MIXING COLORS EXPERIMENT

Materials


Milk
Food colouring
Dish-washing soap
black
red
green
yellow
blue
Dinner plate
Cotton buds

STEP1

Pour enough milk in the dinner plate to completely cover the bottom to the depth of about1/4 inch.

Note: Allow the milk to settle before moving on to the next step.

STEP2

Add one drop of each of the four colours of food coloring—red, yellow, green, and blue—to the milk.

Hint: Keep the drops close together in the center of the plate of milk.

Prediction 1

Predict what will happen when you add one drop of each of the four colours of food coloring in the dish containing the milk?

Observation 1:

After adding the colour droplets, the colours stayed on the surface. They didn’t mix with the milk.

STEP3

We are going to put a clean cotton bud into the middle of the milk.

Prediction 2

Predict what will happen when you touch the tip of the cotton bud to the center of the milk?

Observation 2

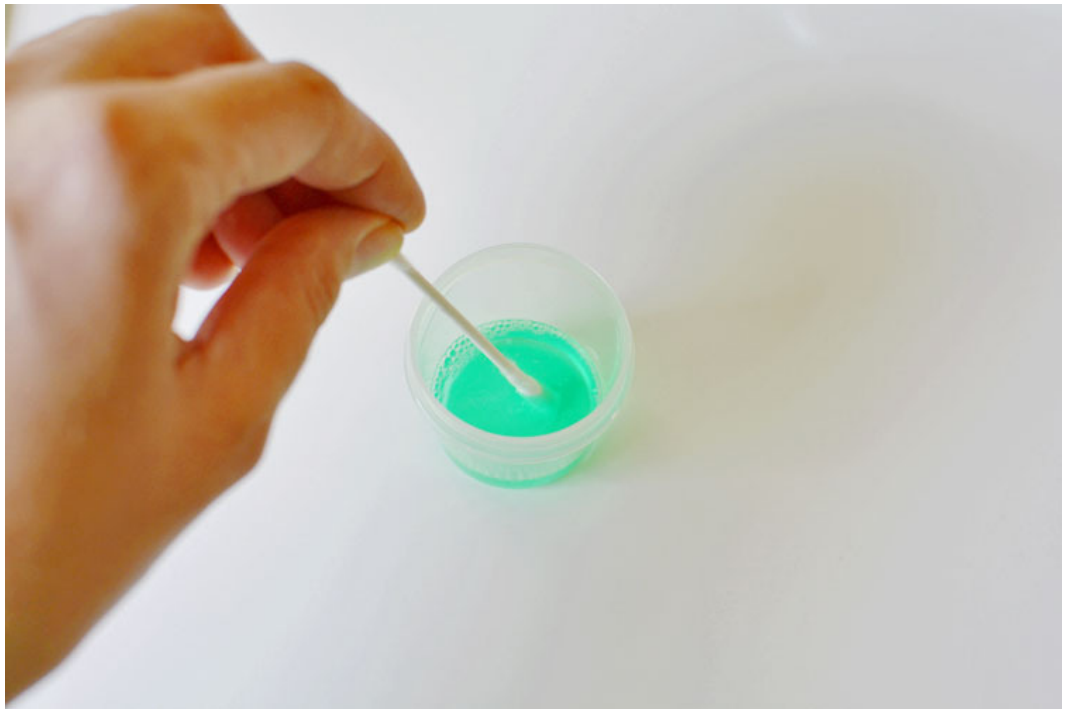
When we put the cotton bud in the middle of the colours,

Nothing happened!

