.



![](_page_13_Picture_10.jpeg)

After explaining the kind of artist, I am, and all the work I've completed within this project, I have then included my 'final piece'. This acts as a conclusion of all the experimentation and research I have processed, and shows what skills I have learnt and taken on board within the set time.

I also included a few snippets from my school sketchbook, which further depicts the ideas I've had, how I've chosen to present them, and how they have influenced my future developments.

#### SETI – the search for extra-terrestrial intelligence – the beginning

![](_page_14_Picture_1.jpeg)

Whilst beliefs in extra-terrestrial intelligence have been expressed for centuries it is only relatively recently that the technological means of conducting a search have been available. Two crucial events contributed to this: firstly, in 1882, the German physicist Heinrich Hertz (pictured left) discovered the existence of radio waves; secondly, in 1931, the American physicist and radio engineer Karl Jansky (pictured right) discovered that we could receive radio waves that were emanating from space, actually

![](_page_14_Picture_3.jpeg)

from our own Milky Way galaxy – he is a founder of Radio Astronomy. These two discoveries moved the idea of searching for extra-terrestrial intelligence from the realm of speculation to that of serious scientific enquiry.

The early modern pioneers of SETI in the late 1950's were Guiseppi Cocconi, Philip Morrison, Frank Drake and Carl Sagan, who marshalled arguments based on what we know about terrestrial life and its origins, and applied them to astronomical data on conditions elsewhere in the universe. In 1959 SETI achieved scientific respectability when the scientific journal, *Nature*, published a paper by Cocconi, a cosmic ray specialist, and Morrison, a physicist. This paper addressed the question of radio communication from extra-terrestrial sources.

The problem of communicating with ET's is that first there has to be an agreement on a medium, which in the 1950's was radio, and then agreement on a frequency. If it is assumed that ETs want to communicate by radio, then the problem of which noise-free frequency out of millions has to be considered. Cocconi and Morrison proposed a frequency which was based on the rate at which hydrogen atoms emit radiation when the spin axis of the electron orbiting the nucleus flips over from being parallel to the nucleus's spin to being opposite to it. They argued that the hydrogen frequency 'has a universal uniqueness, not set by anthropocentric considerations, that fits it as the outstanding choice for potential communicators who have not had the opportunity to agree on a frequency'.

For interstellar communication, a particular range of radio frequencies, "microwaves" from 1 GHz to 10 GHz, are particularly good choices. At lower frequencies our galaxy emits prodigious amounts of radio waves creating a loud background of noise. At higher frequencies the Earth's atmosphere, and presumably the atmosphere of other Earth-like planets, absorbs and emits broad ranges of radio frequencies. The result is a quiet "Microwave Window" through which efficient radio communication is possible.

![](_page_14_Picture_8.jpeg)

The Microwave Window has another interesting feature to recommend it as a place for interstellar communication: the "Water Hole." Some atoms and molecules in space emit radio waves at particular frequencies. Hydrogen atoms emit at 1420 MHz (a wavelength of 21 cm). Hydroxyl molecules, composed of one atom of hydrogen and one atom of oxygen (OH), emit at four specific radio frequencies ranging from 1612 MHz to 1720 MHz. When a hydrogen atom combines with a hydroxyl molecule it forms a molecule of water, the most essential molecule for life as we know it. Thus, the range of frequencies from 1420 to 1720 MHz is called the Water Hole and it has been a popular frequency range for many SETI programs.

Radio SETI experiments have traditionally relied on existing radio astronomy telescopes. While this allows such searches to be conducted on quite large instruments (for example, the 305 m Arecibo dish, in Puerto Rico – now sadly defunct), the amount of telescope time available for the search is necessarily restricted. Now, thanks to the interest and benevolence of many donors, including technologists Paul Allen (co-founder of Microsoft) and Nathan Myhrvold (former Chief Technology Officer for Microsoft), a purpose-built

![](_page_14_Picture_11.jpeg)

telescope – the **ALLEN TELESCOPE ARRAY** – has been built at the Hat Creek Observatory, situated in the Cascade Mountains about 300 miles north of San Francisco, USA.

