

LEONARDO DA VINCI

A LIFE IN DRAWING

Teaching Resources for Human Body Workshop at Millennium Gallery

Leonardo da Vinci is the perfect example of an artist who saw the connections between art and design and invention, science and language, and who shows this in his drawings.

One of Leonardo's greatest gifts is that he shows us how important basic creative skills such as drawing are. Twelve of his remarkable drawings from the Royal Collection are on display as part of a nationwide exhibition marking 500 years since his death. They have been selected to demonstrate the diversity of Leonardo's interests (painting, architecture, music, engineering, botany as well as the breadth of his understanding and ability. They demonstrate how he comprehensively applied his skill through art, design and science. They are a perfect example of the diverse pathways of learning through art.

To help you make the most of this incredible opportunity we have created we have created three different workshops to complement the exhibition. There are lesson plans and resources available for two of the workshops. The following lesson plans and resources relate to the Human Body Workshop. Leonardo da Vinci produced many drawings of the human body focusing on the muscular systems, internal organs and the body's proportions. Your class will see examples of some of his drawings of the human body 'in the flesh' and carry out their own Leonardo-inspired investigations about the human body.

We suggest the following order for the lessons but they can be taught in any order that suits your class.

Lesson 1	Introducing Leonardo da Vinci	At school
Lesson 2	Leonardo da Vinci, the apprentice and his notebooks	At school
Lesson 3	Human Body workshop	At Millennium Gallery
Lesson 4	Leonardo da Vinci, the Human Body: Skeletons	At school
Lesson 5	Leonardo da Vinci, the Human Body: Joints and movement	At school
Lesson 6	Leonardo da Vinci, the Human Body: Vitruvian Man	At school

Lesson 1

Introducing Leonardo da Vinci

Summary

Imagine a time machine has landed in the playground. Who steps out? Why it's the genius who defined the renaissance, Leonardo da Vinci!

Children will work together to research the great man and some facts about his life. Who is he? Why is he so famous? What were his greatest works? They will share their findings in a short dramatised piece.

Cross-Curricular links

Art, Drama, English

Learning outcomes

Art

- To learn about great artists and understand the historical and cultural development of their art form

English, Spoken Language

- To participate in role-play and improvisations
- To gain, maintain and monitor the interest of the listener

Other

- Developing research skills using non-fiction text and working cooperatively

Introduction

Wouldn't it be wonderful if time travel were possible? 500 years ago there lived a man who was such a talented artist that his paintings are amongst the most famous in the world and have been viewed by millions of people. He was also a great scientist, mathematician, engineer and poet. Let's imagine time travel is possible, let's imagine a time machine has landed in school and that Leonardo da Vinci is onboard! We are going to research facts about the great man so that we can role-play meeting him.

Task part 1

Resources: Books/articles/internet searches/images

Children work in groups to research Leonardo da Vinci. Suggested materials- books (see suggested reading list), information pack, online sites as approved by school, images of his work etc.

Differentiation

KS1 give list of questions/facts to find e.g. where was he born? What did paint? What did he draw? What did he try to invent?

KS2 give more open questions e.g. find out about his early life? What is he famous for? Who did he work for? What is meant by renaissance?

This research could be done in lesson time or as part of a homework/ home learning task.

Task part 2

Resources: Reporter Question Sheet

In groups of 5 or 6 nominate one person to play the role of Leonardo da Vinci. The rest of the group will be news reporters. Imagine Leonardo has just stepped out of the time machine. News teams from around the world are anxious to meet him. Give each group a Reporter Question Sheet. They need to devise a question for each reporter to ask Leonardo. Ask them to focus on questions about his life and work, so that they can provide factual answers. No fake news here thank you!
The children should complete the sheet so that each question has an answer.

Task part 3

Resources: Props e.g. press badge, microphone, costume

Ask the groups to practice asking Leonardo their questions as if they are news reporters, first on the scene, eager to gain some insight from the Renaissance man. Groups then perform their piece to the rest of the class. You may want to give them props (press badge, microphone for reporters. Hat, beard for Leonardo etc.) to help them get into character.

Plenary

What have we discovered while researching Leonardo da Vinci?

What do we think are the most exciting facts we've discovered so far?

Explain that over the next few weeks they will be finding out so much more about this fascinating man and even visiting a gallery to see some of his amazing work.

Extension

Develop a news article describing events and giving the reader some background about Leonardo da Vinci.

Resources for Task 2

News Reporter's question	Leonardo's answer

Lesson 2

Leonardo da Vinci, the apprentice and his notebooks

Summary

Learn about Leonardo da Vinci's work as an apprentice and how he developed a love for recording his research in his famous notebooks.

