

Control of Variables Strategy Inventory [CVSI]

by Simon Christoph, Martin Schwichow & Hendrik Haertig

This test evaluates your ability to control variables and to design good and controlled experiments.

To answer the questions you have to choose the right answer among the given options. All items have only one right answer!

Example:

Are you working on a test right now?

Yes

No

If you fell you made a mistake, color the box of the wrong answer and mark the right answer

Example:

Are you working on a test right now?

Yes

No

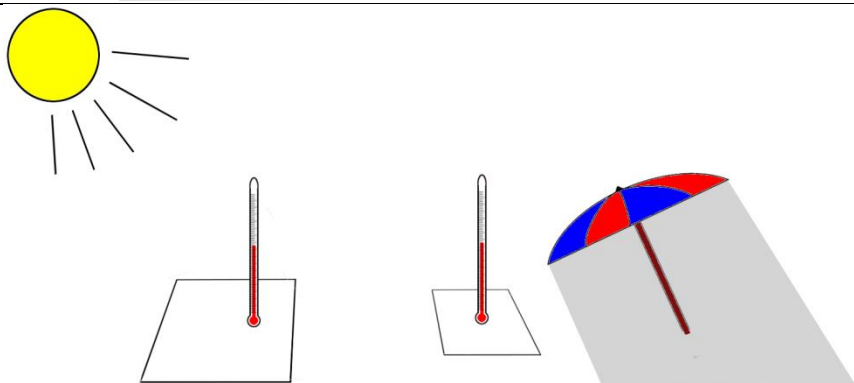
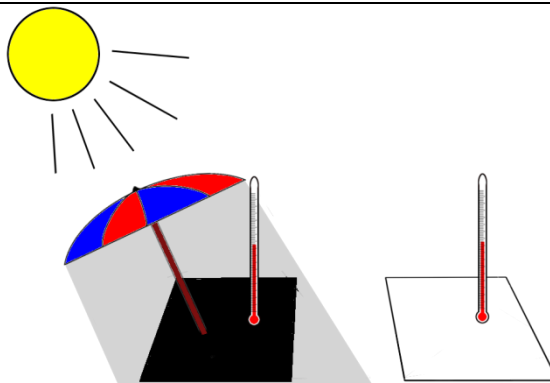
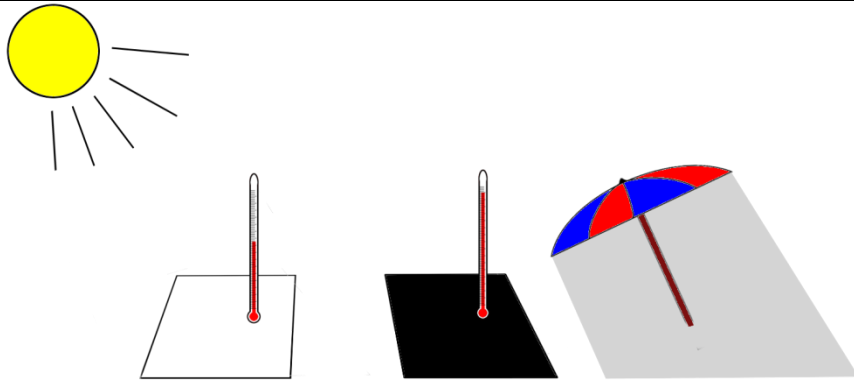
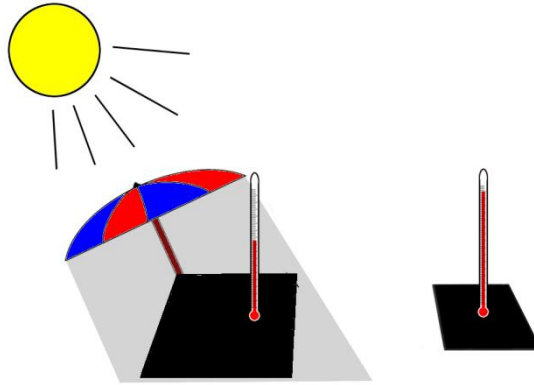
Please stay silent at your place when you have finished the test. Please don't leave your classroom until your teacher allows you to .

Good luck and thanks for supporting our research!

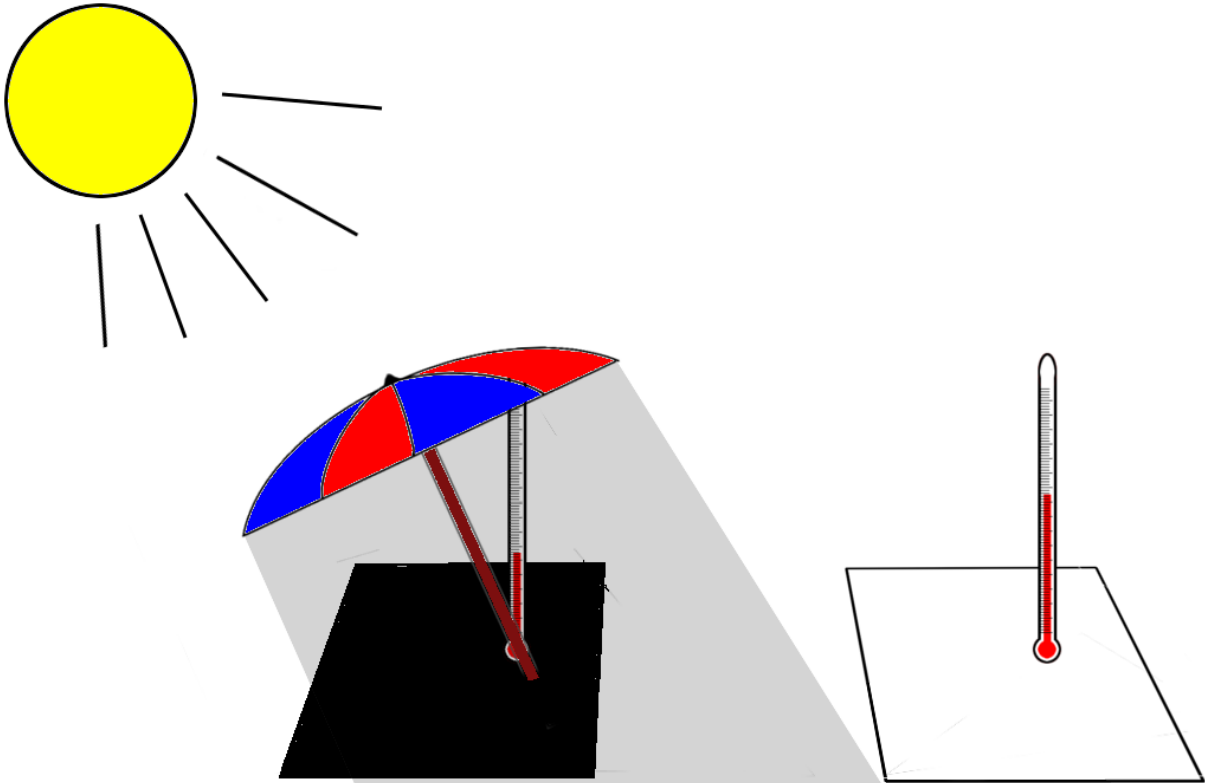
Anna wants to buy a new shirt. Because it is summer she wants to buy a shirt that keeps cool.

