



GET CREATIVE
WITH ART ONLINE

MODULE No: 6 of 8

Science and Technology

- Lesson Background for Teachers -



LESSON AIMS and OBJECTIVES

- To think about what Science is and what kind of relationship it has with Technology
- To highlight the importance of Science and Technology in human life and history
- To consider if Science and Technology can be the inspiration for or be represented in Art

FOCUS

Art, Drama, Language (SMSC) Spiritual, moral, social, cultural understanding

AGE RANGE

Ages 9 – 11 (Adaptable for younger or older pupils)

SKILLS

Analytical Thinking/ Creativity/ Perception/ Self Awareness

Theme: Science and Technology

What do we think of when we think of it?

Science is the strand of knowledge which studies events and phenomena in the physical and natural world. Our way of acquiring that knowledge is called 'scientific method' and is mainly empirical. i.e. based on observation and experiment.

Technology is the application of scientific knowledge. It includes both practical processes and techniques and the resulting products, such as machines and devices.

When we think of Science and Technology, we might think of scientists measuring things, or experimenting, or of engineers using the results of that work to build new and better inventions for us.

Science and technology are interdependent, since technological progress relies upon scientific discoveries and knowledge, while scientific research needs ever more complex technological solutions and instruments for its empirical investigation. Even though science and technology are connected, they have different goals: the science

role is to increase knowledge and answer questions about the world, while technology aims to find solutions to practical problems.

Why is it important?

Science and Technology improve our lives. Scientist's investigation of every part of our world enables advancements which benefit our growth and progress. In general, the goals of science and technology are to solve problems to make human existence easier. Modern science, usually considered since the so called 'Copernican revolution' in 1539, has led to radical changes in the way we live, how we see the world and in how we see ourselves.

Important advances in 'Science and Technology' which have changed our lives include:

- The introduction of electricity, which drastically improved our way of moving and travelling and living.
- Biological and chemical advances in medical research which are helping us overcome some of the major health issues of our time.
- The 'digital revolution' of the last century which has seen advanced automation systems and the internet, both of which have completely changed every part of society.

How does it affect our lives/ our world?

Typically, access to the benefits and products of scientific progress defines the way we live. We see this when we look at the inequality of access to new discoveries and inventions in different parts of the world.

With medical research, for example, when a cure for serious disease is found, the parts of the world able to take advantage of the treatment have an improved quality of life, while those without the access or funding to benefit are left behind. The quality of our lives is dependent on access to scientific inventions and new technologies, which determine our well-being and how safe and comfortable our lives are.

Scientific and technological advancement is not always beneficial. Innovation can also be also used for negative or disruptive purposes, such as the creation of weapons of war or sophisticated software used in cyberattacks.

Did you know

- Most people know of the Nobel Prize, awarded each year to great scientists and intellectuals. Less well known is the satirical 'IG Nobel Prize', which since 1991 has rewarded the most unusual, imaginative and unexpected discoveries and inventions. In 2009, for example, Catherine Bertenshaw and Peter Rowlinson received it for demonstrating that cows with names produce up to 5% more milk than cows without names. While many people think of the IG Nobel Prize as trivial, it can lead to more serious recognition. For example, Sir Andre Geim, won the IG Nobel Prize in 2000 for levitating a frog by magnetism, but went on to be awarded a Nobel Prize in Physics in 2010 for his work with the electromagnetic properties of graphene.
- According to researchers, many discoveries and developments were made first in Ancient China. The most important of those technological advances included **the compass, gunpowder, papermaking, and printing**, only known in Europe much later, at the end of the Middle Ages.
- The history of science is full of cases of 'multiple discovery'. This is when discoveries and inventions are made independently and more or less simultaneously by multiple scientists and inventors, even in distant parts of the world. Great examples of this are the **discovery of oxygen** in 18th-century by Carl Wilhelm Scheele, Joseph Priestley, Antoine Lavoisier and others; or the **theory of evolution of species**, proposed in the 19th century by both Charles Darwin and by Alfred Russel Wallace.

HOW MIGHT AN ARTIST PORTRAY 'SCIENCE and TECHNOLOGY'?

Before the invention of photography, artists were involved in scientific research mainly for the documentation and technical recording of specimens, experiments and discoveries. Their ability to portray nature and technology as realistically as possible was important. Botanical illustrations by Carl Linnaeus and Leonardo da Vinci's anatomical drawings are great examples of this.

Once this technical task became possible with photography, artists were free to depict natural objects through their own interpretation, feelings and thought. For example, Expressionism and Impressionism produced very personal and peculiar visualizations of landscapes and natural phenomena. This can be interesting because the humanization of such art provides an insight on the impact that certain natural events or technological innovations had on people and society at the time they were created.

Nowadays, artists' choices are not just about style and aesthetic interpretation. They also concern the medium. Today's technology provides the artist with an increased number of new means of representation and expression. In many cases, design software, coding and AI have replaced paintbrushes and chisels. These give shape to traditional types of outputs like graphic artworks and sculptures, but also multimedia and purely digital pieces involving video, audio or data. Mapping of natural phenomena and highly technical building specification drawings are now much easier to create than in past centuries.

