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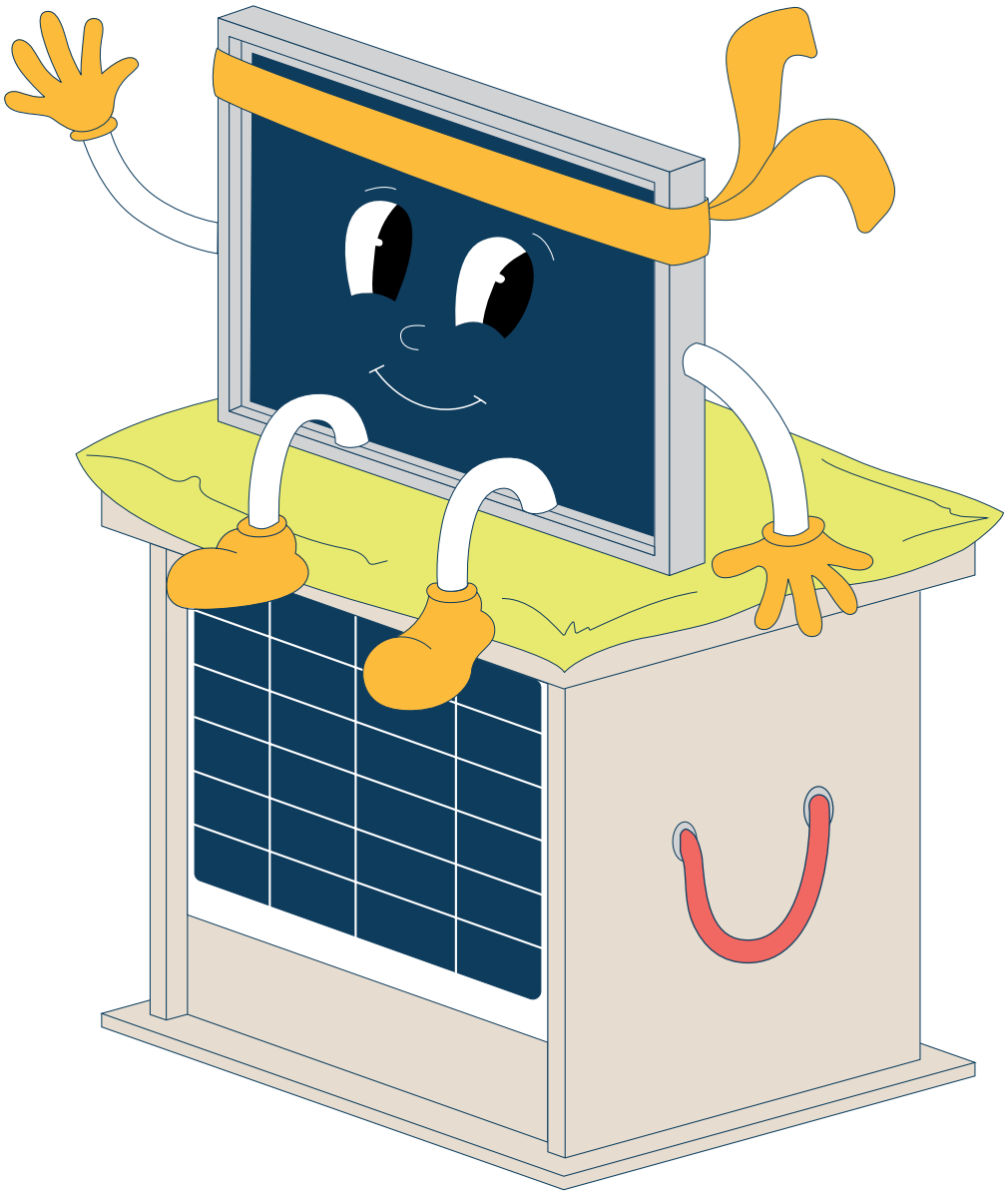

Workbook

Electric circuits & solar energy

in elementary school with the **electric cube**

Grade 3/4

Experiment kit

We always strive to check our lessons thoroughly for possible errors before publication. However, if you, dear user, notice something, we would be grateful if you could send us a message at fehlerteufel@solarbildung.org.

