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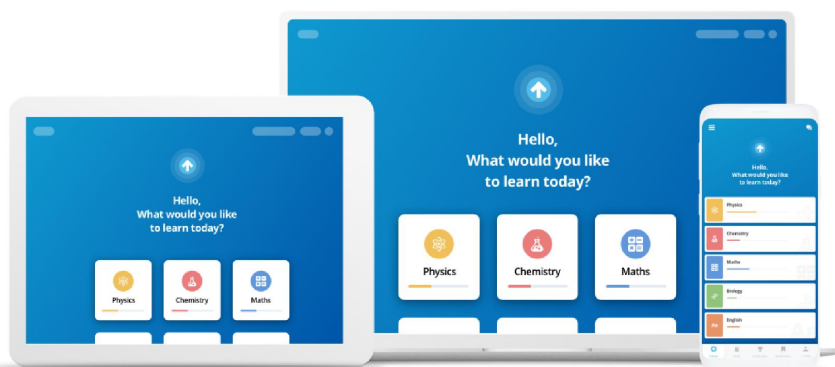
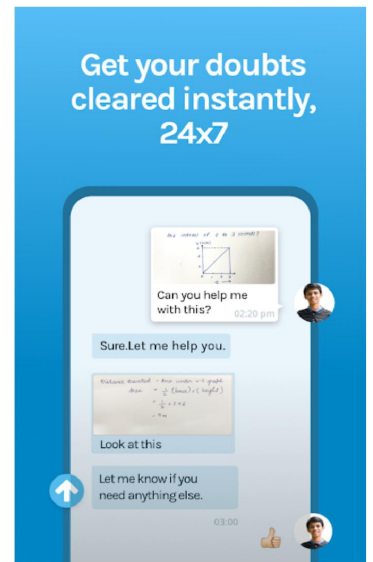
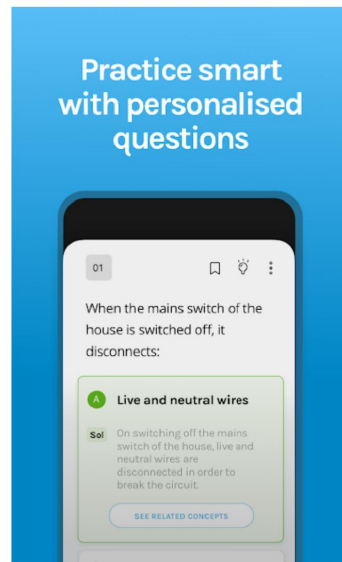
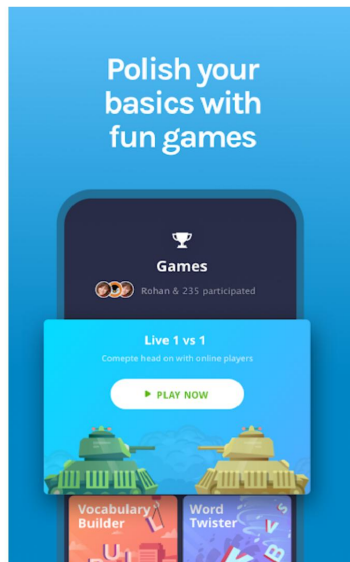
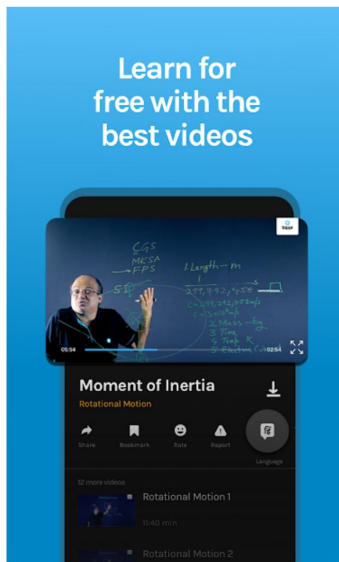
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- [Class 12 Business Studies](#)
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**#489274**

**Topic:** Sewage treatment and biogas

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Distinguish between the followings.

Biogas and natural gas

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**Solution**

Biogas is obtained from the decomposition of farm wastes, animal and human wastes by the activity of anaerobic bacteria. They are available in limited quantities and are most used in rural areas. It can be used as a clean-burning fuel. Decomposition of organic matter results in the formation of biogas, which has higher thermal efficiency in comparison to kerosene, dung cake, and charcoal. It gives no smoke and thus, quite useful as a fuel.

Whereas the natural gas is obtained in a natural form directly from nature due to the action of many microbes on the dead matter over long periods of time. The gas is available in large quantities and can be used as a source of power. It serves as a raw material in petrochemical industries. It is supplied for household use as LPG (Liquefied petroleum Gas) and also used for running vehicles as CNG (Compressed Natural Gas).

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**#526100**

**Topic:** Microbes in industry and household

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In which food would you find lactic acid bacteria? Mention some of their useful applications.

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**Solution**

Lactic Acid bacteria is found in the curd. These bacteria convert lactose sugar into lactic acid thereby promoting the formation of milk into curd. Lactic acid bacteria (LAB) have historically been used as starter cultures for the production of fermented foods, especially dairy products. Lactic acid bacteria (LAB) are widely used in many fields of human activity and especially in food preservation and in medicine. They are used for the synthesis of many heteropolysaccharides and homopolysaccharides.

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**#526103**

**Topic:** Microbes in industry and household

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Name some traditional Indian foods made of wheat, rice and Bengal gram(or their products) which involve use of microbes.

