Lava Lamp 2010 WHERE Challenge

The volcanic liquids inside of the lava are contained in a glass bottle. The glass usually contains silica, soda ash, limestone, magnesium, alumina and boric acid.

The base and the cap of the lava lamp are usually of alumi num or zinc alloys. Older vintage lamps use brass, silver, gold, bronze and some even had all glass bases. Cheaper versions have PVC bases and caps.

IPVC is a thermoplastic that is composed of 57% chlorine (derived from industrial grade salt) and 43% carbon (derived from oil/gas via ethylene). Other plastics are made of products of petroleum/crude oil.

The secret of the lava lamp

Why does the wax in the lava lamp move up-wards then after a period of time sink back to the bottom? Well the secret is that there are two substances in the lava lamp. At room tempera-ture the water and the propylene glycerol are lighter than the wax. But when heated the wax and tetra chloride become lighter and rise to the top. At the top they soon cool and become heavier again. This causes them to sink back to the bottom of the bottle. This is what causes the lava effect of the lava lamp.

Why is it important

The lava lamp has been a form of entertainment since 1963 and still is today. Edward Craven-Walker invented the lamp and sold it in the 60's saying "buy this instead of drugs". The lava lamp was popular through the 60's 70's and 80's and signs of re-popularization are present as lava lamp sales greatly improve.

Mínerals, element and ores

<u>Aluminum</u>

Auminum is used in the base of the lava lamp and the base of the light bulb. The natural form of aluminum alumina, is used in the glass bottle of the lava lamp. Bauxite is the main source of aluminum. Guinea and Australia has 40% of the world's bauxite ore. Brazil, Jamaea, and India also have major reserves. China, United States and Australia are the world's laugest producer of alumina. Alumina is then refined into aluminum metal. Russia, China, U.S., and Canada are the largest producers of aluminum metal.



Zinci sused in the base of the lava lamp as an alloy It is also used in brass and bronze. There is about 1.3 billion tons of zinc on earth. Discovered by Andreas Marggrat, zinc is a good conductor. The second largest use of zinc is in alloys. Zinc is minied in over 40 countries and China is the lead producer. Other producers are Australia, Peru, Canada, and the United States.

<u>Tungsten</u>

Turgsten is a grey-white metallic element discovered by Axel Fredick in 1758. Turgsten has the highest melting point of all the metals. Found in the ores scheeling and wolframice. Nearly half the word reserves are found in China. Canada and Russia also have large reserves. Major production of turgsten concentrates occur in Austria, Bolivia, Canada, China, Portuga and Russia. A significant amount of tungsten is recovered through recycling.

<u>Copper</u>



Copper is used in alloys such as bronze, brass, and new alloy with 3% beryllium. Copper is malleable and ductile. There is an estimated 1.6 billion tons of copper on earth. Large deposits are usually close to the surface. In addition another 0.7 billion tons are estimated to be in deep-sea nocluss as a product o deep-sea volcaric activity. USA, Australia, Canada, Chile, China, Netwoor, Pussia, Peru, Indonesia are major producers. Chile is the lead producer followed by Indonesia and the USA. Copper is rarely found as a natural mineral and instead is found as azurite, malachite, tennantite, chalcopyrite, and bornite.

Silicon

Silicon is the second most common element of the earth. 25 7% of the weight of the earth's crust is composed of silica. The shiny, dark grey tinde bue metal was discovered by Jone Jacob Berzelus. Feldspar and quatz (sand, silicon dioxide, silica) are the two major ores it is found in . Also found in taic, mica, and quatzite, silicon is never found in it's natural state. Silicon is found as a silicate (silicon and oxygen) or in silica (silicon dioxide) rich rocks. Silica is processed into silicon and formsilicon. Obsidian, grante, diorite, and sandstone are other silica rich rocks. Silicon ores are mined in U.S., Norway, Russia, Brazil, and Canada.



<u>Nitrogen</u>

Nitrogen is a coloriess, non-reactive, nonflammable and odoriess gas that makes up 78% of the earth's atmosphere. Most of the nitrogen is taken from the atmosphere, but minor amounts are mined from mines containing nitrogen. Sodium and potassium nitrate are mined in the Atacama desert o Chile.

<u>Tin</u>

Time a silvery-white metal formed in high-temperature veins and in igneous rocks. Tin alloys with copper to get bronze. Tin is most commonl found in cassertle (6nc) and is also found in granitie and rhyolite. Tin is found near tungster. Cassertle is mined in China, Bolivia, and Peru. Primary producers of thi are China, Indonesia and Peru. Some tin is produced in Brazil, Bolivia, and Australia. Tin resources are estimated to meet demands for many decades to come.



