











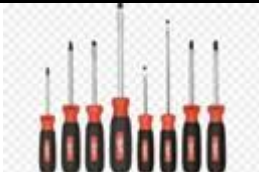







Work plan (Chain experiment)





Olympic games

Ad 1.

The needed tools for every contraption:

<i>Tools</i>	
Drill machine	
Various drill bits (for wood and metal) – 2 mm, 3 mm, 4 mm, 5 mm, 6 mm, 7 mm	
Foxtail saw – small saw teeth	
Metal hand saw and metal saw blade	 
Strong scissors	
Patex thermo gun + glue cartridges	
Hammer (200 g)	
nail puller pliers	

combined pliers	
4 screwdrivers (flathead and Phillips)	
Flat files (for wood and metal)	
Abrasive paper for wood (rough and fine)	
Hot air dryer	
Tape meter (2 m)	
triangle	
clamp	
kotno ravnilo	

pencil	
power strip	
Stanley knife	
Coloring brushes Thin: 1 mm, 3 mm, 5 mm Fat: 1 cm, 3 cm, 5 cm	

Ad2. Execution of section Olympic Games 2020.

The participants will plan and build the contraptions in six groups. All groups will build a section on the same topic which will be based on the same basic plan that is presented below. It is important that during the execution of the article in the pilot group we emphasize the characteristics of each country (geographical, historical, artistic characteristics, habits ...).

Basic plan

Each section is designed in such a way that all planned events are combined together in a wooden box of dimensions: 100 cm x 50 cm x 50 cm. With this design, the device will quickly be ready for use and operation. The basic box will include working elements that should represent individual selected sports of Olympic Games 2020: marathon, basketball, rowing, field hockey, water polo, football, relay race, jump with a stick. If desired, the team will also be able to choose their own sports and will adapt to their choices. The dimensions of the base box are also optional and can be changed by the team.

The freedom of choice should develop the creative imagination of children and encourage them to try to realize their ideas by adding to the section the characteristic features of the countries in the project.

Plan of the box (manjka slika)

Plan of the section (manjka slika)

The needed material and tools which has to be prepared for each section for six teams:

Material for one contraption
Box (board 100 cm x 50 cm, thickness of 2 cm , 2 battens 50 cm in length and two battens 100 cm, width 4 cm, 4 columns height 50 cm and cross section 4 cm x 4 cm)
A slab (0,75 m ²) of Styrofoam, about 3 cm thick
Plastic grooves of inner diameter about 2.5 cm or more. The total length is about 1.5 m.
Wooden slats of square or rectangular cross-section of different dimensions (most useful 30 mm x 25 mm or 40 mm x 25 mm). Two slats should be 1,1 m long.
Wooden board with a thickness of 1 cm and a size of about 50 cm x 50 cm
Wooden carpentry waste
Wood screws of different sizes (from 1 cm to 5 cm)
Nails of different sizes (from 1 cm to 5 cm)
Wood glue
Colors (black, white, red, yellow, blue)
A rope of about 1 mm thickness and a length of about 2 m
Waste plastic bottles, stoppers, and yoghurt cups
Metal wire with a diameter of about 2 mm and a length of 0.2 m
10 pcs of plastic or metal balls with a diameter from 1 cm to 3 cm