Cross-Curricular links

Art and Design

Learning outcomes

Art

- To learn about great artists, craft makers and designers and understand the historical and cultural development of their art forms.

KS1

- To use drawing to develop and share ideas
- To learn about their artists and make links to their own work

KS2

- To create sketch books to record their observations and use them to review and revisit ideas.
- To improve mastery of drawing
- To learn about great artists

Introduction:

As a child Leonardo demonstrated an aptitude for drawing. Raised by his grandparents he was not able to attend school but as a teenager his father recognized his talent and secured him an apprenticeship in Florence with the great artist Andrea del Verrocchio.

Verrocchio's studio was like a factory producing many different works of art for wealthy clients. As an apprentice Leonardo would have started work as the most junior person in the workshop, running errands and clearing up. There were many apprentices working and living at the studio. Verrocchio's apprentices learned first by observing the master, listening as he explained his methods. They could then progress to learning skills like making brushes and preparing paints. Next they were taught to draw, landscapes and figures were popular subjects. The apprentices would copy the master's work onto wooden panels and walls to be completed by more senior apprentices. The apprentices were taught to work in wood, clay, stone and metal. Painting was the final stage of the training and only the best apprentices would assist the master in completing the work. Once the training was complete, usually after about 6 years, the apprentice qualified as a master.

Q what is an apprentice? Discuss ideas with the children

An apprentice is a person who is learning a trade from a skilled employer.

Q what trades might people today learn as an apprentice?

Task part 1- making a sketchbook

Resources: pages to make sketch books, awl or similar to make holes (used up/dry biro works well), Bluetack or Plasticine to push an awl on to. Plastic tapestry needles and waxed thread. Pencils, chalks, pen and ink, some still life subjects such as; fruit, flowers, or pots of artist's tools such as paintbrushes and pallet knives. NB: you may wish to pre punch holes for younger children

The classroom will become the artist's studio today. The teacher will be the master and the children the apprentices. The first job for the apprentices will be to construct their own sketchbook. Using a selection of papers cut to the same size fold down the middle and punch four holes along the fold line (older children shown how to safely use awl). Use the plastic tapestry needle and waxed thread to stitch your book together creating your own sketch book.

Next the apprentices will watch as the teacher demonstrates drawing technique (use pencil/ chalks/ pen ink as appropriate for your class) choose to draw something from a still life that can be replicated on each table e.g. pot of artists tools. Teacher models and talks through technique as the master in the art studio would. Children have a go at the drawing in their sketch books.

Depending on the age of the class you might stop at this point to split part 1 and part 2 across two lessons.

Task part 2 - Leonardo's notebooks

Resources: as above

Leonardo's drawing skills were so incredible that he could accurately record great detail. Drawing helped him to understand the world around him and the skills taught to him as an apprentice were developed into highly intricate research tools. Wanting to perfect his portrait skills he made detailed studies of the face, looking at how the muscles worked, how the hair fell. His painting was informed by his drawing studies. He would draw the same thing from different angles to better understand its form. He became fascinated by the human body as the most perfect machine and wanted to understand how it worked. His sketches were annotated with copious notes. His writing detailed all his observations.

Other note books recorded his interest in water; he drew many studies of water, how it moved, how it might be controlled and inventions for use in water like a diving suit and life preserver. Leonardo drew maps, studies for statues, including many of horses and many, many inventions. He designed machines for warfare, for solving practical problems or for subjects that fascinated him such as flight. The handwritten notes that covered his notebooks and sketches were often in mirror writing, that is written right to left. Many believed this was to stop others reading his work. It is now thought that it was probably just easier for him as he was left handed.

Show the children some of the images of Leonardo's drawings. Leonardo is thought to have produced over 7000 drawings. They were never published but have fascinated scientists, artists, engineers and mathematicians across the world as his observations and inventions were said to be ahead of their time.

Ask the children to select an item to draw in their sketchbooks. When they have made one drawing from one angle then encourage the children to draw a number of sketches of the same object from different angles and to make notes on the page. For KS1 this might be adjectives describing the item. For KS2 perhaps phrases that describe particular features e.g. tone, texture.

Ask the children to compare the drawings from multiple angles with their initial drawing. Do they think their work improved when they were sketching from different angles and making notes about their work? Ask them to share their thoughts with a partner.

Plenary

Do the children think Leonardo's way of recording his observations alongside his drawings is effective? Did trying that technique affect their own work? Having learned about Leonardo's love of drawing and how he produced so many drawings across so many subjects in his lifetime are the children excited to see some of these drawings for real? Tell the children that they can bring their sketchbooks to continue learning about Leonardo when they visit the exhibition at the Millennium Gallery.

