



Solar Mario

Age group	7 years and above
Duration	3 – 5 minutes per game
Group size	Maximum of 8 people per VR glasses (2 are playing each time)
Location	Indoors or outdoors
Possible on rainy days	Yes, even if the sky is cloudy
Keywords	Super Mario™, light conductor, light guide, optical fibre, virtual reality glasses, signal transmission



Short description

The Solar Mario game is inspired by video games in which a character moves using different buttons or performs certain movements (in video games, usually jumping, boxing, kicking, etc.).

In our case, 'Mario' is a real person controlled remotely by another person through virtual reality (VR) glasses that have been modified. Commands are transmitted without electricity, but by conducting daylight through optical fibres, allowing or interrupting this flow of light simply by covering one end of the optical fibre with a finger.

In the game, 'Mario' must go through a circuit, collect 'fruits' and jump over obstacles.



Remark

A group leader should at least be nearby and observe the game. On the one hand, people operating the controller are often unaware that 'Mario' cannot see his surroundings or potential obstacles; on the other hand, the glasses and optical fibres break quite easily if pulled too hard.



Materials

These are the materials you need:

- Solar Mario glasses with the controller
- 'Fruits' printed on paper, optionally laminated
- Clothespins
- Obstacle (for example a rope laid out on the ground or a wooden lath placed on the ground)
- Mobile phone or MP3 player with the Super Mario theme song (mp3, YouTube)



Instructions

That's how Solar Mario is played:

CAUTION: The Solar Mario glasses and the optical fibres are relatively delicate. Handle them with care.

1. One person in the group puts on the Solar Mario glasses. They are darkened and only a few bright spots and their corresponding symbols are visible. The glasses are connected by optical fibres to the controller, on which the same symbols are painted.

2. A second person stands behind Mario, holding the controller towards the light and "directing" him through a circuit in which he must collect "fruit" and jump over obstacles. Commands are given by covering the corresponding end of the optical fibre cable on the controller. Like that, Mario sees inside the glasses a change of light in the corresponding end of the optical fibre and knows what to do.
3. Rules: no talking, commands are only given via the controller.
4. The commands on the controller are: go forward, go backward, turn left, turn right, jump (jump over the obstacle), reach out (pick up the 'fruit'). There may be additional commands such as 'up' and 'down'.

Possible variants: The game can be played against the clock. The winner is whoever completes a given circuit in the shortest time possible.

For very young children (under 7 years old), it may be necessary to use glasses with a smaller interpupillary distance. (The interpupillary distance of commercial virtual reality glasses is suitable for most children aged 7 and above and for adults).

Add other elements, for example, hang strings with bells that Mario must not touch; or in one place a keyword must be transmitted via Morse code.



Practical advice

Solar Mario is one of the most popular experiments, and the background music makes it even more special.

A revealing experience (it's not a button, it's nothing but light transmission)!

At the beginning, go through all the commands before sending Mario onto the circuit.

It is worth adjusting the glasses for each person (distance between the eyes and sharpness).

If possible, hang the fruits at different heights.

Be careful preparing the 'obstacles', the blindfolded players must not fall over them. A string *laid out on the ground* is enough as a symbolic obstacle.

It works well even in low light (outdoors) or artificial light (indoors).

Usually, it is enough to collect 3-4 objects and overcome one obstacle before changing teams. Like this, the game does not last too long and more children can try out the Solar Mario.



Explanation and further information

Light is transmitted through optical fibres in the same way as electricity is transmitted through a cable. Therefore, if light suddenly stops reaching (or at least reaches much more weakly) the end of the optical fibre in the glasses, the difference can immediately be seen in the glasses.



Reflective questions

Compare this experiment with the digital data transmission in optical fibre cables in the telecommunications sector.

What other ways of transmitting signals through light do you know?



Impressions

