

# Physics

## Delprov A

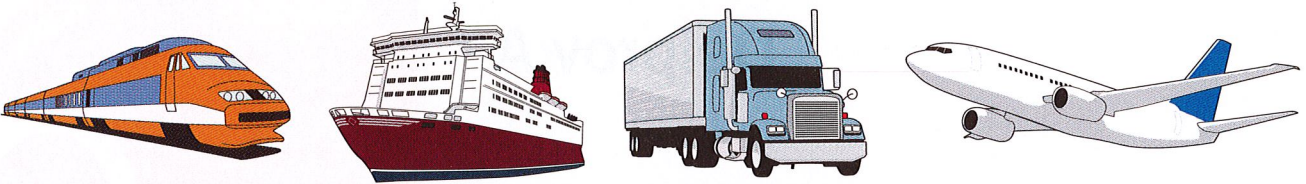
Årskurs

# 6

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Elevens namn och klass/grupp

Before doing a school project on *Transportation and the Environment* Kim, Fia and Nils have to find out more about the transport of fruit. They are interested in how oranges from Italy are transported to Sweden. The fruit may be transported by trains, boats, trucks or planes. The pupils need to decide which mode of transportation to choose. They need to take into consideration that transporting the oranges should affect the environment as little as possible, but at the same time it must be profitable to sell the oranges.



The pupils may ask three questions (no more) of the person responsible for importing fruit for the Fruit Company. The pupils discuss which questions to ask the person responsible for importing fruit.

Here are their suggestions. Read through the questions carefully.

Nils



1. Which mode of transport produces the least amount of dangerous emissions?

2. Which mode of transport is the slowest?

3. Which mode of transport is the most expensive?

7. How long do the oranges stay fresh during transport?

8. Which is the most common way to transport oranges?

Kim



Fia



4. How many oranges are sold in Sweden each year?

5. What amount of dangerous emissions does each mode of transport produce per box of oranges?

6. What does it cost to transport a box of oranges with each of the different modes of transport?

9. How many of the oranges is it possible to sell after having transported them with the different modes of transport?

a) Your task is to choose **three** questions. The questions should help the pupils to make a decision about how to transport the oranges.

**Do not forget** that you need information about how each of the different modes of transport affects **both the environment** and **the profit**.

I choose the following three questions:




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b) **Justify** your choice of questions. Explain why they are important to pose in order to make a decision.

**Do not forget:**

- to use your **knowledge of science**.
- that you are **not** supposed to answer the questions.

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A class is working with measurements and measuring instruments. One group has been asked to make a presentation about thermometers.

Kajsa has been collecting information from the internet. She sends an email to the group asking which information would be useful in a presentation.

### Read the email from Kajsa.

Facts about thermometers for the presentation

From: Kajsa

Sent: Yesterday

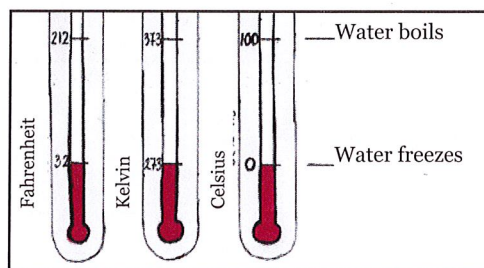
To: Science group

Hello everyone!

I've found a lot of facts about thermometers!

Kajsa

#### Fact 1



The picture shows liquid thermometers with different kinds of temperature scales.

#### Fact 2

Temperature is a measure of the average kinetic energy of the molecules.

#### Fact 3

As far as we know, the warmest place on earth is al Azizia in Libya ( $58^{\circ}\text{C}$  in the shade). The coldest place is called Vostok in Antarctica ( $-89,2^{\circ}\text{C}$  in the shade).

#### Fact 4

Different scales of temperature are used when measuring temperature. The three most common ones are Fahrenheit, Celsius and Kelvin.

#### Fact 5

When you have a fever, the body temperature is above  $37^{\circ}\text{C}$ .

#### Fact 6

There are many different kinds of thermometers. Some of these – for instance the liquid thermometer – are designed on the fact that the energy of the surrounding molecules causes the liquid in the thermometer to expand when it is heated.

Cont.

**Fact 7**

Metals and water conduct heat better than, for example, plastics and wood.

**Fact 8**

Temperature is measured by thermometers. There are many different kinds of thermometers, for example digital thermometers and liquid thermometers.

**Fact 9**

The coloured liquid inside the liquid thermometer is affected by the temperature. At higher temperatures, the liquid expands, but at lower temperatures the liquid contracts.

Which facts do you think that the group should use for their presentation about thermometers? **Choose at least 3 facts** from the email.

**Justify in as many ways as you can** why you think the group should use these facts.

Write your answer in the mail below.

**Do not forget to write:**

- **the numbers** of the facts that you choose.
- **at least one justification** for each of the facts that you choose..

[Re: Facts about thermometers for the presentation]

From: Me

Sent: Today

To: Kajsa; Science group

Hello everyone!

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A lot of energy is used every day around the world. We can produce energy in many different ways. Recently, it has become possible to extract oil from oil sands. In Canada, for instance, there are large amounts of oil sands.

A class is learning about different energy sources. One group in this class has been asked to make a presentation about oil sands and oil.

The group is going to present their work with a slideshow presentation (for instance a power-point presentation). The slideshow should include information about oil sands and oil, as well as both advantages and disadvantages with oil sands and oil.

At the back of this booklet you will find a poster with information about oil sands and oil. The poster may be spread out, so that you can read from it while you are preparing for your slideshow.

### What is a slideshow?

A slideshow is made in the computer and contains clear headings and short texts. It may also include pictures. A slideshow is used while someone is giving an oral presentation. This means that only the most important text should be included in the slideshow.

### Example of slideshow

The image shows a PowerPoint presentation slide titled "TURTLES". The slide content includes:

- Heading:** TURTLES
- Sub-heading:** MAT
- Text:** There are many different kinds of turtles. Most of them live in the water nearly all of the time.
- Image:** A photograph of a turtle.

Labels on the left side of the slide indicate the following elements:

- heading:** Points to the word "TURTLES".
- sub-heading:** Points to the word "MAT".
- text:** Points to the paragraph "There are many different kinds of turtles. Most of them live in the water nearly all of the time."

