Chocolate Bar Challenge

Introduction

Oolite is a fascinating type of clastic sedimentary rock. Of all the chocolate bars that it could be compared with, it most closely resembles a delicious Cadbury Dairy Milk Bubbly bar.

Geological Explanation

Oolite is a clastic sedimentary rock, which means it is composed of fragments of rock that have been cemented together over long periods of time. These small fragments are called ooids (or ooliths) which are small and generally spherically shaped grains. The term ooid is applied to grains that are less than 2mm in diameter, so they are very small when seen with the naked eye. Figure 1 below is a picture of ooid sand which has yet to be cemented to form sedimentary rock and figure 2 is a picture of oolite from Germany. Figure 3 is a delicious Dairy Milk Bubbly chocolate bar for comparison.

Figure 1 – ooid sand.

Figure 2 – oolite rock

Figure 3 – Yum.

Each of the ooid grains starts to form around a very tiny type of centre (or 'nucleus') of a mineral. Over time (sometimes millions of years!) calcium carbonate or other types of mineral based rock forms around this nucleus and increases the size of the ooid grain. The term ooid and oolite are based on the Greek word for fish eggs (*oon*), because they resemble them so well. Most ooids are marine, forming in shallow saltwater such as in the warm water of the Persian Gulf. The movement of the water helps to shape and polish the ooids. Because the ooids form by adding layers of mineral rock over time, they can have a 'banding' pattern to them when examined microscopically – similar to growth rings on a tree. It is when these ooids are cemented together as the water dries up or when they are compressed at the bottom of the ocean or lake that they form oolite.

Similarities Between Bubbly and Oolite

1. Both have a surface appearance of bubbles – they don't have a flat smooth surface texture.
2. Both are made of smaller round shapes that are 'cemented' together into solid.
3. Both have a 'random' composition - there is not patterns to be found in either.
4. Both have 'grains' that are of various sizes and diameters in their composition.

Differences Between Bubbly and Oolite

1. Oolite rock must be composed of grains less than 2mm. Bubbly 'grains' are much bigger.
2. Oolite rock often has other debris or rock fragments in it – Bubbly is a more consistent appearance.
3. Oolite rock grain have a definite centre nucleus to them – Bubbly 'grain' are aerated in the middle.
4. Oolite rock is very dense (1.6g/cm^3) whereas Bubbly has low density due to the air pockets throughout.

New Chocolate Bar

If I worked for Cadbury and could make a new bar that more closely resembled oolite, it would definitely not have any air pockets in it like Bubbly does. The chocolate bar would be dense and made up of tiny balls of chocolate that are a slightly different texture that the chocolate used to 'cement' the ooids together. The cementing chocolate would be slightly darker a little less sweet than the chocolate balls throughout. This would mean that the consumer could feel the tiny ooids in their mouth as the chocolate dissolved. For realism, there would be a few fragments of biscuit mixed in to resemble other impurities in the rock.