The substances in a lava lamp that make it so interesting to watch are solidified mineral oil a light paraffin, carbon tetrachloride, a dye and paraffin wax. The liquids in which the wax flows is 70% water and 30% propylene glycerol.

Inside of the base there is the hardware of the lava lamp. Some lava lamps use incandescent or halogen bulbs to melt the wax. Others contain both a bulb and a ceramic heater. A polarized plug is the standard in lava lamps

Oxygen

Oxygen is obtained by liquifying air Oxygen is used in components of glass, lightbulbs and plastics

HALOGEN BULBS

A halogen bulb is like an incandescent bulb, but the bulb is filled with a small amount of halogen gas such as iodine or bromine. The halogen gases and the tungsten react to cause the halogen cycle which extends bulb life. For the reaction to occur the bulb temperature must be higher than in conventional incandescent bulbs. The bulb must be made of a glass with a higher melting point and this is useful in lava lamps.



<u>Chlorine</u>

Chiorine is a yellow-green gas obtained by the electrolysis of sodium chloride in solution. Chlorine is abundant in the ocean in the form of salt. A common mineral containing chlorine is halle and is mimed in USA, China, Germany, Russia, and Canada.

<u>lodine</u>

odine is a shiny blue-black element that is used in halogen bulbs. dine is primarily retrieved from underground brines that are associa rith natural gas and oil deposits. It is also found in the ocean where with natural gas and oil deposits. It is also approximately 76 billion tons of iodine are ound. It is also retrieved as a by-product with nitrate deposits in caliche deposits. Chile is the number 1 producer followed by Japan and then Russia. Seaweed was a major source of iodine before 1959. , 8

Bromine



Bromine is a reddish-brown fuming liquid found in halog bulbs. Seawater is 65ppm of bromine. This means that there is 100 trillion tors of bromine in the ocas and 1 billion tons of bromine in the dead seas. Underground brines, located in Poland, U.S., and elsewhere, contain dditional millions of hom. The U.S. produces 50% of world's bromine nd Israel produces 40%.

Gold

The Secret formula: Revealed

The patent sent in by Craven Walker (the inventor of the lava lamp) says that the lava contains a solidified globule of mineral oil(prefera-by Onicina 17) with a light parafin, carbon tertachloride, a dye and a parafitn wax. The patent also says the liquid is 70% water and 30% providence hittened.

Paraffin is a name for hydrocarbons called alkanes. Paraffins are made of hydrocarbons. Hydrocarbons are molecules made of only

made of hydrocarbons. Hydrocarbons are molecules made of only hydrogen and carbon. Alkense are hydrocarbons with only single bonds and without any cyclic structure. Paraffin wax is the solid form of paraffins while mineral oil or paraffin oil is the logid form. A paraffin wax is a paraffin mixture of alkanes with a carbon number of more than 22. Paraffins are obtained from perfosium. Paraffin wax is obtained through the distillation of perfosium by solvent effining. Paraffin oil is to blained through the distillation of perfosium by solvent only natural form of paraffin wax is beeswax.





Carbon Tetrachloride

The production of carbon tetrachlorid steeply declined since 1980. In 1992 U.S., Japan and Europe produced 720,000 tons of carbon tetrachloride.

d Oil Reserves by Region

CI

CIM

Petroleum

I

-



<u>Manganese</u>

VICLI LYQLI ICSDE Manganese is a gray-white metal. The main ore of manganese is yrotusile. 80% of manganese resources are found in Ukraine and ouch Africa. Other important deposits are in China. Australia, Fazzi, abaon, India, and Mexico. Someday deep-sea hot springs or hydro-ermal vents, which are 25% manganese, may become a valuable ource of manganese and be worth mining

