

# SCIENCE FAIR LOGBOOK

## Introduction

Every science fair project must include a logbook, also sometimes called a research notebook, which is a complete, permanent record of how you did your experiment/research project; it shows what you did and thought about every step along the way.

**LOGBOOK POINTERS:** write your logbook in a notebook make an entry every time you work on your project date each entry make your notes in point form don't worry about neatness; you do not need to re-copy your logbook to make it look "tidy" organize your logbook into sections such as: schedule, daily notes and ideas, background research, contacts and references, experimental procedure/method, data collection sheets, observations/results in tables and graphs, conclusions Write everything down, even if it seems insignificant at the time; the information may be useful later on Make sure that you describe things in enough detail that you and anyone else reading your logbook in the future will be able to understand your thoughts and repeat the entire experiment exactly like you did it in the first place, just using your logbook. You must create your logbook as you go; it is unacceptable to create your logbook on the computer after you have finished your project

**NOTE:** The text that appears on your backboard/tri-fold is just a summary of what you write in your logbook; there is much more information in your logbook than what appears on your backboard/tri-fold.

## LOGBOOK CONTENT:

Timetable : Come up with a timetable for doing each of the steps of your project and try to stick to it

Choose a Topic: make a list of topics that interest you, things that you are really curious about and that you want to find answers to; explain how you came up with your topic, why you decided to do it.

Background Research: Record your background research about your topic from books, magazines, TV programs, the Internet (with supervision), people and companies. Keep a record about where you gathered your information for your bibliography/list of references and acknowledgements.

Testable Question/Purpose: Based on your background research, write down your testable question/purpose

Hypothesis: write down what you think the results of your experiment will be based on the research that you've done

Materials: List everything that you will need to do your experiment, such as equipment, ingredients, quantities of ingredients, measuring tools etc. Be very specific – give lots of details

Procedure: List the steps you will go through to do your experiment. If you make any changes to the procedure after you start your experiment, describe them in your logbook with an explanation about why you made the change(s) and if the change(s) will affect the results collected prior to the change.

Variables: list the controlled variables, the manipulated variable, and the responding variable

Data: record all of your measurements/raw data that you collected on data sheets in your logbook

Results: record your collected data in charts, tables, graphs, pictures and use these to help you explain what happened in your testing; describe any problems you might have had while you were testing , any changes that you had to make to your original plans, and whether those changes would affect the results collected before you made the changes

Conclusions: write down your conclusions, whether or not your hypothesis was correct and why. It is OK if your results do not support your hypothesis - the information you collected still supports science.

Recommendations/Applications: Make recommendations for improving your project, for further study, and applications I can make from my research

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|---|
| Name: Sohaib Ehtisham   |
| Partner Name: X   |
| Type of Project: Experimental   |
| Project Title/Topic/Testable Question: The Invasion of E.M.R/Finding the levels of radiations in simple household items/Can a normal household item's E.M.R reach the level of harm? What is the cumulative amount of radiations to a person living in a household? |

| Timetable / Schedule  | Write down important goals/objectives and dates here:   |
|---|---|
| <ol style="list-style-type: none"> <li>1. Look through different projects and try one for confirmation if appropriate or not. Jan 1-7</li> <li>2. If not appropriate, start a project with many resources available. Jan 8-15</li> <li>3. I have chosen a project and will gather necessary materials. Jan 16-20</li> <li>4. Use available resources for already written info and background info. Jan 21-24</li> <li>5. Take measurements and data down for slides. Jan 23-26</li> <li>6. Improve slides for satisfaction of judges. Jan 27-28</li> <li>7. Finalize and cumulate all materials for the end result of the project. Jan 29-31</li> </ol> | <ol style="list-style-type: none"> <li>1. Sift through projects to find one of liking.</li> <li>2. Take info from available resources to make slides such as previous works and the internet.</li> <li>3. Take down measurements and data necessary for trifold.</li> <li>4. Finalize each and every detail to ensure judges satisfaction.</li> </ol> |

