No. 51

SCIENCE SPAZA

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DIAMONDS – HELPING SAVE LIVES!

DIAMONDS – MORE THAN JUST PRETTY...

Because diamonds have this remarkable strength they are used to make special tools. ***Drill Bits*** manufactured from diamonds can cut through solid rock with ease and last longer than other types of drilling tools. This large drill is used to drill for oil underground.

https://commons.wikimedia.org/wiki/File:Oil-rig-BC-north.JPG

This picture shows a tool that makes use of a diamond to ***cut glass***. Diamonds are even used to create ***delicate tools*** which are used by doctors during surgery.

Knowledge is Ncah!

LET'S MAKE IT CLEAR!

YOU WILL NEED:

- A CLEAR AND A GREEN PLASTIC BOTTLE (REMOVE THE LABEL)
- SOME WHITE PAPER
- A LIGHT SOURCE (TORCH OR LAMP)

1 STAND BOTTLES 30 CM FROM A WALL. STICK THE PAPER BEHIND IT ON THE WALL.

SHINE THE LIGHT AGAINST THE GREEN AND THEN THE CLEAR BOTTLE. WHICH LIGHT ON THE PAPER IS BRIGHTER?

2 WHILE SHINING THE LIGHT THROUGH THE BOTTLE, HOLD YOUR FINGER OR AN OBJECT JUST IN FRONT OF THE PAPER. WHICH SHADOW IS CLEARER? THE ONE IN FRONT OF THE GREEN OR WHITE LIGHT?

THINK ABOUT IT...

WHY DO YOU THINK THE ONE SHADOW WAS ***CLEARER*** THAN THE OTHER?

WHAT HAPPENED TO THE LIGHT STRIKING THE GREEN BOTTLE?

WHAT'S HAPPENING HERE?

MATERIALS OR OBJECTS ARE CALLED ***TRANSPARENT*** (SEE THROUGH) IF THEY ALLOW LIGHT TO PASS THROUGH THEM. SOME OF THE LIGHT CAN BE ***ABSORBED*** IN THE MATERIAL. IN YOUR EXPERIMENT YOU WILL SEE THAT THE SHADOW IS ***CLEARER*** WHEN MOST OF THE LIGHT PASSES THROUGH THE BOTTLE. SOME DIAMONDS ARE TRANSPARENT TO VISIBLE LIGHT AND THEY APPEAR CLEAR WITH NO COLOUR.

Optics is the study of how light behaves when it touches an object.

All objects reflect light, some more strongly than others.

Most objects ***absorb*** (soak up) light

Some let light ***go right through*** them

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DIAMONDS CAN SAVE LIVES!

X-ray
X-rays are used by doctors to take photos of the inside of a person's body.

Diamonds are made of ***carbon atoms***. Because of the special arrangement of the carbon atoms, most visible light ***passes through*** the diamond.

X-rays are absorbed in the diamond in a special way that allows us to use this to tell us how much x-ray light is being used. Diamonds are now being used in ***mammography*** to measure how much x-ray light goes into a person's body. This is important because ***too much x-ray light can be dangerous*** for a person.

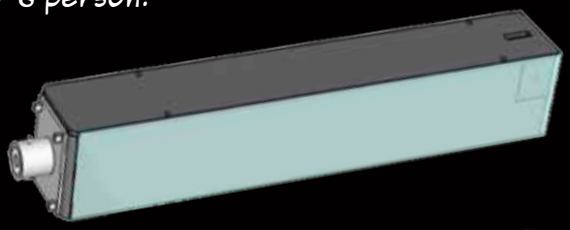

Illustration of the probe used for measurement

CAREERS:

Optical engineers design parts of machinery and instruments that use optics or light. Things like microscopes and telescopes as well as lasers and fibre optic cables are designed by optical engineers. They need to understand how light works and how it can be used for different things.

Radiologists are special medical doctors who work with special machines that generate x-rays, ultrasound and MRI scans to find out what is wrong with a person. They need to understand how these machines work as well as how the human body works.

Diamond cutters are highly skilled people who takes rough diamonds that have been taken out of the ground and cut them into different shapes and then polish them until they are shiny jewels. These diamonds are then used by jewellers to make rings, earrings and necklaces.

Dr. Nicholas Ade is a scientist who studied at the University of Buea in Cameroon where he got his science degree. He then studied for his PhD from the University of Wits in physics. Dr. Ade dedicates his life to discovering how to use diamonds to assist in the world of medicine and in breast cancer detection. He loves what he does because it helps fight cancer. One day, you could also be a scientist who helps save lives with science too!

CURRICULUM LINKS

- ***Grade 7: Natural Sciences*** – physical properties of materials, natural resources and conservation in South Africa.
- ***Grade 9: Natural Sciences*** – visible light refraction, reflection absorbent and the light spectrum, mining in SA and extracting and refining.

PUZZLE YOUR MIND!!!

LIGHT HAS MANY USES. MATCH THE DESCRIPTION ON THE LEFT WITH THE PICTURE ON THE RIGHT:

- LENSES ARE USED TO FOCUS LIGHT TO HELP PEOPLE SEE BETTER.
- LENSES AND LIGHT ARE USED TO MAGNIFY VERY SMALL OBJECTS.
- LIGHT IS SO STRONG AND FOCUSED IT CAN BE USED TO CUT THROUGH METAL.
- LIGHT IS FLASHED OUT TO BE USED AS A WARNING.

CAN YOU COME UP WITH SOME MORE USES OF LIGHT?

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Source: commons.wikimedia.org/wiki/File:Laser_module.jpg

Laser beam

Lighthouse

Glasses

Microscope

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The DST-NRF Centre of Excellence in Strong Materials (CoE-SM) – established in June 2004 – is a research network which focuses research on a wide range of strong materials. The CoE-SM has allowed both researchers and students to access the necessary expertise and equipment to conduct research that will make a contribution to the economy of South Africa.

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