



SunTalk # 4: From the New Mexico Solar Energy Association

Seeing Sunshine

How do you know when you're standing in the sun? Which of your five senses tell you what you need to know? You can't smell, or taste or hear sunshine; but you can see it, of course, and you can most certainly feel it.

The kind of **radiant energy** coming from the sun that we can see we call "sunlight". And you remember from science classes that a **prism** or a bunch of raindrops can split sunlight up into a range of colors - in fact into a rainbow of colors. Picture one of those brilliant summer rainbows. What color is on top of the rainbow? What color is on the bottom? What color is right in between? Ah yes, red on top - violet on the bottom - and green in the middle.

It turns out that our eyes have three types of color photo-receptors, roughly corresponding to red/yellow, yellow/green & blue/violet. In fact, each of these 3 photoreceptors is sensitive to a range of overlapping colors, and together they provide enough information for us to "see" all the colors of the rainbow.

When sunshine hits water or land or trees, some of its radiant energy **reflects** or bounces off. If that were not the case, we wouldn't be able to see those things at all. Most tree leaves look bright green. So - - what colors of the rainbow are being **absorbed** by those tree leaves and what color is being **reflected**? Green tree leaves apparently have little use for green light, so they bounce it on to you. Most of the other colors of the rainbow they keep for themselves.

Our eyes are naturally "tuned" to the color of sunshine. Light also controls the production of the hormone melatonin which follows the natural rhythms of sunrise & sunset to regulate the way our bodies work - (for more on that subject, search on the Internet for "circadian rhythms".) But the light that we can see is just a small part of the radiant energy that comes from the sun. Just above red on the rainbow scale is **infra-red**, which we can't see but night-vision cameras and rattlesnakes can. Rattlesnakes actually use a separate sensor to detect infra-red radiant energy. And just below violet on the rainbow scale is **ultra-violet**, which we can't see but most birds and bees can. Birds have a 4th photoreceptor in their eyes, which is sensitive to **ultra-violet radiant energy**. It's not that birds and bees can see things that we can't see, but they can certainly see colors that we can't see. So from a bird's eye view, you and I are partly color-blind!

Well, what about those night-vision goggles and rattlesnakes? They're seeing heat - aren't they? Well, not directly. They're really seeing **infra-red radiant energy**, not energy in the form of heat. Light and heat are two entirely different **forms of energy**, with very different properties. You understand this very well - or at least your body does. Your eyes can sense light, but not heat. Your skin can sense heat, but not light. And if you want to measure light and heat, you'll have to use two entirely different instruments.

The sun is "**incandescent**", or so hot that it glows - just like an old fashioned light bulb. And the resulting sunlight contains all the colors of the rainbow plus all kinds of other radiant energy that we can't see. But where does the infra-red radiant energy that night vision goggles and rattlesnakes "see" come from? It turns out that all warm objects glow in the dark - that's a fact - that's how the universe works. Your body is just warm enough to **radiate energy** in the form of **infra-red "light"**. That's why Seal Team Six, and Rattlesnake Team Buzz can "see" you, even in the middle of a cool dark night. If you were as 'hot' as you think you are, you would radiate some red light too, and everyone would be truly amazed. Many religious traditions describe radiant beings of one sort or another. You might want to check to make sure your halo or aura is on straight.

So the next time you feel like sitting in the sun for a while - enjoy! Your body is fine-tuned to sunlight. Sitting in the sun is the easiest possible way to be - - *enlightened*.

This sun-talk came to you from the New Mexico Solar Energy Association.

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