

Book of DIY STEM Projects



Welcome to SAM Labs

SAM Labs is a collection of wireless building blocks and a cool app for you to explore your creativity and imagination.

Each SAM Block has its own unique skill: a light, a motor, a button and more. You wirelessly connect SAM blocks together in the **SAM Space** app to program your awesome hacks, pranks, projects and inventions.

Get Inspired

This booklet has 17 crazy cool ideas to inspire your inventions. Create, build & program the inspiring projects and unleash your imagination.



Warning. Some of these projects require the use of scissors and other sharp objects. Please have a parent or guardian supervise you when working with sharp objects.

Get Started with SAM Space



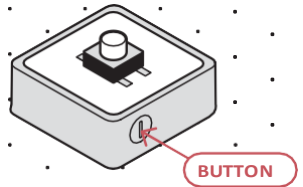
Load SAM Space

The SAM Space app is located at:
studio.samlabs.com/samspace



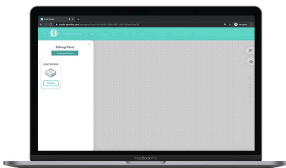
Name your project

Start by naming your project. You can now create & save your own projects.



Turn them on

Press the button on the top of the blocks until the light goes on.



Pair

Select 'Connect Devices' on the Pairing Panel. Select 'Pair' on the the pop-up window



Drag

Drag the blocks into the work space. You are ready to start connecting them.



Connect

When you connect two or more blocks they change color to show they are connected.

Traffic Light

★
EASY

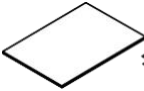
GADGET

Ever wonder how a traffic light works? Now you can build it yourself.
Build and program this simple traffic light and rule the roads.

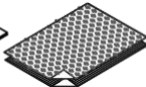
You'll need



Scissors



Cardboard



Colored
paper



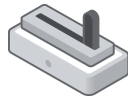
Glue



2 DC Motors



1 RGB
LED



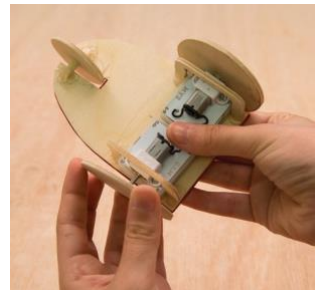
1 Slider



1 Button

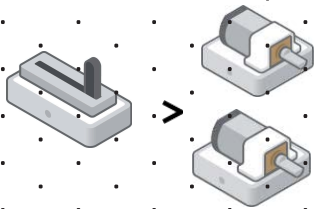


Create your own using 2 DC Motors like the one below:





Open the app and connect the blocks



Add behaviors to the blocks to change the lights on the traffic light.

Watch the step-by-step video on how to pair and connect the blocks at <https://www.youtube.com/watch?v=0LmOtzF7AMU>

Kaleidoscope

★
EASY

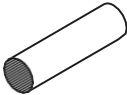
GADGET

Bored of gazing out the window? Try the DIY kaleidoscope!
Use a DC Motor to make this dreamy project.

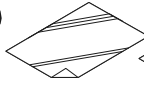
You'll need



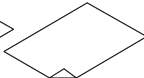
Scissors



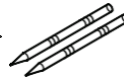
Kitchen Roll



Tin Foil



Paper



Colored Pens



Pencil
or Stick



1 DC Motor

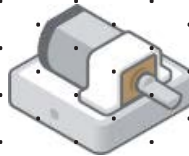


In the white circle create a hypnotic design.





Open the app and
connect the blocks



Connect the DC
Motor to
another block
or use the keys
to activate the
kaleidoscope

Watch the step-by-step video on how to pair and connect the blocks at <https://www.youtube.com/watch?v=0LmOtzF7AMU>

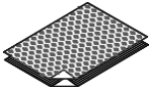
Pattern-Bot

★★
MEDIUM

HOME HACK

Unleash your inner artist and paint unique patterns with just two DC Motors.
Make cards or even a t-shirt with your own design.

You'll need



Colored paper



Glue



Brushes



Paint



2 DC Motors



1 Button

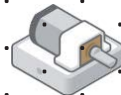
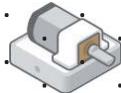


Build your pattern-bot by attaching 3 paint brushes to a DC Motor.





