Hey, Colours, look at these cool photos of the Sun from SDO!

What's SDO?

SDO is NASA's Solar Dynamics Observatory Satellite. Scientists use SDO to study the Sun!

I can pull up SDO's images on my iPad!
THOSE ARE COOL IMAGES AND ALL BUT DON'T THEY HAVE A PICTURE OF THE REAL SUN?

HUH?

THEY ARE ALL THE REAL SUN!

C'MON EVERYONE KNOWS THE SUN IS YELLOW! LOOK, THIS ONE IS PINK AND THAT ONE IS GREEN. AND YOU EXPECT ME TO BELIEVE THE SUN IS TURQUOISE!

HEY ME TOO!
WELL THE SUN ISN'T YELLOW EITHER.

WHAT?!?!

AT LUNCH IN THE PARK ......

THE SUN IS ACTUALLY ALL COLORS OF THE RAINBOW...

OH, YOU MEAN EACH SDO PHOTO IS ONE OF THE SEPARATE COLORS OF THE SUN?
WELL, NOT EXACTLY...

YOU'VE SEEN A RAINBOW, RIGHT?

FRUSTRATED -

OF COURSE I'VE SEEN A RAINBOW. IN FACT, I AM A RAINBOW!

RAINBOWS SHOW ALL THE COLORS OF VISIBLE LIGHT, WHICH WE CALL WHITE LIGHT.

WHY IS VISIBLE LIGHT WHITE?

BECAUSE OUR EYES EVOLVED TO SEE...

...THE MIXTURE OF COLORS IN VISIBLE LIGHT AS WHITE LIGHT.
BACK IN THE CLASSROOM

BUT WHEN I MIX ALL COLORS OF PAINT TOGETHER, I GET ICKY BROWN?

YES, BECAUSE PAINTS ARE MADE OF PIGMENTS (MATTER) NOT LIGHT (ENERGY), SO THEY WORK DIFFERENTLY.

OK, SO MIXED PAINT = BROWN, BUT MIXED COLORS OF LIGHT = WHITE...??

THE SUN PRODUCES ENERGY, WHICH IS DIFFERENT FORMS OF LIGHT. LIGHT THAT WE CAN SEE WITH OUR EYES IS CALLED VISIBLE LIGHT AND IT LOOKS WHITE TO US. THAT'S WHY THE CLOUDS ARE WHITE, AND THE MOON.
OK, I get it. White light = visible light = some of the light energy we get from the sun that our eyes can see.

So, the sun isn’t yellow, it must be white!

Hmm, if the sun is white, why does it look yellow?

It doesn’t look yellow at noon, only at sunrise or sunset.

At sunset or sunrise the sun can appear very orange. This is because in that position the light is traveling a long way through the atmosphere which then scatters away a lot of the blue light and just leaves the orange and yellow light to reach our eyes.
Colors have wavelengths -- just like waves at the beach can be large or small.

Like these big waves, the colors red and orange have long wavelengths.

Like these small waves, the colors blue and violet have short wavelengths.

When little waves (short wavelength) hit big rocks, they get scattered in all directions and never reach shore.

When big waves (long wavelength) hit those same rocks, they roll right over them.
WHEN SUNLIGHT GOES THROUGH THE EARTH’S ATMOSPHERE, THE AIR MOLECULES ACT LIKE ROCKS WITH THE OCEAN WAVES.

SUNLIGHT AT NOON GOES THROUGH VERY LITTLE ATMOSPHERE, HENCE NOT TOO MANY “ROCKS” . SO MOST COLORS (EXCEPT BLUE) GET THROUGH AND THE SUN LOOKS WHITE.

WHY NOT BLUE?

BLUE IS A VERY SHORT WAVELENGTH COLOR. WHEN IT HITS THE AIR MOLECULES, IT GETS SCATTERED AWAY JUST LIKE THE LITTLE OCEAN WAVES DO.

SO THE BLUE GETS LOST?

AH, NOT ALL OF IT GETS LOST. SOME OF IT GETS STUCK IN THE UPPER ATMOSPHERE, BOUNCING AROUND. THAT CAUSES OUR BLUE SKY!
COOL - THE BLUE SKY COMES FROM SHORT-WAVELENGTH BLUE LIGHT HITTING AIR MOLECULES AND BOUNCING AROUND IN OUR UPPER ATMOSPHERE!

BUT IF VIOLET IS THE SHORTEST WAVELENGTH OF LIGHT, WHY ISN’T THE SKY VIOLET?