**Your task** is to help the group plan what the slideshow should look like. The slideshow should deal with **oil sands and oil**. It should include:

- **Information**
- **Disadvantages**
- **Advantages**

**Do not forget to:**

- write as **many** advantages and disadvantages **as possible**.
- write briefly.

**Use the information from the poster** when planning the slideshow.

Slide 1

Information

OIL SANDS AND OIL

Slide 2

Information

OIL SANDS AND OIL

Slide 3

## Disadvantages

**OIL SANDS AND OIL**

Slide 4

## Disadvantages

**OIL SANDS AND OIL**



Slide 5

Advantages

OIL SANDS AND OIL

Slide 6

Advantages

OIL SANDS AND OIL

Advantages

Date

Advantages

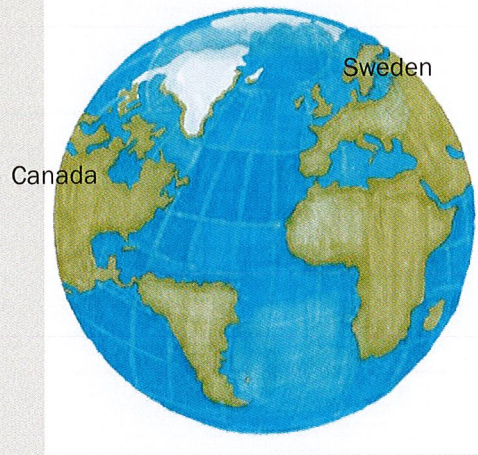
Date

POSTER

When oil is extracted from oil sands, a lot of greenhouse gases are released. Greenhouse gases are gases which make the planet warmer. A lot of energy is used when extracting oil from oil sands. The release of gases may be eight times as large as compared to pumping up oil from the bottom of the sea. Moreover, a lot of water is used when extracting oil from oil sands, which may cause streams to become polluted.

When extracting, transporting and using oil there is a risk of explosion and fire.

If oil leaks into the environment, this will severely harm animals and plants.



Oil sands consist of sand or clay, water and oil. Oil sands have become important lately and there are two reasons for this. One reason is that technology is now available for extracting the oil from the sand. Another reason is that we are running out oil, making oil more expensive.

During the last fifty years, oil has been the most commonly used energy source in the world. This is

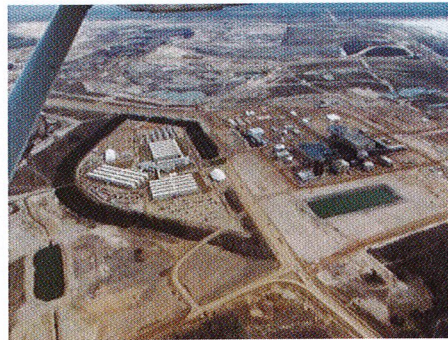
because oil contains a lot of energy. Furthermore, the oil is easy to store and transport.

Oil is used to fuel airplanes, cars, boats and trains. It is also used for machines in agriculture, forestry, mines and the building industry. A lot of oil is used when producing plastic, synthetic rubber and asphalt.



Nicolas Raymond  
https://www.flickr.com

Canada has large forests which are not affected by humans. For instance, you can find the Grizzly bear here.



Jason Woodhead23  
https://www.flickr.com

In order to reach the oil sands in Canada, large forest areas must to be cleared.

The world's largest, now known, reserves of oil

Country	Billions of barrels*
Saudi Arabia	263
Venezuela	211
Canada	175
Iran	137
Iraq	115
Kuwait	104

\*1 barrel holds about 160 liters.

Source: CIA, confirmed oil reserves 1 Jan-11

In some parts of the world, society requires a lot of oil. This means that factories and transport may no longer work if there is no oil. A lot of people would then lose their jobs and their income. Therefore oil is very important to us today.









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Högskolan  
Kristianstad



MALMÖ HÖGSKOLA

# Physics

**Delprov B**

Årskurs

**6**

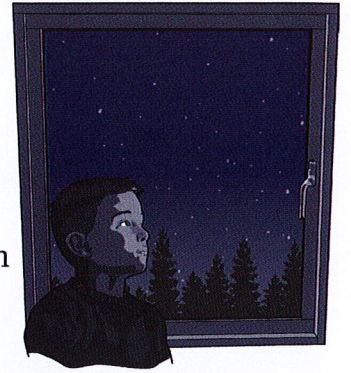
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Elevens namn och klass/grupp





a. The students in class are learning about the sun, moon and the earth. They know that there is about one month between each full moon. Now they are to look at the moon as often as they can for one month.



Which questions can the students answer by looking at the moon themselves for a month?

Put a cross in the correct box.

	They can answer this question	They cannot answer this question
A. How long does it take to go from a full moon to a half moon?	<input type="checkbox"/>	<input type="checkbox"/>
B. How much does the moon weigh?	<input type="checkbox"/>	<input type="checkbox"/>
C. Why does the moon circle around the earth?	<input type="checkbox"/>	<input type="checkbox"/>
D. At which compass point is the moon at 12 midnight?	<input type="checkbox"/>	<input type="checkbox"/>
E. How much air is there on the moon?	<input type="checkbox"/>	<input type="checkbox"/>
F. How far is it from the earth to the moon?	<input type="checkbox"/>	<input type="checkbox"/>
G. How many times each month is the moon visible during the day?	<input type="checkbox"/>	<input type="checkbox"/>

b. Think of some questions about the moon yourself. The questions should be possible to answer from looking at the moon as often as possible for a month.



