switch international

Wonder 8 x 30 min Episodes
40 x 5 min Segments

Episode 1 - Color

Seg 1 Chromatic Adaptation
Chromatic adaptation is the ability of humans to adjust to changes in brightness to keep up with the appearance of colors. this is the reason why we are able to perceive colors properly even though lighting in real environments change constantly.

Seg 2 Color-changing animals
Color changing in animals are developed adaptations which the animals use for various applications such as signaling their species or as a way to hide from predators. Animals that can change color have specialized cells called chromatophores that can alter pigmentation and light reflecting properties

Seg 3 How do we see the color pink
We are able to see pink because our brains are able to perceive variations in light and color. Although pink as a wavelength does not exist in the light spectrum, it is our brains that processes light in a such a way that we are able to perceive combinations of colors thus giving us a way to see colors like pink.

Seg 4 Blue wings, blue feathers
Blue rarely exists in nature. But due to evolution, structural features in the wings and feathers of some animals allow light to bend in ways that make it possible to reflect the color blue.

Seg 5 Snow camouflage
Snow camouflage, is a type of camouflage that certain creatures use to hide during winter. It is typically characterised by differing shades of grays and whites.

Episode 2 - Problems

Seg 1 Monty Hall problem
The Monty Hall Problem poses a counter-instinctive dilemma of picking a choice with a higher probability of winning. It has been calculated that switching from a player's initial choice to the last option possible, after eliminating all empty choices, instead of sticking with the initial choice gives a bigger chance of winning

Seg 2 The Birthday Problem
The Birthday Problem presents a situation that addresses brains' unintuitive response to exponents. We try to figure out why it's possible for only 23 people to have a 50% chance of sharing a birthday when there are 365 unique birthdays. The dilemma usually comes in when we gloss over the fact that even small groups can form several pairings, and we actually compute the probability of sharing a birthday by subtracting the chances of not sharing a birthday by multiplying individual probabilities with each other. The answers can be quite surprising when the math to be done is not instinctive for people

Seg 3 Gambler's ruin
Gambler's Ruin closes in on how a gambler with the smaller amount will always be the loser in the long run in a game of 50-50 chance with an indefinite number of rounds playing. Gambler's Ruin also debunks the 'luck' factor by emphasizing that each round played has its separate probability from previous rounds, thus maintaining chances of winning at 50%.

Seg 4 The Infinite Hotel Paradox
The Infinite Hotel Paradox shows how infinity, for all its vastness, cannot be fully grasped, especially when it goes beyond the confines of the countable infinity. The paradoxical part comes in when the union of two sets with infinite elements will still be infinity; adding, subtracting, multiplying, or dividing infinity with infinity is still infinity.

Seg 5 The Locker Riddle
The Locker Riddle stimulates how good and fast a person is at factorization. In the problem, the key is identifying which numbers from 1-100 are perfect squares, but the solution lies in the number of factors those particular numbers have. Perfect squares have odd numbered factors because one factor will be multiplied by itself and it only counts as one in the riddle's context, leaving those locker numbers open in an alternating open-close pattern.

Episode 3 – Nature's games

Seg 1 Carrion flowers
Carrion flowers are the unorthodox perception of flowers for they are rare, big, and very unpleasant. Other terms are stink flowers and corpse flowers. The biggest flower in the world, rafflesia arnoldii, is a carrion flower. These flowers are difficult to find and reproduce and could breed through cross-pollination by attracting flies and dung beetles.

Seg 2 Aposematism
Aposematism is a form of signalling that enables protection for both preys and predators by giving signs of poison and danger through showing off the bright colors and patterns on their epidermal layers that become associated with inedibility. Some species have developed mimicry based on aposematism in order to avail the protection aposematic colors give

Seg 3 Cuckoo Misdirection
Cuckoo misdirection demonstrates the mimicking abilities of a female cuckoo in order to find host nests to hatch her eggs. The female mimics a cry of a predator bird in order to frighten the hosts, leaving them vulnerable, thus the cuckoo can seize the chance to drop her egg on a host nest.

Seg 4 Pheromones
Animal pheromones are the chemicals secreted and released by different species to communicate with other organisms. There are various types serving different purposes, ranging from reproduction, to trailing, to alarms. Some pheromones are also specific to one species of animals.

Seg 5 Deimatic Behavior
Deimatic behavior is another type of defensive behavior in animals that also involves mimicry. It's the opposite of aposematism because while aposematism works by blatantly showing or signalling its danger or unpalatability, deimatic behavior relies on the element of surprise to startle predators in order for species to flee to safety.

Episode 4 - Perception

Seg 1 Saccadic Eye Masking
Saccadic eye movements are characterized as the fast movement of eyes when perceiving motion. These are so fast that they are blurred. To compensate for the blurriness, our brains mask these blurred visions to help us see a completed albeit masked version of sight

Seg 2 Plant Movement
While plants do not exhibit movement for locomotion or moving from place to place, they still exhibit movement in response to different stimuli. These movements are plant adaptations for food production, plant reproduction and survival.

Seg 3 The Language of Color
Language plays a major role in how people from different parts of the world perceive color. The fact that some languages completely lack terms for some colors that other languages have come to know offers insight on how much influence it has on the way people see colors

Seg 4 Color Blindness
Color blindness is the condition that makes people not able to properly see and perceive colors. Color blindness is the result of damaged or underdeveloped rods and cones. these are the light sensitive cells that can be found in the part of our eyes known as the retina which are responsible for seeing colors. Color blindness can either be genetic or caused by sustained damage to the retina over time.