Instructions for creating a basic box

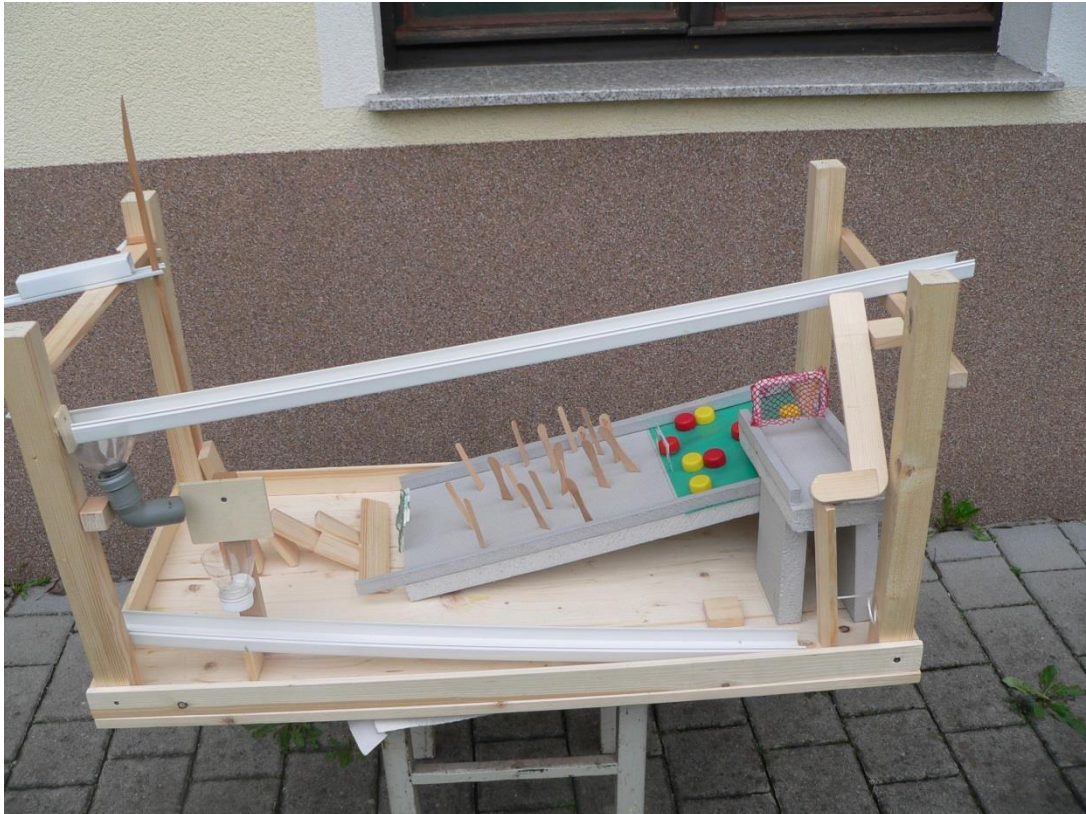
The base board (100 cm x 50 cm) can be bought in a shop or cut from a larger piece. The thickness of the board should be at least 2 cm and wooden, which will not twist and bend later. It can also be chipboard. The dimensions of the box are recommended, but not mandatory, and each group can adapt it appropriately.

Attach all four corners from the bottom with a vertical column screw. When placing pillars, we have to be careful that they are spaced from the edges as much as the thickness of the slats, which will connect the columns with each other. Prior to fixing the columns, it is helpful to lubricate the contact surfaces with adhesive glue. Plates connecting the columns should be placed on the base board, so that the base surface of the box remains 100 cm x 50 cm. The thickness of the strips should be at least 1 cm and the width should be at least 3 cm. The plates are glued to the base surface and screwed from the bottom with screws. With screws, we also screw the slats upright to the pillars to ensure the strength of the pillars. If desired, the intermediate surfaces can be lubricated with glue prior to fixing the strips on the column. The

base box is finished. Allow the adhesive glue to dry. The shape of the box similar to an upside-down table.

Note: in order for the screw heads not be seen from the base and cause scratches on the substrate, we expand the hole with the wider drill before fitting it to the drilled hole. We can do this manually.

Instructions for building the basic section of the Olympic Games 2020.

