	Age group: grade 6
	Theme: creating a STEAM eco-home
	Sub-theme: Using and controlling smart devices,
	Keywords: smart home, Arduino, programming
	Individual/group work: group
	Language: (English or local) Hungarian
	Time required: 3x45 minutes

Description of the task:

Required tools:

1. **Dollhouse: can be homemade or ready bought.**
2. **For example:**
   a. **Lights,**
   b. **Bells,**
   c. **Gas detector with alarm,**
   d. **Running water (bath, garden sprinkler),**
   e. **Air conditioning,**
   f. **Movable windows, doors,**
   g. **Temperature sensor.**
3. **Some outdoor devices:**
   a. **8 x 8 LED matrix, street lighting,**
   b. **8 x 8 LED streetlights, 8 x 8 LED lights, 8 x 8 LED streetlights**

4. **Connect the Arduino to your computer.**

5. **If you don't have a development environment installed, install the necessary software (Arduino) on your computer (tablet).**
   Make the program for the controls and save it to the Arduino.
   a. Connect to Arduino with your smartphones!
   b. Control the lighting!
   c. Turn on the doorbell on your phone - as if you were remotely activating an alarm.
   d. Control the outside lights!
   e. Control the doors, windows and gate!

Solving the problem (solutions):

1. 1. Give the following part of the solution sheet to the students so that they can follow the process to be followed. Older children can try to do them without the help of a teacher, but always have a supervisor nearby to spot if a step done incorrectly could damage a device. It won't ruin a better Arduino if you ... hook something ... up backwards. Says Brown in the video but I can't remember what...
2. 2. Put the available dollhouse in a well accessible place.

3.   Install the following devices as follows:
    a.   Fix the ground to the inside wall of the house with the cable clamp which can be fixed to the wall with a drawing pin
    b.   Place the smoke detector on a small table.
    c.   Place the bell (active buzzer) on another table/external/inner wall.
4. 4. In addition to the USB and power connectors, the Arduino board circuitry has additional outputs (legs) called pins. The outputs can be divided into four groups: analogue (A0-A5), digital (0-13), power (3.3V, 5V, GND, VIN) and the "leftovers": the control pins. The properties of each pin are described in detail at the time of use. Power on is indicated by a green LED marked ON on the board. In addition, there are three yellow LEDs on the board, two LEDs indicating serial line communication (RX, TX) and a built-in LED marked L, which will be discussed in more detail later. Note that the numbering of the outputs starts with 0, not 1! This will also be the case in our programs.

5. Etc.
6. Once the "hardware" is ready, all sensors are installed and the connections are in place, you can start programming.

Prior knowledge: Computer, smart device handling practice. Programming knowledge is an advantage but not necessary.

Notes:

     This exercise can also be done in 5th - 6th - 7th - 8th grades, in groups of 3 or 4, but only if there is a teacher or helper available for 2-3 groups. If you are ready for a simple smart home for smaller classes you can bring your child in as a motivation, showing the little ones that they did it! The use of ICT tools also plays an important role in this activity. It is important to strive for precision and accuracy. Their planning and creative skills and critical thinking develop.

Links to other subjects/topics/fields: engineering, physics, chemistry, computer science/architecture, engineering.