Electric cube designed by Lothar Leuchter (master electrician & master designer)
Accompanying material created by Alexandra Müller (elementary school teacher)

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Workbook

Electric circuits & solar energy

in elementary school with the **electric cube**

Content

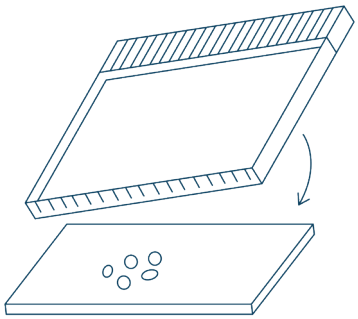
Name: _____ Date: _____

FB 1 Making electrical charge visible

Confetti Fleas

You will need:

- Paper confetti
- CD case
- Dish towel / faux fur



Here‘s how it works:

1. Use a hole punch to punch 5 confetti “fleas” out of the paper.
2. Scatter the confetti “fleas” on your table.
3. Guess: What happens when you rub the CD case with the cloth? CD case rubbed with the cloth over the confetti?
4. Place the CD case on the table and rub it several times with the cloth or the art felt.
5. Now hold it briefly over the confetti.

My assumption

That‘s what I observed

Insight

Underline the correct words in brackets

Plastic objects (cannot/can) be electrically charged.

An invisible force acts around electrically (charged/discharged) objects.

Pieces of paper (can/cannot) be attracted by this force.

Unequal (charges/objects) attract each other and equal (charges/objects) repel each other.

Grab an air balloon and try to make the electrical charge visible to you. Draw your experiment here.

Try to explain your observations with the help of the first experiment.

Name: _____ Date: _____

FB 2 We make the lamp light up

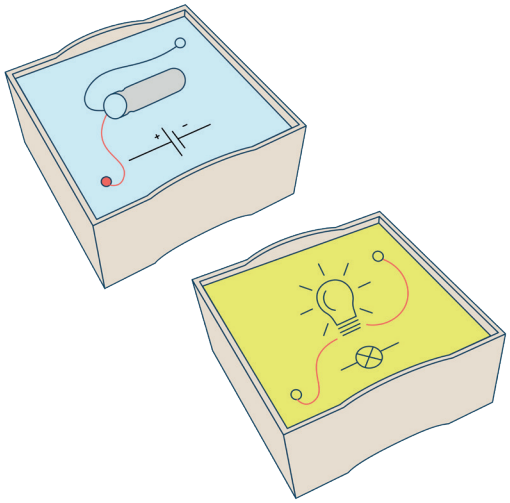
Exercise 1

How do you need to connect the two boxes to each other so that the lamp lights up?
First draw your guess and then try it out.

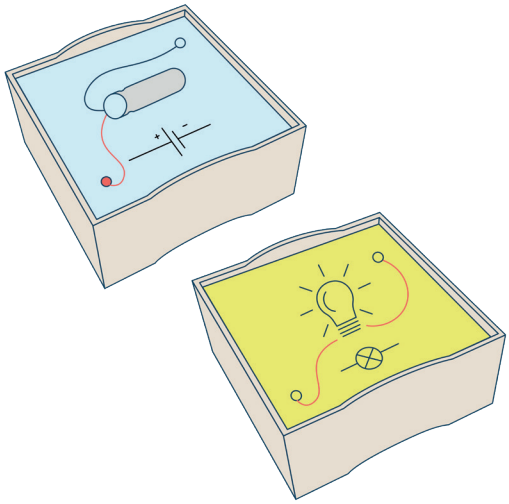
You will need

- ____ Cable
- 1 light blue module
- 1 yellow module

My guess



My Solution



Excersice 2

Draw a suitable circuit diagram for your solution.