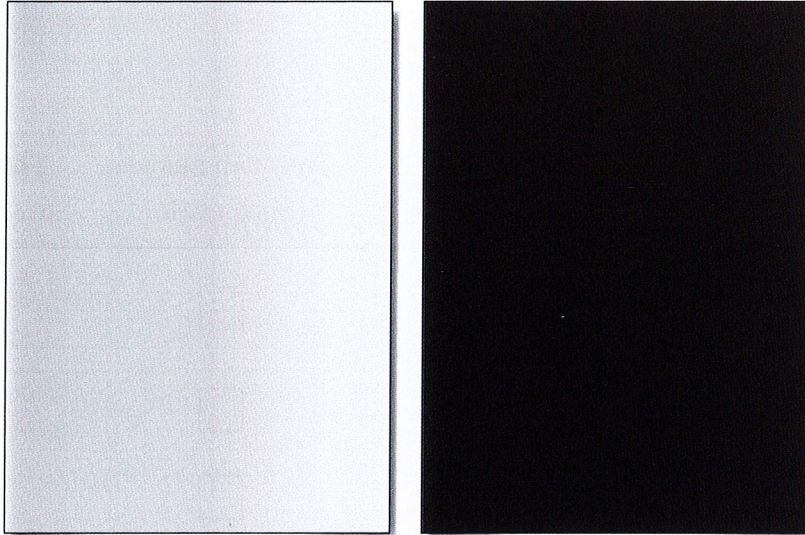
You should not ask questions that can be answered with Yes or No.

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- .....  
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- .....  
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- .....  
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**A school class is to investigate the following question**

**Black or white – which becomes warmest?**



The students in a class are going to investigate whether it is warmest under a piece of black or white paper. They are working in four groups.

Each group uses the following method:

They take two pieces of similar paper, one white and one black.

They put the white and the black paper beside each other in the sun on a wooden bench which has the same temperature over its entire surface.

They have two thermometers. They place a thermometer under each paper.

**a. What should they think about when they use the thermometers so that their results are reliable?**

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The groups in one class got the following results:

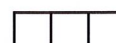
	Temperature under the paper (°C)	Temperature under the paper (°C)
	White paper	Black paper
Group 1	25	28
Group 2	23	26
Group 3	24	29
Group 4	26	28

**b. What similarities do you see between the results of the groups?**

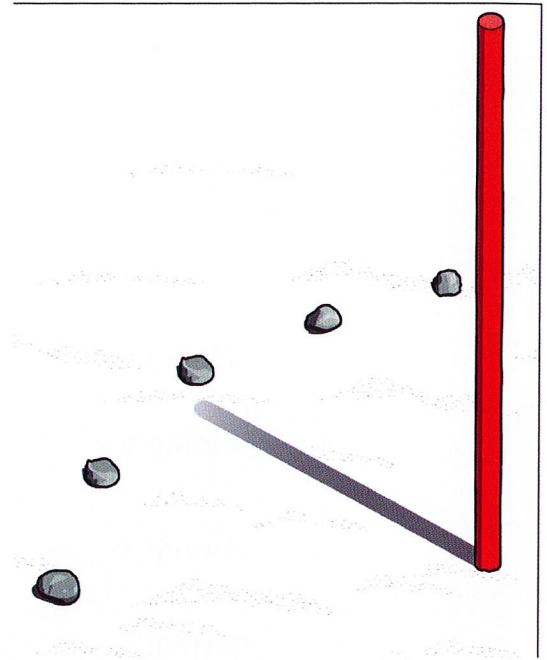
- .....
- .....
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**c. Now answer the original question: white or black – which becomes warmest?**

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You can find out what the time is using the sun, the shadow of a stick and some stones. A clock like this is called a sundial.



**a. In which order should you do these steps? Put the letters A - E in the boxes below. There is one step (one letter) that should not be used.**

- A. Write the time on the stones you have placed out.
- B. Choose a place where the sun shines all day.
- C. Place a stone where the shadow points each hour.
- D. Turn the stick half way around after each hour.
- E. Put a stick in the ground.

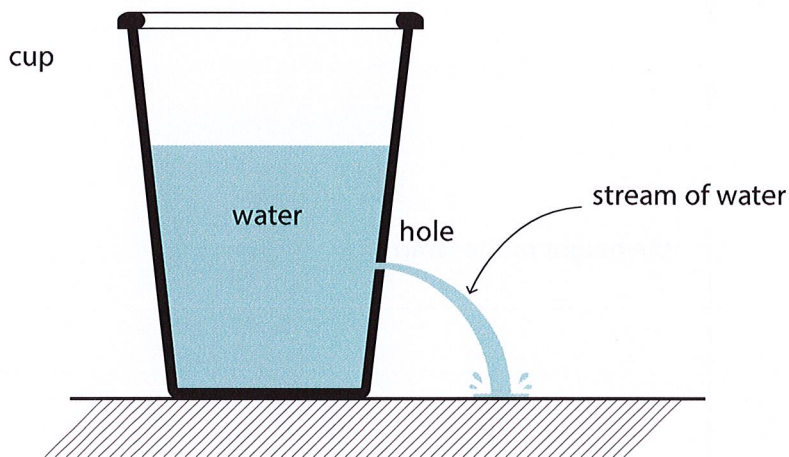
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Filip has been given the task of making a “clock” that shows when 3 minutes are up (the correct time for cooking fresh pasta).

He uses a paper cup that he pours water (or something else) into. He makes a small hole in the cup so that the water runs out slowly. It should stop running out after 3 minutes.

He can test this a number of times and in several different ways, but there is only one sort of cup. The first time Filip tries, the water stops running after 2 minutes.