She assumes that a white shirt would be better than a dark one because in the sun white shirts are not getting as warm as dark shirts.

Which of the following experiments would be a good experiment to test her assumption?



Toni did the following experiment:



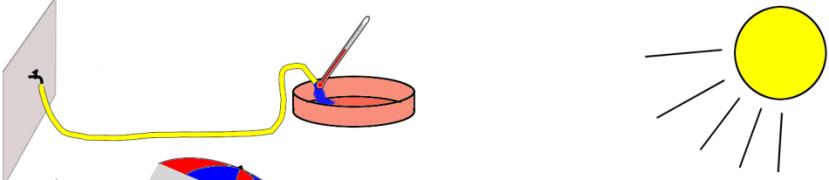
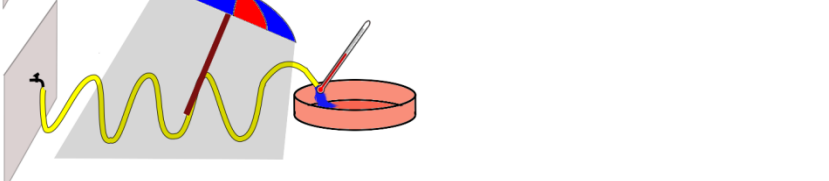
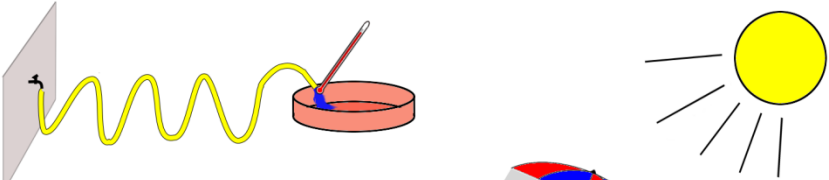
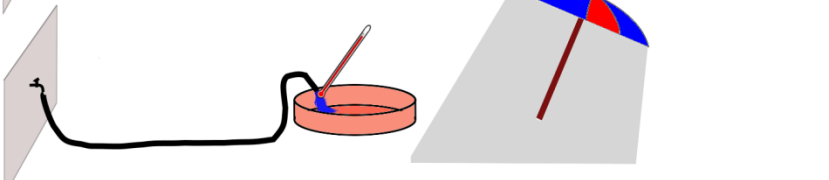
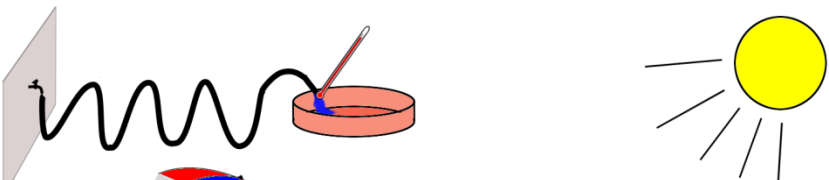
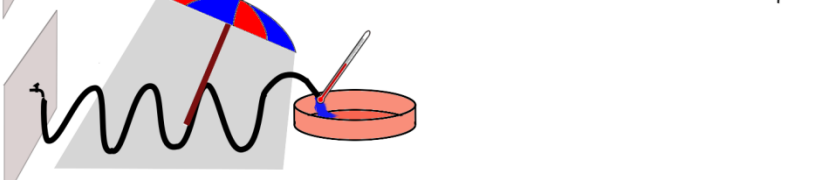
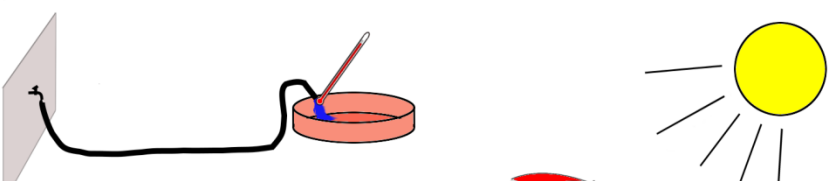
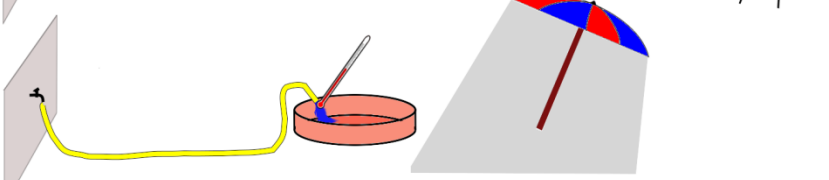
What does his experiment show?

<input type="checkbox"/>	Objects in the shadow are getting less hot.
<input type="checkbox"/>	The color of an object influences the object's temperature.
<input type="checkbox"/>	Color and shadow influence the temperature of the object.
<input type="checkbox"/>	The experiment does not allow any valid conclusion.

Sebastian wants to fill his pool with warm water.

He assumes that the water will be warmer when he uses a black instead of a yellow hose.

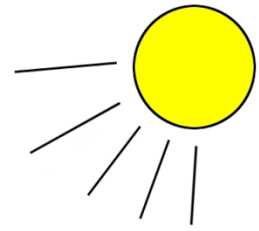
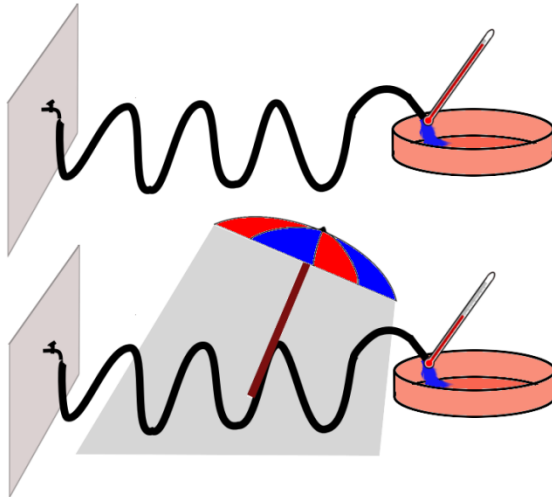
Which of the following experiments would be a good experiment to test his assumption?