Due to this great "technologization" of art, artists can choose to represent scientific progress and technological innovation through new mediums. Much of their time can be spent on developing tools to do it. Complex machines and process designs are sometimes exhibited for their sheer beauty, as well as for what they can do.

OUR MAIN ARTWORK



- Title: PRISMI LUNARI
- Artist: FORTUNATO DEPERO 1892 - 1960 / Italian
- Medium: Painting
- Dimensions: Unknown
- Date Completed: 1932
- Location Displayed: NATIONAL GALLERY OF MODERN ART, ROME, IT
- Web link <https://artsandculture.google.com/asset/prismi-lunari-fortunato-depero/pgE6H1u-H2m2-Q?hl=en>
- How / When was it acquired by the gallery? Unknown

How does it communicate 'SCIENCE AND TECHNOLOGY'?

Fortunato Depero was an Italian futurist painter, writer, sculptor and graphic designer from the 20th century. Like the other artists from the same artistic movement, his work celebrated technological progress. He promoted the modernization of culture and society. In 'Prismi Lunari', Depero evokes this spirit, painting an abstract architecture, sculpted from light, to glorify what he called the "structural and spatial magnificence".

Depero and the other Futuristic artists mostly represented their desired cultural and social revolution using symbols of technological progress, such as machines, trains and robots. Many futuristic artists included strength and violence in their celebration of modernity and progress, even promoting war and weapons. But in this painting, we see the bending of moonlight reflected around the unlikely angles of a square roomed home with furniture and the equipment and inventions for comfortable, modern living.

IN CONTEXT

Are there other works by the same artist (or others) that help us understand it more?



Automation and machines were some of the favourite objects represented in *Futurism*. Those were the symbols of their desired technical and technological progress. In 'Automation with Pipe', Fortunato Depero again tried to display the technical future through the details of his machine.

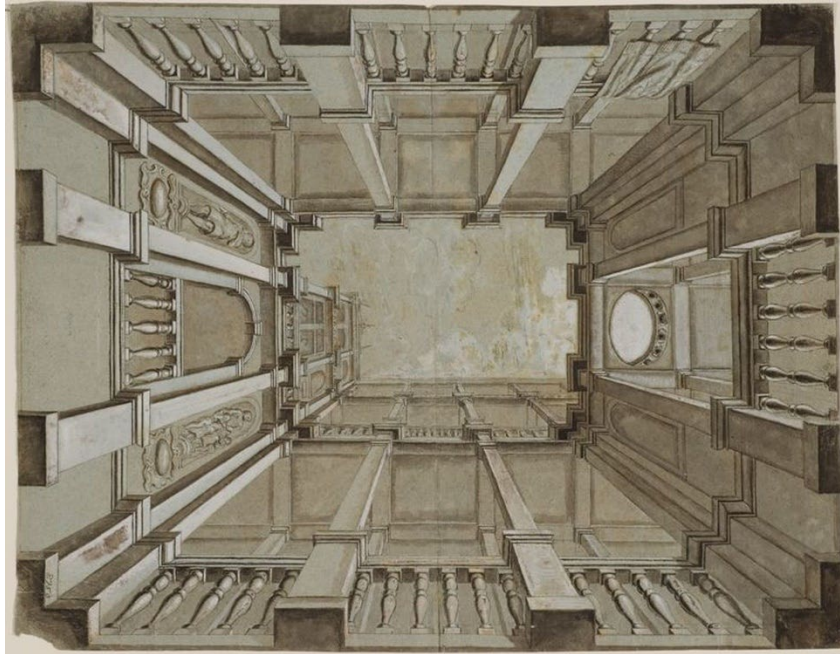


Technological progress was associated by Futurists with strength and power. Even today, some scientists worry that our inventions could 'get out of hand' and even destroy us. Could 'super robots' turn on us? In this artwork, Fortunato Depero shows a fight between robots, which as the title suggests, 'Rissa (Discussione del 3000)', is a way of presenting the discussion of one possible future in Art.



For Futurist artists, modern means of transportation such as trains, airplanes and cars were the symbols of the dynamism and speed of a future society shaped by technological progress. Artist Tullio Crali shows this in the swirls and movement in, 'Le Forze della Curva,' from 1930

OTHER ARTWORKS THAT SAY SOMETHING ABOUT 'SCIENCE and TECHNOLOGY'



From Sweden

- Title: **SUGGESTION FOR A PLAFOND, ARCHITECTURE IN QUADRATURE AGAINST A SKY WITH CLOUDS**
- Artist: **Unknown** Swedish
- Date Completed: **17th Century**
- Location Displayed: **THE NATIONAL GALLERY, STOCKHOLM, SE**

What it says about 'Science and Technology'

Just like Depero's 'Prismi Lunari', this artwork makes use of perspective to evoke an imaginary, feeling or idea. At first glance, the drawing seems to have a technical purpose. But thanks to the historical and cultural relevance of perspective and its creative application, it also gains a high artistic value. The importance of some inventions and technical innovations has been represented by artists throughout the years.