Open the app and
connect the blocks



Cut old brushes
and attach
them to a DC
Motor with a
wheel or gear,

Watch the step-by-step video on how to pair and connect the
blocks at <https://www.youtube.com/watch?v=0LmOtzF7AMU>

Door Prank

★
EASY

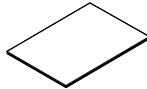
HOME HACK

Attach a Tilt block to the bottom of your door handle and scare anyone who dares to come through your door!

You'll need



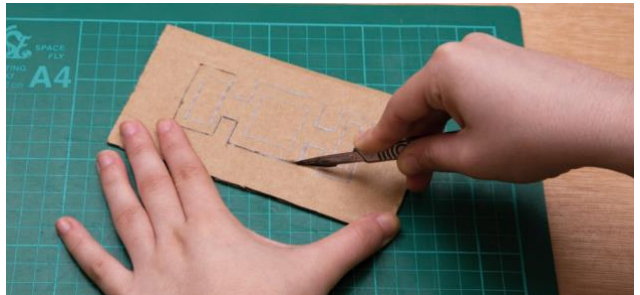
Scissors



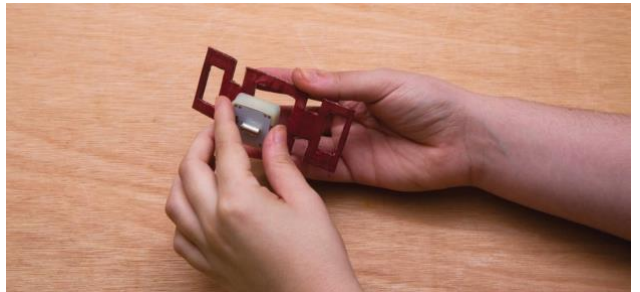
Cardboard



1 Tilt

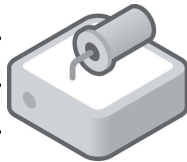


Create a holder for your Tilt and place on the door handle. So simple!





Open the app and
connect the blocks



Try different
sounds and see
which one is the
scariest.

Watch the step-by-step video on how to pair and connect the blocks at <https://www.youtube.com/watch?v=0LmOtzF7AMU>

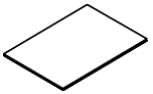
Bridge

★★
MEDIUM

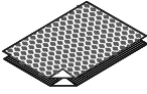
GADGET

Build a bascule bridge for your car.
Use a DC Motor to control it remotely.

You'll need



Cardboard or
Wood



Colored
paper



Glue



String



1 DC Motor



1 Button



Make a simple DC Motor and string connection.





Open the app and
connect the blocks



Connect the
motor to the
button, the
slider or tilt
blocks to control
your bridge.

Watch the step-by-step video on how to pair and connect the
blocks at <https://www.youtube.com/watch?v=0LmOtzF7AMU>

Flipbook

★★
MEDIUM

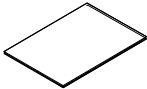
GADGET

Create your own flip book, and save yourself the flipping!