**What can he change to make it run for 3 minutes? Give four suggestions after the example.**

- smaller hole

- 

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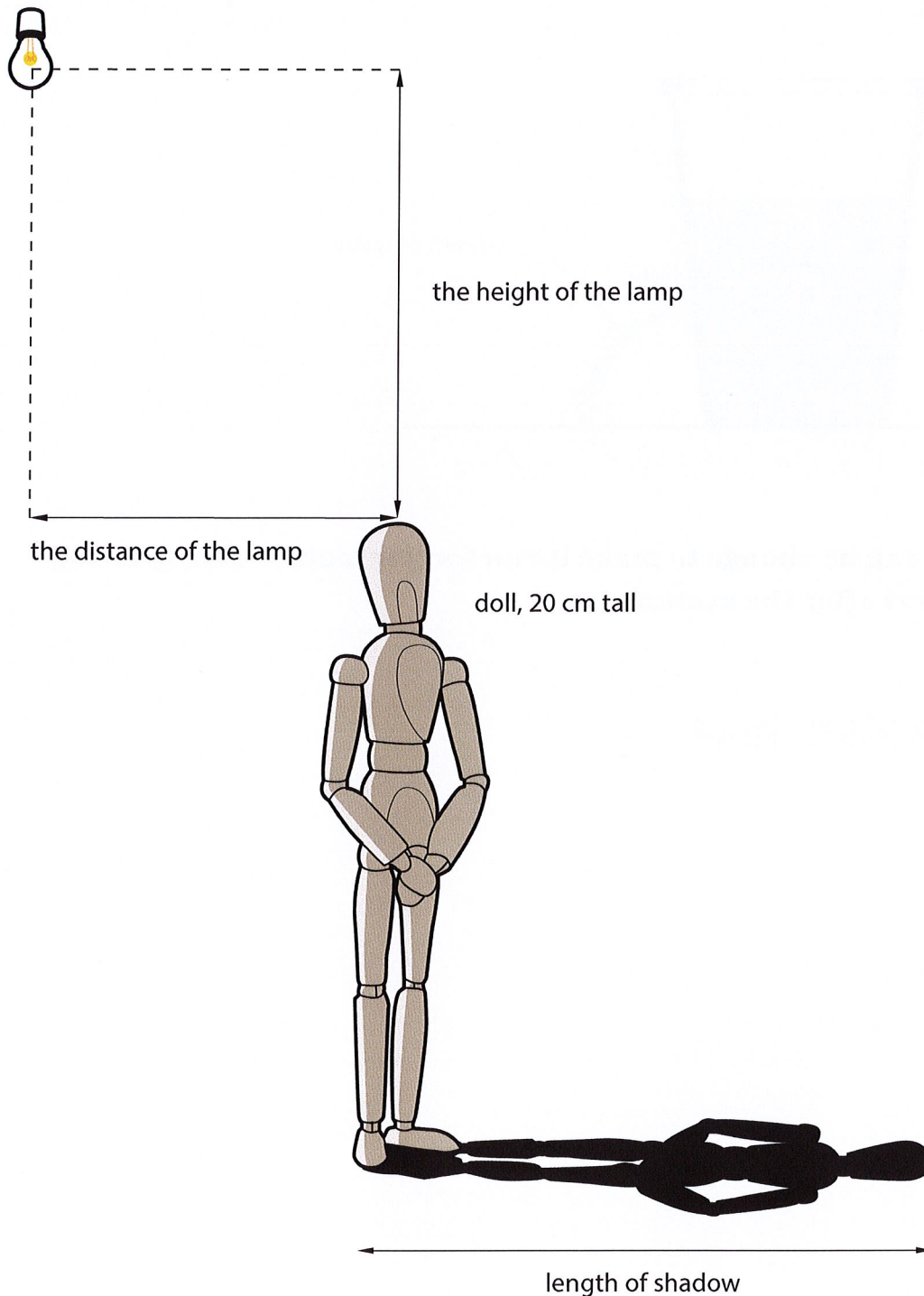
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## 5 | *The length of a shadow*

Oscar and Emma are play-acting and think it's fun to see how the length of the shadows on the stage change according to where the spotlight is placed. In their science lesson they do an experiment to investigate the length of shadows.

They put a doll, which is 20 cm tall on a table in a rather dark room. They shine a light on the doll and measure the length of the shadow, from foot to head. They also measure the distance to the lamp and its height (**see the picture and table of notes**).



RESULTS		
Lamp distance (cm)	Lamp height (cm)	Shadow length (cm)
10	30	7
20	20	20
20	40	10
30	30	20
20	30	d)

**What can you learn from the following experiment? Put a cross in the correct box for each question.**

a. If the distance of the lamp is the same but its height is increased, the shadow is	<input type="checkbox"/>	longer
	<input type="checkbox"/>	unchanged
	<input type="checkbox"/>	shorter

b. If the height of the lamp is the same but its distance is increased, the shadow is	<input type="checkbox"/>	longer
	<input type="checkbox"/>	unchanged
	<input type="checkbox"/>	shorter

c. If the height of the lamp is equal to the distance from the doll, the shadow is	<input type="checkbox"/>	longer than the doll
	<input type="checkbox"/>	as long as the doll
	<input type="checkbox"/>	shorter than the doll

d) As you can see, the students forgot to measure the shadow on one occasion.

**Look at the other results in the table and fill in the approximate result they would have got *in the empty box!***



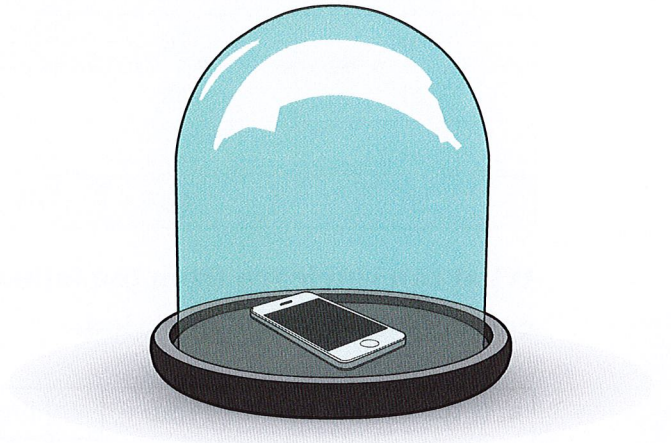
Oscar and Filip wonder if it is possible to hear music out in space, where there is a vacuum.

**Vacuum = Airless, there is no air**

Science teacher Maria performs an experiment to investigate this.

Maria puts a mobile telephone under a bell jar. When you call the telephone, you can see it vibrating and hear it ring.

Then Maria pumps out all the air from the jar so that a vacuum is created. You can still see that the telephone is vibrating, but you cannot hear any sound.