## CHLOE LE MOEL

My name is Chloe LeMoel. I am an aspiring artist who has been influenced by the beauty and fragility of nature which we take for granted. Over the past weeks I have tried to capture the sights and sounds of our woodlands and show the contrast of the colours and the textures of the flora and fauna from different perspectives.

# A WALK IN THE WOODS

![](_page_15_Picture_3.jpeg)

"Nature educates us into beauty and inwardness and is a source of the most noble pleasure" – Karl Blossfeldt

Whilst walking my dog, Toby, through the forest, I was inspired by the natural beauty, sights and sounds which are often taken for granted. Through photographs and two short films, I have captured my journey through the forest from a human's and animal's perspective to highlight the colours and textures which we should stop and take the time to appreciate.

![](_page_15_Picture_6.jpeg)

![](_page_15_Picture_7.jpeg)

## **KACPER KARPIK**

Hi, I'm Kacper and I study art in St Benedict's School, and I have been introduced to a project of Golden Record at the beginning of the second lockdown. This project is an opening to my discovery to a range of new digital styles. I find this project helping me to expand my interest in virtual reality and digital art. This is my main interest, this will also help me in future if I choose to focus on Graphic Design as a freelancer or a commercial graphic designer. It's enjoyable to do this project because it allows me to find different methods for new effects that have I never tried before.

I have done some digital art studies that show the journey through the technology of games, I compared pinball that is an original game that was first played in 1995 to The Witcher that is a modern game, and from the two pictures there's a huge difference seen that in pinball the graphics are really simple and the witcher has a range of different effects and creatures that are hyper realistic.

![](_page_16_Picture_3.jpeg)

After doing Journey themed art study I went on and created an art study that has text included in it as Text was another component that we had to do. I made the background as my room and the meaning behind it is that for 6 months I was in front of the computer for most of the time.

![](_page_16_Picture_5.jpeg)

After that I have added text saying "COVID I WAS IN IT" to give the art work a dramatic emotion.

Then I tried making a final outcome and I included outer space, used alien related pictures, since the whole meaning of Golden Record is to communicate with creatures outside earth. I used famous quotes related to space and technology.

![](_page_16_Picture_8.jpeg)

We had to create a website and in my page I have started with sound. I have 3 different sounds. The first sound recording I've done was pouring a sparkling drink into a glass and putting in ice cubes after it. I think it was my best sound recording out of all, the recordings seem to be in ASMR type. After that I showed my animation that I have made in software called Blender, the animation is basically a water simulation, where water is poured into glass from a tap. The theme for this animation was stop motion so the animation is made in a lower frame rate to make that feel of stop motion. For the final piece I have included text in different languages like English, Polish and French.

## **GINA HUGHES – Art and Science**

My name is Gina Hughes, I'm an aspiring British artist and educator, who likes to work in a variety of mediums and explore multiple themes. Within my own work my main aim is to create a deeper meaning and encourage the viewer to reflect on issues and concepts that influence me, for example the beauty of nature and the nature of humans, concepts that have definitely become more significant to me during the lockdowns. This is something I feel I have developed through the Golden Record, especially within the medium of text which introduced me to artists such as Robert Montgomery, whose purpose of artwork and poetic voice is very influential to me and the artwork I produce. I enjoy experimenting and working with different mediums, with the Golden Record allowing me to explore this further as I've become introduced and interested in Video, Photography and Text art, all of which I am keen to work with in the future.

#### **ART AND SCIENCE: Laura Cinti and Howard Boland**

#### Artworks:

'Martian Rose' (2007)

-Genetically engineering a rose to withstand Mars' harsh

#### 'Nanomagnetic plants'

-nanoparticles are absorbed into the roots of a plant, with their size allowing them to not be detected by a plant's selection mechanisms.

-the nanoparticles then allow the plant to respond to a magnet, in turn allowing us to control the movement of a plant.