Extension

Use their sketchbooks to continue their Leonardo da Vinci style work. Practice drawing technique with different materials and note making.
Have a go at mirror writing and see if they can read each other's mirror writing.

Lesson 3

Human Body Workshop

Leonardo da Vinci produced many drawings of the human body focusing on the muscular systems, internal organs and the body's proportions. Your class will see examples of some of his drawings of the human body 'in the flesh' and carry out their own Leonardo-inspired investigations about the human body.

For booking information please see

<http://www.museums-sheffield.org.uk/learning/schools-and-colleges/>

or email learning@museums-sheffield.org.uk

Lesson 4

Leonardo da Vinci, the Human Body: Skeletons

Summary

This lesson will focus on the skeleton, names of bones and why we need our skeleton. The children will explore structure to test for strength and stability in their own design. It can extend learning following visit to see the Leonardo da Vinci drawings at Millennium Gallery.

Cross-Curricular links

Art and Design, Science, Design and Technology

Learning outcomes

Art and Design

- To learn about great artists, craft makers and designers and understand the historical and cultural development of their art forms.

Science

- To identify that humans and some animals have skeletons and muscles for support, protection and movement.

Design and technology

- To build structures, exploring how they can be made stronger, stiffer and more stable.
- To critique, evaluate and test their ideas and products and the work of others

Introduction

Leonardo's passion for knowledge was keenly shown in his research of the human body. Notebooks full of anatomical sketches and accompanying notes show his drive to learn all he could about the human body. He worked in a hospital at night dissecting bodies to work out how the body functioned. At the Millennium Gallery we did our own studies of the human body and made some observational drawings of the skeleton.

Q what is our skeleton for? (support, protection and movement)

Q do all animals have skeletons? (some do, but not all discuss vertebrates and invertebrates)

Q what are the bones called?

If not already done so the children could label the bones on their drawings at this point.

Task 1

Resources: per group- one apple, a complete newspaper (staples removed to make separate sheets), a roll of Sellotape, a bundle of paper art straws. Image of one of Leonardo's inventions (any will do, does not need to relate to the skeleton)

Let's think about how the skeleton supports us. Looking at the bones in our body which bones need to be particularly strong? Which bones help to keep us stable? To investigate strength and support in structures like the skeleton we are going to take part

in a challenge. Each group has an identical set of resources but how they use them is entirely up to them. Show them Leonardo's invention sketch with all his ideas written amongst his sketches. Give them 5 mins to make notes and sketch ideas and then 15 mins to construct a structure to support the apple as high as possible from the ground. The structure must be free standing. They may adapt and change the design as they develop their structure.

To test the structures each group must demonstrate that their structure can support the apple unaided for 1 min, i.e. they need to step back and see if the structure is self-supporting.

Discuss the different designs, what was successful? How different are the designs to their original design?

What are the key features of the design and do they resemble any of the bones in our bodies? Possibly tubular like legs/ back bone? Or broader to bear weight like the pelvis or feet?

Plenary

What are the key features of our skeleton?

What makes the human skeleton different to other species?

How is our skeleton well designed to support us?

We have developed our understanding of the human body today by investigating the skeleton we studied at the Millennium Gallery and testing our theories about what makes a strong support structure. Leonardo made 100s of sketches of human anatomy, just imagine how much he learned from all those years of research!

Extension

To continue this type of investigation the children could next investigate the bones that protect organs in our body such as the ribs, pelvis, vertebra and of course the skull.

Why not challenge the children to make an effective casing (skull) for an egg (brain)?

What structure can offer that type of protection? Can they devise a casing for the egg that will prevent it breaking if dropped? Will their egg survive the egg drop challenge?

Lesson 5

Leonardo da Vinci, the Human Body: Joints and movement

Summary

To extend learning following a visit to see the Leonardo da Vinci drawings at Millennium Gallery. This lesson will use Leonardo's anatomical drawings to explore the way the body moves, the muscles and the joints. The children will develop a short dance sequence to demonstrate the body's different range of movement.

Cross-Curricular links

Art and Design, Science, Physical Education (Dance)

Learning outcomes

Art and Design

- To learn about great artists, craft makers and designers and understand the historical and cultural development of their art forms.

Science

- To identify that humans and some animals have skeletons and muscles for support, protection and movement.