| <b>November 2024</b>                   |                              |           |           |           |                       |           |
|--|------------------------------|-----------|-----------|-----------|-----------------------|-----------|
| Sun                                    | Mon                          | Tue       | Wed       | Thu       | Fri                   | Sat       |
|  |                              |           |           |           | <b>1</b>              | <b>2</b>  |
| <b>3</b><br>Remembrance Day Activities | <b>4</b>                     | <b>5</b>  | <b>6</b>  | <b>7</b>  | <b>8</b><br>No School | <b>9</b>  |
| <b>10</b>                              | <b>11</b><br>Remembrance Day | <b>12</b> | <b>13</b> | <b>14</b> | <b>15</b>             | <b>16</b> |
| <b>17</b>                              | <b>18</b>                    | <b>19</b> | <b>20</b> | <b>21</b> | <b>22</b>             | <b>23</b> |

|    |    |    |    |    |    |    |
|----|----|----|----|----|----|----|
| 24 | 25 | 26 | 27 | 28 | 29 | 30 |
|----|----|----|----|----|----|----|

| <b>December 2024</b> |                    | <b>School Play</b> |                    |                    |                    |     |
|----------------------|--------------------|--------------------|--------------------|--------------------|--------------------|-----|
| Sun                  | Mon                | Tue                | Wed                | Thu                | Fri                | Sat |
| 1                    | 2                  | 3                  | 4                  | 5                  | 6                  | 7   |
| 8                    | 9                  | 10                 | 11                 | 12                 | 13                 | 14  |
| 15                   | 16                 | 17                 | 18                 | 19                 | 20                 | 21  |
| 22                   | 23<br>Winter Break | 24<br>Winter Break | 25<br>Winter Break | 26<br>Winter Break | 27<br>Winter Break | 28  |
| 29                   | 30<br>Winter Break | 31<br>Winter Break |                    |                    |                    |     |

| <b>January 2025</b> |     |     |     |     |     |     |
|---------------------|-----|-----|-----|-----|-----|-----|
| Sun                 | Mon | Tue | Wed | Thu | Fri | Sat |

|                   |    |    |                   |                   |                   |                   |
|-------------------|----|----|-------------------|-------------------|-------------------|-------------------|
|                   |    |    | 1<br>Winter Break | 2<br>Winter Break | 3<br>Winter Break | 4<br>Winter Break |
| 5<br>Winter Break | 6  | 7  | 8                 | 9                 | 10                | 11                |
| 12                | 13 | 14 | 15                | 16                | 17                | 18                |
| 19                | 20 | 21 | 22                | 23                | 24                | 25                |
| 26                | 27 | 28 | 29                | 30                | 31                |                   |

### Background Research

I had received 5 main sources that helped me really understand the concept of E.M.R and how it works. I first used <https://www.safespaceprotection.com> to get info such as, E.M.R can have a bigger effect on children but could also harm adults with illnesses such as blood disorder, headaches, birth defects, cataracts, cancer, and skin cancer. The rest of the sources were from videos and websites that provided me with much information like, EMF stands for electromagnetic fields. These consist of invisible electric and magnetic forces that emit radiation, which takes the form of waves. The human body and the earth itself create EMFs, but these are very low-level. However, many recent technologies create artificial EMFs. These are much more powerful — and more dangerous, and also that you are exposed to 100 million times more EMFs than your grandparents were. That's because most of the trappings of modern life – appliances, cell phones, wireless Internet, high-voltage wires and more – emit artificial EMFs that disrupt the body's natural energy field and can cause many health problems. The more EMFs to which you are exposed, the more likely and serious your risk is. I then used [https://youtu.be/BUYeOa\\_-ojk](https://youtu.be/BUYeOa_-ojk) to learn that light can be broken into different types, Infrared, Microwave, Radio, Ultraviolet, X-ray, and Gamma rays, altogether, they are called The Electromagnetic Spectrum. Gamma rays have the most speed while Radio rays have the least. Next, I used <https://youtu.be/nllCgjlWAF4> to learn that Electromagnetism refers to the interaction between Electricity and Magnetism, it is one of the four fundamental interactions of nature around us. The movement of electrons is referred to as Electricity, a moving Electric charge creates a