LIVING MIFFOF (2013)

= mirror filled with bacteria, which responds to magnetic fields

-A camera scans your face and creates a magnetic field, which the bacteria respond to and an image is produced

![](_page_17_Picture_12.jpeg)

![](_page_17_Picture_13.jpeg)

![](_page_17_Picture_14.jpeg)

#### MY OWN ARTWORK – BASED ON THE GOLDEN RECORD P

#### **IMAGES: JOURNEY**

**TEXT: SENSES** 

![](_page_17_Picture_18.jpeg)

![](_page_17_Picture_19.jpeg)

![](_page_17_Picture_20.jpeg)

![](_page_17_Picture_21.jpeg)

THE DAY BEGINS TO END THE SKY BLAZING WITH FIRE AND BLANKETED IN STREAKS OF PURPLE + PINK THE MIRRORS ON THE GROUND REFLECTING THE WORLD ABOVE

# THE DRAKE EQUATION

Are humans unique and alone in the vast universe? This question–summed up in the famous Drake equation–has for a half-century been one of the most intractable and uncertain in science.

First proposed by radio astronomer Frank Drake in 1961, the equation calculates the number of communicating civilizations by multiplying several variables. It's usually written, according to the Search for Extra-terrestrial Intelligence (SETI), as:

$$N = R_* \circ f_p \circ n_e \circ f_i \circ f_i \circ f_c \circ L$$

The challenge (at least for now) is that astronomers don't have firm numbers on any of those variables, so any calculation of the Drake Equation remains a very rough estimate. There have been, however, discoveries in some of these fields that give astronomers a better chance of finding the answer.

Although astronomers certainly could imagine the existence of other planets outside the solar system in 1961, it took until 1995 until the first confirmed exoplanet was found around a main-sequence star. Called **51** *Pegasi b*, the discovery ushered in a new era when astronomers were able to track down many other planets across the universe.

As of 22 June 2021, there are 4,768 confirmed exoplanets

in 3,527 planetary systems, with 783 systems having more than one planet. The *Habitable Exoplanets Catalog* currently assesses 60 exoplanets to be capable of harbouring life, at least as we know it! This is based upon their rocky composition, temperature and ability to have surface liquid water, in other words they are *"Earthlike"*.

Finding life outside of Earth — even microbial life — would be an important step toward better understanding the Drake Equation. Astronomers in fact have not given up on finding life within our own solar system. There are several areas that could host habitable environments now, or did in the past, such as the planet Mars or Jupiter's moon Europa and Saturn's moon Enceladus.

A next step would be determining how to send a message to extra-terrestrials and whether they could receive or understand it. On a small scale, astronomers have beamed messages to the stars and in a few cases, put discs on board spacecraft (such as Voyager) for anyone in the neighbourhood to read and potentially find Earth for further communications.

Drake, now 91, is still passionate about the hunt for extra-terrestrial life. He's currently participating in Breakthrough Initiatives, a new program backed by entrepreneur Yuri Milner that's searching for interstellar life through radio and optical signals. And thanks to the recent findings of more exoplanets and more possibilities of Earth-like worlds, Drake says he remains optimistic that we'll find "something" out there.

In an interview a few years ago, Drake was asked how he first got interested in the idea of extraterrestrial life:

"I was a little 8-year-old kid living in Chicago, and my father one day told me there are other worlds in space, which astounded me. I had no idea that such a thing was a possibility—I thought Earth was it. It was a medieval attitude. So that just really catalysed me, and I wondered, Oh, what are they like? Are the people the same as us, do they look the same way we do? What's their planet like? And of course, at that time, there was no way those questions could be answered in the slightest."

![](_page_18_Picture_13.jpeg)

The number of detectable, intelligent N civilizations in the Milky Way galaxy The average rate of formation of stars that can host life The fraction of those stars that have planets The average number of planets within ne systems that can support life The fraction of those planets where life tε develops f<sub>i</sub> The fraction of those planets that develop intelligent life f<sub>c</sub> The fraction of intelligent civilizations that develop a detectable technology The average length of time such civilizations are detectable.

# ARTISTS INTERPRET THE ICONIC DRAKE EQUATION IN THE ART IMAGINARIUM

The SETI Institute's Art Imaginarium is a Facebook group dedicated to the space where art meets science. Each month, artists tackle a new challenge theme, interpreting science through visual arts, dance, music, poetry and more.

On May 28 2020, Frank Drake, celebrated scientist and Emeritus Trustee at the SETI Institute, turned ninety years old. To honour his birthday month, the Art Imaginarium group was challenged with Frank's most wellknown contribution to SETI, the Drake Equation. This equation seeks to put mathematical constraints on the existence of intelligent life in our own galaxy, the Milky Way. The idea for the challenge originated from a project created by grad student Dan Peluso and his high school physics classes. They took the different variables from the Drake Equation and used them as inspiration for an art installation at their school.

