Germinating Seeds

What are the best conditions for seed to germinate?

Have you got a garden and do you grow your own vegetable there? If you have one, the following task may be easier for you than for those who are deaf to gardening. However, you could notice that gardening is becoming increasingly popular nowadays. It is a hobby that people have from different reasons. Someone is relaxing from working environment by the work in the garden, it brings physical activity, or even some extra money. But more and more people want to grow their own vegetable or fruit, because they want to be more self-sufficient and they also want to control the quality of grown vegetables, eg in terms of fertilizers.

You may also set to gardening one day and if you do not want to buy quite expensive young plants, you will grow it on your own from the seeds.

Some of you suspect what seeds need for germinating. But could you describe us precisely the best condition for seeds germinating? Try to find the optimal conditions in following experiment and communicate the results and experience from experiment performance among groups.

What you might need to know

Plants reproduce themselves by seeds – that are germs of future plant. Seed contains nutrients (eg. starch), that are use dat the beginning as a source of energy for growth and development.

Before you go to laboratory

Think about the difference between seed and mature plant and write your answer below (appearance, speeches, etc.).

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v. 0.0 (2014-06-23)

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Look at the chart below and put a note in it, whether a given variable does influence (✓) or does not influence (✗) germinating seeds. Give reasons for your answer in the next column.

Variable	Influence?	Explain the answer
O_2		
CO_2		
Humidity		
Light		
Temperature		
Nutrients		

Explore the world around: simulate the process in laboratory

1. Make groups and decide which group will study one variable from the table above.

What variable have your group chosen for experiment? _____

You can use one of these sensors: gas oxygen, gas carbon dioxide, temperature sensor.

Which sensor will you choose for examining the influence of chosen variable and why have you chosen it?

Sensor 1: _____
Reason: _____

(Sensor 2: _____ in case there are enough sensors)
(Reason: _____)

Design the experiment

2. You must verify your prediction from the table, but it is very important to design the experiment performance. Write down a list, how do you plan to examine chosen variable (what do you need for it) and draw a scheme of your apparatus – working place.

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What do you think? How long does it take to observe the changes in the graph? _____

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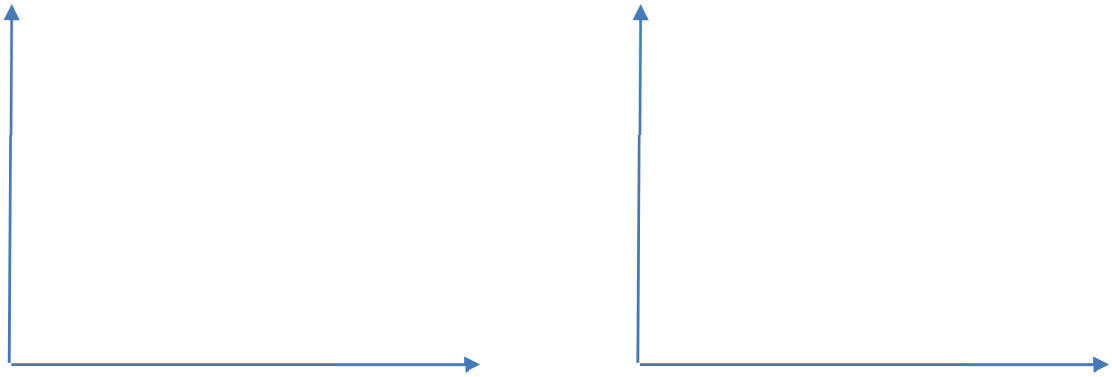
Scheme of apparatus:

Make a prediction

3. Before you start performing the experiment, draw a graph that you expect during the measurement. *Do not forget to name the axes (dependence which variable on what variable will you study).*



4. To correctly evaluate the measured data, it is good idea to make an experiment at the ideal conditions for germination and these data later compare with other measurements.

At primary school, you probably observed the germination of seeds. Today, there is an opportunity to study the process more deeply by measurement of changes of concentrations of oxygen and carbon dioxide. How do you plan to do it?

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Draw the measured curves bellow:

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Experiment

Perform the experiment. Describe the changes you had to do compared to your suggestion:

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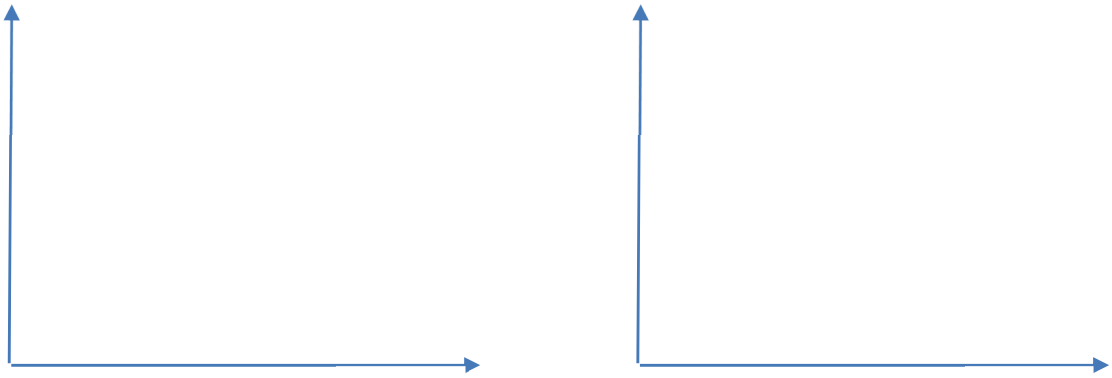
Evaluate the data

5. Perform the experiment and observe the chosen factor which can influence the germination. Write down important measured data in appropriate way.

Draw measured graphs; *don't forget to name the axes.*



Describe and interpret the measured data. Explain the course of the curves and changes in comparison with the measurement at conditions **ideal** for germination.

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Conclusion:

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Show your results

Each group has explored different variable affecting germinating seeds. Communicate the results in a short conference. Present the design of experiment, measured data and the final results. Make a short description of what you want to present.

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