Physical Education

- Perform dances using a range of movement patterns

Introduction

Leonardo's studies of the human body are beautiful works of art as well as being scientifically useful. We can see how the body works and understand the connection between the skeleton, the muscles attached to that skeleton and the movements our body can make. Muscles are attached to the bone by tendons and work in pairs. To move a joint one muscle contracts while the other muscle relaxes and becomes longer.

Task

Resources: sketchbooks/ drawings from the gallery visit. Images from Leonardo's anatomy collection, selection to show different muscles in action. Images of Leonardo's figurative drawings that show different poses. Music of your choice, something with slower parts that will allow for slow motion movements.

Show small a selection of the above. Can the children imitate the pose or positioning in the sketch/ image? Feel for muscle movement. Discuss what is happening to enable that pose/ movement. Look at the children's mannequin sketches. Can those positions be recreated? Can the children identify which joints and muscles they used?

In groups can the children make a repeating pattern of 5 or 6 different positions that demonstrate different muscle and joint movements? Can be set to music if you have something suitable.

Share with the class and ask each group to talk you through the positions they chose.

Plenary

Dance is another art form that can help us learn about our bodies. Professional dancers are very aware of how their bodies move, what makes them work and how to take care of their muscles and joints.

What happens when muscles or joints get damaged?

How can we take care of our joints and muscles?

Extension

To further explore the way our joints work, why not make an articulated model of an arm? The bones are made from stiff cardboard, the joint at the elbow is hinged with a paper fastener and the muscle represented with elastic. The model can be annotated just like Leonardo's drawings!

Lesson 6

Leonardo da Vinci, the Human Body: Vitruvian Man

Summary

To extend learning following visit to see the Leonardo da Vinci drawings at Millennium Galleries. This lesson will use Leonardo's anatomical drawing of Vitruvian Man to investigate proportion, ration, measure and statistics.

Cross-Curricular links

Mathematics; measurement, statistics (and for Y6 ratio and proportion). Art and Design

Learning outcomes

Art and Design

- To learn about great artists, craft makers and designers and understand the historical and cultural development of their art forms.

Mathematics

- Measurement - to measure, compares, add and subtract lengths in m/cm/mm
- Statistics - to interpret and present data using bar charts, pictograms and tables.
- Ratio and Proportion (for upper KS2/ Y6 students) solve problems involving similar shapes where the scale factor is known or can be found.

Introduction

Leonardo da Vinci's Vitruvian man is one of the most important works of the Italian renaissance. It depicts Leonardo's version of the engineer Vitruvius' theory of anatomy. Leonardo was fascinated by the human form and so wanted to test Vitruvius' findings about the geometry of "perfect" proportions of the human anatomy. Leonardo's version exceeded the data recorded previously and he noted 22 significant measurements. We are going to look at the observations Leonardo made and see if they are true today. We will take the most famous of these theories as our starting point, Height=Arm span.

Task

Resources: pencils, paper, tape measure, large paper that can be joined together (for KS1), scissors, graph paper and Photocopies of Vitruvian man by Leonardo da Vinci (for KS2).

Our first investigation is to test the theory that your height is equal to your arm span (arms out straight, raised parallel to the ground at 90 degree angle)

KS1 in pairs draw around one of the pair, arms outstretched at sides at 90 degree angles. Then draw a line from fingertip to fingertip then from top of head to base of heel. Measure these lines using a tape measure. Are they a similar size? Or simplify with ball of string, are the two lengths the same size?

KS2 Measure this on the picture of Vitruvian Man, is this correct?

Now in pairs take measurements of each other record results.

KS2 could plot on bar chart to show whole class results. Each students arm span and height recorded in a-joining bars so the class can see how many students represent a

close correlation between their height and arm span. They will be able to see if the class results show the theory is correct.

Leonardo's Vitruvian Man suggests other correlations. Such as: length of hand is equal to one tenth of height. Length of foot is equal to one seventh of height can you test these theories? KS1 could use same figure just cut out a separate footprint and handprint to draw round to see how many fit along the height line. KS2 could collect data from the class and try different ways of presenting the data.

Older KS2/ Y6 may want to devise their own investigations exploring ratio

Plenary

Talk about the children's findings. Are Vitruvian Man's theories correct today? If not, why not? What factors could affect this? (Natural variations? age of subjects? - a child's proportions differ from an adult's as they are still growing)

Extension

There are many different theories about proportion suggested by Leonardo's Vitruvian Man. You could investigate further in following lessons.

Why not create your own version of Vitruvian Man by photographing children in the 2 Vitruvian Man positions, cutting out and overlapping the photos. Or create life size images by drawing around a student in the 2 positions and annotate with measurements and findings.