**What can you learn from this experiment?**

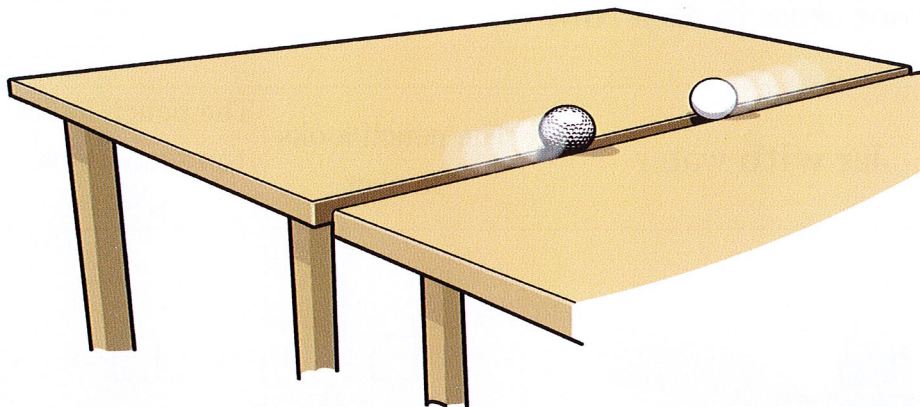
**Put a cross in each row.**

	The experi- ment shows this is true	The experi- ment shows this is false	The experi- ment does not answer this question
a. <i>Sound</i> travels faster than light	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b. <i>Sound</i> can pass through a vacuum	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c. <i>Sound</i> can pass through glass	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d. <i>Light</i> can pass through a vacuum	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
e. <i>Light</i> can pass through glass	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
f. <i>The battery of a mobile phone</i> can work in a vacuum	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



Perform the following experiment:

**You will need** a heavy golf ball and a light table tennis ball, and a place where they can roll in a straight line.



- Place the balls in a narrow crack (between two tables). The balls should be about 50 cm from each other.
- Give them a push so that they straight towards each other at about the same speed.
- Do it once more so that you are sure of the result.

**What happens to the balls when they collide?**

**Place a cross to answer yes or no in each row.**

	Yes	No
The table tennis ball continues in the same direction as before the collision		
The table tennis ball stops after the collision		
The table tennis ball rolls back		
The golf ball continues in the same direction as before the collision		
The golf ball stops after the collision		
The golf ball rolls back		

*Teacher's  
signature to certify  
completed experiment*

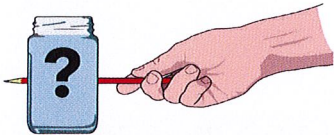
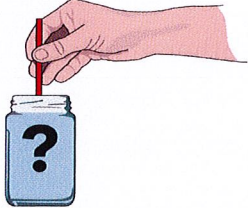


You have a glass jar filled with water. You also have a long pencil. Investigate what the pencil looks like when you look through the jar.

Hold the pencil as shown in the pictures, behind and close to the jar.

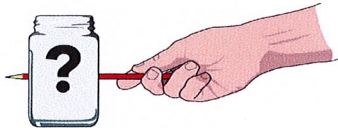
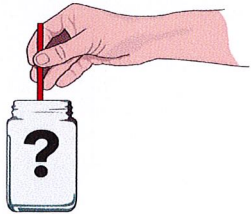
**a. What does the pencil look like when you look through a jar of water?**

**Put one cross in each row.**

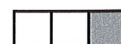
Jar <b>with</b> water	The pencil looks thicker	The pencil looks the same thickness	The pencil looks thinner
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**b. Do the experiment again, this time without water.**

**What does the pencil look like when you look through the jar?**

Jar <b>without</b> water	The pencil looks thicker	The pencil looks the same thickness	The pencil looks thinner
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Teacher's  
signature to certify  
completed experiment











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MALMÖ HÖGSKOLA

# Physics

Delprov C

Årskurs

6

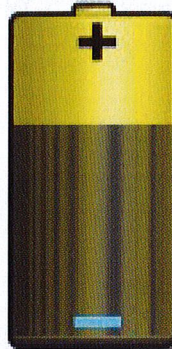
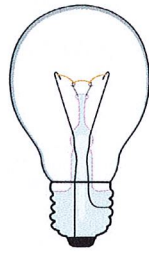
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Elevens namn och klass/grupp



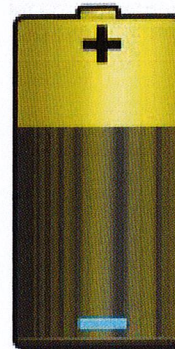
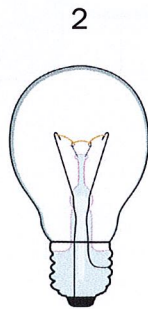
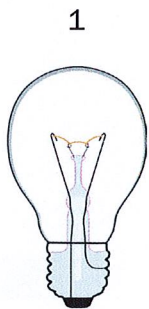


a) Draw wires in the figure so that the lamp lights up.



Remember to draw the wires from and to the correct position on the lamps and the battery.

b) Draw wires in the figures so that **both** lamps light up.



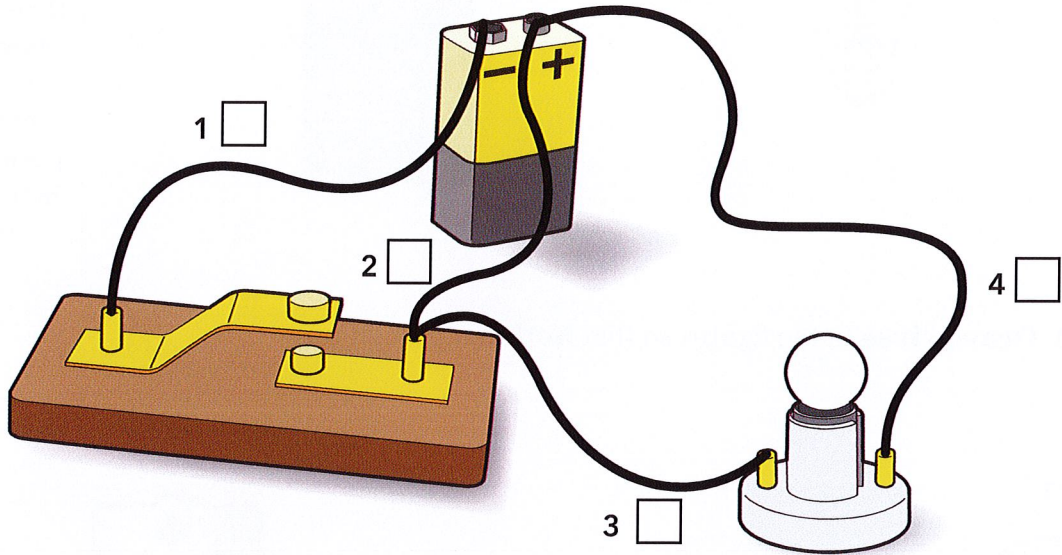
c) In the figure that you have drawn, what will happen to lamp no 1 if lamp no 2 breaks?  
Mark one alternative.