<input type="checkbox"/>	
<input type="checkbox"/>	
<input type="checkbox"/>	
<input type="checkbox"/>	
<input type="checkbox"/>	
<input type="checkbox"/>	
<input type="checkbox"/>	
<input type="checkbox"/>	

Hot water

IN-SO-2

Samuel did the following experiment:



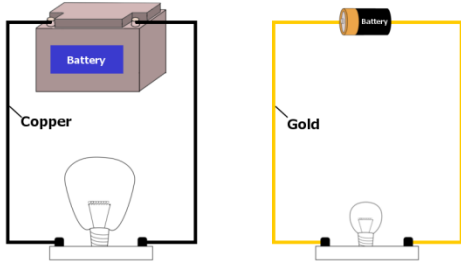
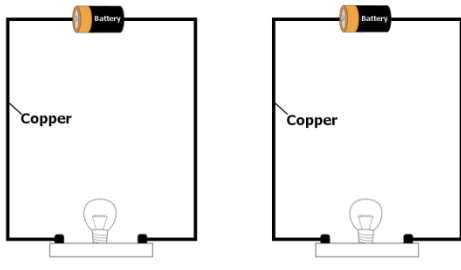
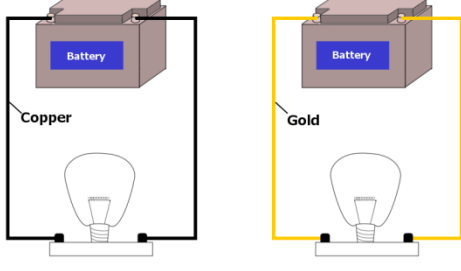
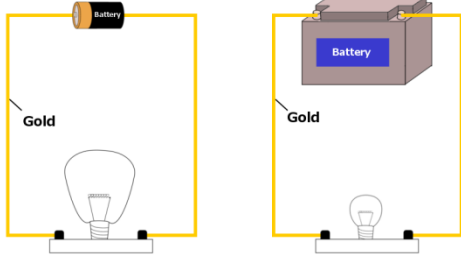
What does his experiment show?

<input type="checkbox"/>	Water gets warmer when it flows to a longer hose.
<input type="checkbox"/>	The water flowing through the hose in the shadow is less warm.
<input type="checkbox"/>	The length of the hose and whether the hose is in the shadow or sun have an impact on the temperature of the water.
<input type="checkbox"/>	The experiment does not allow any valid conclusion.

Peter wants to find out whether the material of a wire has an impact on its resistance.

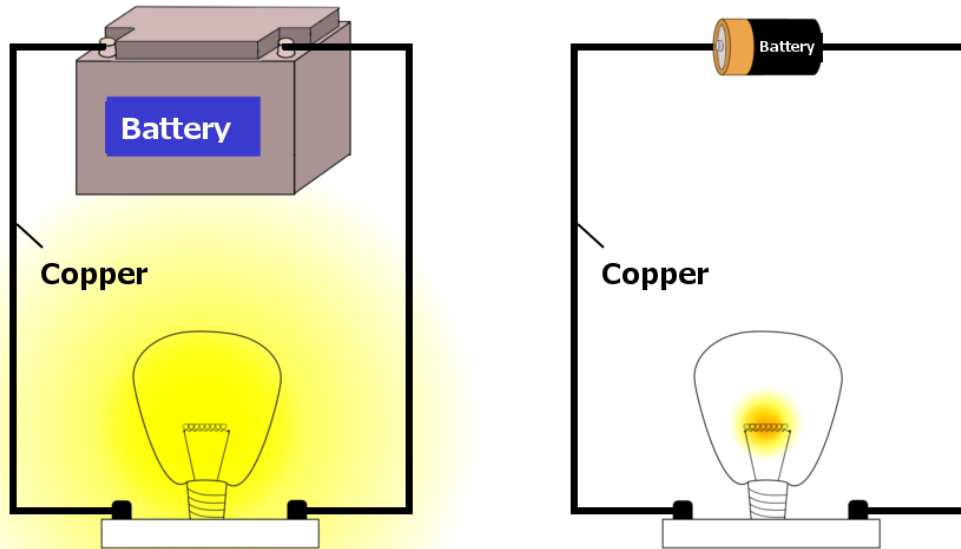
He assumes that the bulb will shine brighter when he uses gold instead of copper to connect it with a battery.

Which of the following experiments would be a good experiment to test his assumption?

<input type="checkbox"/>	
<input type="checkbox"/>	
<input type="checkbox"/>	
<input type="checkbox"/>	

Bright light	IN-LS-1
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Anna did the following experiment:



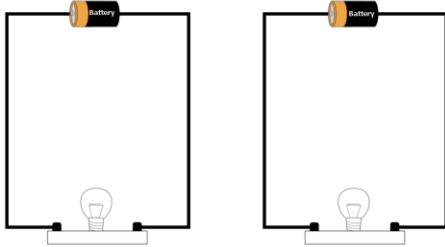
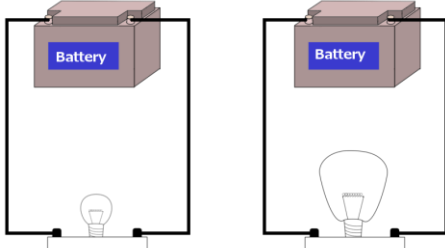
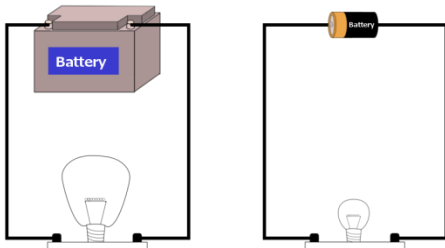
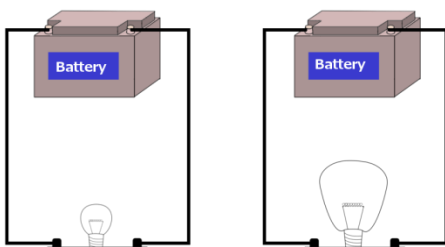
What does her experiment show?

<input type="checkbox"/>	The battery has an impact on the brightness of the bulb.
<input type="checkbox"/>	The material of the wire has an impact on the brightness of the bulb.
<input type="checkbox"/>	The battery and the wire's material have an impact on the brightness of the bulb.
<input type="checkbox"/>	The experiment does not allow any valid conclusion.

Daniel wants to find out whether a bulb shines brighter in a warm room than in a cold room.

He assumes that the bulb will shine brighter in a cold than in a warm room.

Which of the following experiments would be a good experiment to test his assumption?

