Temperature control in the classroom. It is too hot in the classroom. When students come in, they know to close the blinds, but during break time, the classroom gets really hot. How can we create a more autonomous system through programming?

Collect data thanks to the board and its embedded sensors

To make sure the blinds close when we need them to, we need to collect outside information. We need to gather if (and how strong) the sun is shining and we also need to know if the classroom is running too hot. To measure the outside brightness, we need a light sensor. To measure temperature, we need a temperature sensor. We need to think about where we place these sensors: a temperature sensor placed into the sun will give a temperature that is higher than the rest of the room. Assemble a breadboard with a light sensor and use the onboard temperature sensor to measure data. To achieve this, we need to program the board in MakeCode. To collect the data we will use the data logging from the MakeCode environment.

Display the data to get the needed information

After we have measured the light and temperature we need to use these data to keep a nice climate in the classroom. We will learn how to use sensor data and have multiple outputs react based on the data measured. Use the sensor data (from light and temperature sensors) to control the motor. When the temperature gets above a certain threshold, 22°C, the motor should automatically turn on to close the blinds. Likewise, when the brightness is too high, the blinds should also close. When the temperature drops back down and/or the outside light decreases, the blinds should automatically open again. We will also program a button to act as an override so that we can still manually open and close the blinds. We have to program one or multiple motors to act based on certain values the sensors pick up. We also need to program a button (or another kind of witch) to manually override the sensor so that we can close the blinds ourselves.

Analyse the data and learn from them

We now have automatically closing blinds. We have to monitor the system to see if it works in multiple different situations. This might be a process that takes time, as temperature and daylight greatly vary between seasons and we may for example not want the blinds to close in the darker months at all. To improve our system, we need to register the different situations in which our system works.

Replicate the Inquiry-based approach   **Ideas of project**