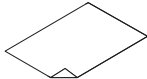
You'll need



Scissors



Cardboard



Paper



Glue



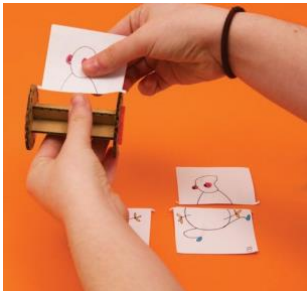
Colored pens



1 Button

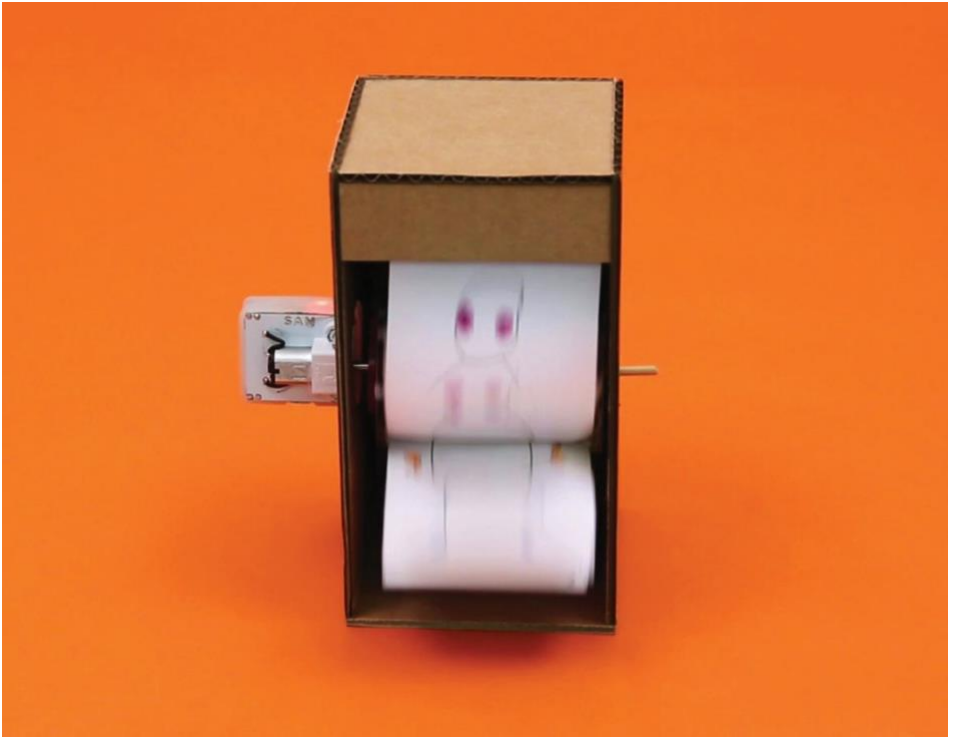


1 DC Motor



Create a short story or a mesmerizing design.





Open the app and connect the blocks



You can program the DC Motor to spin backwards on SAM Space.

Watch the step-by-step video on how to pair and connect the blocks at <https://www.youtube.com/watch?v=0LmOtzF7AMU>

Stirring Machine

★
EASY

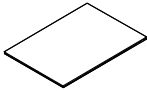
HOME HACK

Not a morning person? Get a DC Motor to stir your breakfast for you.

You'll need



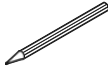
Scissors



Cardboard



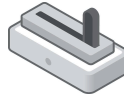
Glue



Pen



Spoon and Bowl



1 Slider



1 DC Motor

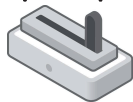


Connect the spoon to the rotating top.





Open the app and
connect the blocks



You can use the
Slider to change
the intensity of
your stirring.

Watch the step-by-step video on how to pair and connect the
blocks at <https://www.youtube.com/watch?v=0LmOtzF7AMU>

Alarm

★★
MEDIUM

HOME HACK

Wakey wakey. Create this alarm clock.
The drum machine will wake you up in the morning.

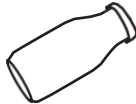
You'll need



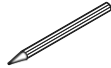
Tins



Fork



Bottle or glass
container



Pencil or stick



Elastic bands



1 DC Motor

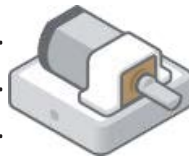


Set the time with the Time Trigger block in the SAM Space app.





Open the app and
connect the blocks



You can use the
Keypress
to make a snooze
button.

Watch the step-by-step video on how to pair and connect the
blocks at <https://www.youtube.com/watch?v=0LmOtzF7AMU>

Flashlight

★★
MEDIUM

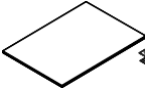
GADGET

Light your way with this epic torch. Connect the RGB LED to a Tilt Sensor and program the light modes on the torch.

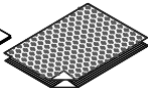
You'll need



Scissors



Cardboard



Colored Paper



Glue



Colored String



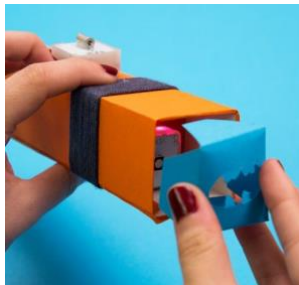
1 RGB LED



1 Tilt



Create torch toppers to flash different designs.





Open the app and connect the blocks



You can program the RGB LED to flash or change colors using the SAM Space app

Watch the step-by-step video on how to pair and connect the blocks at <https://www.youtube.com/watch?v=0LmOtzF7AMU>

Sync Dancers

★
EASY

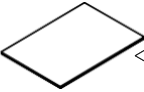
GADGET

Shake it shake it baby! Make your own conveyor belt of dancers.
All you need is a DC Motor, some paper and a cable.

