
B
A
B
D
D
A
C
C
Aut
STEM

AutoSTEM – automata to teach STEM subjects to young learners

Erasmus KA201 large-scale project to create innovative resources

For students from 4 to 8 years

How to they introduce STEM areas?

What are automata?

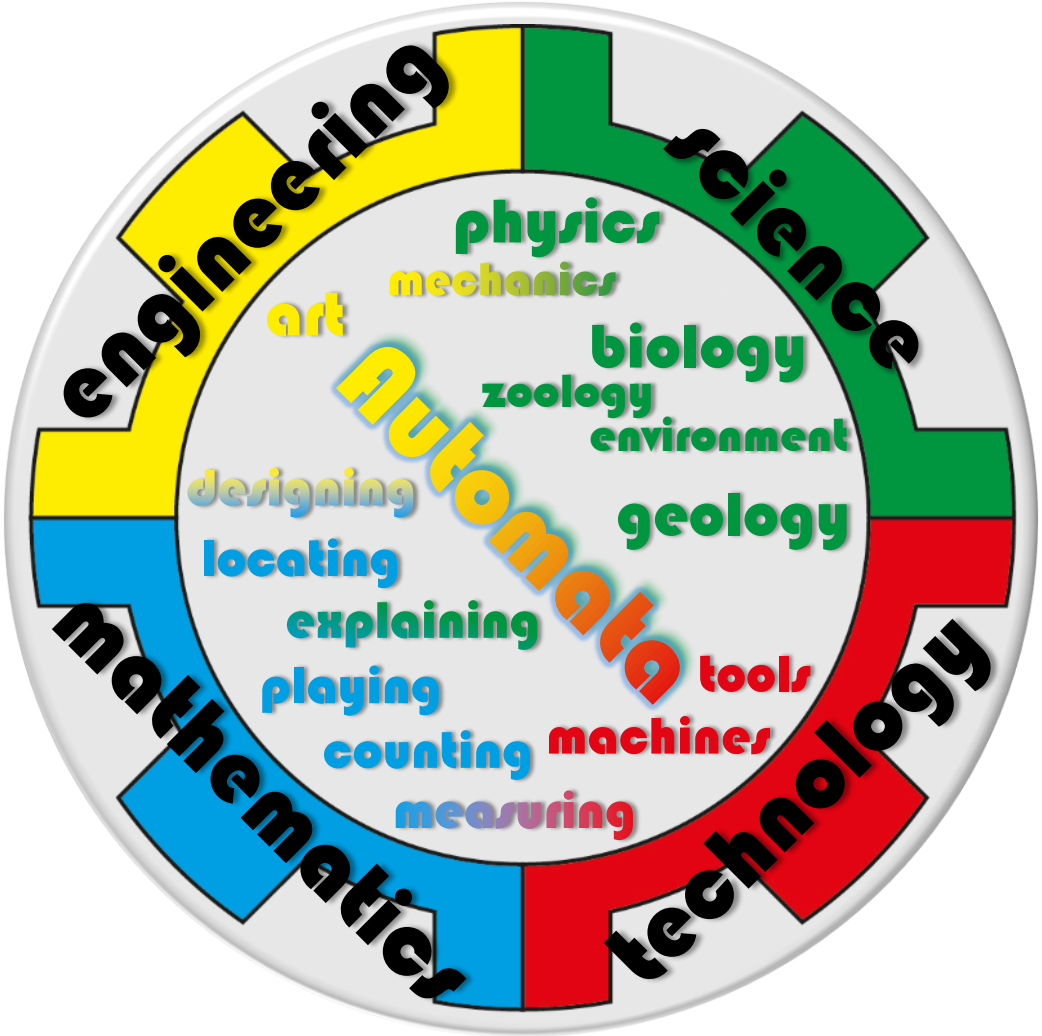
What are they made from?

Partners

University of Coimbra Portugal, Queen Maud University College Trondheim Norway, 32 SU School “Sv.Kliment Ohridski” Sofia Bulgaria, Eurek@ Perugia Italy, Kindersite UK

With the support of the Erasmus+ Programme of the European Union. The content reflects only the author’s view and the European Agency and the European Commission are not responsible for any use that may be made of the information it contains

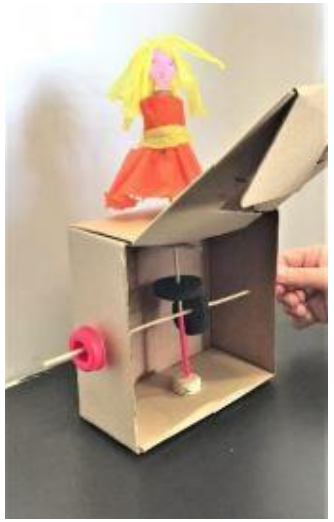
Co-funded by the Erasmus+ Programme of the European Union


engineering
science
mathematics
technology
physics
mechanics
art
biology
zoology
environment
designing
geology
locating
explaining
playing
tools
counting
machines
measuring
Automata

