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| **SCIENCE EDUCATION PLANNER: YOU, ME AND UV** |
| **SCIENCE STRANDS:**Living WorldMaterial World | Physical World Plant Earth and Beyond | **MAIN IDEA:** Identify and describe the effects of UV and understand the importance of making lifestyle choices that can reduce exposure to UV, particularly in a New Zealand context.  | **LEVEL:** 1 2 3 4**YEAR:** 5 & 6**TEACHER:** Barbara Ryan |
| Nature of Science – understanding, investigating, communicating and participating and contributing. |
| **STRANDS/AOs:** | * Physical inquiry and physics concepts – identify and describe the effects of ultraviolet light.
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| **KEY COMPETENCIES:** * Thinking – using scientific evidence and knowledge of UV to make personal choices that will reduce the risk of cancer.
* Language – using scientific language related to UV and its effects.
* Managing self – learning will make students responsible to make lifestyle choices to reduce UV exposure.
* Relating to others – listening, discussing and sharing ideas within groups and in class.
* Participating and contributing – working together in investigating activities and subsequent discussion.
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| **INTENDED LEARNING OUTCOMES:** The students will: |
| **Conceptual LOs** | **Procedural LOs** | **Nature of science** | **Technical LOs** |
| Students will understand that:* ultraviolet (UV) light is part of a family of radiations called the electromagnetic (EM) spectrum
* UV can cause sunburn and skin cancer but also triggers vitamin D production, helps mood and is useful for sterilisation and disinfection by destroying some bacteria and viruses.
 | Students will be able to:* research using the Science Learning Hub to explore UV and some of the effects in New Zealand
* gather this information, discuss and record ideas
* use ideas and observations with ideas of others to make testable predictions
* investigate the effects of UV by setting up and carrying out some simple activities using UV detector beads
* evaluate investigations and report back to class.
 | Students will understand and appreciate that scientists:* try to find natural ways to classify things and have classified UV as a type of radiation and part of the electromagnetic spectrum
* often get involved in arguments, for example, whether UV is good or bad
* give results of data from research.
 | Students will be able to:* develop skills to carry out simple experiments in groups.
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| **MANAGEMENT/MATERIALS:****Resources:** [www.sciencelearn.org.nz/resources/217-you-me-and-uv-introduction](http://www.sciencelearn.org.nz/resources/217-you-me-and-uv-introduction),Worksheet: [What is UV?](#UV)  |
| **ASSESSMENT ACTIVITY EXAMPLES:*** Students produce a pamphlet, cartoon strip or PowerPoint slideshow to show an understanding of UV and lifestyle choices that can be made to reduce exposure to UV and possible risk of developing cancer.
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| **SCIENCE: PLANNING FOR TEACHING AND LEARNING: YOU, ME AND UV** |
| **MAIN IDEA:** Identify and describe the effects of UV and understand the importance of making lifestyle choices that can reduce exposure to UV, particularly in a New Zealand context. |

| **Micro task** | **Resources** | **Planned****interactions** | **Intended learning****outcomes** | **Reflections** |
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| **MESO TASK:** Finding out about UV. |
| Make a connection between UV and the Sun. | * Images>[Suntanners on the beach](https://www.sciencelearn.org.nz/images/210-at-the-beach)
* Images>[Sunburned back](https://www.sciencelearn.org.nz/images/1248-sunburned-back)
 | * Present images to class
* Discuss. What are these people doing? Why?
* What might be happening to them?
* What has happened to the girl in the second image? How?
 | Students will understand that: * New Zealanders enjoy the outdoors
* sunburn results from time exposed to sunlight.
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| Examine the electromagnetic spectrum. | * Worksheet[: What is UV?](#UV)
* Interactive>[The electromagnetic spectrum](https://www.sciencelearn.org.nz/image_maps/63-the-electromagnetic-spectrum).
 | * Discuss radiation and that the electromagnetic spectrum shows different electromagnetic waves.
* Demonstrate travel of waves by dropping a pebble into container of water.
* In small groups, work through/discuss the worksheet [What is UV?](#UV)  and [The electromagnetic spectrum](https://www.sciencelearn.org.nz/image_maps/63-the-electromagnetic-spectrum).
 | * Students will understand that scientists have found that the electromagnetic spectrum is made up of a number of different wave types.
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| **MESO TASK:** The effects of UV in New Zealand. |
| Investigate positive and negative effects. | * [Positive and negative effects of UV](https://www.sciencelearn.org.nz/resources/1304-positive-and-negative-effects-of-uv).
* [Vitamin D and UV](https://www.sciencelearn.org.nz/resources/1313-vitamin-d-and-uv).
 | * Is UV good or bad? Discuss.
* Read articles Positive and negative effects of UV and Vitamin D and UV in groups, then discuss as a class.
* Discuss the ‘conflicting’ science ideas that are involved with UV – UV can cause cancer vs UV can increase the amount of vitamin D in the body, which is important for bone health.
 | Students will understand that: * UV is important for providing vitamin D for our bodies’ health
* UV can cause cancer
* an aspect of the nature of science is that scientists get caught in controversies (e.g. Is UV good or bad?) when they present results of research.
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| Investigate UV intensity in New Zealand. | * Video>[UV and melanoma](https://www.sciencelearn.org.nz/videos/666-uv-and-melanoma).
* Video>Skin cancer [statistics in New Zealand](https://www.sciencelearn.org.nz/videos/672-skin-cancer-statistics-in-new-zealand).
* Video>[Why are UV levels high in New Zealand summer?](https://www.sciencelearn.org.nz/videos/87-why-are-uv-levels-high-in-new-zealand-summer)
 | Show:* Video>[UV and melanoma](https://www.sciencelearn.org.nz/videos/666-uv-and-melanoma)
* Video>[Skin cancer statistics in New Zealand](https://www.sciencelearn.org.nz/videos/672-skin-cancer-statistics-in-new-zealand)
* Video>[Why are UV levels high in New Zealand summer?](https://www.sciencelearn.org.nz/videos/87-why-are-uv-levels-high-in-new-zealand-summer)