- Lamp no 1 will also break.
- Lamp no 1 will go out.
- Lamp no 1 will shine more weakly.
- Lamp no 1 will shine with the same strenght as before.
- Lamp no 1 will shine brighter.

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Nina presses the power switch, but the lamp does not light up. Kim says there is a wire too many in the connection.

**Which** wire should Nina take away for the bulb to light up when she presses the power switch? Mark **one** alternative.

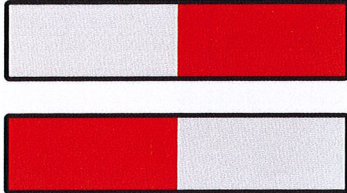


Hassan has two magnets. He places them in different positions.

Use words from the yellow box, when answering questions 3 a-d.

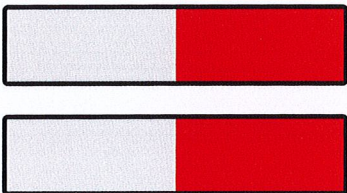
attracts (drawn towards)  
repulses (pushes away)  
north end  
south end

a) **When** Hassan places the magnets as shown below, **how** will the magnets move?



b) **Why** do the magnets move like that?

c) **When** he places them as shown below, **how** will the magnets move?



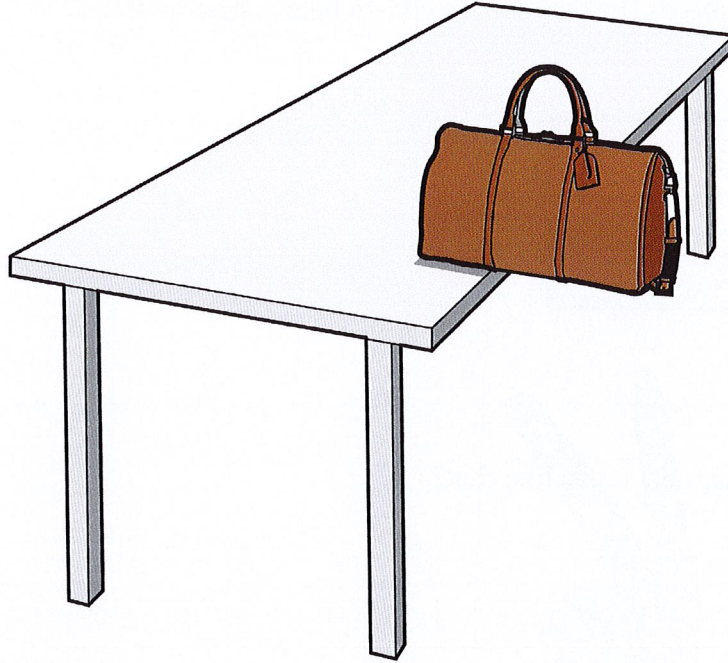
d) **Why** do the magnets move like that?



The teacher Frank enters the classroom and puts his bag on the table, as shown in the picture.

Explain how the bag stays on the table without falling down.

Use the words in the yellow box in your explanation.



weight  
centre of gravity  
support surface

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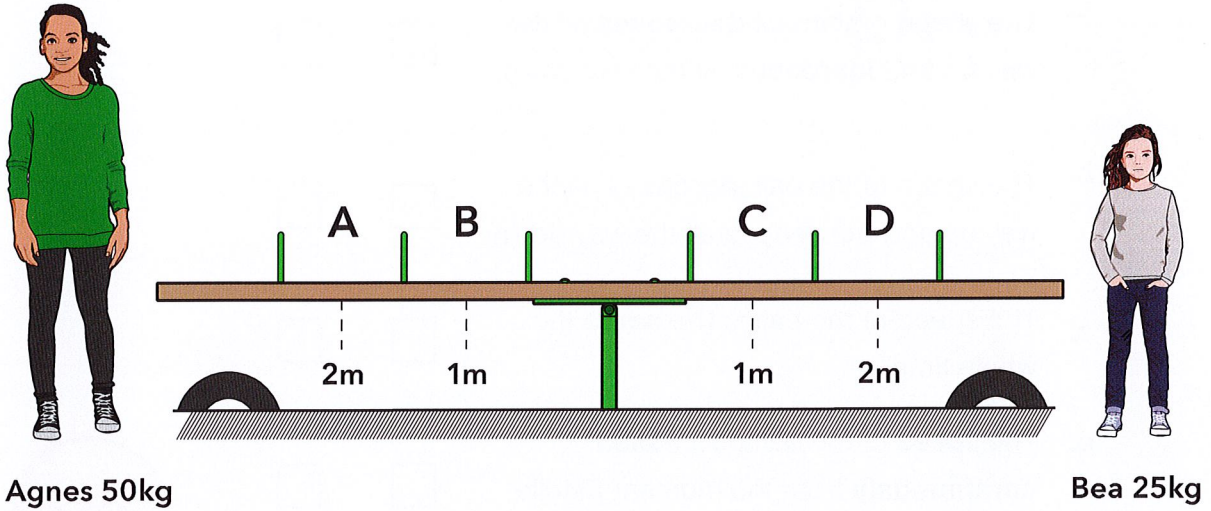
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Agnes and Bea are going to play on a seesaw. What will happen during the three different events that are described? Mark with an X on each line under your choice.



Agnes 50kg

Bea 25kg

The seesaw tilts to  
Agnes' side

The seesaw is  
balanced

The seesaw tilts to  
Bea's side

1. Agnes sits in spot **B**  
and Bea sits in spot **C**




2. Agnes sits in spot **A**  
and Bea sits in spot **C**




3. Agnes sits in spot **B**  
and Bea sits in spot **D**





Estelle throws a heavy ball up in the air and catches it again when it comes down.  
Mark each statement below true or false.

