A1.3 Electro quiz

You would like to build an electro quiz for your little brother.
He will use it to learn what animals eat.
To this end, you have drawn five animals and the corresponding feed in two columns. As soon as your brother touches an animal and the corresponding feed with the cable clips at the same time, the lamp on your quiz lights up.

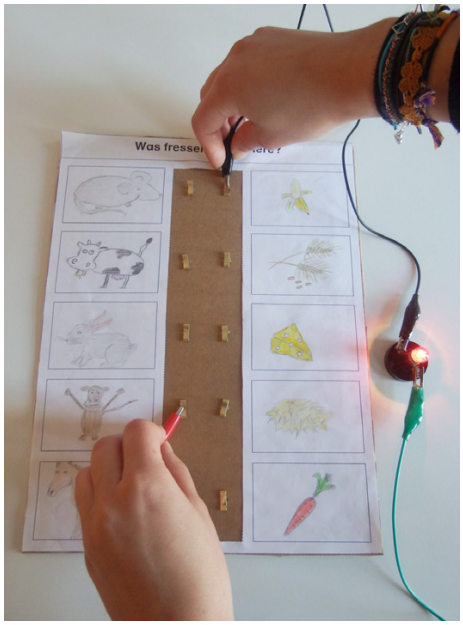


Figure 1: An electro quiz.

How do you have to build your electro quiz so that it works?

Write down your ideas and guesses:

You need the following to build the testing device

- ☐ 1 battery holder
- ☐ 3 batteries
- ☐ 3 cables with alligator clips
- ☐ 1 incandescent lamp (3.5 volts)
- ☐ 1 incandescent lamp socket

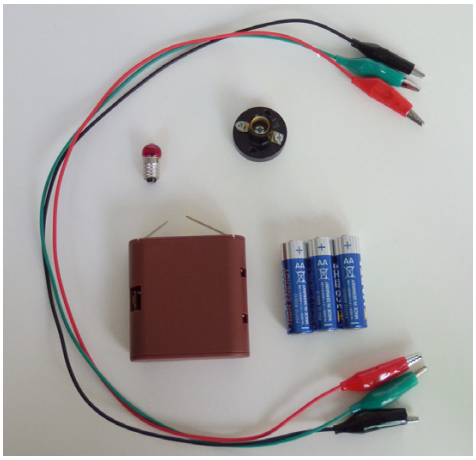


Figure 2: Required materials.

How to build the testing device:

The sketched circuit diagram provides help.

1. Connect the battery holder and incandescent lamp socket using a cable.
2. Attach a cable to the free terminal of the battery holder.
3. Attach a cable to the free terminal of the lamp socket.
4. Screw the incandescent lamp into the lamp socket.
5. When you touch the two cable ends together, the lamp should light up.

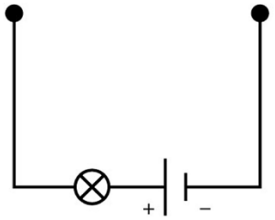


Figure 3:
Sketched circuit diagram of the testing device.

You need the following to build the quiz board:

- ☐ 10 brass fasteners
- ☐ Colored pencils
- ☐ 1 glue stick
- ☐ 5 interconnecting wires
- ☐ 1 pair of scissors
- ☐ 1 screwdriver (Phillips)
- ☐ 2 sheets of paper, standard letter size
- ☐ 1 sheet of thin cardboard, standard letter size
- ☐ 1 sheet of thick cardboard (as a base)
- ☐ 1 wire stripper

Figure 4: Required materials.

How to build the quiz board:

Do you happen to have a favorite topic for which you would like to build a quiz? Another idea is to design a quiz for a family member, using his or her favorite topic. (Example: animals and what they eat.)

1. Cut two cards out of the paper, approx. 5 cm high and 5 cm wide.
2. On each of the two cards, write a term or draw a picture that matches the other and fits the topic.
   (Example: draw a mouse on one card and a piece of cheese on the other card.)
3. Make three to five pairs of cards.
4. Glue all the cards to the thin cardboard so that a little bit of space remains next to each card. The matching cards should not be next to each other.
5. Next to each card, bore a hole into the cardboard.
6. Insert a brass fastener into each hole.
7. Turn the cardboard over.