Show Why are UV levels high in New Zealand summer? again and discuss reasons for higher intensity in New Zealand.Brainstorm ideas to help control our exposure to UV. | * Students will understand that New Zealand has a bigger problem with UV than other countries. We need to be aware of the intensity and effects of UV and think of ways to control our expose to it.
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| Investigate UV intensity using UV beads. | * UV beads.
* Activity>[Investigating UV intensity.](https://www.sciencelearn.org.nz/resources/1340-investigating-uv-intensity)
 | * Follow the instructions in [Investigating UV intensity](https://www.sciencelearn.org.nz/resources/1340-investigating-uv-intensity).
* Discuss results as a class.
 | Students will understand that: * the intensity of UV varies depending on interference between the Sun and us
* there are things we can do to lessen UV intensity.
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| Examine how effective sunscreens are at protecting us. | * UV beads.
* Sunscreens.
* Activity>[Investigating sunscreens](https://www.sciencelearn.org.nz/resources/1339-investigating-sunscreens).
 | * Discuss SPF as a class.
* Follow the instructions in [Investigating sunscreens](https://www.sciencelearn.org.nz/resources/1339-investigating-sunscreens). Students could bring sunscreens from home to test.
* Share results with the class.
 | Students will understand that: * the higher the SPF rating, the more protection we get from UV
* some brands of sunscreen are better than others at reducing UV even though they have the same SPF.
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| Make an item to monitor exposure to UV. | * Beads, string, wire
* Activity>[UV bead items](https://www.sciencelearn.org.nz/resources/1368-uv-bead-items).
 | * Follow the instructions in [UV bead items](https://www.sciencelearn.org.nz/resources/1368-uv-bead-items).
 | * Students will appreciate the need to monitor UV and are able to read the beads to know when to move to the shade, apply sunscreen, get a hat etc.
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| Assessment task. | * Activity> [The face of melanoma](https://www.sciencelearn.org.nz/resources/1365-the-face-of-melanoma).

**Teacher reference:*** Article>[Skin cancer risk factors.](https://www.sciencelearn.org.nz/resources/1331-skin-cancer-risk-factors)
 | * Talk about skin cancer risks.
* Follow the instructions in [The face of melanoma](https://www.sciencelearn.org.nz/resources/1365-the-face-of-melanoma).
 | * Students will show an understanding of lifestyle choices that help reduce exposure to UV and the risk of developing cancer.
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**What is UV?**

Ultraviolet light (UV) is produced by and comes from the Sun. We already know that the energy we receive from the Sun is in the form of heat and light. UV light (which cannot be seen) shines on the Earth along with visible light and heat. Of all the UV produced by the Sun, only a small amount reaches the Earth.



UV is energy that comes (radiates) from the Sun in waves. If you look on the electromagnetic spectrum to compare the different types of waves and energy, you will notice that the UV waves are just beyond the visible light and they are divided into three groups – A, B and C. Each group has slightly different wavelengths and energy. The upper part of the atmosphere filters out the UVC (shorter wavelengths) and most of the UVB. That means that we get UVA (the longer wavelengths) and a small amount of UVB.

UV travels at the speed of light. Humans cannot see it, but some animals, especially insects can see UV light and have marks on their body that reflect UV light.

**Discussion questions**

* Can you see ultraviolet light (UV)?
* Does it have more or less energy than visible light?
* Are UV wavelengths longer or shorter than visible light?
* How many types of UV light are there? Name them.
* Look at and discuss the interactive [The electromagnetic spectrum](https://www.sciencelearn.org.nz/image_maps/63-the-electromagnetic-spectrum)