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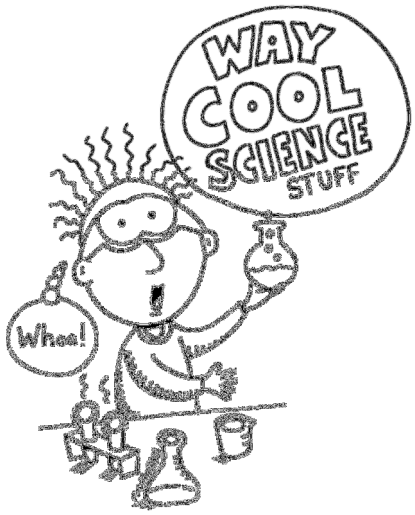
Changes Matter – Science Fair Project

Science Fair: Monday 26th May

This science project will give you an opportunity to find out more about scientific changes. It will allow you to share the results of your investigation with others. There are four different ways to do your investigation.



- RESEARCH
  Gather research about your chosen area of science and put it into your own words.
- EXPERIMENT
  An experiment can be a test to determine if a prediction (your guess of what will happen) is accurate. E.g. the change in the amount of water after evaporation
- DEMONSTRATION
  A demonstration shows how and why something works. You could bring in an example of the experiment. Please discuss with your teacher whether it is something that you can demonstrate in school.
- REPORT
  This will be a scientific report of your experiment. It would include: aim, prediction, method, fair test (if applicable), equipment, results, conclusion

Your project must include a three-sided display that gives viewers an overview of the science topic under investigation. This display will be an overview of what you found out as a result of your investigation. It will have a title, a summary of your most important information, and pictures, graphs, charts, and/or drawings to show what you did and what you learnt. Your presentation may also include a demonstration, which is exhibited on the table in front of your display.

You will be required to give a short oral presentation about your project. You will need to explain what you have done and what you have learned as a result of your investigation. You could also include videos and photos to show to your audience.

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Step 1: Coming up with a Good Question…

Once you have decided what change you will be investigating, it's time to write a question or identify a problem within that topic. To give you an idea of what we mean you can start off by filling in the question blanks with the following list of words:

The Effect Question:

What is the effect of _____ on _____?

sunlight	the growth of plants
eye color	pupil dialation
brands of soda	a piece of meat
temperature	the size of a balloon
oil	a ramp

The How Does Affect Question:

How does the _____ affect _____?

color of light	the growth of plants
humidity	the growth of fungi
colour of a material	its absorption of heat

The Which/What and Verb Question

Which/What _____ (verb) _____?

paper towel	is	most absorbent
foods	do	meal worms prefer
detergent	makes	the most bubbles
paper towel	is	strongest
peanut butter	tastes	the best

Now its your turn:

Create your Science Fair question using either the "Effect Question", the "How does Affect Question" or the "Which/What and Verb Question":

_____

_____

_____

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Step 2 : Doing the Research and forming a Prediction

So you've picked your category and you've chosen a topic. You even wrote a question using our cool fill in the blank template. Now it is time to research your problem as much as possible. Becoming an expert at your topic is what real scientists do in real labs.

So How do you become an expert?

YOU READ!!!!

READ about your topic. READ encyclopedias. READ magazine articles and books from the library. READ articles from the internet. Take note of any new science words you learn and use them. It makes you sound more like a real scientist. Keep track of all the books and articles you read. You'll need that list for later.

YOU DISCUSS!!

Talk about it with your parents. Talk about it with your teachers. Talk about it with experts like Veterinarians, Doctors, Weathermen or others who work with the things you are studying. (*hint: take pictures of yourself interviewing people)

Whew…..

Then when you think that you can't possibly learn anymore and the information just keeps repeating itself. You are ready to…

Write a Prediction

Now it is the time to PREDICT what you think will happen if you test your problem. This type of "SMART GUESS" or PREDICTION is what real scientists call A HYPOTHESIS. Using this fancy word will amaze your friends and will have you thinking like a fully-fledged scientist.

So how do you begin? Well, just answer this very simple question:

What do you think will happen, (even before you start your experiment)?

Example Problem: Which Paper Towel is more absorbent?

Example Hypothesis: I think Brand X will be more absorbent because it's a more popular brand, it is thicker and the people I interviewed said that the more expensive brands would work better

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Now it's your turn:

Write down the problem and create a Hypothesis based on what you have researched.

