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## TITLE:

Solar Spider

GRADE LEVEL: 5TH, 6TH, 7TH AND 8TH GRADE

STEAM AREAS: SCIENCE, TECHNOLOGY,  
ENGINEERING

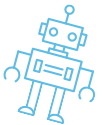
## MATERIALS NEEDED:

- Paper clips or wire;
- One 3 volt mini solar panel;
- One vibrating motor;
- 2 little plastic eyes;
- Hot glue;
- Insulating tape;
- a pincer;
- a very sunny day;
- a smooth surface.



## OBJECTIVES:

- Students will be able to make a solar powered spider following instructions;
- Students will be able to learn how a solar panel can become an energy source;
- Students will have the opportunity to reflect about green energy sources;
- Students will be able to solve issues related to the project.



## PROCEDURE:

These are the instructions to make a solar spider or if you are scared of spiders you can create a cute beetle or something else.

### Step 1: gathering the materials. (15 minutes)

Before starting this activity you need to buy the mini solar panel and the mini vibrating motor. You can find them easily on the internet and they are not too expensive. (In alternative you can try to find a mini vibrating motor inside an old smartphone).

### Step 2: connecting the vibrating motor to the solar panel (5 minutes)

Take the mini solar panel, turn it over and attach the two cables of the vibrating motor to the corresponding poles with insulating tape. Be careful to glue the red wire to the negative pole and the black wire to the positive pole.

### Step 3: Securing the vibrating motor to the panel (5 minutes)

Secure the vibrating motor in the middle of the solar panel with tape or glue.

### Step 4: Preparing legs (5 minutes)

For a spider: open 4 large paper clips or prepare 4 pieces of thin wire about 20 cm long each;

For a beetle: open 3 large paper clips or prepare 3 pieces of thin wire about 20 cm long each;

The wire must be very thin otherwise the spider weighs too much and it will struggle to move.



## PROCEDURE:

### Step 5: adding legs (5 minutes)

Adding 3 or 4 legs to the solar panel using hot glue. Use pieces of iron 20 cm long and then if they seem too long you shorten them. Check that the legs are all the same length, otherwise shorten the longest ones.

### Step 6: adding eyes (5 minutes)

Add two plastic eyes to your spiders (In reality, spiders and beetles have more than two eyes but this time we won't be so fussy).

### Step 7: testing the model (10 minutes)

Place the spider on a very smooth surface, in the sun and wait a few moments. If everything has been well assembled, the motor will start to vibrate soon and the spider will move in a somewhat chaotic but funny way.

### Step 8: solving problems (undefined time)

If the spider does not move or finds it too difficult to move:

- please check if all the parts are properly connected;
- be sure it is a very sunny day;
- check that the surface is very smooth;
- maybe the spider is too heavy, so change your project and create a beetle. Beetles have 3 pairs of legs so they are lighter (and less scary for me!).

### Step 9: Adding antennas, wings etc.

You can complete your model by adding antennas, wings etc. but be careful, they must be very light otherwise your pet won't be able to move.

### Conclusion and Reflections

Teacher and students can reflect about the project, underlining the problems encountered, the way they try to overcome them and what they learnt. They can also reflect on the Sun as a source of clean and renewable energy.

**Note:** The time duration provided are approximate and can be adjusted based on the pace and needs of the students.

## ASSESSMENT:

- After building their solar spider the students will describe the entire construction process, the problems encountered and the way they solved them. They also have to tell what they have learned about solar energy.

## REFERENCES:

- Inventor Lab: Awesome Builds for Smart Makers (DK, Activity Lab), ISBN: 9780241343517, Publisher: Dorling Kindersley Publishers (English Edition)