AutoSTEM – Resources produced

Step by Step Teacher Guide

- What are automata and STEM
- The theoretical framework and pedagogical concepts
- Key concepts for constructing automata



Automata Pedagogical Guidelines and Construction Instructions

- Details in the next section

Scenarios to implement Automata

- Ideas how to take the ideas further holistically and in to additional subject areas

Resources for planning and reflection

Videos

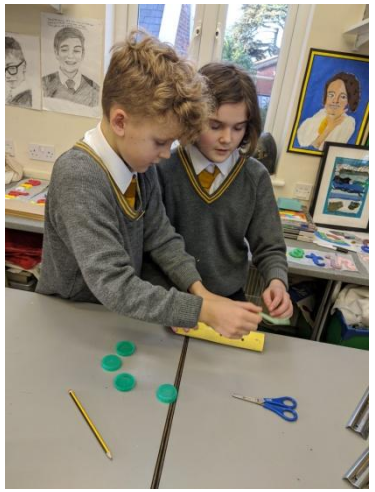
- 29 videos to date

Co-funded by the Erasmus+ Programme of the European Union

AutoSTEM – automata to teach STEM to young learners

The Automata that have been developed

- Jelly Bird
- The Talking Elephant
- The Dancing Doll
- The Balloon Car
- The Amphicar
- The Snapping Crocodile
- The Acrobat
- The Wind Turbine
- The Colour Spinning Disk
- The Eco Car
- The Drawbridge
- The Two Faces
- The Returning Tin Can
- The Butterfly



With the support of the Erasmus+ Programme of the European Union. The content reflects only the author's view and the European Agency and the European Commission are not responsible for any use that may be made of the information it contains

Co-funded by the Erasmus+ Programme of the European Union

AutoSTEM – Choosing an Automata to Use

Pedagogical guidelines and construction instructions

This is an automata that is suitable for using with children between the ages of 3 to 8 years. The Jellybird is a fun and engaging way that children can be introduced to number of mathematical concepts and it can also bring children closer to learning about birds.

- Areas of learning include:
  - Spatial imagination (shapes and placement)
  - Twice
  - Inside/outside
  - Round and pointed
  - Narrow and through
  - Either side, left-hand side and right-hand side
  - Up/down
  - Symmetry, and mirror symmetry

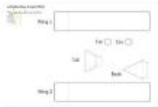
What areas of STEM learning are included

How to make video

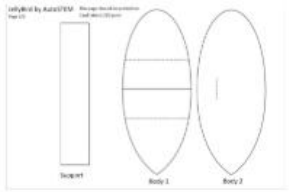
1. Instructions – how to use the Jellybird to teach Math concepts and Step by step guide – click here
2. Templates:.
   1. To be printed on paper (see image below to download)
   2. To be printed on card (approx. 220GSM)
      (see image below to download)
3. Video tutorial (see above)
4. Videos of children making the Jellybird (see below)

Full teachers step by step guide

Media examples of children making the automata

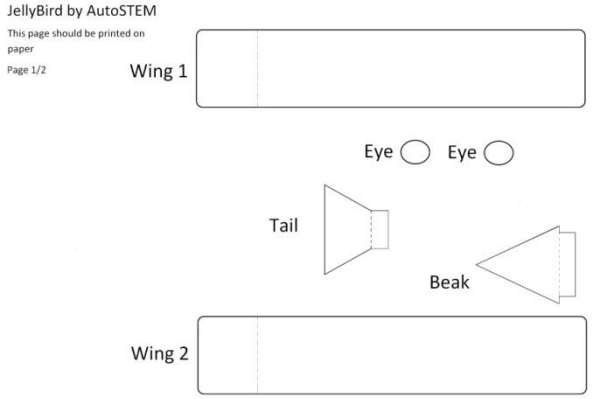


Print this template on paper
Click here to download the template.

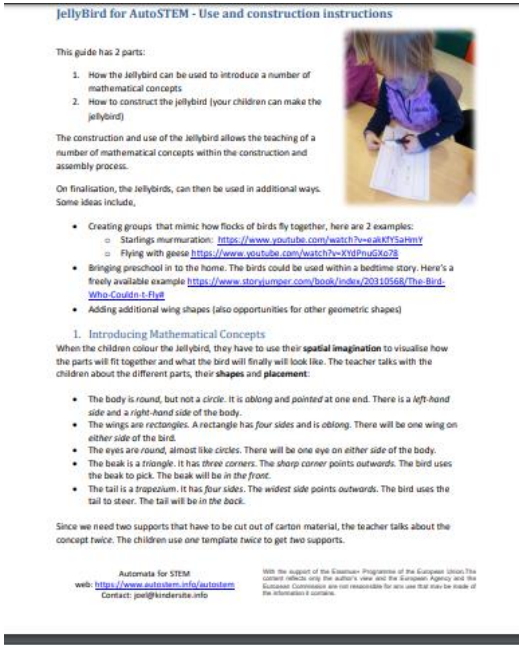


Print this template on card (220 gsm)
Click here to download the template.