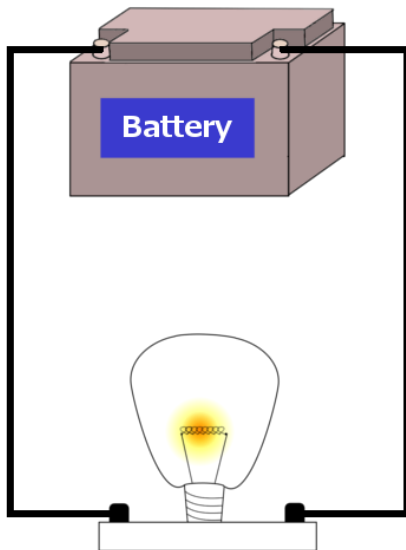
<input type="checkbox"/>	<p>Room temperature 5°C Room temperature 30°C</p> 
<input type="checkbox"/>	<p>Room temperature 30°C Room temperature 30°C</p> 
<input type="checkbox"/>	<p>Room temperature 30°C Room temperature 5°C</p> 
<input type="checkbox"/>	<p>Room temperature 5°C Room temperature 30°C</p> 

Bright light

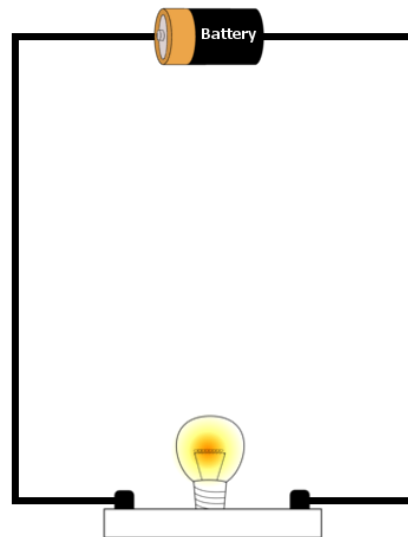
UN-LS-2

Toni did the following experiment:

Room temperature 30°C



Room temperature 10°C



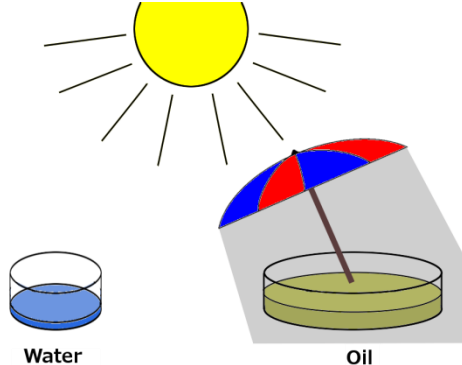
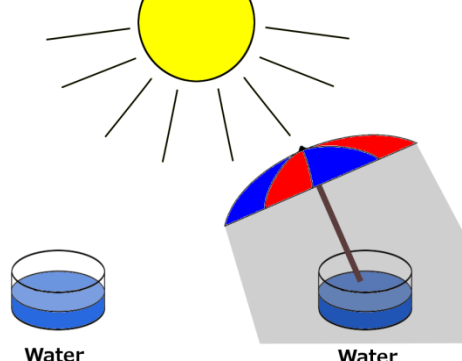
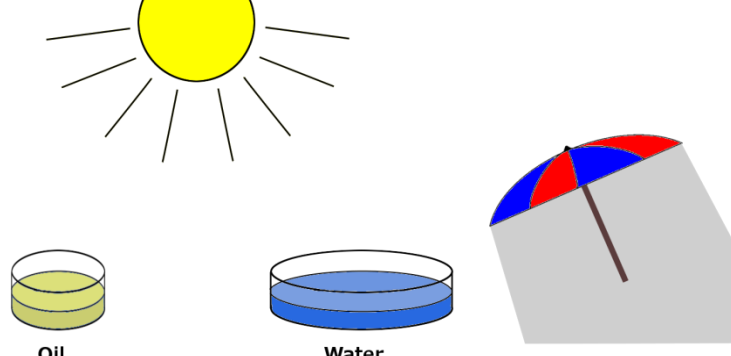
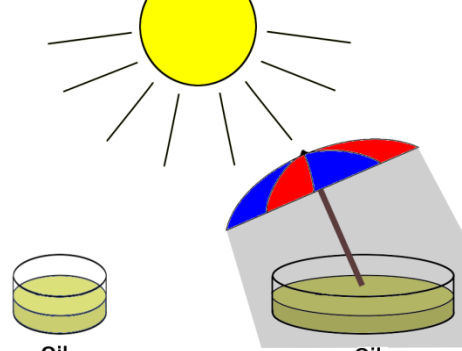
What does his experiment show?

<input type="checkbox"/>	The material of the wire has an impact on the brightness of the bulb.
<input type="checkbox"/>	The room temperature has an impact on the brightness of the bulb.
<input type="checkbox"/>	The wire's material and the room temperature have an impact on the brightness of the bulb.
<input type="checkbox"/>	The experiment does not allow any valid conclusion.

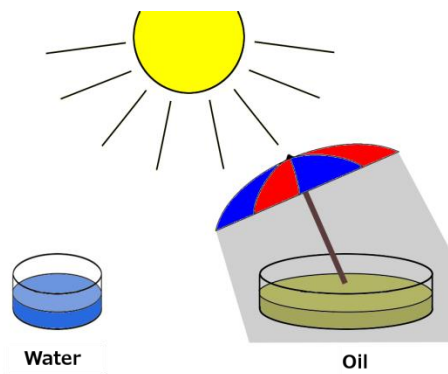
After frying eggs Mara always puts some water into the pan to avoid that the oil is sticking to the pan. However if she waits to long to fix the dishes the water disappears but not the oil.

She assumes that this is because water evaporates faster than oil.

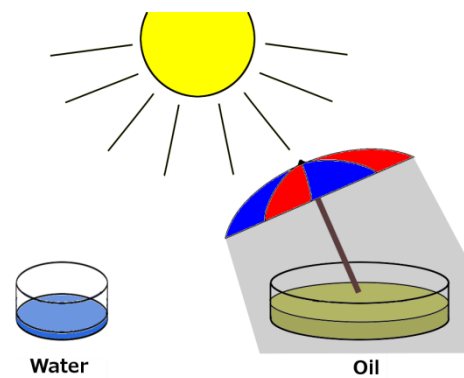
Which of the following experiments would be a good experiment to test her assumption?

<input type="checkbox"/>	 <p>Water</p> <p>Oil</p>
<input type="checkbox"/>	 <p>Water</p> <p>Water</p>
<input type="checkbox"/>	 <p>Oil</p> <p>Water</p>
<input type="checkbox"/>	 <p>Oil</p> <p>Oil</p>

Michael did the following experiment:



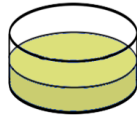
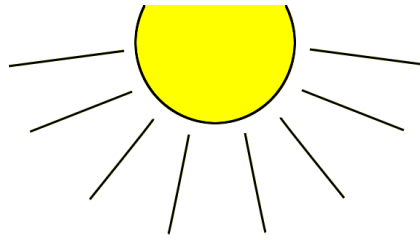
Three hours later ...



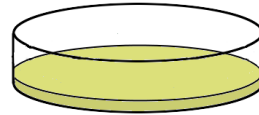
What does his experiment show?

<input type="checkbox"/>	The size of the container has an impact on the evaporation speed of the liquids.
<input type="checkbox"/>	The evaporation speed of liquids is faster when containers are in the sun instead of in the shadow.
<input type="checkbox"/>	The container size and whether the containers are in the sun or in the shadow influence the evaporation speed of the liquids.
<input type="checkbox"/>	The experiment does not allow any valid conclusion.

