

# Changing in Ohio

## 5<sup>th</sup> Grade

Kelley Dunbar (modified from a lesson by Meghan Knapp), Mr. Bellamy and Mrs. Cargle

### References:

- Blast off on Ohio Science, Book 5. Profiles Corporation. 1998

### Benchmarks:

SLC 8: Propose and/or evaluate an investigation of simple physical and/or chemical changes.

Benchmark: A) Students will identify physical and chemical changes and compare their properties.

### Objectives:

Students will be familiarized with more abstract chemical/physical changes that are connected to industrial processes developed in Ohio. Students will use their knowledge of chemical and physical changes to distinguish these two, even though they may not be familiar with the procedures.

### Materials:

- motor oil
- Vaseline
- gasoline
- kerosene
- spoon
- clear bowl
- sheet metal
- steel kitchen utensil

### Initial Demonstration:

Set out the petroleum based products and ask the students what they have in common.

### Target Observations:

- The substances are oily or greasy.
- They all come from crude oil.

### Target Model:

- Many different products can be made with crude oil.

### **Procedure:**

Have the students describe the properties of crude oil. You may want to remind them of images they might have seen of oil wells, or that it was once called “black gold.” Basically, it is a thick (viscous) black liquid that is flammable. Have the students describe the properties of the products in front of you. What are some of the physical changes they can describe?

Tell the students that a man from Cleveland, William Burton (good time for a map of Ohio, can the students find Cleveland?), invented a process called “cracking.” This process involves high pressure and temperature. How can the students tell if this is a chemical change or just a physical change? Have the students review their notes on chemical and physical changes.

Students should note that new substances were formed and that they all have different properties than crude oil. Is the process easily reversible? Try mixing a sample of each product in a bowl to see if you can recombine them to form “crude oil.”

We don’t know how cracking works. However, we know something about the substances before and after. From this knowledge we can determine that cracking is not easily reversible, and that new substances with new properties are formed. From this information, we can discern that cracking is a chemical change.

### **Target Observations:**

- Crude oil can be transformed into many different substances.

### **Target Revised Model:**

- Many different products can be made from crude oil. The process to make them, called cracking, involves a chemical change.

### **Procedure:**

Show the students a steel kitchen utensil. Ask them if they know what it is made of. Ask the students how they would make a utensil such as this one from a lump of steel. (Many will probably say to melt it down and pour it into a mold). Show the students the sheet metal. Assume it is also made of steel. We need sheets like this to make machines and cars and things for factories. How would you make a nice flat sheet like this?

Tell the students that a man named John Tytus from Middletown, Ohio invented a process for making strips of “rolled steel” that made it much easier and cheaper to build cars. How can we tell if this process involved a physical change or a chemical change?

Have the students describe the properties of the sheet metal and the kitchen utensil (which will be our “lump”). The objects are different sizes and shapes, but they are both made from shiny, silver colored metal that is strong but flexible.

**Target Observations:**

- Some of the physical properties changed, but no new substances were formed.

**Target Revised Model:**

- Rolling steel involves a change in the shape of the steel.
- Rolling steel is a physical change- no new substances are formed.

**Summary:**

Crude oil can be turned into many different products using a process called cracking. This is an example of chemical change. Sheet metal steel is manufactured by rolling steel. This involves a change in shape- no new substances are formed. Rolling steel is a physical change.