Seg 5 Perspective Illusion
This is a technique used in illustrations to render scenes and objects in 3 dimensions with depth and foreshortening. The technique was pioneered by Italian painters during the renaissance period. It involves drawing objects with reference to points measured from a constant line of sight.

Episode 5 - Phantoms

Seg 1 Body Transfer Illusion
The Body Transfer Illusion is the illusion of perceiving another object to be part of your body. This is best exemplified by the rubber hand experiment where in a volunteer is a shown a rubber hand while their real hand is obscured. Both the fake and real hand is subject to the same stimulus and soon the volunteer will perceive the fake hand as theirs.

Seg 2 Autokinetic Effect
The Autokinetic Effect is the effect caused by subtle movements in our eyes when looking at dark environments. This causes stationary light sources to be perceived as moving even though they aren't.

Seg 3 Moon Illusion
The Moon Illusion is the illusion where the moon appears to change sizes during different periods in time when especially when it appears closer to the horizon in fact the moon's size remains constant. This happens because we are able to compare the moon's size with visual references like trees and buildings when it appears nearer the horizon

Seg 4 Geometric Illusions
Geometric Illusions are illusions that can literally be illustrated on paper. This type of illusions make use of geometric properties of renderings and illustration and make them appear different in terms of points, length and curvature.

Seg 5 Stereoscopy
Stereoscopy is the technique where in our eyes are made to perceive two images that make up one whole image. This technique enables us perceive 3 dimensions from 2 flat image sources.

Episode 6 – Art of illusion

Seg 1 Animation
Animation is the process and technique that involves creating the illusion of movement from still drawings and inanimate objects. It is achieved by displaying images with slight variations in a rapid and successive manner thus making our eyes perceive the illusion of movement.

Seg 2 Aviation Illusions
Aviation illusions are the sensory illusions associated with taking flight. When pilots take flight their vestibular system, the sensory system responsible for balance, is affected by conflicting stimulus from what the pilot sees and feels during flight.

Seg 3 Spinning Dancer
The spinning dancer illusion is an illusion that was created by Noboyuki Kayahara. One can either perceive the dancer as spinning clockwise or counter clockwise. This phenomenon is explained by Bistable perception which states that perception can be altered subjectively just by how an object is observed

Seg 4 Mirage
Mirages are a physical optical phenomenon that can be observed when there is a difference in the temperature in the surrounding air of an area. The different temperatures of the air causes light to refract and cause weird distortions when viewed at the correct angle. This can range from weird reflections to distortions and even the appearance of floating objects

Seg 5 Rainbow Formation
Rainbows are formed as a result of sunlight being refracted and reflected by tiny drops of water in the atmosphere. The water droplets act as prism that can split the sun’s white light into the spectrum of visible colors thus creating the effect of a colorful rainbow.

Episode 7 - Phenomenal

Seg 1 Iridescence
Iridescence is the phenomenon where surfaces reflect a multitude of colors at once and could change color perspectives upon shifting the angle of viewing. Iridescence is caused by interference, where light gets reflected or cancelled out by the structures of the surfaces.

Seg 2 Chemiluminescence
Chemiluminescence is the phenomenon of producing light energy through chemical reactions. The byproduct of a chemiluminescent reaction, instead of heat energy, is a photon or a light particle. Only selected compounds are capable of producing chemiluminescence, usually highly oxidized compounds when reacting with another compound.

Seg 3 Bioluminescence
Bioluminescence is a form of chemiluminescence, only that this occurs in living things. Special compounds collectively called as luciferin oxidizes upon catalysis by enzymes called luciferase, producing oxyluciferin. Upon decay, oxyluciferin releases photons or light particles. Bioluminescence serve different functions for each organism, but all for survival purposes.

Seg 4 Gemstone Coloration
A gemstone acquires its color through elements that are essential to its structure or through impurities, or elements that replace some of the metallic ions in the structure that will affect which colors in the visible spectrum gets absorbed or reflected.

Seg 5 Mechanical Plant Defenses
Mechanical plant defenses demonstrate how survival instincts are incorporated into plant morphologies and physiologies by growing or producing various defensive features such as thorns, spines, and prickles to the less obvious ones like trichomes and raphides and less aggressive forms of defense like thigmonasty.

Episode 8 - Sensory Tricks

Seg 1 Visually-Evoked Auditory Response
VEAR or Visually Evoked Auditory response is the type of auditory perception where our brains perceive to hear sounds in response to seeing something. In the case of the jumping pylon illusion, a thud sound is perceived even though there is no sound accompanying the animation.

Seg 2 Retinal Fatigue
Retinal fatigue is the term used to describe the condition when the photoreceptors in our eyes become tired or strained due to staring at one color for extend periods of time. The effect causes an afterimage of the complementary color to appear out of nowhere and will be temporarily visible for a few seconds.

Seg 3 Müller-Lyer illusion
The Müller-Lyer illusion is an optical illusion where parallel lines of the same length appear longer when perceived with different pointed arrowheads drawn at the ends. Possible explanations suggest that our minds tend to look at overall length rather than just the line's parts or segments when processing the image. Another possible explanation is that our minds tendency to look at angled lines and perceive patterns of depth.

Seg 4 Ames Room
The Ames room is a specially constructed room that features a distorted and skewed floor plan. when viewed from one angle, our brain is tricked into thinking that the perspective of the rooms is normal but when a person walks from one end to another the distorted floor angle makes it look as if the person changes size drastically.

Seg 5 Synesthesia
Synesthesia is a genetic condition that is present in at least 4% of the human population. People with synesthesia have hyper connected neurons that allow them to perceive a stimuli as interconnected with different senses. An example of which is the ability to see color while hearing sounds.