Michael did the following experiment:

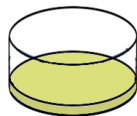
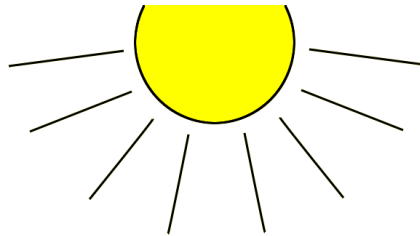


100 ml Oil

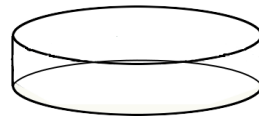


100 ml Oil

After six hours



40 ml Oil



0 ml Oil


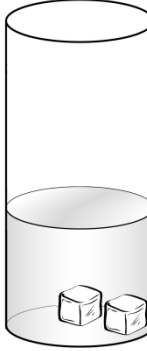




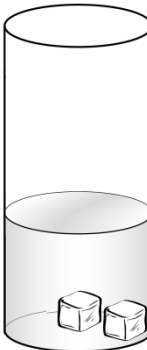
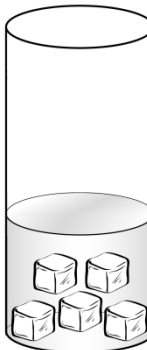
What does his experiment show?

<input type="checkbox"/>	The surface of the containers has an impact on the evaporation speed of the liquids.
<input type="checkbox"/>	The filling level has an impact on the evaporation speed of the liquids.
<input type="checkbox"/>	The surface and the filling level of the containers have an impact on the evaporation speed of the liquids.
<input type="checkbox"/>	The experiment doesn't allow any valid conclusion.

Hannah wants to cool down water with some ice-cubes.

She assumes that ice-cubes melt faster in warm than in cold water.

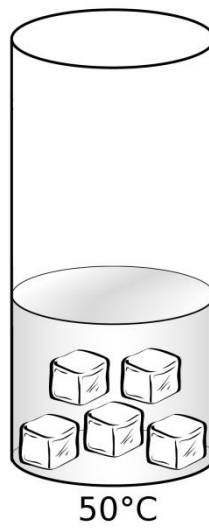
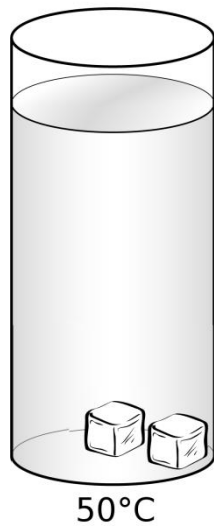
Which of the following experiments would be a good experiment to test her assumption?

<input type="checkbox"/>		 50°C	 50°C	
<input type="checkbox"/>		 50°C	 20°C	
<input type="checkbox"/>		 20°C	 50°C	
<input type="checkbox"/>		 20°C	 20°C	

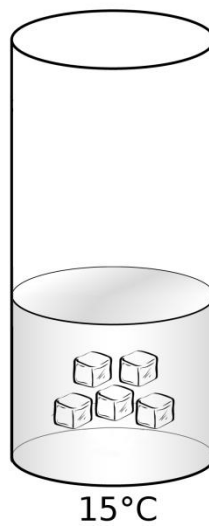
Disappearing ice-cubes

UN-EIS-1

Brian did the following experiment:



After seven minutes...



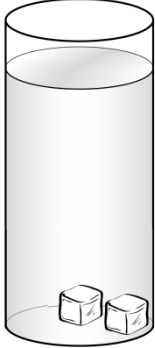
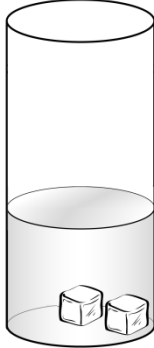
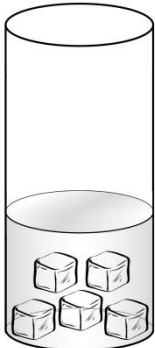

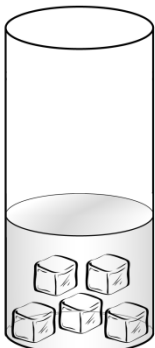
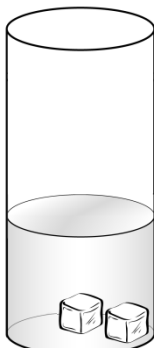
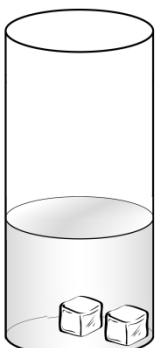
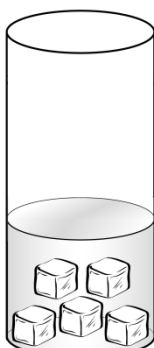
What does his experiment show?

<input type="checkbox"/>	The size of the containers has an impact on the melting speed of the ice-cubes.
<input type="checkbox"/>	The water temperature has an impact on the melting speed of the ice-cubes.
<input type="checkbox"/>	The size of the container and the water temperature has an impact on the melting speed of the ice-cubes.
<input type="checkbox"/>	The experiment does not allow any valid conclusion.

Timo has an idea.

He assumes that ice-cubes melt faster in a large amount of water than in a small amount of water.

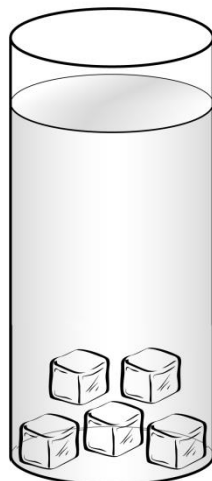
Which of the following experiments would be a good experiment to test his assumption?

<input type="checkbox"/>		 30°C	 10°C	
<input type="checkbox"/>		 30°C	 30°C	
<input type="checkbox"/>		 10°C	 10°C	
<input type="checkbox"/>		 10°C	 30°C	

Disappearing ice-cubes

UN-EIS-2

Julia did the following experiment:



30°C

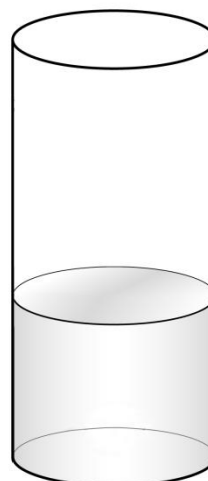


30°C

After 15 minutes...