Here are some examples of their poster work:

![](_page_19_Picture_4.jpeg)

![](_page_19_Picture_5.jpeg)

![](_page_19_Picture_6.jpeg)

![](_page_19_Picture_7.jpeg)

![](_page_19_Picture_8.jpeg)

## ANGELA GARNACE

#### About, theme and concept:

Hello, I am Angela, and I am very interested by the natural environment, the cosmos and human Philosophy. Consequently, I have decided to focus on the theme of habitat throughout our 'Golden Lockdown' project and along the way, I have discovered innovative types of medium that I have not used before, such as digital art and filmmaking. Along the way, I have also collaborated with two young artists which enabled me to work in a collaborative manner – I found that discussing and exchanging ideas is quiet, wonderful. I will treasure everything that I have learnt through doing this project and will take into consideration on how to develop my creativity forward through collaboration and exploration!

#### Logo Designs

![](_page_20_Picture_4.jpeg)

I have created logos using a stylus pen and my touch screen laptop and used an application called Sketchbook. These are some of my thumbnails that I have made digitally. They are placed in the order of an evolutionary process. I wanted to make these because when I heard that we would be creating a website for 'The Golden Lockdown', I become excited that I had many ideas on how to design and structure my individual site. Thus, I created logos by drawing with a stylus.

![](_page_20_Picture_6.jpeg)

#### Moving Image: Bill Viola

![](_page_20_Picture_8.jpeg)

Within the subtopic of 'moving images', I had found an artist called Bill Viola who works with the movement of water. I have then watched an interview on him and found a particular quote quite fascinating to me – "I fell to the bottom of the lake ...It was kind of paradise and I felt like it was the real world"

One of his pieces interested me (Five Angela of the Millennium). This had inspired me to recreate a similar moving image to his – my fish swimming in slow motion upside down.

#### Text, Greetings and Language:

For my Text, Greetings and Language work, I have produced a concertina book, which includes a range of messages, poems, paintings, and photographs that relate to human environment and the natural environment.

![](_page_20_Picture_13.jpeg)

**Conclusion:** Through this experience of exploring varied themes from contributing to 'The Golden Lockdown', I will consider the skills and knowledge I have learnt to apply to my artwork in the future! The next page will feature two other artists that I have collaborated with.

## ELIZABETH DUNNE – Golden Lockdown

![](_page_21_Picture_1.jpeg)

The Golden Record has introduced me to working digitally in different ways: images, moving images and audio in which I was inspired to collect ideas for in lockdown, through capturing images with wherever I went during the day. Although I prefer working using Medias such as biro and acrylic to create studies, this project has allowed me to explore different ways art can be created, digitally and by hand. I chose to focus on habitats and journey as there are different forms of habitat that can be investigated and used further into the project. The area of text inspired me to collect messages and apply them to the theme, in which I included a variety of text messages.

I included messages and rhetorical questions which reflect society and human behaviour.

The text piece I created relates to lockdown and how people have reacted to it differently. I enjoyed this project as it gave me the opportunity to collect ideas from media and what was surrounding me at the time.

I also took interest of many artists such as Barbara Kruger who is an American conceptual artist and collagist who creates most of her pieces in black and white using her photographs to represent her ideas. Also, Raymond Hains, who is a French visual artist and Alberto Giacometti who created many sketches of figures and Victoria Vesna who created scientific art which represented her ideas and how nature processes. I applied ideas from their work to create new pieces for the project as they inspired me.

![](_page_21_Picture_6.jpeg)

I took photos to add to the project and work on through creating studies in my book, which are inspired by the theme of habitats and journey.

![](_page_21_Picture_8.jpeg)

![](_page_21_Picture_9.jpeg)

## VLADA AVERINA – The Wonder of Life

My name is Vlada Averina. I am a young artist who mainly works with pencils and watercolours. Most of my work consists of drawings and paintings of the natural environment.

For this project I picked the theme of 'Habitat' where I focused on my surroundings to capture the environment throughout my everyday life. Most of my focus was on the bright and vibrant colours that I was attempting to capture, mostly through the use of photography.