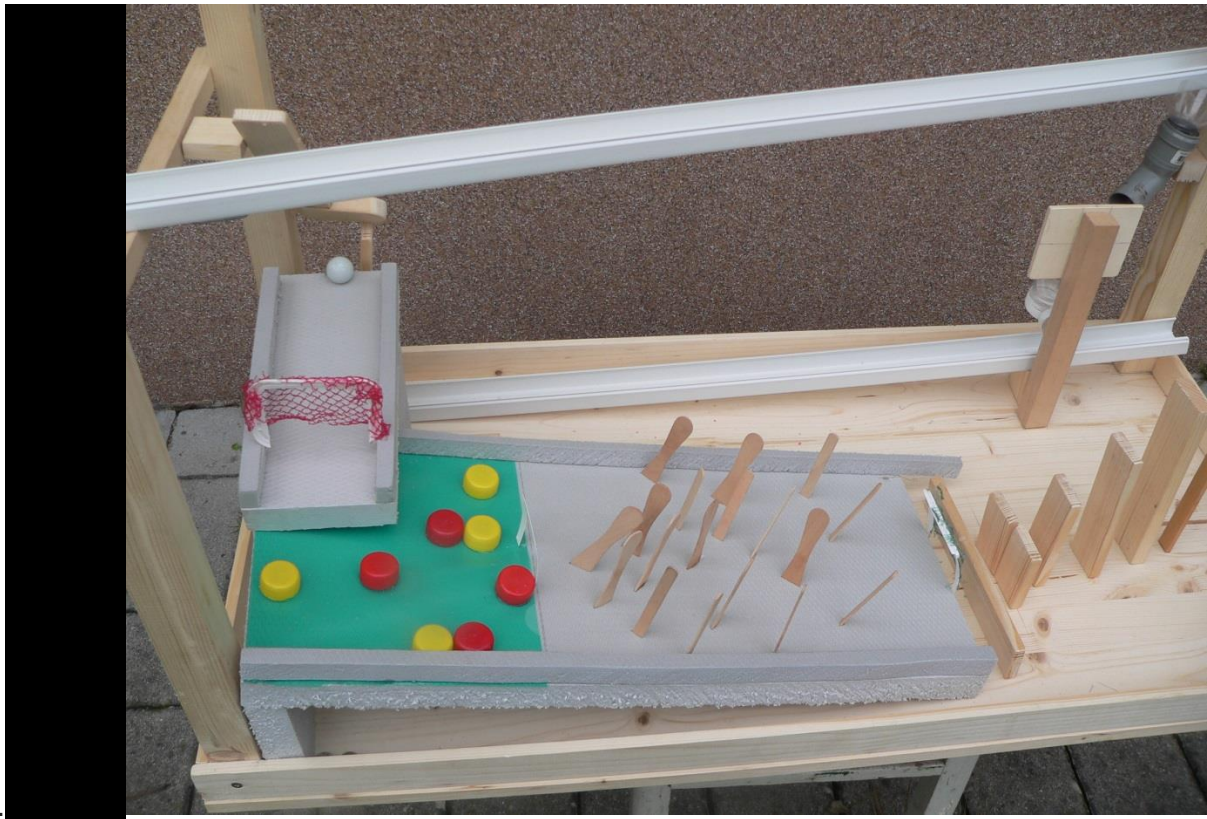




An excellent sketch makes it easier to work on the section and prevent subsequent falling apart of the already made construction. At the same time, it allows us to divide the work and the individual can produce a certain element or part of the section.

We begin to build a section with an element that occupies the most space. In our case, this is a football playground and water polo pool. It is made of Styrofoam. Cut off a plate of 60 cm x 25 cm. On the basis of testing the speed of the ball, we select the slope and paste the appropriate mountings below the plate, which ensure the stability of the slope and constant inclination.

We will put players of football and water polo in the end when we test the performance of the device



We make a hockey court from wood, but we can also make it from a styrofoam. The size of the playground is 27 cm x 12 cm, you can also change the dimensions. The court is slightly inclined towards the goal to make it easier for the ball to roll into water polo pool. On the opposite side of the goal, we make a hole in the playground, where we place a ball (it represents a hockey pack). A hockey stick strikes the ball into the goal. The stick is pivotally attached to the column above the ball. The hockey playground is raised above the base surface of the box, so that metal ball will fall on the water polo pool.