magnetic field, likewise, a changing magnetic field creates an Electric field. Lastly, I used <https://youtu.be/7v2gs8rdQzU> to learn that all the types of rays in the Electromagnetic Spectrum are all transverse waves, meaning that they Oscillate perpendicular to the direction of the energy transfer, also meaning up and down. The thing that differs between each type of ray is their wavelength and frequency.

## **Contacts and References**

X

## **Testable Question / Purpose**

Can a normal household item's E.M.R reach the level of harm? What I mean by a level of harm is a level that could give you illnesses and damage your health, and yes, a simple household item can give off a lot of radiation waves.

## **Hypothesis**

Since I have many household appliances that all give off E.M.R in my household, I will collect the data, then compare the readings between harmful and non harmful levels. Based on all the research, intelligence and knowledge I have gained, I think these household items will be at harmful levels which is over 2.5 milligauss (According to the Environmental Protection Agency).

## **Materials**

1. Electromagnetic radiation detector
2. Household daily appliances
3. Ruler
4. Notebook
5. pencil

## **Procedure / Method**

1. I made a list of appliances and electronic gadgets that need to be tested for E.M.R
2. Use the electromagnetic radiation detector to obtain data and reading for the next step.
3. Use the readings and data of E.M.R of the appliances and electronic gadgets when in use to create a table in which the distance of 2, 5, 10, and 15 cm.
4. I analyzed my data between harmful and unarmful levels using E.P.A guidelines.
5. I compared my results and tables with my hypothesis and concluded the project.

## **Variables**

Independent Variable (will change): My independent variable will be the appliances and electronic gadgets I take readings from.

Dependent Variable (change I will measure): The intensity of E.M.R coming out of the appliances and electronic gadgets in milligauss.

Controlled Variable (will not be changed): The distance from each appliance and electronic gadget from the E.M.R detector (2, 5, 10, and 15 cm)

### **Data**

I will take readings from a household that contains 12 appliances or electronic gadgets. After the readings are taken at 2, 5, 10, and 15 cm, I will compare each reading between harmful and unarmful levels based on guidelines from E.P.A (which is 2.5 milligauss from the Environmental Protection Agency).

### **Observation / Results**

I observed that most of the readings were at harmful levels, and also that different appliances can give off different radiations that could harm us severely, giving us mental and physical illnesses.

### **Conclusions**

- My research and results did support my hypothesis as most of the readings on my reading table was at harmful levels
- The electromagnetic radiations of an item can be recorded when the item is on or not.
- The kitchen is a hotspot for E.M.R as there are many appliances in that room, but other rooms are affected too.

### **Recommendations/Applications**

Recommendations:

1. Use corded phones instead of cordless phones
2. Use the dishwasher at night so that you will not be near it most of the time
3. When using a microwave or oven, keep a distance of 6 feet
4. Use hands free option on cell phones to avoid excessive E.M.Rs
5. Do not use laptops or ipads on your lap to avoid the absorption of E.M.Rs in your skin
6. Turn off your Wifi router when not in use, particularly before bedtime
7. Keep your cell phone on airplane mode while sleeping to avoid E.M.Rs

Applications for the future:

1. Increase my research by comparing more households to each other to ensure efficiency for more accurate reading on harmful and unarmful levels
2. Check the readings for different brands of different appliances and electronic gadgets being tested
3. Compare each reading test for appliances and electronic gadgets with other brands of different Electromagnetic radiation detectors