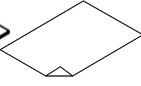
You'll need



Scissors



Cardboard



Paper



Glue



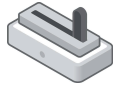
Cable



Paper
fastener



1 DC Motor



Slider

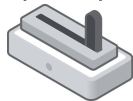


Connect the DC Motor to the cable to make the dancers move.





Open the app and
connect the blocks



Adjust the speed
of the dancers by
moving the slider
up and down.

Watch the step-by-step video on how to pair and connect the
blocks at <https://www.youtube.com/watch?v=0LmOtzF7AMU>

Smart Watch

★★
MEDIUM

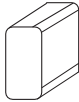
GADGET

Analog and digital are so 2010.
Build the watch of the future with a Tilt and RGB LED block!

You'll need



Paint



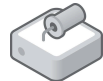
Modelling clay



Colored string



1 RGB LED



1 Tilt



Program the blinking light to tell you the time when you shake your wrist.





Open the app and connect the blocks



You can use Time or Number behavior blocks to create a watch!

Watch the step-by-step video on how to pair and connect the blocks at <https://www.youtube.com/watch?v=0LmOtzF7AMU>

Pinball

★★
MEDIUM

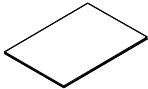
GAME

Build your own pinball machine with 2 DC Motors, a Slider, a Button and a RGB LED. The difficult part is scoring the most points!

You'll need



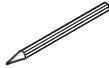
Scissors



Cardboard



Tape



Pen



2 DC
Motors



1 Button



1 Slider

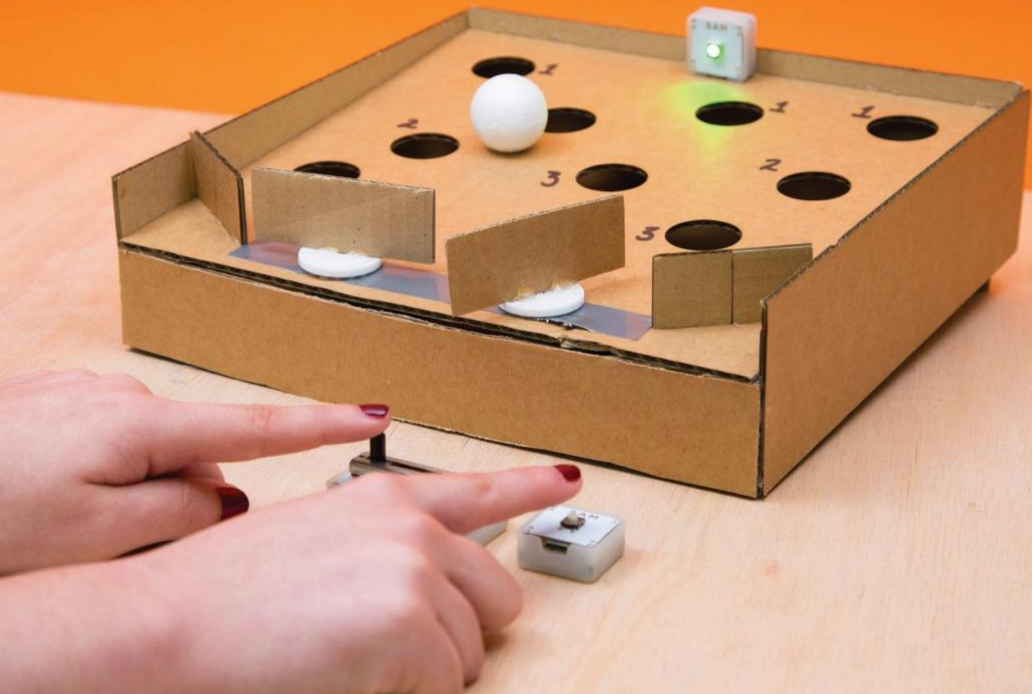


1 RGB LED

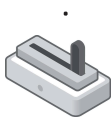


Make sure the holes are a little smaller than the ball!