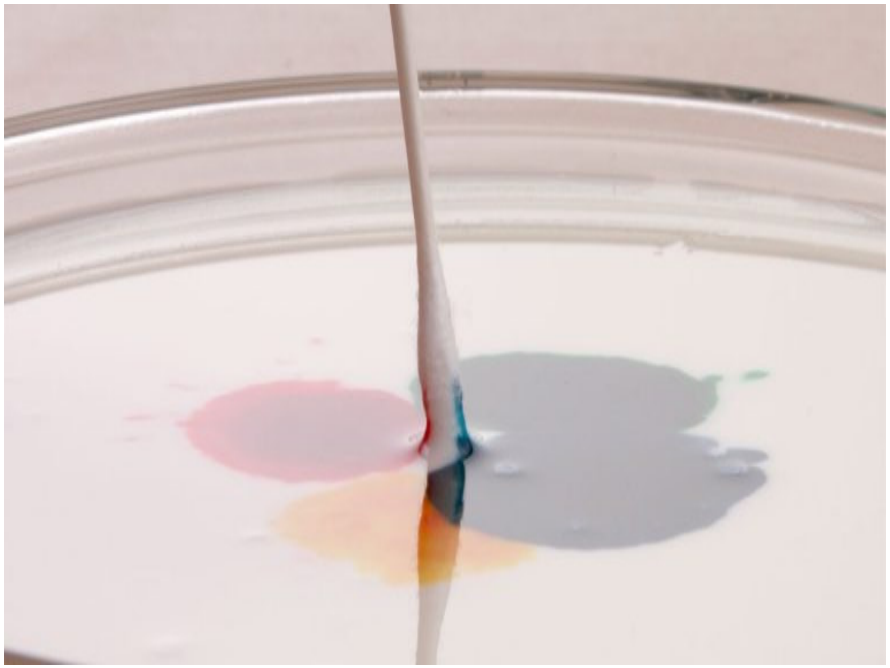
OR

The colours moved a little.

STEP4



Now place a drop of liquid dish soap on the other end of the cotton bud.



Place the soapy end of the cotton bud in the middle of the milk and hold it there for 10 seconds.

Prediction 3

Predict what will happen when place the soapy end of the cotton bud in the middle of the milk this time?

Observation 3

By adding a drop of soap, colours burst and seemed dancing around.

Some new colours appeared from somewhere.

STEP5

This time, we try with black food colouring. Put a drop in the middle.

Now each student of each group, dip the cotton bud in soap and then place it in the middle.

Prediction 4

Predict what is going to happen when touch with the soup bud this time?


LEARNING 4 KIDS

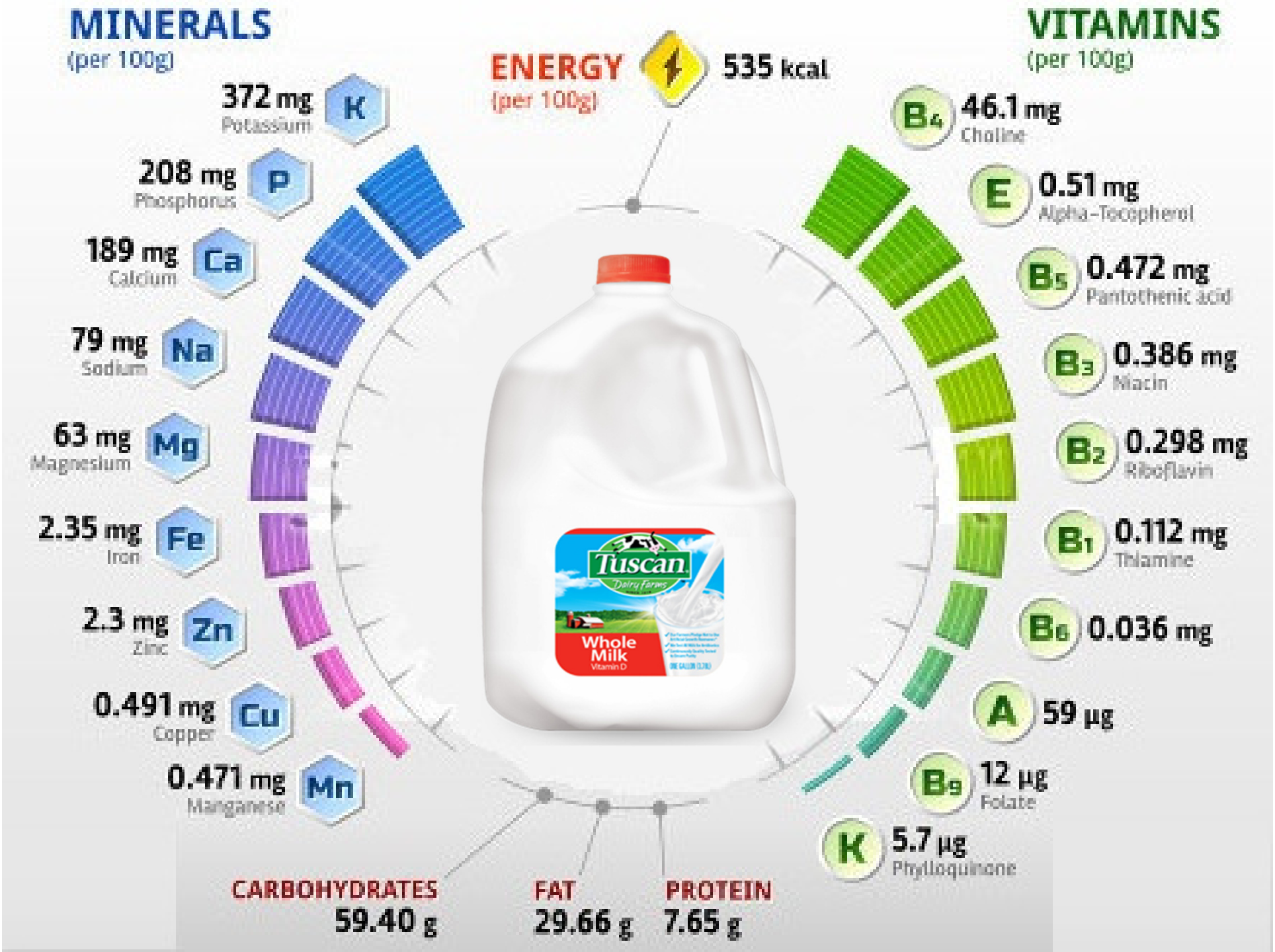
Observation 4:

