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WORKSHEET - 5

Green Crackers

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WORK-SHEET

Part - 5

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Green Crackers

Indian Council of Scientific and Industrial Research (CSIR) has developed green crackers, which are new and improved formulations of the previous sound-emitting crackers and other fireworks.

What are green crackers?

They are less harmful and less dangerous than the conventional ones. They are the crackers with reduced emission and decibel level. They **are known as ‘green’ firecrackers because they have a chemical formulation that produces water molecules**, which substantially reduces emission levels and absorbs dust.

1. It promises a reduction in particulate matters and harmful gases, like nitrous oxide and sulfur oxide, by 30- 35 per cent.
2. The green crackers will be 25-30 per cent cheaper to manufacture and manufacturers would not have to make any changes in their facilities.

Background

- Concerned about the pollution levels and the role firecrackers played in exacerbating it, the Supreme Court in October 2018 banned the sale, use and manufacture of crackers that weren't ‘green’.
- This meant that the crackers couldn't be loud beyond a certain limit, had to be approved by the **Petroleum and Explosives Safety Organisation (PESO)** and had to be free of mercury, arsenic and barium. However, compliant crackers weren't available in the market.
- The Supreme Court, in May 2019, allowed the bulk manufacture of green crackers after the CSIR said its labs had been able to make trial samples and had them approved by the PESO.
- CSIR's project of development of green crackers adopted a two-pronged approach.
 - One stream of activity was focussed on improving the traditional crackers through **reduction in the level of Barium Nitrate**.
 - The second pathway aimed at **replacing Barium Nitrate** with a more benign Potassium Nitrate.
- The apex court is expected to take a decision on “improved crackers”, which have reduced levels of barium nitrate on 22nd October 2019.

PT Pointers

Petroleum and Explosives Safety Organisation

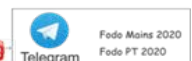
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- PESO is an office under the Department for Promotion of Industry and Internal Trade, **Ministry of Commerce and Industries**.
- It was established in 1898 as a **nodal agency for regulating safety of substances such as explosives**, compressed gases and petroleum.
- Its head office is located in **Nagpur, Maharashtra**.

National Environmental and Engineering Research Institute

- Council of Scientific & Industrial Research (CSIR) is an autonomous body under Ministry of Science & Technology, having **38 national laboratories** working in various areas of science and technology
- **CSIR-NEERI is one among those laboratories**.

Context: In a bid to resolve the crisis of air pollution, the Government has launched **green firecrackers**.

- These crackers are available as sparklers, flowerpots, maroons and atom bombs and have been **developed by the National Environmental and Engineering Research Institute (NEERI)**, a Council of Scientific and Industrial Research (**CSIR**) lab.
- CSIR has signed agreements with 230 companies to manufacture green crackers and make them available for sale.
- As per the CSIR’s assessment, green crackers would **reduce particulate matter pollution by 30%**.
- **Green logo as well as a Quick Response (QR) coding system** has been developed for differentiation of green crackers from conventional crackers. QR codes is a novel feature incorporated on the fire crackers to avoid manufacture and sale of counterfeit products.

What gives colour to the firecrackers?

Red: Strontium salts (Nitrates, carbonates and sulphates of strontium).

Orange: Calcium salts (Carbonates, chlorides and sulphates of calcium).

Yellow: Sodium salts (Nitrates and oxalates of sodium).

Green: Barium salts (Nitrates, carbonates, chlorides and chlorates of barium).

Blue: Copper salts (Carbonates and oxides of copper).

Purple: A combination of copper and strontium compounds.

White: The burning of metals like magnesium, aluminium and titanium).

- The new CSIR-NEERI formulation for green crackers has **NO barium nitrate** — one of the key ingredients of traditional firecrackers.
- These crackers have been named “safe water releaser (SWAS)”, “safe minimal aluminium (SAFAL)” and “safe thermite cracker (STAR)”.

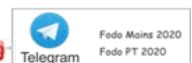
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- The three crackers release water vapour or air as a dust suppressant and diluent for gaseous emissions.
- These products can only be manufactured by those who have signed a non-disclosure agreement (NDA) with CSIR-NEERI.
- The green crackers will be sold with a unique logo on the box, and will also have a QR code with production and emission details.