Problem:_____

_____

Research: My problem is about this subject: _____

Books I found in the library on my topic are:

Title: Author:

_____

_____

_____

Internet sites that I found on my topic are:

_____

_____

_____

People I talked to about my topic are:

_____

_____

_____

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Some important points that I learned about my topic are

- _____
- _____
- _____
- _____

Hypothesis: I think that _____

(will happen) because (my research shows…) _____

_____

_____

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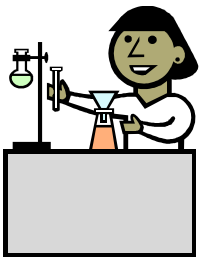
Step 3: Testing your Hypothesis by doing an experiment



Now we've come to the good part. The part that all scientists can't wait to get their grubby little hands on… you guessed it… The EXPERIMENT! Designing an experiment is really cool because you get to use your imagination to come up with a test for your problem, and most of all, you get to prove (or disprove) your Hypothesis.

Now our rules state that you cannot perform your experiment live, so you'll have to take plenty of pictures as you go through these seven very simple steps.

First: **Gather up your materials**: What will you need to perform your experiment? The safest way to do this is get that adult you recruited to help you get the stuff you need. Oh, did we mention to take pictures or draw pictures of your materials. This will come in handy when you are making your board display.

Second: **Write a METHOD**. A method is a list of steps that you did to perform an experiment. Why do you need to write it down? Well it's like giving someone a recipe to your favorite dish. If they want to try it, they can follow your steps to test if it's true. Scientists do this so that people will believe that they did the experiment and also to let other people test what they found out. Did we mention to take pictures of yourself doing the steps?

Third: **Make it fair.** The variables are any factors that can change in an experiment. Remember that when you are testing your experiment you should only **test one variable at a time** in order to get accurate results. In other words, if you want to test the affect that water has on plant growth, then all the plants you test should be in the same conditions, these are called **controlled variables:** same type of dirt, same type of plant, same type of location, same amount of sunlight, etc. The only variable you would change from plant to plant would be the amount of water it received. This is called the **independent or manipulated variable.** The independent variable is the factor you are testing. The results of the test that you do are called the **dependent or responding variables.** The responding variable is what happens as a result of your test. Knowing what your variables are is very important because if you don't know them you won't be able to collect your data or read your results.

Fourth: **TEST, TEST, TEST.** Remember that we expect your results to be consistent in order to be a good experiment, in other words, when you cook from a recipe you expect the outcomes to be the same if you followed the directions (or procedure) step by step. So that means you need to do the experiment more than once in order to test it properly. More is better! Don't forget to take pictures of the science project being done and the results.

Fifth: **Collect your DATA.** This means write down or record the results of the experiment every time you test it. You also need to organise it in a way that it is easy to read the results. Most scientists use tables and graphs to show their results. Organising makes the results easy to read, and much easier to recognise patterns that might be occurring in your results.

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WHAT KIND OF PROJECT?

RESEARCH

You are now ready to begin planning your project by researching your question. You can get information from encyclopedias, books, pamphlets, the internet and interviews. Look for information from several different sources.

SCIENCE DAY RULES

1. All projects must be approved by the teacher before beginning.
2. A contestant may only enter one project.
3. More than one student may participate on a project.
4. Teachers or parents may advise. Parents should have students do the actual work.
5. The following are prohibited: dangerous chemicals, open flames, explosives, or animal experiments that involve starvation or any other form of cruelty.
6. Electrical switches and cords needed for exhibits must be approved by the teacher. There will be no electrical outlets available, however, at the Science Fair.
7. Expensive or irreplaceable fragile items should not be displayed. Valuable items essential to the project should be simulated or photographed.
8. School and teachers assume no responsibility for loss or damage to any exhibit.

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Model Science Fair Project Success Criteria

You will use many HPL skills to complete the tasks. Below are some examples of the skills that may help you with your project!

1. **SKILLS AND PROCEDURES**

   Precision, Strategy Planning and Creative & Enterprising

   Has appropriate research been carried out?
   Has this been linked to concepts the children already know?
   Does the project answer a specific question?
   Has the experiment been used to answer the specific question?

   Flexible Thinking, Critical & Logical Thinking and Self-regulation

   Has a hypothesis been formulated? (answers the question)
   Was the scientific method followed to test the hypothesis?
   Were the observations and measurements recorded?
   Was data analysed accurately?
   Was an accurate conclusion drawn based on observation and data?
   Was the conclusion in a logical order and did they effectively critique their findings?

   For Demonstrations:

   Imagination and Abstraction

   Did the demonstration work?
   Did the demonstration teach the desired topic?

2. **UNDERSTANDING**

   Multi-Step Problem Solving and Connection Finding

   Were project and procedures clearly explained?
   Was the scientific principle explained and understood?
   Was the research presented accurately?
   Was the importance of this information clearly explained?

3. **DISPLAY**

   Intellectual Confidence

   Was the display creative, neat, attractive, colourful, and appropriate for the project?

Were effective graphs used to display data?
Were graphs clearly labeled?
Does the display contain accurate research information?
Was the display student-generated?