Each student tell the groupmates that what colours appear from his / her original colour.

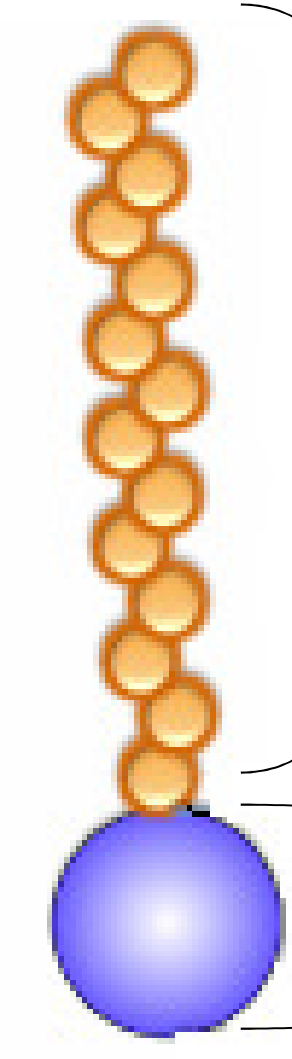
Let's Discuss...

What's in the milk?

Milk is mostly water, but it also contains vitamins, minerals, proteins, and tiny droplets of fat suspended in solution. Fats and proteins are sensitive to changes in the surrounding solution (the milk).


MINERALS
(per 100g)
372 mg Potassium K
208 mg Phosphorus P
189 mg Calcium Ca
79 mg Sodium Na
63 mg Magnesium Mg
2.35 mg Iron Fe
2.3 mg Zinc Zn
0.491 mg Copper Cu
0.471 mg Manganese Mn
ENERGY
(per 100g)
535 kcal
VITAMINS
(per 100g)
B4 46.1 mg Choline
E 0.51 mg Alpha-Tocopherol
B5 0.472 mg Pantothenic acid
B3 0.386 mg Niacin
B2 0.298 mg Riboflavin
B1 0.112 mg Thiamine
B6 0.036 mg
A 59 µg
B9 12 µg Folate
K 5.7 µg Phylloquinone
Tuscan
Dairy farms
Whole Milk
Vitamin D
CARBOHYDRATES
59.40 g
FAT
29.66 g
PROTEIN
7.65 g