ARGH.... BECAUSE OUR EYES DON’T SEE VIOLET VERY WELL.

OK, SO BLUE AND VIOLET BOTH GET SCATTERED AROUND IN OUR UPPER ATMOSPHERE, BUT OUR EYES CAN’T SEE THE VIOLET....

BACK TO THE COLORS OF THE SUN -- AT SUNRISE OR SUNSET, THE SUNLIGHT HAS TO GO THROUGH A LOT OF AIR. THE ONLY COLORS THAT GET THROUGH THE LONG "ROCKY" ATMOSPHERE ARE REDS, ORANGES, AND YELLOWS (LONG WAVELENGTHS).
OK, THE SUN IS REALLY WHITE. AND WHITE LIGHT IS MADE UP OF ALL COLORS OF THE RAINBOW.


HOWEVER, AT SUNRISE OR SUNSET, ALL THE SHORT WAVELENGTH COLORS HIT THE MOLECULES IN THE AIR AND GET SCATTERED AWAY. SO ONLY THE LONG WAVELENGTH COLORS LIKE RED, ORANGE, AND YELLOW GET THROUGH.

I GET IT!!!!

WHHEW!

YEAH!!!
SO, COULD OTHER PLANETS HAVE DIFFERENT COLORED SKIES AND DIFFERENT COLORED SUNSETS???

YES, BUT THAT’S ANOTHER STORY....

AND YOU NEVER EXPLAINED WHY THOSE SDO IMAGES WERE SUCH FUNNY COLORS.

STAY TUNED!

THAT WILL HAVE TO BE FOR ANOTHER TIME!

MORE TALES FROM STANFORD SOLAR AT -
HTTP://SOLAR-CENTER.STANFORD.EDU/COMICS
FOLLOW CAMILLA AND COLOURS!
WOULD YOU LIKE TO LEARN MORE ABOUT THE SUN? HERE ARE SOME GREAT LINKS TO CHECK OUT!

FOR STUDENTS:

THE STANFORD SOLAR CENTER HAS A LARGE COLLECTION OF ACTIVITIES, Videos AND IMAGES TO EXPLORE
HTTP://SOLAR-CENTER.STANFORD.EDU/ACTIVITIES/GREENSUN.HTML

FEATURES OF THE SUN
A GREAT INTERACTIVE GAME WHERE YOU ARE A SOLAR SCIENTIST!
HTTP://LASP.COLORADO.EDU/HOME/EDUCATION/K-12/PROJECT-SPECTRA/SOLARFEATURES-INTERACTIVE/

SPACE WEATHER CENTER
LOTS OF GREAT GAMES AND FUN ACTIVITIES
HTTP://WWW.SPACEWEATHERCENTER.ORG/ACTIVITY_PAGE/01/01.HTML

FOR TEACHERS:

THE STANFORD SOLAR CENTER HAS A LARGE COLLECTION OF LESSONS, MOSTLY 4-12
HTTP://SOLAR-CENTER.STANFORD.EDU/TEACHERS/

SDO FOR EDUCATORS
ELEMENTARY AND SECONDARY LEARNING UNITS
HTTP://SDO.GSFC.NASA.GOV/EPO/EDUCATORS/

NOVA’S SUN LAB
GREAT LESSONS AND STUDENT ACTIVITIES
HTTP://WWW.PBS.ORG/WGBH/NOVA/LABS/LAB/SUN/

OUR STAR THE SUN
COLLECTION OF SUN-THEMED CLASSROOM RESOURCES FROM NASA’S SOLAR AND HELIOSPHERIC OBSERVATORY
HTTP://SOHOWWW.NASCOM.NASA.GOV/classroom/classroom.html
TALES FROM STANFORD SOLAR

STORY: DEBORAH SCHERRER AND EMILY KELLAGHER
DESIGN: EMILY KELLAGHER

WHAT COLOR IS THE SUN?

THE 1ST INSTALLMENT OF “TALES FROM STANFORD SOLAR”, A COMIC BOOK SERIES ADDRESSING MISCONCEPTIONS AND TOPICS IN SOLAR SCIENCE.

FEATURING OUR FRIENDS CAMILLA CORONA AND COLOURS O’IRIS

PROJECT COLLABORATION:

STANFORD SOLAR CENTER
HTTP://SOLAR-CENTER.STANFORD.EDU/

CIRES EDUCATION OUTREACH
HTTP://CIRES.COLORADO.EDU/EDUCATION/OUTREACH/