SWAS and STAR

- They eliminate the use of potassium nitrate and sulphur, and reduce particulate matter like sulphur dioxide and nitrogen oxide by at least 30 per cent.
- The two types have matching sound intensity with commercial crackers, that is, in the range of 105-110 dBA.

SAFAL

- It minimally uses aluminium, which results in at least 35 per cent reduction in particulate matter compared to commercial crackers.
- Its sound intensity matches with commercial crackers in the 110-115 dBA range.
- The product categories include Chinese crackers, maroons, atom bombs, flowerpots, pencils and sparklers.

Toxic nature

Conventional firecrackers contain chemicals which produce effects like bright lighting and colours. However, these chemicals can have adverse effects on human health and the environment



Initial ingredient	Use in crackers	Health hazards
Charcoal, potassium nitrate and sulphur	Black powder which is the primary fuel in the cracker	The dust released is hazardous when inhaled; different compounds formed can be carcinogenic
Strontium and lithium	Colouring agent (Red)	Strontium can replace calcium in the body which can be toxic; Lithium releases harmful fumes
Barium	Colouring agent (Orange)	Fumes can cause respiratory and other health issues
Nitrates, chlorates/perchlorates	Oxidising agents	The compounds can hamper the growth of small children; they remain airborne for days and can be poisonous

Need:

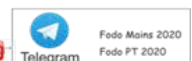
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1. With concern over pollution in major cities growing, there was a demand for a ban on firecrackers.
2. Legal battles to this end have been going on for about a decade now, though the movement has intensified in the last couple years.
3. A petition was filed in the Supreme Court on behalf of three infants in 2015 by their fathers asking for a complete ban.
4. With air pollution level going up 29 times above the World Health Organisation standards in November 2016, the Court suspended the sale of fireworks in the NCR, affecting 50 per cent of the total crackers sold in the country.
5. The Court also asked the Central Pollution Control Board (CPCB) and some others to conduct a study on the impact of bursting fireworks during Dussehra and Diwali on the health of the people.

For More reading THE HINDU : <https://www.thehindu.com/sci-tech/energy-and-environment/how-green-are-deepavali-crackers/article29807948.ece>

All the best
JAI HIND

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Class explanation- mind map

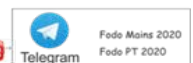
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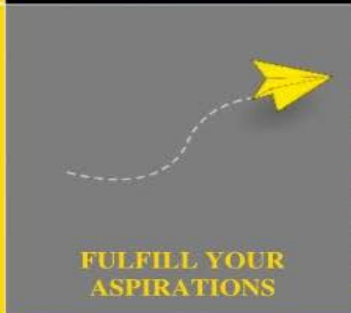
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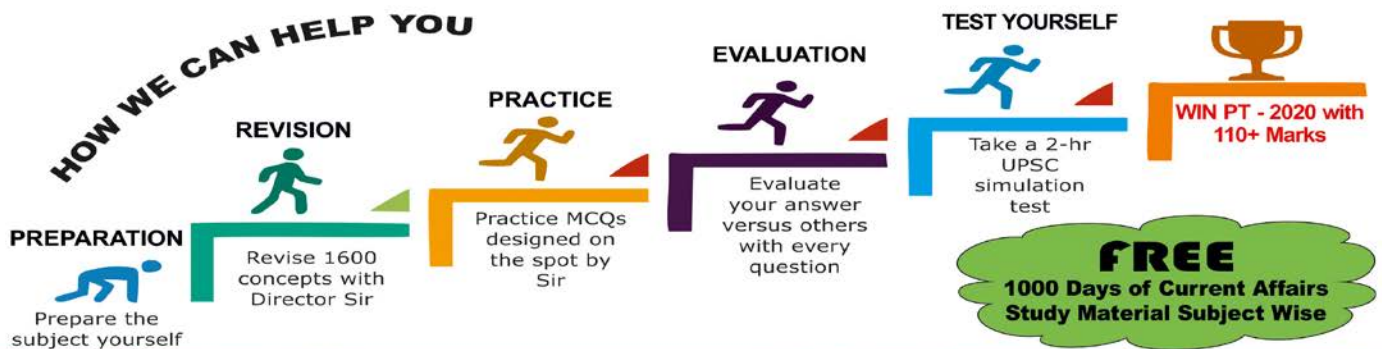
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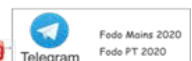
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