10°C



10°C

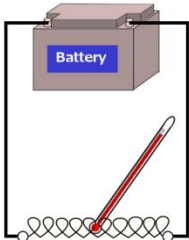
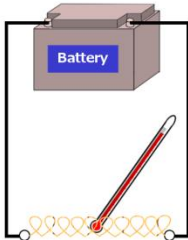
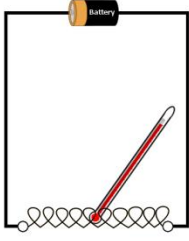
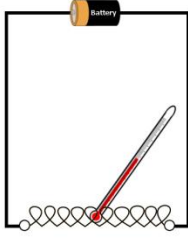
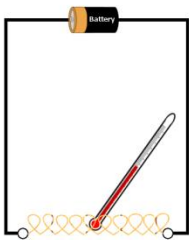
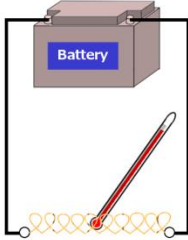
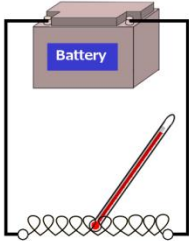
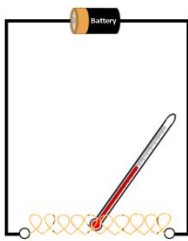
What does her experiment show?

<input type="checkbox"/>	The number of ice-cubes influences the temperature change after adding ice-cubes.
<input type="checkbox"/>	The original water temperature influences the temperature change after adding ice-cubes.
<input type="checkbox"/>	The number of ice-cubes and the original water temperature influences the temperature change after adding ice-cubes.
<input type="checkbox"/>	The experiment does not allow any valid conclusion.

Jason wants to know how a toaster works.

He suggests that thin wires are not getting as hot as thick wires.

Which of the following experiments would be a good experiment to test his assumption?

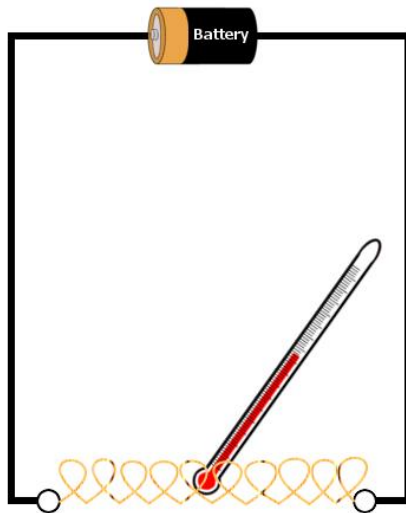
<input type="checkbox"/>	<div style="display: flex; justify-content: space-around;"> <div style="text-align: center;"> <p>Room temperature 5°C</p>  <p>Iron (Fe)</p> </div> <div style="text-align: center;"> <p>Room temperature 30°C</p>  <p>Copper (Cu)</p> </div> </div>
<input type="checkbox"/>	<div style="display: flex; justify-content: space-around;"> <div style="text-align: center;"> <p>Room temperature 30°C</p>  <p>Iron (Fe)</p> </div> <div style="text-align: center;"> <p>Room temperature 5°C</p>  <p>Iron (Fe)</p> </div> </div>
<input type="checkbox"/>	<div style="display: flex; justify-content: space-around;"> <div style="text-align: center;"> <p>Room temperature 30°C</p>  <p>Copper (Cu)</p> </div> <div style="text-align: center;"> <p>Room temperature 30°C</p>  <p>Copper (Cu)</p> </div> </div>
<input type="checkbox"/>	<div style="display: flex; justify-content: space-around;"> <div style="text-align: center;"> <p>Room temperature 30°C</p>  <p>Iron (Fe)</p> </div> <div style="text-align: center;"> <p>Room temperature 5°C</p>  <p>Copper (Cu)</p> </div> </div>

Hot wire

IN-WS-1

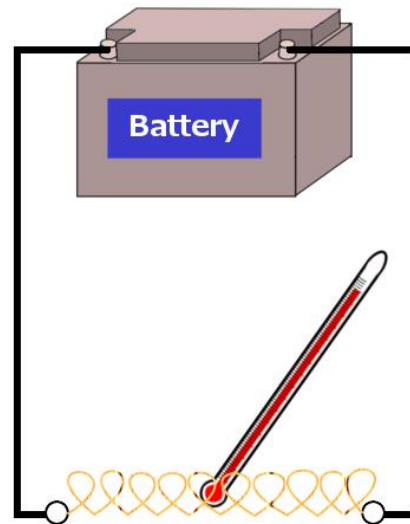
Florian did the following experiment:

Room temperature 30°C



Copper (Cu)

Room temperature 30°C



Copper (Cu)

What does his experiment show?

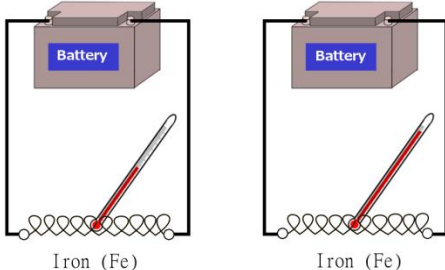
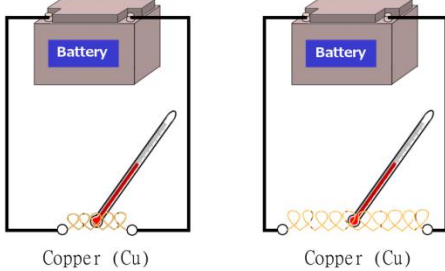
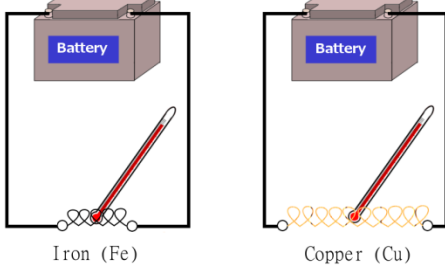
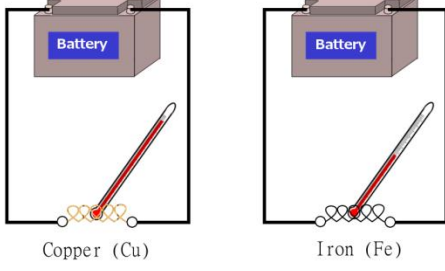
<input type="checkbox"/>	The battery has an impact on the wire's temperature.
<input type="checkbox"/>	The material of the wire has an impact on the wire's temperature.
<input type="checkbox"/>	The battery and the wire's material have an impact on the wire's temperature.
<input type="checkbox"/>	The experiment does not allow any valid conclusion.

Long wire	ID-WS-2
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Oliva has an idea.

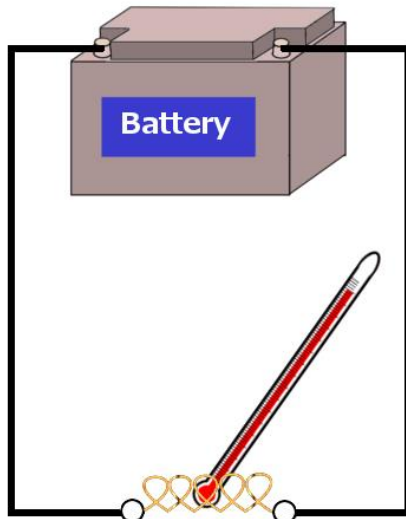
She assumes that short wires are not getting as hot as long wires when the same current is flowing through them.