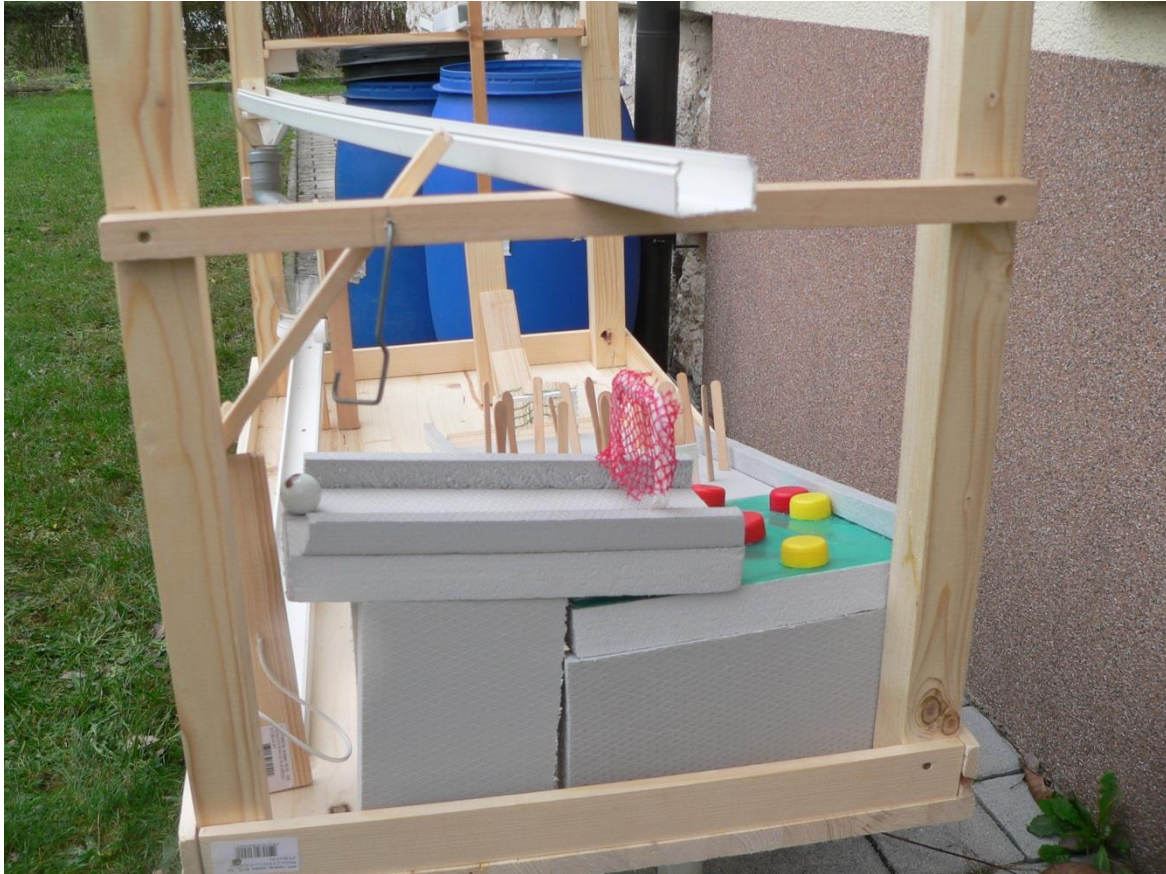
We have to move the hockey stick from a balanced position and support it with a wooden sling. In our case, the height of the slat is 22,5 cm. When the ball falls through the basket, it rises to

the wooden sling on the slope and pushes it under the hockey stick, so the stick swings and hits the ball in the goal.