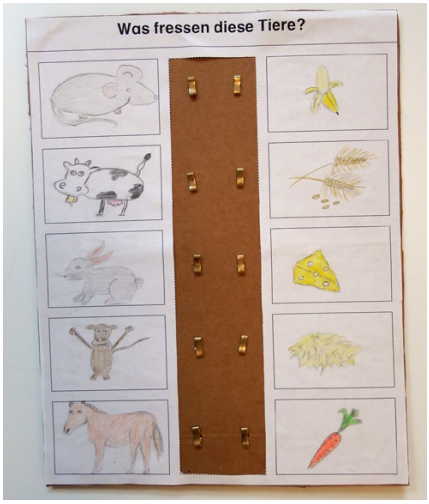


Figure 5: Electro quiz – front.

8. Use an interconnecting wire to connect the two brass fasteners that belong to each pair of cards.
9. Then bend all legs of the brass fasteners open. Tip: Make sure that the legs do not touch each other.

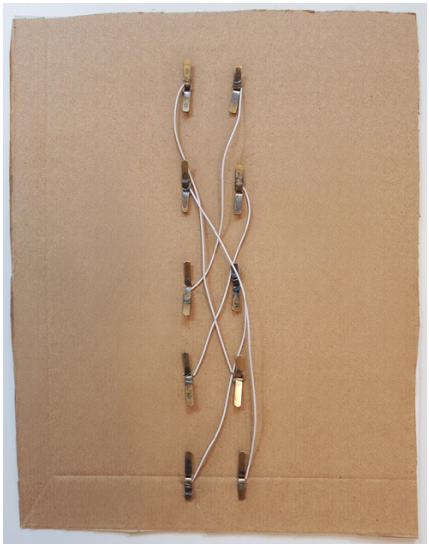


Figure 6: Electro quiz – back with wiring.

How to play the electro quiz:

Lay down the quiz so that the card pairs are facing upward.

1. Using your testing device, touch one cable to the two brass fasteners that belong to a pair of cards.
2. Check all pairs of cards.
   (If something doesn't work correctly, go get the sheet "Do you need help?")
3. If your electro quiz works, you can exchange it with another group's quiz.
4. Pick up your testing device and play the other group's electro quiz.

Write down your observations:

Complete the text by crossing out the wrong terms.

When I touch the testing device to the matching pair of cards, the circuit is closed / interrupted. When I touch an incorrect pair of cards, the circuit is closed / interrupted.

Evaluate your observations:

You have found out that the lamp of the testing device lights up when you have found two matching cards.

Complete the following sentence with the correct verb:
clamps – closes – connects – opens.

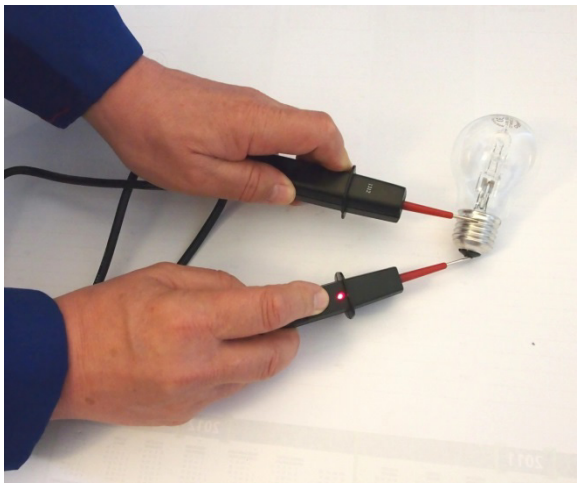
The cable that connects a matching pair of cards _____ the testing device's circuit.

Doing further research:

Build the electro quiz so that you can use it for other quiz questions without having to rewire it. Write down your ideas.

Tracking down technology

1. Look at the photo.
2. Beneath the photo, write the name of the technical device. If you don't know, then read the tip and write down your guess.



Tip: During the experiment, you yourself built a device that works just like the one in the photo.

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3. In your opinion, what does the device do? Write down your ideas.
4. Sketch two circuit diagrams that show what happens when the incandescent lamp is undamaged and when it is broken.