True	False
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- |    |   |                          |                          |
|----|---|--------------------------|--------------------------|
| a. | The speed of the ball <b>decreases</b> all the way up and <b>increases</b> all the way down.                      | <input type="checkbox"/> | <input type="checkbox"/> |
| b. | The speed of the ball <b>increases</b> all the way up and <b>decreases</b> all the way down.                      | <input type="checkbox"/> | <input type="checkbox"/> |
| c. | The speed of the ball is <b>the same</b> the whole time.  | <input type="checkbox"/> | <input type="checkbox"/> |
| d. | The speed of the ball <b>decreases continuously</b> from the moment Estelle throws it until she catches it again. | <input type="checkbox"/> | <input type="checkbox"/> |
| e. | The speed of the ball is <b>zero</b> when the ball is at the top.   | <input type="checkbox"/> | <input type="checkbox"/> |
| f. | The speed of the ball is <b>greatest</b> when the ball is at the top.   | <input type="checkbox"/> | <input type="checkbox"/> |
| g. | The speed of the ball is <b>the same</b> when leaving Estelle's hand as when she catches it again.                | <input type="checkbox"/> | <input type="checkbox"/> |



7

You can get energy from a number of different sources.  
Some energy sources are renewable and others can run out.

Mark each energy type if it comes from a renewable source or non-renewable source.

	Renewable	Non-renewable
Coal power	<input type="checkbox"/>	<input type="checkbox"/>
Wind power	<input type="checkbox"/>	<input type="checkbox"/>
Gasoline	<input type="checkbox"/>	<input type="checkbox"/>
Nuclear power	<input type="checkbox"/>	<input type="checkbox"/>
Wave power	<input type="checkbox"/>	<input type="checkbox"/>
Oil	<input type="checkbox"/>	<input type="checkbox"/>
Water power	<input type="checkbox"/>	<input type="checkbox"/>
Ethanol	<input type="checkbox"/>	<input type="checkbox"/>
Biogas	<input type="checkbox"/>	<input type="checkbox"/>
Solar energy	<input type="checkbox"/>	<input type="checkbox"/>

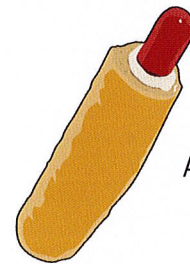
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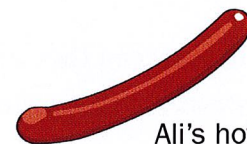
Agnes buys a hot dog *in* a bun and Ali buys a hot dog *without* a bun.

Ali says that he does not want a bun, because he wants his hot dog to cool off faster.

Explain why the hot dog cools off faster without a bun.



Agnes' hot dog



Ali's hot dog

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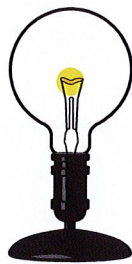
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Lisa and Ludvig are planning a shadow play for their younger brothers and sisters. In the picture you can see how they make the shadows on a sheet. Ludvig is surprised that the shadow figure is larger than the hand making it.

a) Draw beams from the lamp that explain the size of the shadow. Use a ruler when you draw.

Remember to draw  
the beams  
from the right place  
on the lamp.



b) How can they make a shadow that is **smaller** than the one in the picture?  
Describe **three** different ways!

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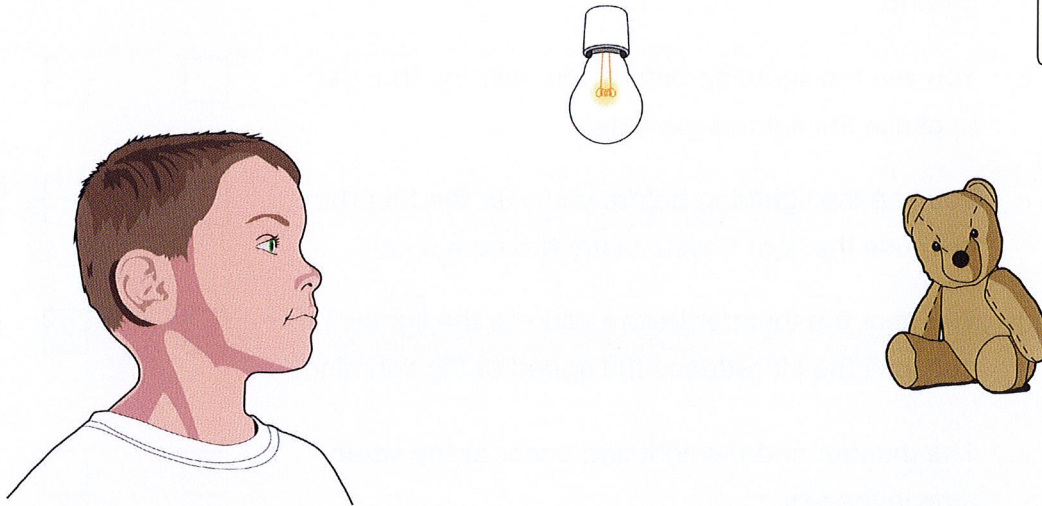




When Filip switches the lamp on, the room is lit and he can see the teddy bear.

Draw **arrows** in the picture to show how the light travels from the lamp and enables Filip to see the teddy bear. If you want to, you can also explain in writing.