Open the app and
connect the blocks



Program the
RGB LED to
stay on for 1
minute

Watch the step-by-step video on how to pair and connect the
blocks at <https://www.youtube.com/watch?v=0LmOtzF7AMU>

Conductor

★
EASY

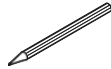
GAME

Attach your Tilt Sensor to a wooden stick and start moving your new conductor's stick to control the melody on touchpianist.com

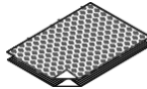
You'll need



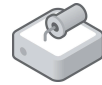
Elastic bands



Pen or stick



Colored papers



1 Tilt

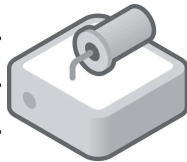


Transform this project into a wand by programming the tilt to make magical sounds.





Open the app and
connect the blocks



Try different
sounds and see
which one is the
scariest.

Watch the step-by-step video on how to pair and connect the
blocks at <https://www.youtube.com/watch?v=0LmOtzF7AMU>

Football game

★★
MEDIUM

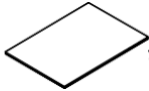
GAME

Sports fan? Create a soccer pitch and moving ball for hours of play with your friends.

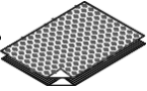
You'll need



Scissors



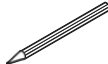
Cardboard



Colored Paper



Glue



Pen



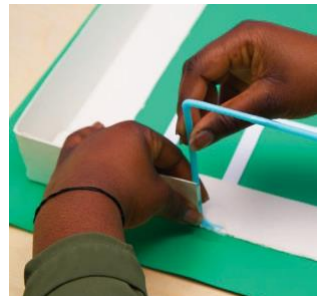
Straw



2 DC Motors

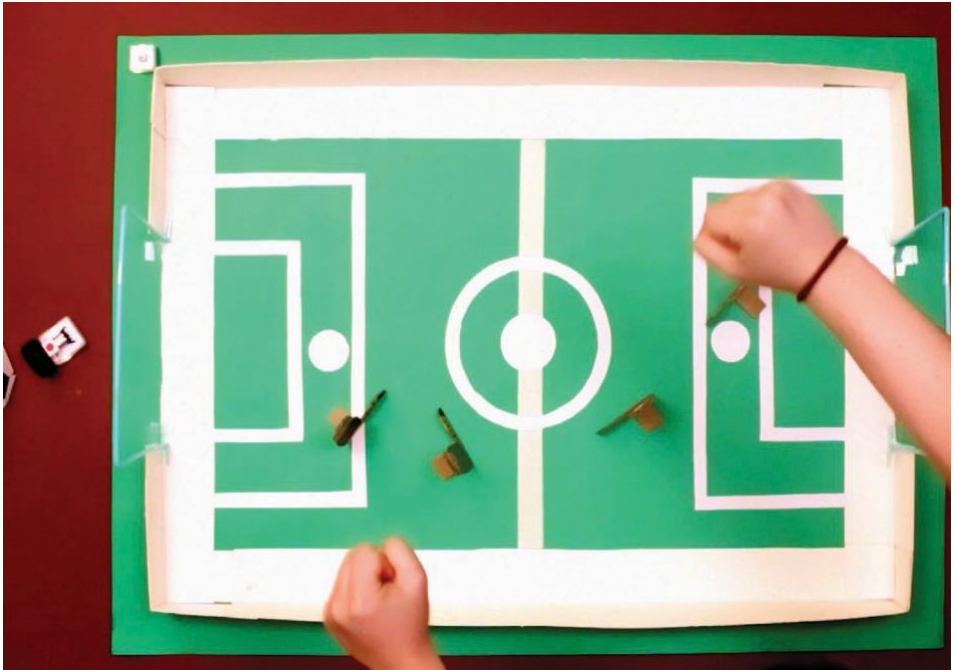


1 Button



Use the DC Motors to create the moving soccer ball.





Open the app and
connect the blocks



>



Try adding
behaviors to
change the
seed on the
SAM Space
app!

Watch the step-by-step video on how to pair and connect the blocks at <https://www.youtube.com/watch?v=0LmOtzF7AMU>

Gameshow button

★★
MEDIUM

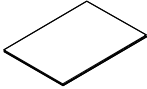
GAME

From chores and homework, to brushing your teeth or making dinner, turn everything into a game!