Which of the following experiments would be a good experiment to test his assumption?

<input type="checkbox"/>	<p>Room temperature 10°C Room temperature 30°C</p>  <p>Iron (Fe) Iron (Fe)</p>
<input type="checkbox"/>	<p>Room temperature 10°C Room temperature 10°C</p>  <p>Copper (Cu) Copper (Cu)</p>
<input type="checkbox"/>	<p>Room temperature 30°C Room temperature 30°C</p>  <p>Iron (Fe) Copper (Cu)</p>
<input type="checkbox"/>	<p>Room temperature 30°C Room temperature 10°C</p>  <p>Copper (Cu) Iron (Fe)</p>

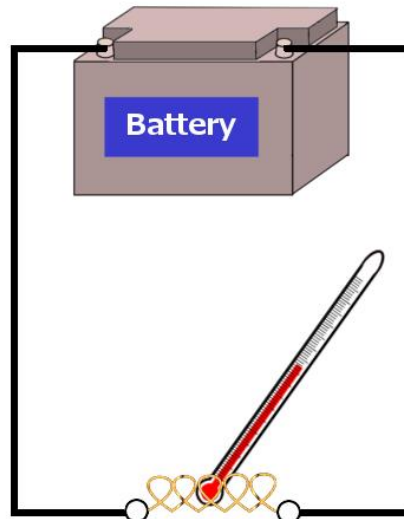
Joshua did the following experiment:

Room temperature 30°C



Copper (Cu)

Room temperature 10°C



Copper (Cu)

What does his experiment show?

The wire material has an impact on the wire's temperature.

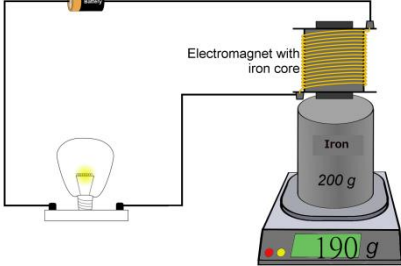
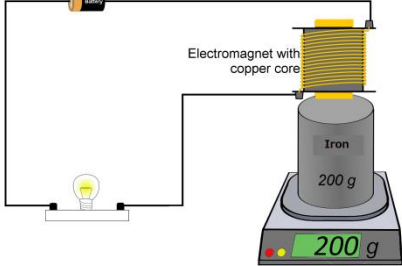
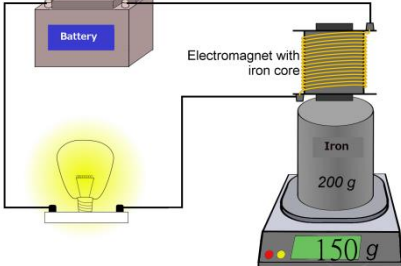
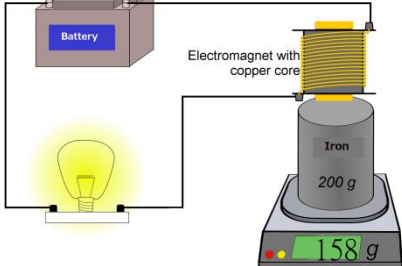
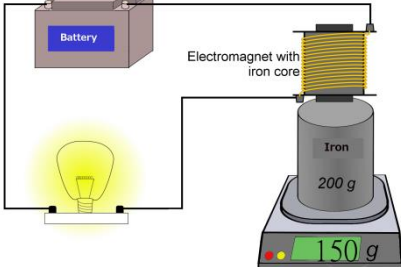
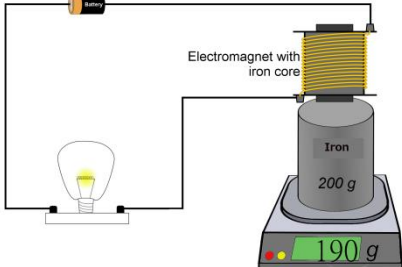
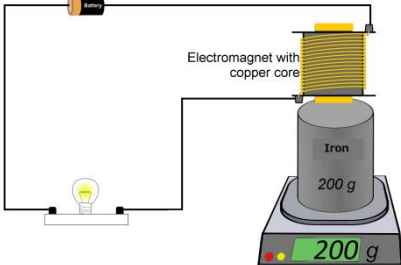
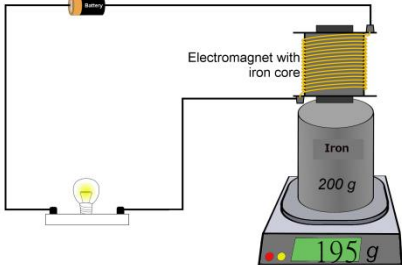
The room temperature has an impact on the wire's temperature.

The material of the wire and the room temperature has an impact on the wire's temperature.

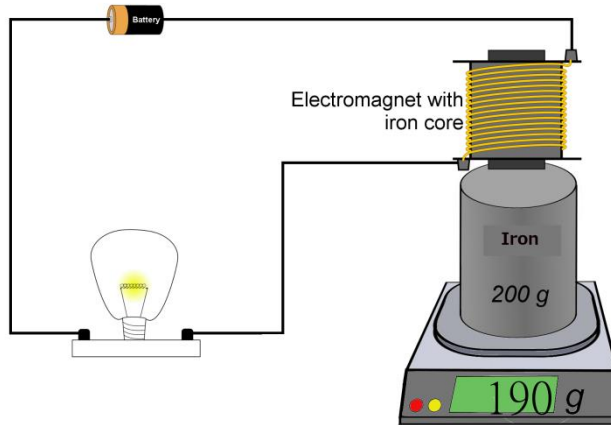
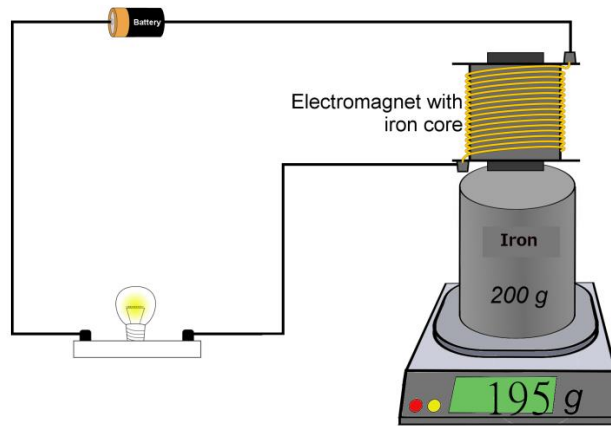
The experiment does not allow any valid conclusion.

Tina assumes that the magnetic force of an electromagnet depends on the current flowing through the coil.

Which of the following experiments would be a good experiment to test his assumption?