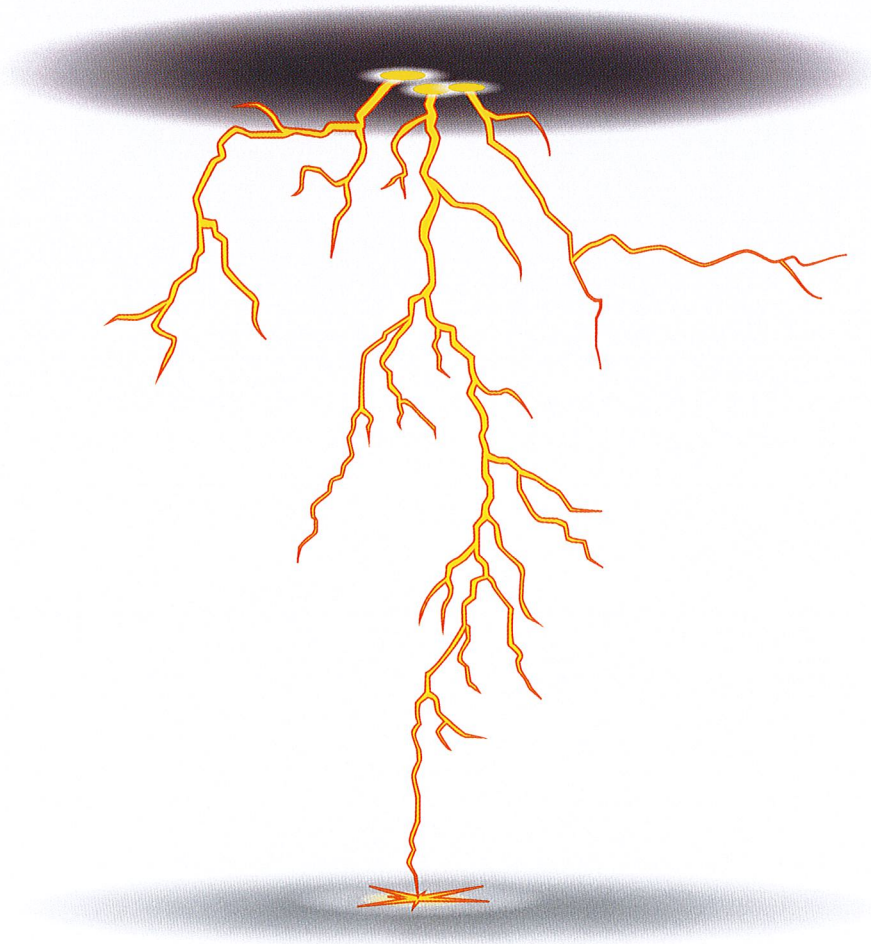
Use a ruler when you draw.



The sentences below are about lightning and thunder.

Mark each one true or false.

	True	False
a. The thunder occurs when the lightning strikes the ground.	<input type="checkbox"/>	<input type="checkbox"/>
b. You see the lightning before you hear the thunder because the lightning is closer.	<input type="checkbox"/>	<input type="checkbox"/>
c. You see the lightning before you hear the thunder because the light travels faster than the sound.	<input type="checkbox"/>	<input type="checkbox"/>
d. You hear the thunder before you see the lightning because the air reduces the speed of the lightning.	<input type="checkbox"/>	<input type="checkbox"/>
e. The thunder and the lightning occur at the same time in the sky.	<input type="checkbox"/>	<input type="checkbox"/>



12

Johan shouts into an empty room.  
He hears an echo.

When the room has been furnished with a sofa, curtains and rugs, there is no echo when he shouts.

Explain **why there is an echo** when the room is empty,  
and **why there is no echo** once the room is furnished.

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13

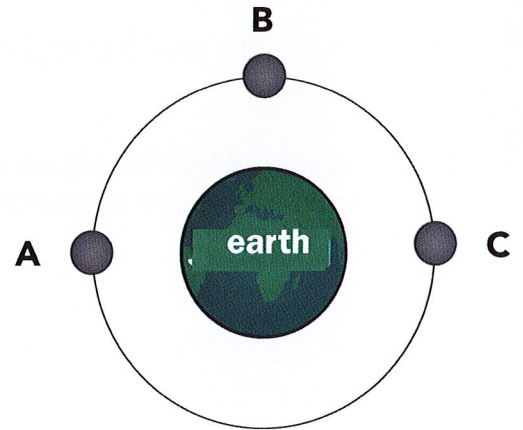
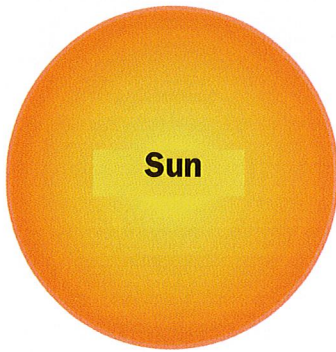
Gravity and friction are two different types of forces.

Mark the correct force for each incident.

	gravity	friction
a. An apple falls from a tree to the ground.	<input type="checkbox"/>	<input type="checkbox"/>
b. A weightlifter lifts a barbell.	<input type="checkbox"/>	<input type="checkbox"/>
c. A car skids off a slippery road.	<input type="checkbox"/>	<input type="checkbox"/>
d. A plank becomes smooth from being sandpapered.	<input type="checkbox"/>	<input type="checkbox"/>
e. A ball-bearing inside a skateboard wheel makes the wheel turn easily.	<input type="checkbox"/>	<input type="checkbox"/>
f. The moon orbits around the earth.	<input type="checkbox"/>	<input type="checkbox"/>



This is a model of the sun, the earth and three different positions the moon can be in.



Mark an x on each line.

In what position (A, B or C) is the moon when there is a

	A	B	C
full moon	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
half moon	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
solar eclipse	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

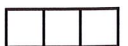


Choose words from the box and fill in the empty spaces to make the sentences correct.

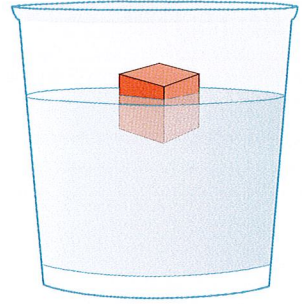
Some words may be used several times, and some words might not be used at all.

28 days and nights    a week    sun    earth    one day and night    moon    a year

- a. Day and night occurs because the ..... rotates.
- b. It takes one year for the ..... to orbit around the .....
- c. When the ..... has rotated one circuit around the earth, the time elapsed is .....
- d. Seasons occur because the ..... has a tilted axis.



Ella has a cube. She knows it isn't hollow, but she *doesn't know* what material it is made from. When she puts the cube in a glass of water, it floats.



- a) What happens to the water level in the glass, when she puts the cube in the glass?  
Mark one alternative.

The water level rises.

The water level does not change.

The water level lowers.

- b) Explain why this happens.

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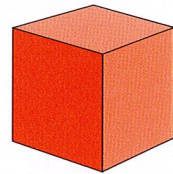
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- c) Ella puts a larger cube, made from the same material as the smaller cube, in the water.  
What happens to the larger cube when she puts it in the water?

It floats.

It sinks.



- d) Explain why this happens.

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**GÖTEBORGS  
UNIVERSITET**

Institutionen för didaktik och pedagogisk profession



Högskolan  
Kristianstad

Sektionen för lärande och miljö



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