



# CALIFORNIA STATE SCIENCE FAIR 2010 PROJECT SUMMARY

<b>Name(s)</b> <b>Matthew J. Chaffee</b>	<b>Project Number</b> <b>J0702</b>
<b>Project Title</b> <b>Me and My Oil: Finding the Most Ideal Reservoir by Measuring Sedimentary Rock's Permeability and Porosity</b>	
<p style="text-align: center;"><b>Abstract</b></p> <p><b>Objectives/Goals</b> The goal of my project is to determine which of the most common sedimentary rock type (Sandstone, Shale or Limestone) provides the most ideal reservoir to store oil. The composition of the rock (especially its grain size and pore space) will affect its permeability and porosity. I believe Sandstone with the largest grain size and loose bonding between the grains will allow quick absorption and have the pore space to store the most oil.</p> <p><b>Methods/Materials</b> Instead of extracting oil, the design is to pour oil into the rock samples. The experiment ran six trials for each rock type utilizing two different oils. To measure the rate of absorption (permeability), five drops of oil were placed on the sample and timed to see how long it took to soak into the sample. To measure the rate of saturation (porosity), additional drops of oil were added one drop at a time until the oil pooled underneath the sample. Visual inspection was achieved by splitting or splintering the rock and measuring grain size to the Udden-Wentworth scale.</p> <p><b>Results</b> The Limestone rock samples absorbed the oil the fastest(14.97 seconds with organic oil and 6.97 seconds using inorganic oil) among the three rock types. Sandstone had the slowest absorption rate (25.20 seconds)when organic oil was used and had roughly the saturation rate as Limestone (17 drops of oil compared to 16 drops of oil held).</p> <p><b>Conclusions/Discussion</b> The three sedimentary rock types all had different permeability and porosity rates due to their composition and the visual inspection verified the oil's absorption and saturation as well as confirming grain size. My assumption that Sandstone would provide the best reservoir was incorrect, apparently, the silica bonding and size of its grains inhibited absorption and space for the oil. Limestone had the most effective permeability and adequate reservoir due to its skeletal fossil composition featuring interconnected pore space. My project information validated that exploration and drilling need to consider the type of sedimentary rock where oil is located.</p>	
<b>Summary Statement</b> How measuring the rate of permeability and porosity along with visual inspection can provide the most ideal reservoir for oil in sedimentary rock.	
<b>Help Received</b> My parents assisted me in using Microsoft Word and Excel and purchasing the rock samples from MineMe Geology.	