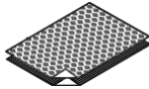
You'll need



Scissors



Cardboard



Colored Paper



1 RGB LED



1 Button



Press the Button: the RGB LED will flash and trigger anything else you think of.





Open the app and
connect the blocks



>



Try adding
behaviors to
change the
colors on the
RGB LED

Watch the step-by-step video on how to pair and connect the
blocks at <https://www.youtube.com/watch?v=0LmOtzF7AMU>

Drawing Machine

★★★
HARD

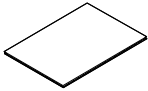
HOME HACK

Create art with the Drawing Machine. Ready? Set? Art!

You'll need



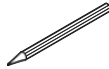
Scissors



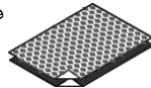
Cardboard



Glue



Pen



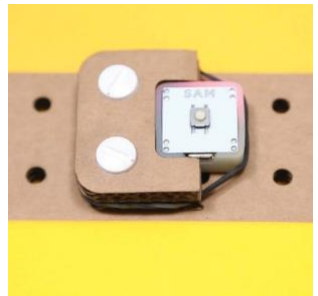
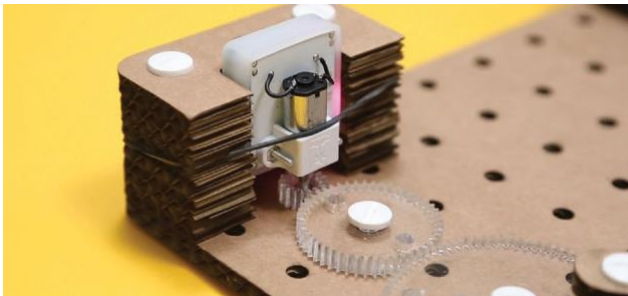
Colored Papers



2 DC Motors

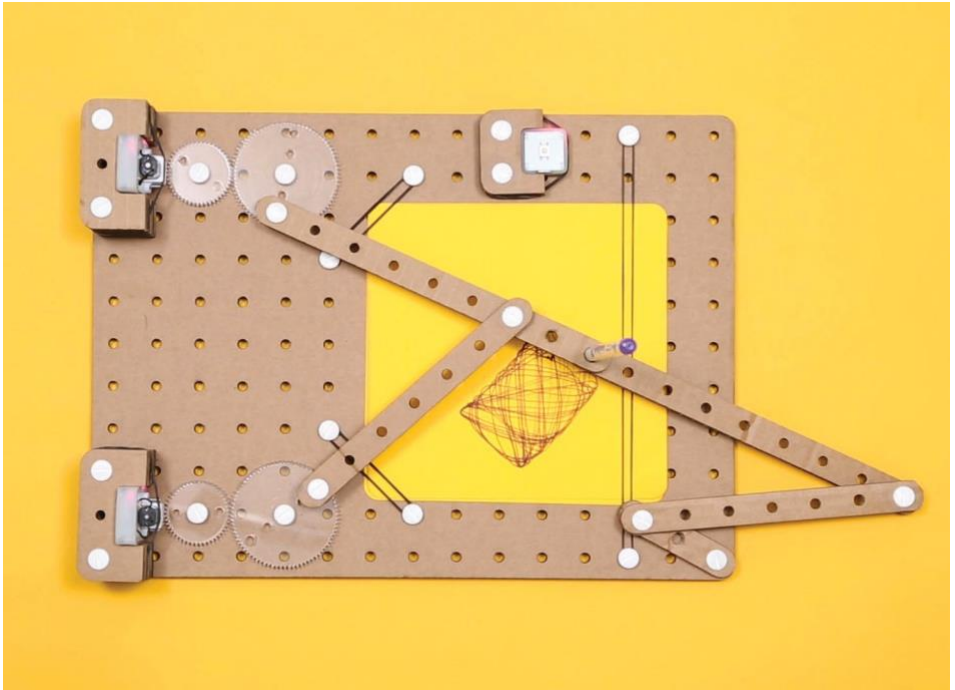


1 Button



Position the cardboard arms using the holes to create different drawings.





Open the app and
connect the blocks



>



Try adding
behaviors to
change speed
and directions
of the DC
Motors

Watch the step-by-step video on how to pair and connect the blocks at <https://www.youtube.com/watch?v=0LmOtzF7AMU>