

Background

Oil production is a complex process that uses precise technology to extract, separate, and clean petroleum brought to the surface. Refineries have specific standards that they require suppliers to meet before they will accept the petroleum. The production of petroleum and natural gas is strictly regulated to minimize the negative effects on the environment and people.

This activity aims to explore the production process and its advancing technologies to better extract petroleum for products and energy use.

Materials

- Team notebook
- Jars of dry beans (“oil fields”) e.g. kidney beans and black eyed peas
- Small stones e.g. chuckies
- 3 containers labelled “Processing Oil”, “Refined Oil” and “Accumulated Oil”
- Small spoons
- Digital kitchen scales
- Optional: Big spoons or spoons with varied handle lengths for purchase in later rounds

Instructions

1. Form teams of 3-5 pupils on each team.
2. One person will be the driller, and one person will be the processor.
3. You will receive a set of jars which represent your oil field, one very small spoon, and three containers. One container is for processing oil, one is for refined oil, and the third is for accumulated oil.
4. Each jar contains a mixture of black eyed peas (oil), kidney beans (dirt and other contaminates) and stones.
5. You may mine the oil from any jar in any order. However, you may not pick up the jars, lean them over, use your fingers to extract beans, or pull out the rocks. You may only use your spoons to scoop beans out of the jars. The jars may not move.
6. Your teacher will set the timer for 30 seconds (one “year”) and tell you to begin.
7. During each timed period of 30 seconds, your goal is to get as much clean oil into the team’s refined oil container as possible. You will be penalized for contaminated oil and for any material outside of the containers.

8. One container can be used as an intermediate processing plant in which you may remove kidney beans and rocks, before placing in the refined container.
9. The processing and drilling must take place at the same time, and stop after the timer goes off. All activity stops immediately, and scoring occurs.
10. For each kidney bean (dirt) in the refined oil container, two black eyed peas are removed. Also remove the kidney beans.
11. For each black eyed pea spilled outside the containers, two black eyed peas are removed from the refined oil container.
12. All spilled and unprocessed oil must be discarded into the communal waste container for the classroom.
13. Measure that year's production by weighing the beans that remain in the refined oil container after penalties. Record the production in the team's notebook.
14. Add the current year's harvest to the team's accumulated oil storage container. You will use this stored oil to purchase tools and employees.
15. You may purchase better tools and hire more staff in between 30-second rounds. Your teacher will tell you how much each item costs. Be careful! The price of tools and staff will likely rise as the game continues.

Results

1. Use a computer or graph paper to graph your team's yearly production. How does your graph compare to the real global oil production? www.iea.org/aboutus/fags/oil

2. Did the oil in your oil field really run out?

3. Estimate the percentage of the original oil left in your oil field.



Assessment Questions:

1. What happens to production as the volume of oil in the ground decreases?

2. How is this model similar to the real world?

3. How is this model different to the real world?
