

Extracting Oil Lab

Goal: So far, we have explored ways to find oil. Now, they will have the chance to extract that oil and learn about the business of fossil fuel energy.

Materials: The same oil field used in part 1, the map produced in part 1, markers, ruler, chop stick, toothpicks, tape, reservoir volume and recovery rate cards.

Drilling Rules: Each group starts with a \$3 million drilling budget. The goal is to make money by extracting oil. To drill, a group attaches a drill bit (toothpick) to the drilling rig (chopstick). The group then uses the map generated in part one to drill in places they feel are likely to contain oil. The following budgetary rules apply:

-\$225,000 to set up the drill rig in a new location

-\$100,000 for each cm drilled

-\$500,000 for a broken drill bit and replacement

-\$500,000 for EPA infractions (disturbing the surface of the oil field)

How to play:

- Each team will use the oil field map they created using the seismic data provided by the Kearny Geological Solutions field team.
- The team will choose a grid square in which to drill, following the rules above.
- Once the team has located the oil, they **draw a card** representing the size of their reservoir (between 5 and 8 km³) and the **recovery rate of the oil** (between 25% and 50%). They can then calculate the amount of oil in the reservoir and the amount of oil extracted.

Amount of oil in reservoir = reservoir volume * 0.5 (due to rocks, sand etc)

Amount of oil recovered (km³) = Amount of oil in reservoir * recovery rate

Barrels of oil = Amount recovered (km³) * 6290 (Barrels/km³)

Money from sale = Barrels of oil * 93.76 (\$/Barrel)

Procedure

- 1) Measure and mark **each centimeter** on the chop stick
- 2) Attach the **drill bit (toothpick)**
- 3) Select the location for the first drill site and drill straight down. Make sure to note the depth of the drilling bit (cm).
- 4) Record the cost associated with the first site and the depth you drilled
- 5) If there was no oil, *select another site* and repeat the process (make sure to record all costs)
- 6) After oil is discovered, inform the site foreman (the teacher), select a **reservoir and recovery rate card** and calculate the total money spent and generated by this site.

Lab Questions:

- 1) Did your oil exploration and recovery efforts make money? Discuss which variables would you want to change to make your business more profitable.
- 2) Complete the “T chart” below, to show which aspects of this simulation were realistic, and which aspects did not mimic reality?

Realistic Variables	Unrealistic Variables

Discuss how some of these variables were unrealistic.

- 3) Summary: What was the purpose of this activity? What were some things you learned about oil exploration and extraction?