Realisation

Electrons can only move in an

_____

The movement of electrons

generates _____

in the incandescent lamp and

_____

FB 3 We are installing a switch

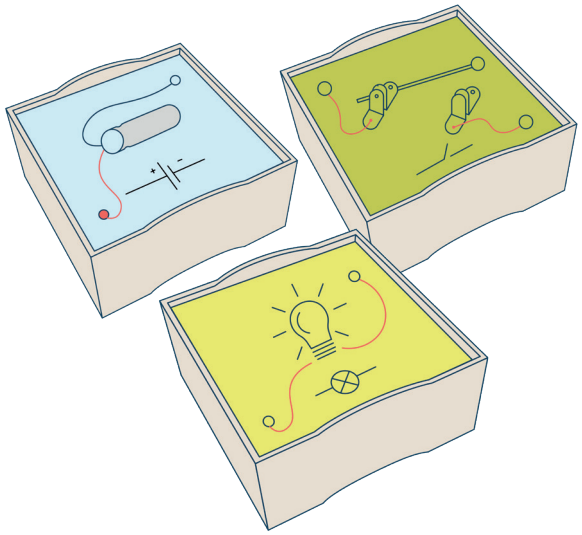
You will need

- ____ Kabel
- 1 hellblaues Modul
- 1 gelbes Modul
- 1 grünes Modul

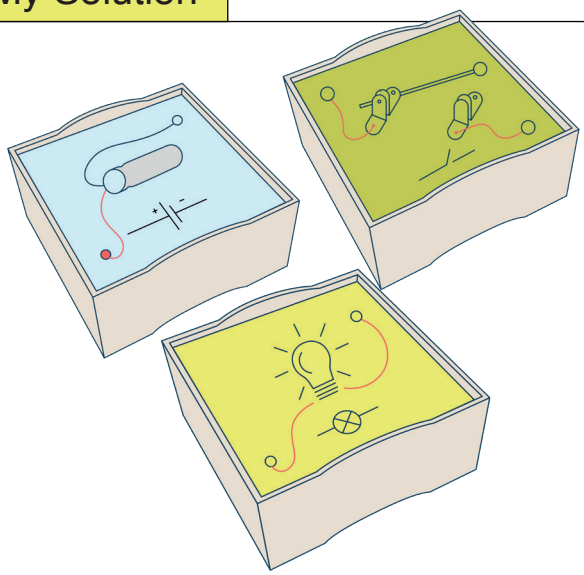
Exercise 1

How do you connect the boxes so that you can turn the lamp on and off with the switch? First draw your guess and then try it out.

My guess



My Solution



Exersice 2

Draw a circuit diagram matching your solution.

Realisation

You can use the switch

to selectively

_____

and _____ .

The lamp is now

_____ .

Name: _____ Date: _____

FB 4 We light up two lamps

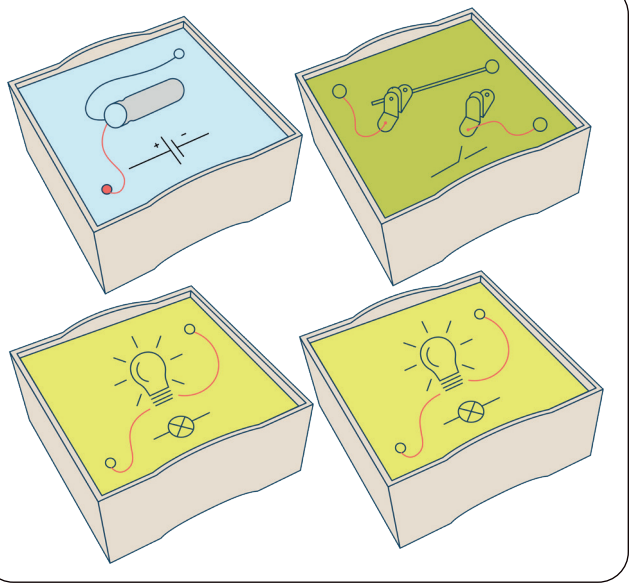
Du brauchst

- ____ Cable
- 1 light blue module
- 1 green module
- 2 yellow modules

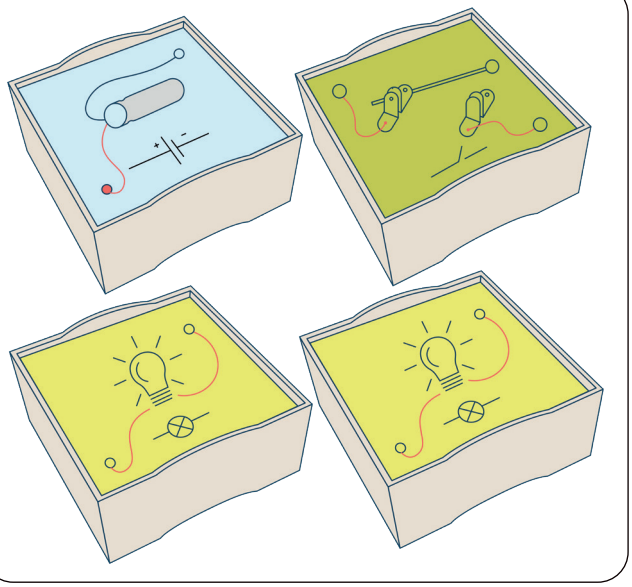
Exercise 1

How do you have to connect the boxes so that you can switch two lamps on and off with the switch? First draw your guess and then try it out.