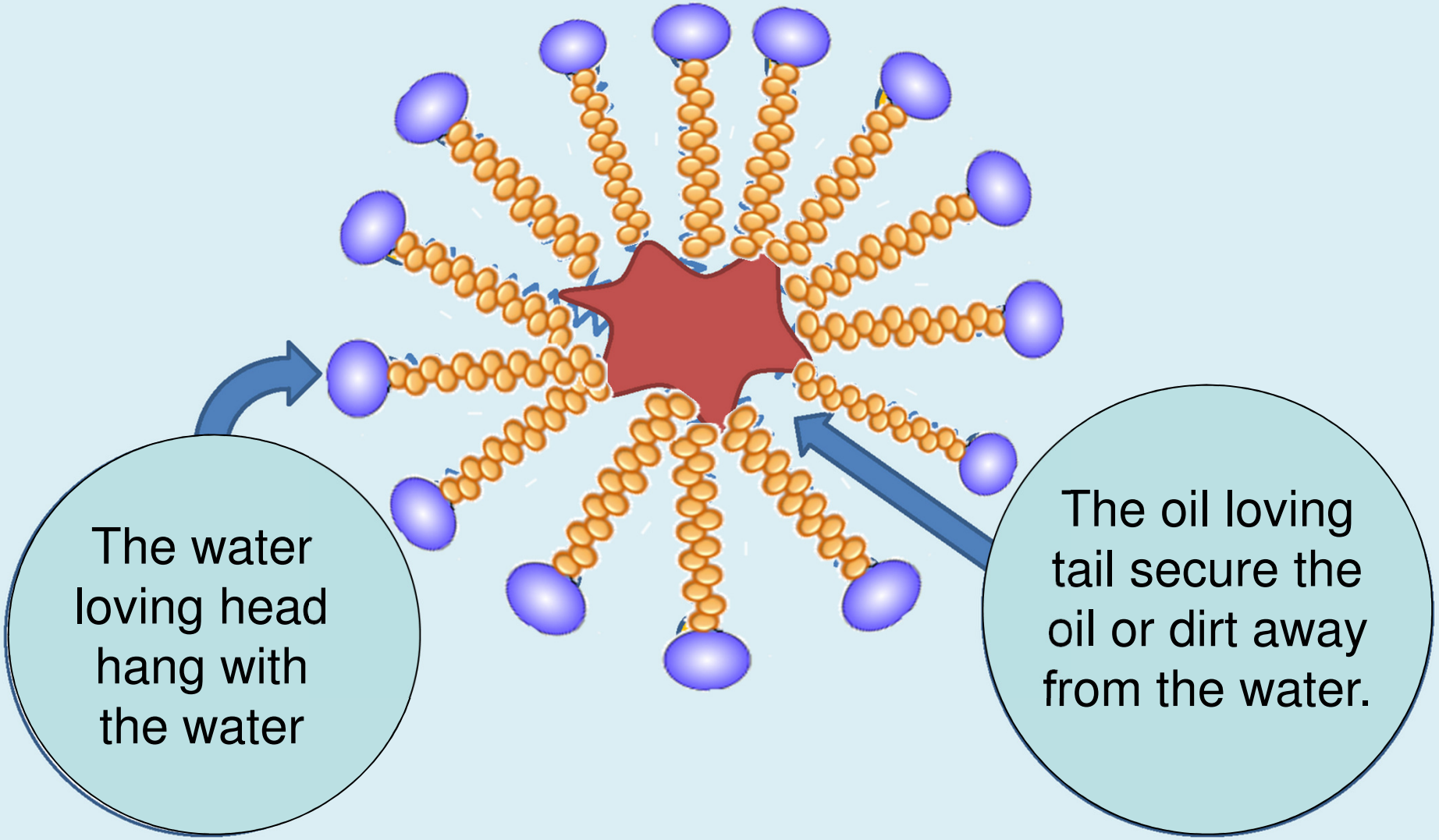
What's in the soap?



Non polar tail : It hates water but loves all other stuff e.g. dirt, oil, food etc.

Polar head :
It only loves water.