Templates to print off



AutoSTEM – Automata Step by Step guide


JellyBird for AutoSTEM - Use and construction instructions

This guide has 2 parts:

1. How the Jellybird can be used to introduce a number of mathematical concepts
2. How to construct the jellybird (your children can make the jellybird)

The construction and use of the Jellybird allows the teaching of a number of mathematical concepts within the construction and assembly process.

On finalisation, the Jellybirds, can then be used in additional ways. Some ideas include,

- Creating groups that mimic how flocks of birds fly together, here are 2 examples:
  - Starlings murmuration: https://www.youtube.com/watch?v=eaKfYSaHmY
  - Flying with geese https://www.youtube.com/watch?v=XYdPnuGXo78
- Bringing preschool in to the home. The birds could be used within a bedtime story. Here's a freely available example https://www.storyjumper.com/book/index/2031068/The-Bird-Who-Couldn-t-Fly#
- Adding additional wing shapes (also opportunities for other geometric shapes)

1. Introducing Mathematical Concepts

When the children colour the Jellybird, they have to use their **spatial imagination** to visualise how the parts will fit together and what the bird will finally will look like. The teacher talks with the children about the different parts, their **shapes** and **placement**:

- The body is *round*, but not a *circle*. It is *oblong* and *pointed* at one end. There is a *left-hand side* and a *right-hand side* of the body.
- The wings are *rectangles*. A rectangle has *four sides* and is *oblong*. There will be one wing on *either side* of the bird.
- The eyes are *round*, almost like *circles*. There will be one eye on *either side* of the body.
- The beak is a *triangle*. It has *three corners*. The *sharp corner* points *outwards*. The bird uses the beak to pick. The beak will be *in the front*.
- The tail is a *trapezium*. It has *four sides*. The *widest side* points *outwards*. The bird uses the tail to steer. The tail will be *in the back*.

Since we need two supports that have to be cut out of carton material, the teacher talks about the concept *twice*. The children use *one* template *twice* to get *two* supports.

Automata for STEM
web: https://www.autostem.info/autostem
Contact: joel@kindersite.info

With the support of the Erasmus+ Programme of the European Union. The content reflects only the author's view and the European Agency and the European Commission are not responsible for any use that may be made of the information it contains.


Co-funded by the Erasmus+ Programme of the European Union

When the children stick the beak and the tail to the body, the teacher talks about the *inside* and *outside* of the bird. The children have to stick the beak and the tail to the *inside*. Furthermore, the teacher uses the *concepts round* and *pointed*. The children have to stick the beak to the *round* side and the tail to the *pointed* side.

When pushing the support that carries wings through the body, the teacher can talk with the children about the mathematical concepts *narrow* and *through*. The support has to go *through* the *narrow* gap.

When bending the wings, the teacher talks with the children about the concepts *down*, *either side*, *left-hand side* and *right-hand side*. The children have to bend the wings down on *either side*, one on the *left-hand side* and one on the *right-hand side* of the bird. The wings are *symmetrical*, they have a *mirror symmetry*, i.e. they look the same on *either side* but point in different directions – one *to the left* and one *to the right*.

When playing with the bird, the teacher talks with the children about motion and the concepts *up* and *down*. We move the support *up* and *down*. The wings flap *up* and *down*. The bird flies upward in the air and then forward.

The body is round, but not a circle.

It is pointed at one end and round at the other

There is a left-hand side and a right-hand side of the body.
The wings are rectangles. A rectangle has four sides and is an oblong.
There will be one wing on either side of the bird.

The eyes are round, almost like circles. There will be one eye on either side of the body.

The beak is a triangle. It has three corners. The sharp corner points outwards. The bird uses the beak to pick. The beak will be in the front.

The tail is a trapezium. It has four sides. The widest side points outwards. The bird uses the tail to steer. The tail will be in the back.

Co-funded by the Erasmus+ Programme of the European Union

AutoSTEM – Evaluation

Children’s play with automata is important
The project facilitates creativity and wonder
The workshop is interdisciplinary
Do not do too much
Provide enough time
- to build automata
- for exploration
- to test and play with the automata

Do not have too many children in the group

Co-funded by the
Erasmus+ Programme
of the European Union

Thank you for your attention

Website : https://www.autostem.info

Videos : https://www.youtube.com/channel/UCaVYKg0qYXnUNNdqwNtLAVQ

Facebook : https://www.facebook.com/AutomataforStem

Email : joel@kindersite.info

Co-funded by the Erasmus+ Programme of the European Union