<input type="checkbox"/>	 <p>Electromagnet with iron core Iron 200 g 190 g</p>	 <p>Electromagnet with copper core Iron 200 g 200 g</p>
<input type="checkbox"/>	 <p>Battery Electromagnet with iron core Iron 200 g 150 g</p>	 <p>Battery Electromagnet with copper core Iron 200 g 158 g</p>
<input type="checkbox"/>	 <p>Battery Electromagnet with iron core Iron 200 g 150 g</p>	 <p>Electromagnet with iron core Iron 200 g 190 g</p>
<input type="checkbox"/>	 <p>Electromagnet with copper core Iron 200 g 200 g</p>	 <p>Electromagnet with iron core Iron 200 g 195 g</p>

Patrick did the following experiment:



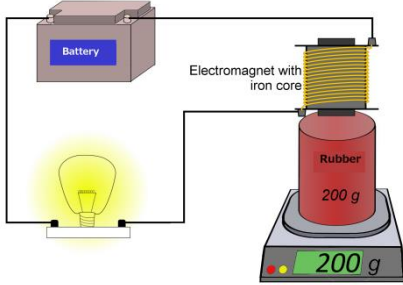
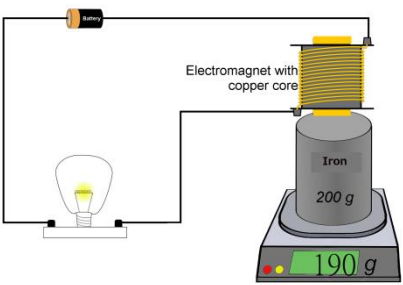
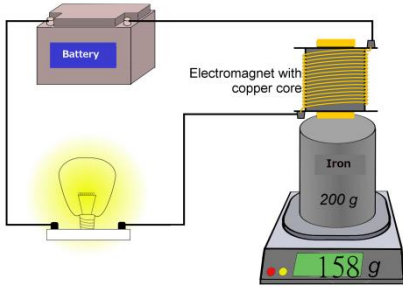
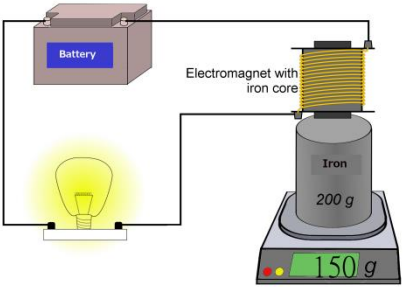
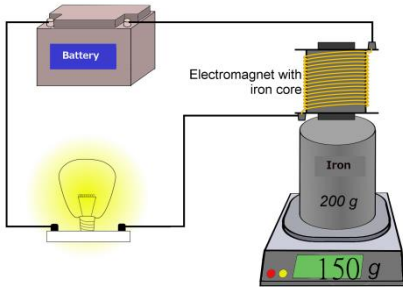
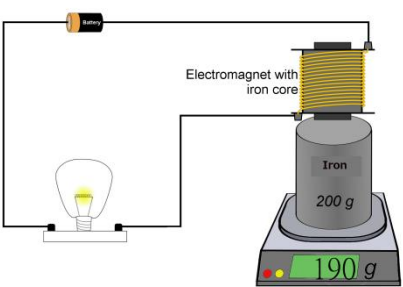
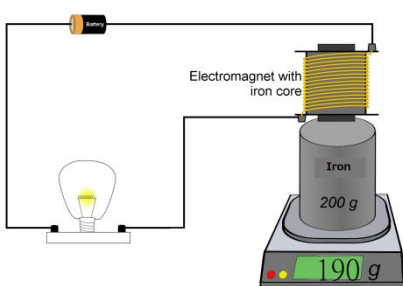
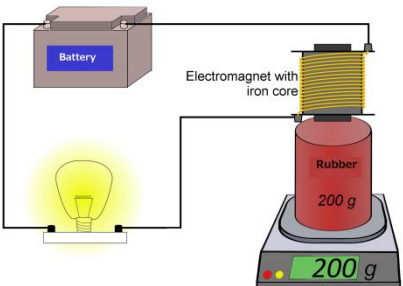
What does his experiment show?

<input type="checkbox"/>	The bulb has an impact on the force of the electromagnet.
<input type="checkbox"/>	The battery has an impact on the force of the electromagnet.
<input type="checkbox"/>	The bulb and battery have an impact on the force of the electromagnet.
<input type="checkbox"/>	The experiment does not allow any valid conclusion.

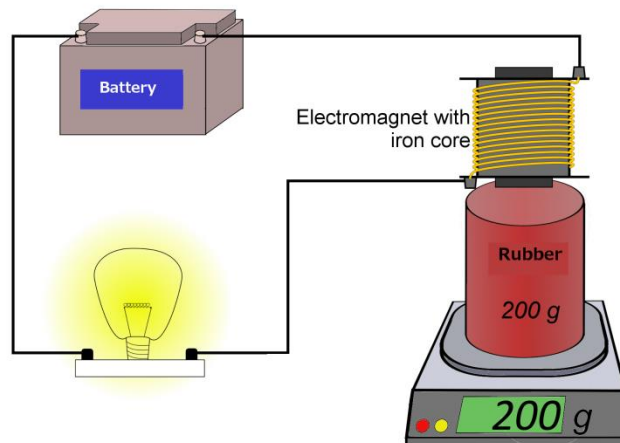
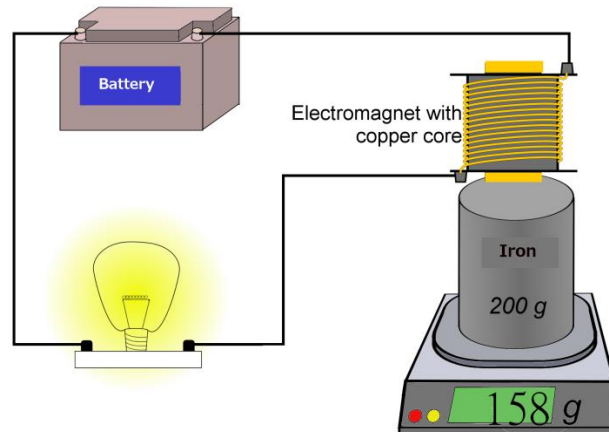
Isa has an idea.

She assumes that the magnetic force of an electromagnet depends on the core material.

Which of the following experiments would be a good experiment to test his assumption?

<input type="checkbox"/>		
<input type="checkbox"/>		
<input type="checkbox"/>		
<input type="checkbox"/>		

Christopher did the following experiment:



What does his experiment show?

<input type="checkbox"/>	The core material has an impact on the force of the electromagnet.
<input type="checkbox"/>	The attracted material has an impact on the force of the electromagnet.
<input type="checkbox"/>	The core material and the attracted material have an impact on the force of the electromagnet.
<input type="checkbox"/>	The experiment does not allow any valid conclusion.