I am interested in working with the outside, capturing elements like trees, plants and flowers. With different media I also push my work to extend to animals and humans.

I studied art at all my education sites and sought it outside too by finding classes full of inspiring people and branching out to different styles and perspectives.

For the 'Our Golden Lockdown' project I explored new media, artists and styles. This was my first time working with photography as an art media rather than a reference, I experimented with editing and new software's. Looking at new artist I attempted a more peaceful style that focuses more on reality rather than its interpretation.

The project **'Wonder of Life'** is an overview of my work during lockdown. It was inspired by the 'Voyager Golden Record', which was a record, sent aboard 'the Voyager spacecraft' in 1977, containing images, sounds and text selected to portray life, diversity and culture on earth intended for intelligent alien life to discover. For my personal work I focused on the

theme of Habitat. I explored different environments, mainly those that I often encounter in my life. In my project I primarily focused on exterior environments such as trees and flowers. I took inspiration from artist like **Ben Gest** and **Hannah Starkey.** 

![](_page_22_Figure_8.jpeg)

On my page, I presented examples of artworks and projects that I took inspiration from. The work of Ben Gest that attempted to capture the moments in time using photography. I attempted to recreate it by taking a picture in the same place over the course of a week, displaying the change in the environment. I followed that up by editing the photographs to experiment with different saturation, filters and colours. I ended the project with a short time-lapse film, which recorded the change outside through the day.

![](_page_22_Picture_10.jpeg)

Additionally, I discovered a poem that discussed the theme of **life**, which is what most of my work was about, when creating the project titled **'The Wonder of Life'** 

![](_page_23_Picture_0.jpeg)

#### About us:

We are young artists and best friends who have come together to create a collage to demonstrate the pinnacle of historical evolution, the result of the space race.

![](_page_23_Picture_3.jpeg)

#### Angela Garnace

Themes Explored: Habitat, Evolution, World Culture Website: https://goldenlockdown.w ordpress.com/angelagarnace/ Kirstein Paulo Themes Explored: Journey, History, American Politics Website: https://goldenlockdown.w ordpress.com/kirsteinpaulo/

![](_page_23_Picture_7.jpeg)

#### **Collage Collaboration**

![](_page_23_Picture_9.jpeg)

We planned to use two pieces of A5 sheets of paper stuck together with Sellotape, then we glued down an old A5 world map in the centre. Then we agreed for one side to be based on science, philosophy and human evolution and the other side to be based on politics, American history, and NASA.

But overall, we both had so much fun making this piece! We had also made some hidden stories and meaning within the collage in which you can see in more depth in our website – <a href="https://goldenlockdown.wordpress.com/paulo-and-garnace/">https://goldenlockdown.wordpress.com/paulo-and-garnace/</a>

## A GLOSSARY OF TERMS compiled by the Yr12 project group

AnatomicalAnatomy is the branch of biology concerned with the study of the structure of organisms and their parts.ArtificialMade or produced by human beings rather than occurring naturally, especially as a copy of something natural
organisms and their parts.   Artificial Made or produced by human beings rather than occurring naturally, especially as a copy of something natural
Artificial Made or produced by human beings rather than occurring naturally, especially as a copy of something natural
especially as a copy of something natural
Activism The policy or action of using vigorous campaigning to bring about political or
social change.
Art Installation An art installation can take many forms and can be either permanent or
temporary. They are often site-specific and are intended to change the
viewer's perception of the space.
Aesthetic Giving or designed to give pleasure through beauty.
Rioluminescence The biochemical emission of light by living organisms such as glow-worms
and deen-sea fish
Rioluminescence Photobacterium phosphorous
Biotoria
Coloctial Desitioned in assoluting to the slaver or outer space as observed in astronomy
Co authorphin To prosto a piece of artwork with another person
To create a piece of artwork with another person.
Outline wating The situation of the surgery and in the state state and the state of
Collaboration The <u>situation</u> of two or more <u>people</u> working together to <u>create</u> or <u>achieve</u> the
same tring.
Concept An abstract idea.
Co-production Co-production is an approach where two or more practitioners work together
in an equal way, sharing influence, skills and experience.
Cosmological Something relating to the origin and development of the universe
Documentation Material that provides official information or evidence or that serves as a
record.
Engagement To be involved, to take part – often relating to an audience.
Genetic 1) Relating to genes or heredity.
2) Relates to origin.
Interconnected For two or more things/people to be connected.
Participation The act of taking part in something.
PhenomenonA fact or situation that is observed to exist or happen, especially one whose
cause or explanation is in question.
Psychological Of, affecting, or arising in the mind; related to the mental and emotional state
of a person.
Science Science is the pursuit and application of knowledge and understanding of the
natural and social world, following a systematic methodology based on
evidence.
Site specific Artwork located in an exact space. Often the site/space is where the artwork
has been created and provides essential context.
Truth That which is true by definition (Plato's view).
Macro Large; relating to the whole of something, rather than its parts.
Micro Very small
Outsider A person who is not involved with a particular group of people or an
organization.