My guess



My solution



Exercise 2

Draw a suitable circuit diagram for your solution.

Realisation

The two lamps are switched

_____ .

They both light up

_____ .

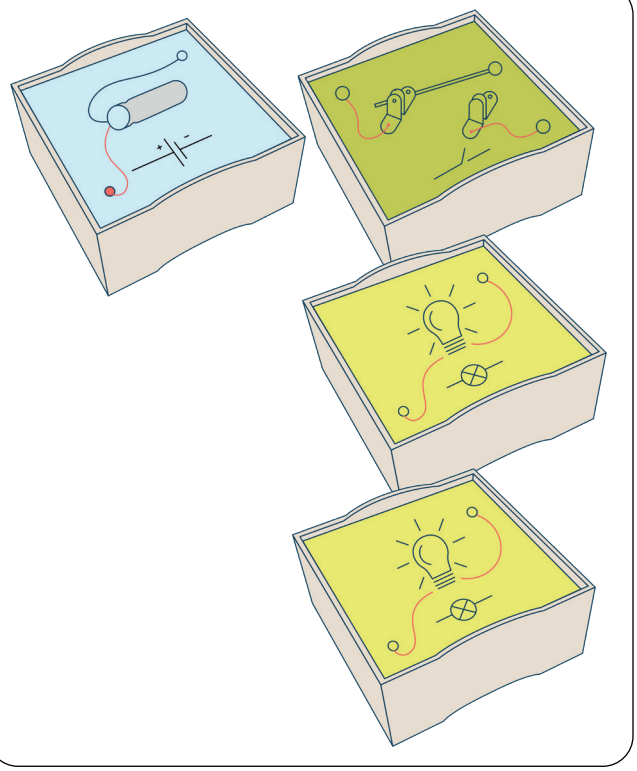
Exercise 3

How do you connect the boxes so that one lamp continues to light up when the other lamp is unplugged?

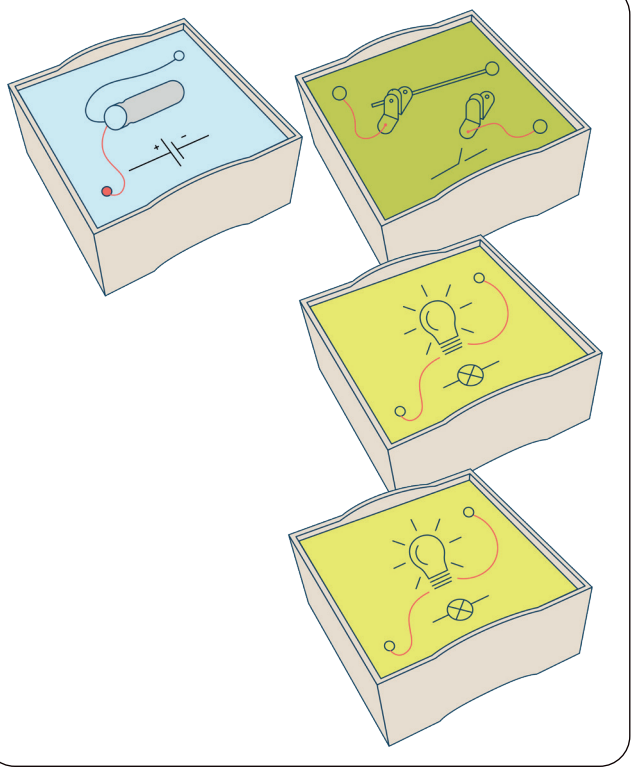
Du brauchst

- ____ Cable
- 1 light blue module
- 1 green module
- 2 yellow modules

My guess



My solution



Exercise 4

Draw a circuit diagram matching your solution

Realisation

The two lamps are switched

_____ .

They both light up

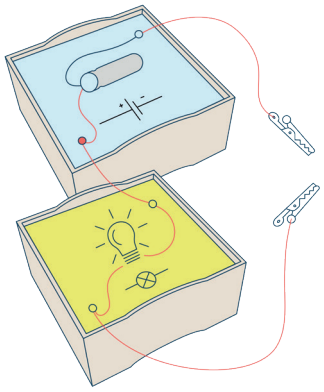
_____ .

Name: _____ Date: _____

FB 5 Which materials conduct electricity?