A Soap Micelle at Work



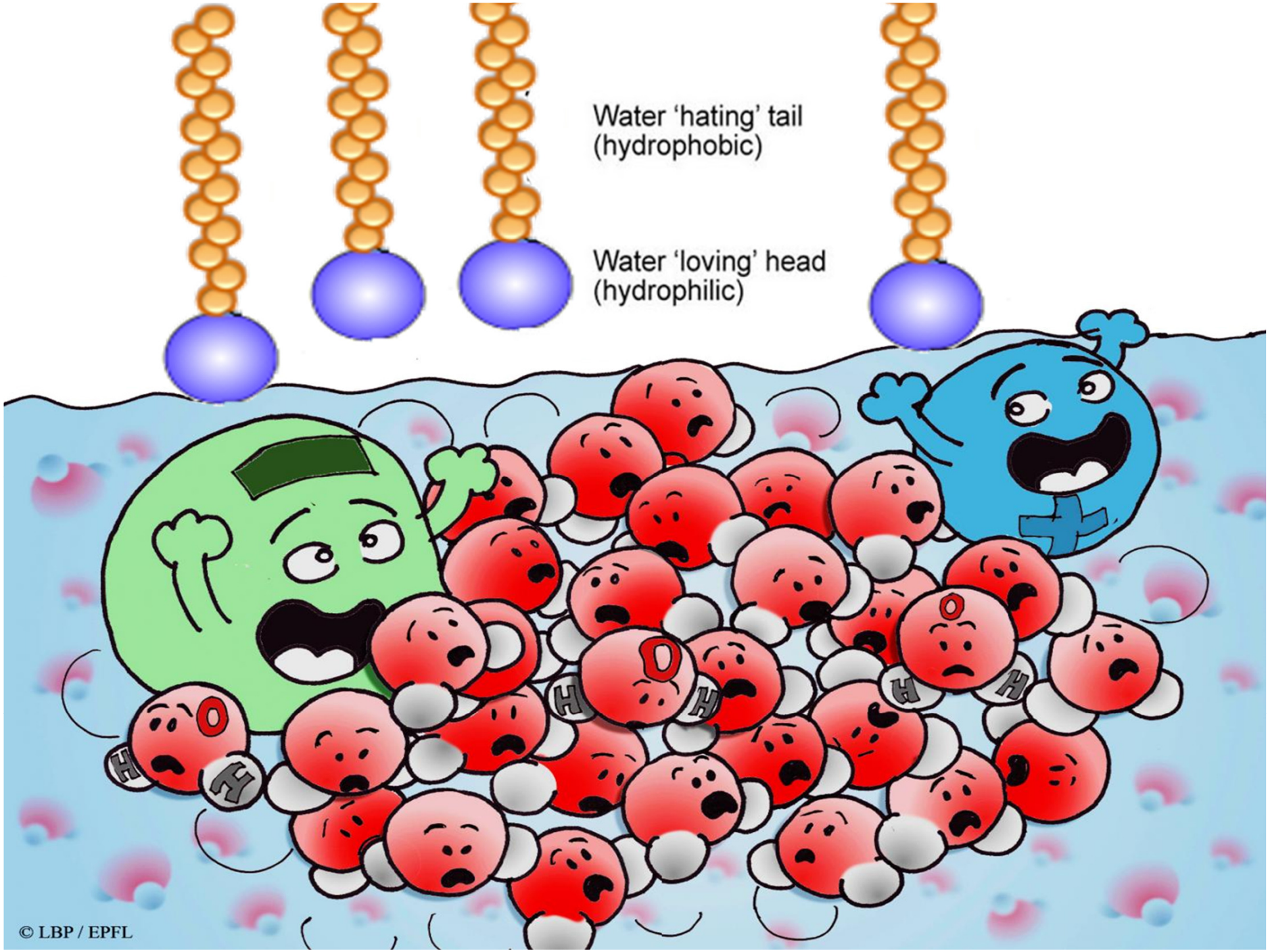
Why do we see new colours?

Dish soap break the water tension by breaking the bonds of water as it spreads. As soap attacks the fat in the milk. That attacking cause the swirling of the colours. Where the colour meets, they combine and form new colours.


Do your colour
burst like that?

Why do the colours dance?

The food coloring in the milk will move the fastest because the dish soap bonds (attacks) the fat in the milk. This bond is so strong that the water and the food coloring are pushed out. Everything else has to dance out of the way to make room for the dish soap and fat bond.


Water ‘hating’ tail
(hydrophobic)
Water ‘loving’ head
(hydrophilic)
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Cleansing action of soap

https://www.youtube.com/watch?v=paRmLh7m7EM

Presentation in slides

https://prezi.com/z8azxsj5dg28/copy-of-color-changing-milk/

Chemistry of milk and detergent

https://www.youtube.com/watch?v=j4q4J8oL9Ao