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**Solution**

Bread from wheat, dosa from rice and Khandvi from Bengal gram use microbes for fermentation during dough formation. Anaerobic fermentation by *Saccharomyces cerevisiae* serves the purpose.

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**#526107**

**Topic:** Microbes in industry and household

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In which way have microbes played a major role in controlling diseases caused by harmful bacteria?

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**Solution**

The antibiotics are substances produced by the natural metabolic processes of spore-forming aerobic bacteria and fungi as their natural defense against other microorganisms. Among bacteria and fungi, bacterial genera outnumber the fungal genera in the production of antibiotics. The highest numbers of antibiotics are derived from bacterial genera *Streptomyces* and *Bacillus* and fungal genera *Penicillium* and *Cephalosporium*. These antibiotics are used to control the disease-causing bacteria.

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**#526109**

**Topic:** Microbes in industry and household

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Name any two species of fungus, which are used in the production of the antibiotics.

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**Solution**

Antibiotics are the chemical substance produced by the micro-organisms like bacteria and fungi and used in the treatment and prevention of diseases which are caused by other bacteria and parasites. They may either kill or inhibit the growth of bacteria.

The common species of fungus used in the production of antibiotics are:

1. *Penicillium notatum* which is the source of Penicillin.
2. *Cephalosporin acremonium* which is the source of Cephalosporin.

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**#526126**

**Topic:** Microbes in industry and household

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Do you think microbes can also be used as source of energy? If yes, how?

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**Solution**

Yes, Microbes can be used as a source of energy. Gobar gas is a mixture of methane ( $\text{CH}_4$ ), carbon dioxide ( $\text{CO}_2$ ), hydrogen ( $\text{H}_2$ ) and hydrogen sulphide ( $\text{H}_2\text{S}$ ) with methane as a major component (65%). Methanogens are anaerobic autotrophic bacteria that convert carbon dioxide and hydrogen into methane gas. The hydrogen serves as an electron donor for reduction of carbon dioxide. Thus, methanogens produce gobar gas by anaerobic fermentation of biomass (dung) in presence of water.

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**#526133****Topic:** Biofertilizer

Microbes can be used to decrease the use of chemical fertilisers and pesticides. Explain how this can be accomplished.

**Solution**

Biopesticides and bioinsecticides are the living organisms that specifically inhibit the growth of pest and insects e.g., *Bacillus thuringiensis* (Bt) is a gram-positive bacterium that produces crystal proteins which are potent and highly specific insecticides. *Trichoderma harzianum* is a bio-fungicide and is used for suppression of various disease-causing fungal pathogens. Biofertilizers are the microorganisms which increase the nutrient availability from soil to plants thereby causing nutrient enrichment, for example, free-living and symbiotic nitrogen fixing bacteria and Cyanobacteria.

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**#526140****Topic:** Sewage treatment and biogas

Three water samples namely river water, untreated sewage water and secondary effluent discharged from a sewage treatment plant were subjected to BOD test. The samples were labelled A, B and C; but the laboratory attendant did not note which was which. The BOD values of the three samples A, B and C were recorded as  $20\text{mg/L}$ ,  $8\text{mg/L}$  and  $400\text{mg/L}$ , respectively. Which sample of the water is most polluted? Can you assign the correct label to each assuming the river water is relatively clean?

**Solution**

The presence of organic matter increases the microbe population which in turn increases the BOD i.e. BOD is a direct measure of pollution. Among the given samples, river water is the most pure one and will have minimum BOD (8 mg/L) while untreated sewage water is richest in organic waste and will exhibit highest BOD (400 mg/L). Part of organic waste removed by sewage treatment and secondary effluent has BOD of 20mg/L. The given samples in increasing order of pollutants are river water (B) < secondary effluent (A) < untreated sewage water (C).

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**#526141****Topic:** Microbes in industry and household

Find out the name of the microbes from which Cyclosporin A (an immunosuppressive drug) and Statins (blood cholesterol lowering agents) are obtained.

**Solution**

Cyclosporin A, a fungal product (*Trichoderma polysporum*), is an immunosuppressant that blocks the activation of T helper cells and interferes with the release of interleukin-2 and thereby prevents organ rejection in transplantation processes. Statins are the competitive inhibitors of the enzyme HMG CoA reductase, an enzyme of cholesterol biosynthesis and are produced by *Monascus purpureus*.

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**#526143****Topic:** Sewage treatment and biogas

Arrange the following in the decreasing order (most important first) of their importance, for the welfare of human society. Give reasons for your answer. Biogas, Citric acid, Penicillin and Curd.

**Solution**

Biogas is a mixture of methane ( $\text{CH}_4$ ), carbon dioxide ( $\text{CO}_2$ ), hydrogen ( $\text{H}_2$ ) and hydrogen sulphide ( $\text{H}_2\text{S}$ ) with methane as a major component (65%). Methanogens produce biogas by anaerobic fermentation of biomass in presence of water which in turn serve as an eco-friendly and economic source of energy. Penicillin is an antibiotic used in different bacterial infections. The curd is a fermented dairy product used by a human as a nutrient source. Citric acid is used as a food preservative.

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**#526144****Topic:** Biofertilizer

How do biofertilisers enrich the fertility of the soil?

**Solution**

A biofertilizer is a fertilizer that is made up of living microorganisms. When applied to the field it promotes the plant growth by increasing the supply or availability of primary nutrients to the host plant. This helps in increasing the fertility of the soil. Many species of bacteria and cyanobacteria have the ability to fix free atmospheric nitrogen. One of the major advantages with biofertilizers is they are eco-friendly and cost effective.