HUMANS ON THE MOON

Name:……

FarLabs
Freely Accessible Remote Laboratories

GHD Foundation

LA TROBE UNIVERSITY

telematics trust

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SCIENCE, RADIATION & THE MOON

Answer the questions below.

1. Define the iterative process:

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2. What is the scientific method and why is it useful?

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3. Describe and explain the source of the solar wind.

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4. Describe how the Earth's magnetic field (magnetosphere) protects us from the solar wind.

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5. Name the three different kinds of particle produced by radioactive decay of the atomic nucleus:

i. ……

ii. ……

iii. ……

6. Write down one way radiation is useful.

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7. Write one reason why radiation is dangerous to life

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8. Draw a picture showing how a Geiger Counter works:

9. Can you see radiation with the naked eye? (circle the correct answer)

YES NO

10. Write down one way radiation is blocked in a medical setting.

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HOW TO USE FARLABS

1. Head to https://www.farlabs.edu.au/
2. Click on the **Nuclear** button.
3. Open the **Turntable** tab and click **Explore**.
4. You should see 8 blue rectangular boxes on the left side. Click on the **Turntable number** your teacher has given you.
5. Click on the **Activate** button to log in to your station.
6. Clicking the buttons labelled **Source** lines up the Geiger counter with one of four real radioactive samples.
7. Clicking the buttons labelled **Absorber** puts a barrier made of a particular material in between the source and the detector.

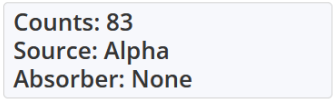
There may be a delay after clicking on the buttons. Please give it a few seconds.

α EXPERIMENT 1: ALPHA RADIATION

Method

1. Click on the **Alpha** source and in the Absorber column, click on **None**.

2. At the top left of your screen, you should see this graphic. Notice that the **Counts** number is changing? Give the turntable about 10 seconds to get started and then record five different counts in the table below.



3. Repeat this process for all five absorbers.

4. Once you have five counts for each absorber, calculate the average count for each in the space provided.

Results: Alpha Radiation

Absorber	1st Count	2nd Count	3rd Count	4th Count	5th Count	Avge
None						
Plastic						
Thin Aluminium						
Thick Aluminium						
Lead						

Analysis

What did you notice when you went from no barrier to a barrier?

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β EXPERIMENT 2: BETA RADIATION

Method

1. Click on the **Beta** source and in the Absorber column, click on **None**.

2 At the top left of your screen, you should see this graphic. Notice that the **Counts** number is changing? Give the turntable about 10 seconds to get started and then record five different counts in the table below.

3. Repeat this process for all five absorbers.

4. Once you have five counts for each absorber, calculate the average count for each in the space provided.

Results: Beta Radiation

Absorber	1st Count	2nd Count	3rd Count	4th Count	5th Count	Avge
None						
Plastic						
Thin Aluminium						
Thick Aluminium						
Lead						

Analysis

What do you notice when you go from no barrier to the different kinds of barriers? Was there a difference between the thin and thick piece of Aluminium?

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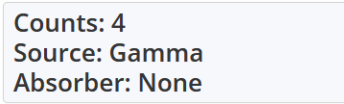
γ EXPERIMENT 3: GAMMA RADIATION

Method

1. Click on the **Gamma** source and in the Absorber column, click on **None**.

2. At the top left of your screen, you should see this graphic. Notice that the **Counts** number is changing? Give the turntable about 10 seconds to get started and then record five different counts in the table below.



3. Repeat this process for all five absorbers.

4. Once you have five counts for each absorber, calculate the average count for each in the space provided.

Results: Gamma Radiation

Absorber	1st Count	2nd Count	3rd Count	4th Count	5th Count	Avge
None						
Plastic						
Thin Aluminium						
Thick Aluminium						
Lead						

Analysis

Does anything affect the average number of counts for gamma radiation? If so, how?

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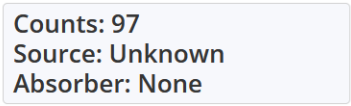
EXPERIMENT 4: UNKNOWN SOURCE RACE

Method

1. Click on the **Unknown source** and in the Absorber column, click on **None**.

2. At the top left of your screen, you should see this graphic. Notice that the **Counts** number is changing? Give the turntable about 10 seconds to get started and then record five different counts in the table below.



3. Repeat this process for all five absorbers.

4. Once you have five counts for each absorber, calculate the average count for each in the space provided.

Results: Unknown Source

Absorber	1st Count	2nd Count	3rd Count	4th Count	5th Count	Avge
None						
Plastic						
Thin Aluminium						
Thick Aluminium						
Lead						

Analysis

The unknown source will respond to the blockers in the same way as one of the three known sources. Does it have the same *activity* in counts per second?

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PRESENT YOUR PROTOTYPE

Before you present your prototype, check that your design has considered:

- [ ] gravity
- [ ] temperature
- [ ] water supply
- [ ] radiation
- [ ] air
- [ ] meteorite strikes
- [ ] moon dust
- [ ] food
- [ ] safety
- [ ] a healthy body
- [ ] mental health
- [ ] people and play