Flat As A Flapjack

**Problem**: What are the key changes to substances during metamorphic rock (flapjack) formation?

**Research**: Refer to Chapter 4, Section 4 (pgs 106 – 111) in your text to review information about metamorphic rocks. \*\*Metamorphic rocks are formed from sedimentary, igneous, or other metamorphic rocks. ***These rocks are subjected to intense heat and intense pressure***. The heat and pressure is not quite enough to melt the rock, but it does cause the minerals in the rock to ***change their size, shape, or even combine with other minerals*** to form ***new or bigger minerals***.

**Hypothesis**: **10 pts**

If\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

then\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Ingredients:**

* **1 cup Hungry Jack Easy Pack Pancake Mix**
* **3/4 cup water**
* **1 tablespoon of 2 or 3 assorted foods**
* **2 T. of m&ms or chocolate chips, raisins, marshmallows**

**Procedure**: **10pts**

**1) Heat** griddle to medium-high or 375°.

**CAUTION: The griddle will become very hot!**

**2) Combine** pancake mix (dry) and water (wet) in mixing bowl. **Holding the bowl**, stir just until the large lumps disappear.

**3) Gently fold your measured,** assorted foods into the batter. (Batter should be lumpy).

**4) Using the ¼ cup measuring tool, Pour** slightly less than ¼ cup batter for each pancake onto hot griddle.

**5) Heat** 1 ½ minutes. Bubbles will begin to pop. Flip pancake and cook another 1½ minutes.

**6) Press down on** pancake between griddle and spatula **(add intense pressure)** until both sides are golden brown. Sorry- No fluffy pancakes!

|  |  |  |  |
| --- | --- | --- | --- |
| **Data: 30pts** | **3 bullets each** |  | **Dependent Variable****(y)** |
| **Ingredient** | **Physical Properties**(include the phase of matter) | **Earth Ingredient**(What real substance **under the surface** of the earth does this ingredient remind you of **& why!)** | **Final Observation**(what did the ingredient look like in the end) Did it change? HOW did it change? (YES or NO) (Disappear? Melt? include color and phase) |
| **pancake mix** | **-****-****-** |  |  |  |
| **water** | **-****-****-** |  |  |  |
| **raisins** | **-****-****-** |  |  |  |
| **marshmallows** | **-****-****-** |  |  |  |
| **chocolate morsels** | **-****-****-** |  |  |  |

**4 Data Questions/Observations: 20 pts**

1. What two ***geological processes*** are required for **earth-made** metamorphic rock to form?
2. Based on #1 above, what did the griddle represent?
3. Based on #1 above, what did the spatula represent?
4. Pancake before process: Pancake after process:



**Conclusion Paragraph: 30 pts**

Metamorphic rocks are formed from \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, \_\_\_\_\_\_\_\_\_\_\_\_, or other metamorphic rocks. ***The geological processes of these types of rocks are being subjected to intense \_\_\_\_\_\_\_\_\_\_ and intense \_\_\_\_\_\_\_\_\_\_\_\_\_.*** The heat and pressure is not quite enough to melt the rock, but it does cause the minerals in the rock to deform, or: ***change their \_\_\_\_\_\_\_\_\_, \_\_\_\_\_\_\_\_\_\_, or even combine with other minerals*** to form ***new or bigger minerals***. Regional metamorphism occurs when the material experiences pressure deep in the Earth’s Crust. It makes \_\_\_\_\_\_\_\_\_\_\_\_\_ metamorphic rocks (ex. \_\_\_\_\_\_\_\_\_\_) Contact metamorphism is when a rock is heated with nearby magma. It is called \_\_\_\_\_\_\_\_\_\_\_\_\_\_ metamorphic rock (ex.\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_).

Word Bank:

Foliated Gneiss Marble

Nonfoliated Shape Igneous

Contact Crystallization Size

Regional Composition Heat

Sedimentary Pressure