Patented Formula

propylene glycol. Ξ _

Paraffins



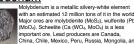
LIGH LOULD THE LIGHT BULB IS MADE OF MANY DIFFERENT PARTS. THE BASE OF THE LIGHT BULB IS MADE OF ALUMINUM OR BRASS. THIS LEADS TO THE FUSE WHICH IS MADE OF NICKEL, MANGA-NESE, COPPER, AND/OR SILLCON ALLOYS. THE WIRES IN THE STEM PRESS (WHICH IS MADE OF GLASTS) ARE MADE OF NICKEL-IRON AND HAVE A COPPER S. BLEVCE. THE HEAT DEFLECTOR. IS MADE OF CHROME. THE TIE WIRES AND THE SUPPORT WIRES ARE MADE OF MOLYBDENUM. THE BUTTON AND BUTTON ROD ARE MADE OF THE SAME GLAST SAT THE BULB FLUS LEAD. THE FILLAMENT IS MADE OF TUNGTER. THE GLASTS BULB CONTAINT SILLCA, SODA ASH, LIME, COAL AND SALT. THE GLASTS INSIDE ARE ARGON AND NITROGEN. THE LIGHT BULBS IN LAVA LAMPS ARE MADE OF HARD GLASS IN SITEAD OF RECU-LAR, CLASS. HARRO GLASS IN SITEAD OF RECU-LAR, CLASS. HARRO GLASS IN SITEAD OF RECU-LAR. CLASS. HARRO GLASS IN SITEAD OF RECU-LAR. CLASS. HARRO GLASS IN SITEAD OF RECU-ING. SHARRO GLASS IN SITEAD OF RECU-LAR. CLASS. HARRO GLASS IN SITEAD OF RECU-HARRON AND CAN WITHSTAND HIGHER FERENTLY AND CAN WITHSTAND HIGHER TEMPERATURES.



<u>Nickel</u>

INICKI is a silvery, shiny metal discovered by Axel Fredick. Nickel is one of the three naturally ferro-magnetic elements. Out of the three ferromagnetic metals it is the least magnetic. Nickel and iron are with make up the liguid outer core of the earth and the solid inner core. There are 140 million tons of nickel available in identified deposits. 80 % of nickel is found in laterile deposits and 40% is found in nick 60 % of nickel is found in laterite deposits and 40% is found in nickel sufficie deposits. Nicclifie is a major ore of nickel, large reserves of nickel are found in Australia, Canada, Cuba, New Caledonia, Indonesia, Philippines, and Russia. Leading producers of nickel are Australia, Canada, Norway and Russia. 87,000 tons of nickel are recycled annually. Manganese crusts and noclules on the cean floo could become a valuable source of nickel.

<u>Molybdenum</u>



<u>Silver</u>

Vive's inmined in 56 countries with the largest reserves in U.S., anada, Mexico, Peru, and China. 23 of silver's resources are found association with zinc, lead and cooper or deposits. Trace anound silver are found in gold, lead, copper and alnc deposits. Lead oducers are Mexico, Peru, Chile, Canada, and the USA. Silver's ost important ore is argentite (Ag.S).

lron

n, a dark, silvery metal, composes about 5% of the earths crust. ut of the three naturally magnetic elements iron is the strongest. Or arth there is 230 billion tons of the element iron and 800 billion tons iron resources. Principle ores are hematite (Fe₂O₃) which is 70% or iron resources. Principle ores are hematile (Fe₂O₂) which is 70% fron and magnetite (Fe₂O₂) which is 72% iron. Tacontie is a low-grade ron ore that is 30% hematile and magnetite. Iron-nickel is one of arifiest materials found in meteorities and the earth's core. Iron is mined workfwide in over 60 countries, but 15 countries produce 96% rft II. Major producers are Russia, Brazil, China, Australia, India, and ISA

Lead

act resources exceed 1.5 billion tons. Galena (lead sulfite), nglesite (lead sulfate), cerussite (Lead arbonate) are major ores of lead. USA is the ord/ds largest producer of lead. Other major roducers are Australia, Canada, China,

Peru, and Kazakhstan. Significant amounts of lead are being recovered as a by-product or co-product from zinc mining and silver-copper

<u>Soda Ash</u>

Socia Ash, made of trona and nahcolite, forms in streams carved out of volcanic rock. Soda Ash also forms in brines (sodium rich water) and in sodium rich minerals. There are deposits are located in USA, China, Bottswana, Uganda, Kerwy, Mexico, Peru, India, Egypt, South Africa, and in Turkey. Worldwide there are 60 known Soda Ash deposite.





<u>Hydrogen</u>

ydrogen is obtained in the reaction between methane gas and vater. It is also produced in the reaction of water and metallic iron at high temperatures. Another method of obtaining hydrogen is through e electrolysis of water. Hydrogen is present in many minerals.

<u>Magnesium</u>

agnesium is a silvery, white, shiny metal that is almost chiefly tained through the electrolysis of magnesium chioride. The ocean ratans virtually unlimited quantities of magnesium. Smaller antities of magnesium can be dound in the minerak, doiomite, agnesite, kieserite, bruche, camalite, cordierite, and diopsula. agnesium is mined in China, North Korea, Russia, Austria, ecce, and USA.

<u>_imestone</u>

= the chemical lime nestone is a form of the chemical lime. ne is a basic chemical found in calcium rbonate rocks, such as limestone or Iomite. Major producers of lime are USA, Inada, Mexico, Belgium, Brazil, China, ance, Germany, Italy, Japan, Poland, omania, and the U.K.

