**Experiment 2: UV Radiation and Damage to Life – Pupil Sheet**

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| --- | --- | --- |
| LI: | We are learning about the topic of environmental change. (SCN 2-20b) |  |
| SC: | I can contribute to an experiment about harmful UV rays. |  |
|  | I can identify ways to block UV rays to avoid skin damage. |  |
|  | I can use a guide to determine the best UV block. |  |
|  |  |  |

1. *When you have finished the experiment, please traffic light the success criteria.*

**Equipment - you will need:**

|  |  |  |  |
| --- | --- | --- | --- |
| UV beads |  | paintbrushes |  |
| sunscreen |  | petri dishes or clear plastic |  |
| UV keyring torches |  | UV colour change charts |  |
| mixed materials |  |  |  |

* *When you have checked that you have each item, tick it off the checklist.*

**Conducting the Experiment**

* Observe the plastic beads using the colour chart to check shade before investigation.
* Put the UV (ultra-violet) beads into a petri dish or table in the classroom. Add the lid of some form of clear plastic covering.
* Apply a thin layer of sunscreen to the plastic covering.
* Before you shine the UV torch on the beads discuss your predictions in your group based on the following sentence stems:
  1. I predict that the beads will lighten/darken \_\_\_ shades because \_\_\_\_\_.
  2. I (dis)agree with \_\_\_\_\_ that the beads will lighten/darken \_\_\_\_ shades because \_\_\_\_\_.
  3. Due to the fact that, \_\_\_\_\_, I predict that there will be no change.
* Shine the UV keyring torch at about 8 cm above the dish for 60 seconds. *DO NOT shine the torch in anyone’s face.*
* Remove the plastic covering and observe the UV beads using the colour chart.
* Discuss your findings in your group based on the following sentence stems:
  1. Based on my findings, I can deduce that \_\_\_\_\_.
  2. My conclusion after conducting the experiment is \_\_\_\_\_.
  3. As the beads have \_\_\_\_\_\_\_\_\_, I can infer that\_\_\_\_\_\_\_.
* *When you have discussed your findings ask for the results guide.*

**Experiment 3:– UV Light and Damage to Life - Reaction Guide**

1. Based on your experiment, tick the result that you observed.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | No activity | Darkens by 0-2 shades | Darkens by 2-4 shades | Darkens by >4 shades |
| Sunscreen / material 1 |  |  |  |  |
| Sunscreen / material 2 |  |  |  |  |
| Sunscreen / material 3 |  |  |  |  |

1. What might happen in an experiment with no block?

The beads you are using change colour under UV light because of complex chemical changes (reactions) between the plastic and UV radiation.

1. How does this link to UV damage on planets?

Plastics are made of hydrocarbons like you and me (but obviously, our hydrocarbons are in a different form) so they are a good substitute for how UV radiation affects us. Ultraviolet radiation is damaging to life since it interacts with organic molecules and causes damage to them or makes them change chemical characteristics. It can damage important molecules such as DNA by breaking the strands or it can cause proteins to unfold or ‘denature’.

This experiment is focused on radiation as a damaging agent for life. Ultraviolet radiation in sunlight can limit the ability of life to grow.

* *Write down any new words or unfamiliar words and their meaning below.*

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* *Things to think about during your investigation - how do animals and plants life protect themselves against UV radiation (tanning)? What would life on a planet like Mars with no ozone shield be like? Why is the ozone hole on Earth is a concern?*