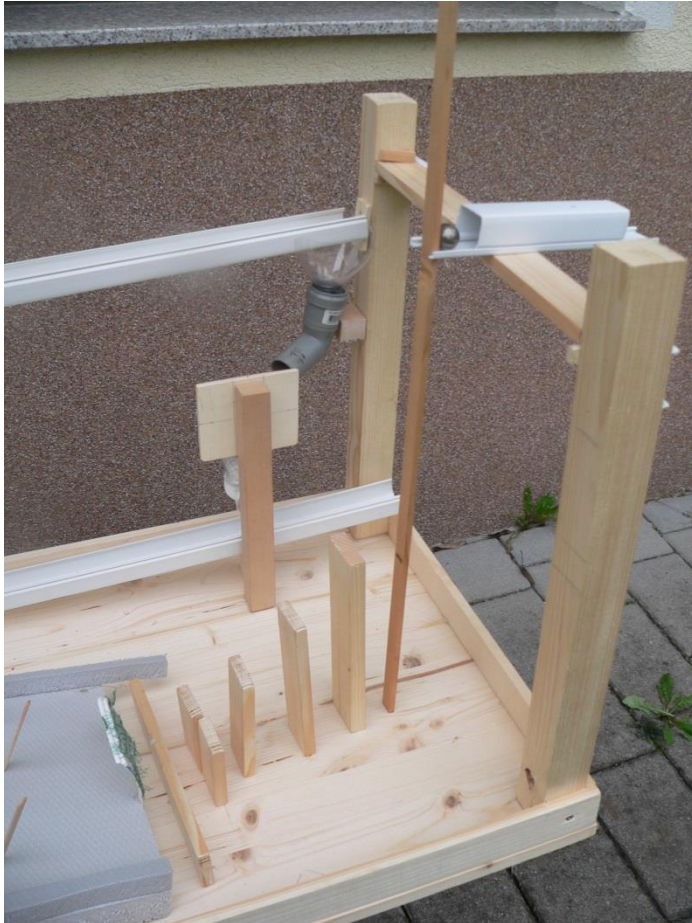


The slope (representing the rowing track) is made from a plastic groove, which is 4 cm wide, 2,5 cm deep and in our case 85 cm in lenght. At the beginning of the slope, under the basket, we can attach a cut-off funnel of a plastic bottle to ensure that the ball from the basket drops safely into the groove.

Above the funnel we make a basket, which is attached to the wooden pillar. The basket height is not important, we decided 6 cm above the slope. The rim of the basket can be metal or plastic. Waste material may be used. We decided for the upper part of the bottle. Its diameter is 6,5 cm, so it is more likely that the ball will drop into the basket. The lower exit of the basket (bottle neck) must have a diameter greater than 2.2 cm. Shooting to the basket will represent a curved plastic tube. With the curvature of the tube and its position, the ball is always approaching the basket. We find the correct position by trying a few times. We attach the curved tube to the upright corner pillar with the upper part of the bottle. With a tension cord (option), which is tilted approximately at the turn of the tube, we can change the inclination of the tube and thus the direction of the flight of the ball to the basket if it is necessary.



Through plastic groove (they represent the marathon run track), we lead the received ball at the entrance of the device to the opening of the curved plastic tube carrier to the basket. The ball comes into the contraption at a height of 44 cm. The plastic tube is 1.1 m long and is removed during transport, so that the dimensions of the device are smaller. The cross-section of the tube is 4 cm x 2.5 cm, but it can also be 3 cm x 2.5 cm.



We need to finish the race of the ball after football. Since we do not know where the ball will come down from the football field, we place a long domino (21 cm in our country) across the width of the court. Behind them, we place parallel two domains (7 cm high), followed by one domino (height 11 cm) and the other (height 15 cm) and the third (height 20 cm). These domains represent a relay race. This is followed by a jump in height with a stick, which we present with a narrow stick of height of 50 cm. The stick is slightly hinged on the ball that sits in the well at the beginning of the outlet groove. The last dominoes (20 cm high) are opposed to the stick and the rod pushes the ball through the groove to the next device at a height of 45 cm. The outlet groove is glued to the slat, which can be removed during transport in order to reduce the dimensions of the device.