## **CARL SAGAN – PALE BLUE DOT**

![](_page_25_Picture_1.jpeg)

In September 1977, NASA launched **Voyager 1**, a robotic spacecraft on a mission to study the outer Solar System and eventually beyond into interstellar space. After the encounter with Jupiter in 1979 and Saturn in 1980, the primary mission was declared complete in November of the same year. Voyager 1 was the first space probe to provide detailed images of the two largest planets and their major moons.

Voyager 1 was expected to work only through the Saturn encounter. However, its systems remained operational and the craft maintained radio contact with Earth. After it passed Saturn in 1980, Sagan proposed the idea of the space probe taking one last picture of Earth. He acknowledged that such a picture would not have had

much scientific value, as the Earth would appear too small for Voyager's cameras to make out any detail, but it would be meaningful as a perspective on humanity's place in the universe.

Although many in NASA's Voyager program were supportive of the idea, there were concerns that taking a picture of Earth so close to the Sun risked damaging the spacecraft's imaging system irreparably. It was not until 1989 that Sagan's idea was put into practice, but then instrument calibrations delayed the operation further, and the personnel who devised and transmitted the radio commands to Voyager 1 were also being laid off or transferred to other projects. Finally, NASA Administrator Richard Truly interceded to ensure that the photograph was eventually taken – 14<sup>th</sup> February 1990 – at a distance of 3.7 billion miles.

In his 1994 book, Pale Blue Dot, Carl Sagan comments on what he sees as the greater significance of the photograph:

"Look again at that dot. That's here. That's home. That's us. On it everyone you love, everyone you know, everyone you ever heard of, every human being who ever was, lived out their lives. The aggregate of our joy and suffering, thousands of confident religions, ideologies, and economic doctrines, every hunter and forager, every hero and coward, every creator and destroyer of civilization, every king and peasant, every young couple in love, every mother and father, hopeful child, inventor and explorer, every teacher of morals, every corrupt politician, every "superstar," every "supreme leader," every saint and sinner in the history of our species lived there--on a mote of dust suspended in a sunbeam.

The Earth is a very small stage in a vast cosmic arena. Think of the rivers of blood spilled by all those generals and emperors so that, in glory and triumph, they could become the momentary masters of a fraction of a dot. Think of the endless cruelties visited by the inhabitants of one corner of this pixel on the scarcely distinguishable inhabitants of some other corner, how frequent their misunderstandings, how eager they are to kill one another, how fervent their hatreds.

Our posturings, our imagined self-importance, the delusion that we have some

![](_page_25_Picture_10.jpeg)

Earth is circled. (The bands are optical artefacts)

privileged position in the Universe, are challenged by this point of pale light. Our planet is a lonely speck in the great enveloping cosmic dark. In our obscurity, in all this vastness, there is no hint that help will come from elsewhere to save us from ourselves.

The Earth is the only world known so far to harbour life. There is nowhere else, at least in the near future, to which our species could migrate. Visit, yes. Settle, not yet. Like it or not, for the moment the Earth is where we make our stand.

It has been said that astronomy is a humbling and character-building experience. There is perhaps no better demonstration of the folly of human conceits than this distant image of our tiny world. To me, it underscores our responsibility to deal more kindly with one another, and to preserve and cherish the pale blue dot, the only home we've ever known."