Exercise 1

Build an electric circuit with the boxes and draw the cables in the experimental setup.



You will need

- 1 cable with plug
- 2 cables with crocodile clips
- 1 light blue module
- 1 yellow module

Draw a circuit diagram matching your solution

Exercise 2

Guess which substances conduct electricity. Then check your guess, by building the different substances into your circuit.

Material	Assumption	… Conducts electricity	… doesn‘t conduct electricity
Wood			
Plastic			
Fabric			
Rubber			
Aluminium			
Copper			
Iron			
Graphit (pencil lead)			
Glass			
Coal			
Ceramics			

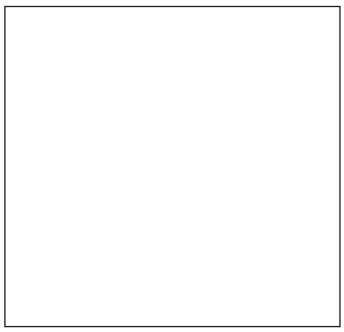
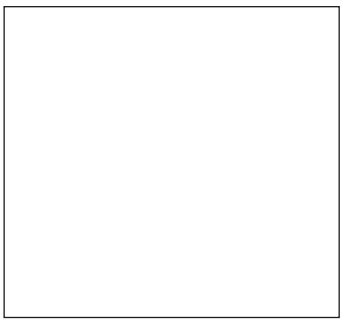
FB 6.1 We are discovering Solar energy

Exercise 1

When does a solar panel generate little or a lot of electricity? Draw different positions of the solar panel, describe the position, and guess how many lights will be lit.

Position	Assumption	Measurement result
	○○○○	○○○○
	○○○○	○○○○
	○○○○	○○○○

Name: _____ Date: _____

	○○○○	○○○○
	○○○○	○○○○

Exercise 2

What conclusions can you draw from the measurements?

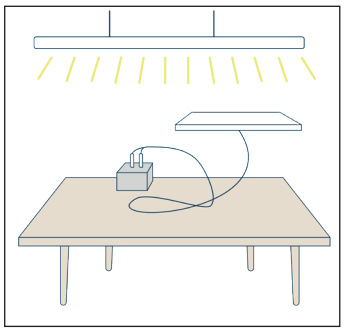
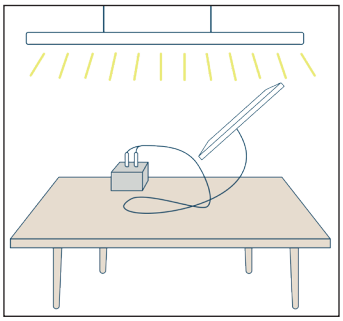
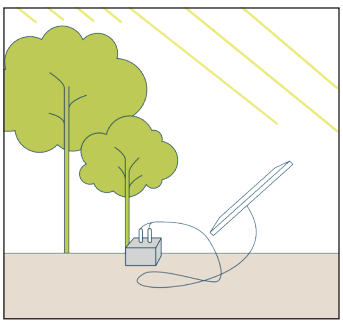
Exercise 3

In addition to location, what environmental factors influence the amount of electricity generated?

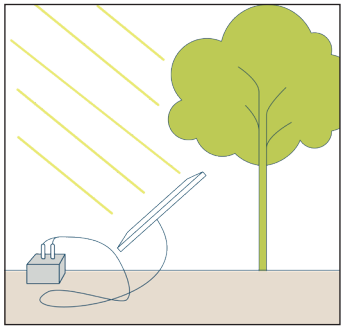
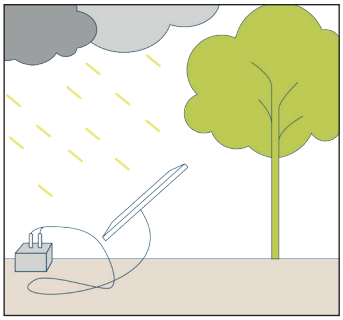
FB 6.2 Discovering solar energy

Exercise 1

When does a solar panel generate little or a lot of electricity? Describe the position and guess how many lights will be lit.

Position	Assumption	Measurement result
	○○○○	○○○○
	○○○○	○○○○
	○○○○	○○○○

Name: _____ Date: _____

	○○○○	○○○○
	○○○○	○○○○

Exercise 2

What conclusions can you draw from the measurements?

Exercise 3

In addition to location, what environmental factors influence the amount of electricity generated?