From United Kingdom

- Title: **AN EXPERIMENT ON A BIRD IN AN AIR PUMP**
- Artist: **Joseph Wright 'of Derby'** 1734 – 1797, English
- Date Completed: **1768**
- Location Displayed: **THE NATIONAL GALLERY, LONDON, UK.**

What it says about 'Science and Technology'

Wright's painting looks almost religious, but in fact shows an experiment at the time scientists were only just discovering the existence of the air around us and that oxygen that allows living things to breathe. As well as the experiment, the different reactions to it are captured in the faces of those watching. Despite the stylistic differences, this artwork has in common with Depero's '*Prismi Lunari*' an underlying celebration of the technical progress and modern thought it records.



From Greece

- Title: MASS TRANSPORT OR GENERAL TRANSPORT
(ΜΑΖΙΚΗ ΜΕΤΑΦΟΡΑ Ή ΓΕΝΙΚΕΣ ΜΕΤΑΦΟΡΕΣ)
- Artist : YANNIS GAITIS 1923 – 1984, Greek
- Date Completed: 1984
- Location Displayed : NATIONAL GLYPTOTHEQUE, HELLENIC ARMY PARK,
GOUDI, GREECE

What it says about 'Science and Technology'

Transportation has always been a symbol of progress. But the 'humorous attitude' of this sculpture compared to the previous artworks -- especially to the Futurists works, points out the ironic drawbacks of modernity. The artist uses a repetition of his iconic 'little man' to represent the homogenization and alienation of modern human being.

PUPIL ACTIVITIES:

(POSSIBLE ACTIVITIES TO USE AS APPROPRIATE WITH YOUR PUPILS)

Teachers can choose from each category below or devise their own – *or* different activities, like creating computer generated images, a piece of music/ song/ rap inspired by art or researching other galleries or pieces of art they feel illustrate this theme.

ART ACTIVITIES

Design and draw a machine that does not yet exist or never could exist and try to show how it could work in your home. The only rule is that the machine has to do something, but the result can be anything: it could serve to build something, to do a simple activity that you don't like to do or just produce beautiful sounds and colours.

The history of scientific and technological research is full great inventions originally intended for a completely different purpose or that were designed by accident. For instance, the microwave oven was invented in 1945 when Percy Spencer realized that the new radar system that he just developed was able to melt his chocolate bar and make pop-corn. Find an object, device or tool from your classroom or home and try to think of a new possible use for it. Make some tests and if it works. Then film it or draw your discovery so you can show it to everyone.

Early scientists pressed and dried biology specimens (like flowers and leaves) or painted them in great detail to study them. Find a flower or another once living thing nearby and preserve it as art.

Leonardo da Vinci drew flying machines and other inventions that he did not have the modern materials and technology to build – but which today look like early forms of helicopters and planes. These days we have modern technology, such as computers, to bring our ideas to life. How could you use modern tools to imagine flying machine designs of the future?

LANGUAGE ACTIVITIES

Try to think of ten scientific specializations and write for each one – what the scientist in that field is called, what they study and what is their most important work tool. (ex. Astronomy: Astronomer – They study planets, stars, galaxies and all the object in the outer space - Telescope). Research online or in books if you need to.

Robots have always been one of the most intriguing fantasies about future technology. Do you think it would be possible to have a robot as a friend in the same way as a human friend? What would you want it to be like? What do you think you could do with it and what you couldn't do? Once you have thought about it, describe everything about your robot friend to the rest of the class.

Research the meaning of the word 'serendipity'. Then, find an example of it in the history of scientific and technological research. You can use anything available to you: a dictionary, an encyclopaedia, a computer or a smartphone. If necessary, get help with the meaning of any words that you find and don't understand.

DRAMA ACTIVITY / Circle Time

In groups of 3-4 imagine a robot machine that could be really handy for you in your everyday life. What would that be? Create this robot with your bodies and keep one player of the group as the handler of the robot. What would happen if due to a malfunction, the robot would go off uncontrollably? Let's watch!

Improvise a short scene to the rest of the class, where the robot owner comes back home and the robot has broken down. What kind of damage has occurred? What would be the owner's reaction?

Imagine a time in the future when robots help humans in everyday life. In groups of 3 or 4, plan a story which features the malfunctioning of a robot. Describe what happens and with what results. When the story is complete, act it out for the other groups, with one person playing the robot and the others playing the characters that try to fix it.

USEFUL RESOURCES:

Why is Art Vital to Science? A Forbes article, 2020

www.forbes.com/sites/annapowers/2020/07/31/why-art-is-vital-to-the-study-of-science/?sh=51c4a80a42eb

An Overview of the Art Movement known as 'Futurism'

<https://www.theartstory.org/movement/futurism/>

The History of Science. (Part of a Video series made by the 'CrashCourse' YouTube Channel.)

<https://youtu.be/YvtCLceNf30>