Earth appears as a blue dot in the photograph primarily because of Rayleigh scattering of sunlight in its atmosphere. In Earth's air, short-wavelength visible light such as blue light is scattered to a greater extent than longer wavelength light such as red light, which is the reason why the sky appears blue. The ocean also contributes to Earth's blueness, but to a lesser degree than scattering. Earth's reflectance spectrum from the far-ultraviolet to the near-infrared is unlike that of any other observed planet and is partially due to the presence of life.

#### This section of the Journal highlights the work of some Year 10 students who have also been investigating art and science inspired by the Golden Record, including how origami is also used in space by NASA in different ways.

The following images are taken from the Year 10 students' gallery on the Golden Lockdown website. Space does not allow for all students to have their work published here. The following examples were selected for their scientific context. Also, their reproduction in the journal cannot convey the true visual impact that they have. The reader is therefore encouraged to visit the students' gallery directly to view their whole body of work:

#### Year 10 Gallery – Golden Lockdown (wordpress.com)

![](_page_26_Picture_3.jpeg)

#### **POLLY CAILES**

![](_page_26_Picture_5.jpeg)

#### ANNALIESA DOCKRILL

6.9

![](_page_26_Picture_8.jpeg)

**OLIWIA WAS** 

![](_page_27_Picture_0.jpeg)

#### MATILDA GRANT

![](_page_27_Picture_2.jpeg)

FLORENCE SCOTT

#### IZZY GAMMON

#### **ROXY BUJNOWSKA**

![](_page_28_Picture_2.jpeg)

( accorded shie bound, as it's a common there I hear in the morning when I come doconstruits. On gauged hand, ) compressed the wachigroeur

why, much aline to my thation of histore.

I those is record rounds of our dry as these are the sounds commonly heard in the north and our national. The sound article I am inspired here is therefore run thin, as you one there rounds give one a new of constance are recurrely, much alive to my thatton of herwork.

![](_page_28_Picture_6.jpeg)

# sciences-

till liter fo

-panting This is the sound that gave one the initial idea to have one project on vernage, as I was builting above what a rector the always second to make. As I was in the car when Incorded this, I had to use voice manses, and premability we prior near the near much rating apart your repeiring background near. I wild the presentation of the carbo neine in voice memors, so I used thus screensive.

![](_page_28_Picture_9.jpeg)

![](_page_28_Picture_10.jpeg)

#### **KADEN GOOCH**

![](_page_28_Picture_12.jpeg)

![](_page_29_Picture_0.jpeg)

![](_page_29_Picture_1.jpeg)

![](_page_30_Picture_0.jpeg)

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![](_page_30_Picture_6.jpeg)

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In addition to the Year 10 artists featured above, the journal commends the following Year 10 students who also presented work for the Golden Lockdown:

JASMINE LAU WILL HURRY CLAIRE JONES SOPHIE CRANE JURAJ KRISKO JESSICA WOODLAND WIKTORIA KROSZKIEWICZ RUBY COBB MAYA KOTLAREK SOPHIA HE

# NASA, SPACE and.....ORIGAMI!?

Some of the work featured above made reference to how NASA scientists and engineers use origami. It started with getting huge, elaborate solar panels delivered to the International Space Station and the Hubble Space Telescope back in the 90s. Now NASA are using the origami concept with a whole new space telescope.

For the new **JAMES WEBB SPACE TELESCOPE** to fit into a rocket, it must fold up. Whether it is the primary mirror or the sunshield, many parts of Webb are designed to deploy or unfold once in space. The whole thing has to fit in the confined space of a tubular rocket compartment (see image on the right).

Once in orbit around the Earth the whole structure will be "unfolded" in a very precise sequence – the result of meticulous planning and programming during the design and construction phase of the telescope back on Earth. Once fully deployed in orbit it will look like this:

![](_page_31_Picture_6.jpeg)

![](_page_31_Picture_7.jpeg)

One of the key goals of the Webb Telescope will be to search for exoplanets (planets orbiting other stars in our Milky Way galaxy) and, in particular, to study their atmospheres for signs of life.

NASA had hoped to launch the James Webb telescope in October this year, but that now seems highly unlikely because of issues with the Ariane rocket that will launch it.