Physical Science
Big Idea 8: Properties of Matter
Grade 5 Quarter 1 Topic 4
Mixtures and Solutions

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Quarter 1 Topic 4:
Mixtures and Solutions
Benchmarks

- SC.5.P.8.3 Demonstrate and explain that mixtures of solids can be separated based on observable properties of their parts such as particle size, shape, color, and magnetic attraction.
- SC.5.N.1.1 Define a problem, use appropriate reference materials to support scientific understanding, plan and carry out scientific investigations of various types such as: systematic observations, experiments requiring the identification of variables, collecting and organizing data, interpreting data in charts, tables, and graphics, analyze information, make predictions, and defend conclusions.
- SC.5.N.2.1 Recognize and explain that science is grounded in empirical observations that are testable; explanation must always be linked with evidence.
- LACC.5.SL.1.1 Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 5 topics and texts, building on others' ideas and expressing their own clearly.

What do you know about mixtures?

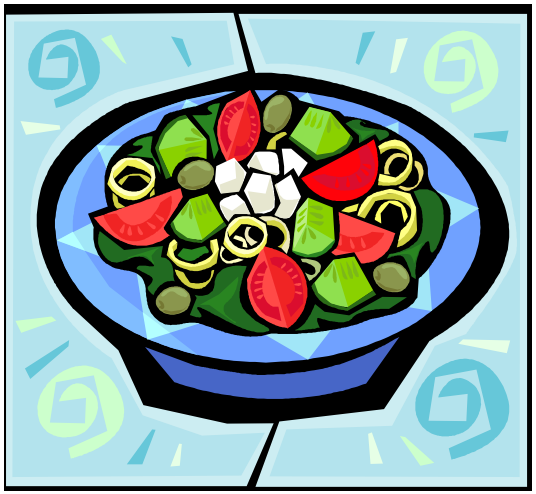
- Form when two or more substances combine.
- Keep their physical properties.
- Can be separated by their physical properties.

What are some physical properties of matter?

- Color
- Texture
- Odor
- Size
- Volume
- Mass

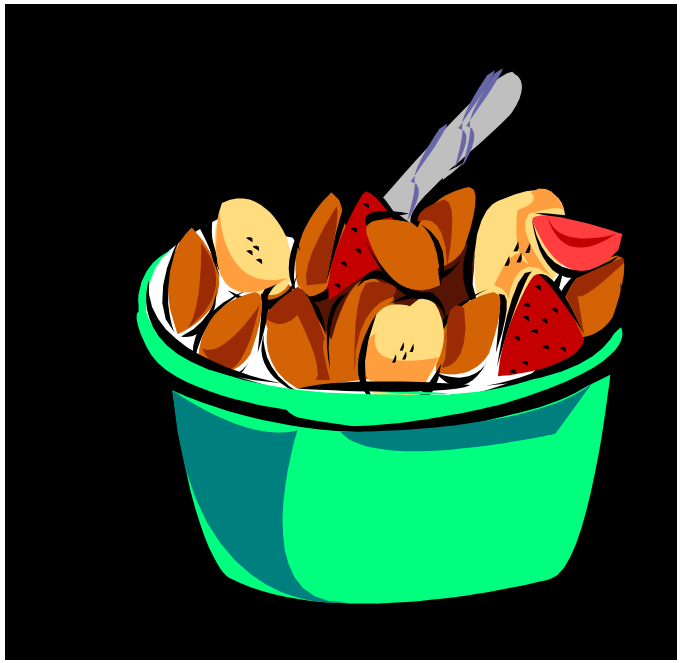
- Solid, Liquid, or Gas
- Magnetic
- Floats or sinks
- Boiling point
- Melting point

Salad is an example of a mixture



- The lettuce and vegetables do not change when mixed

Is cereal a mixture?

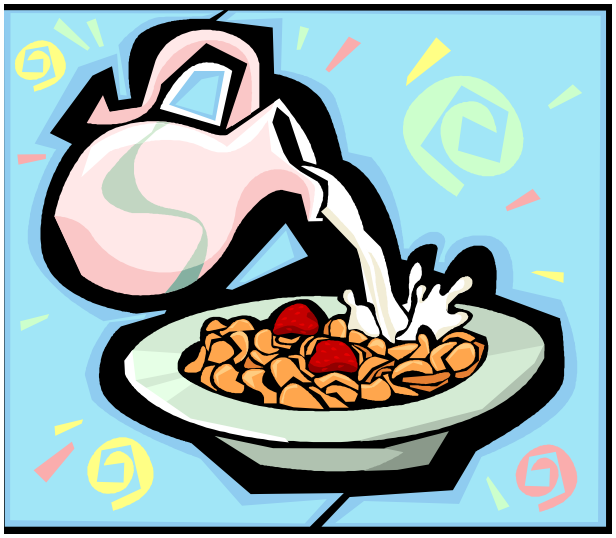


Yes…the properties of the substances do not change.

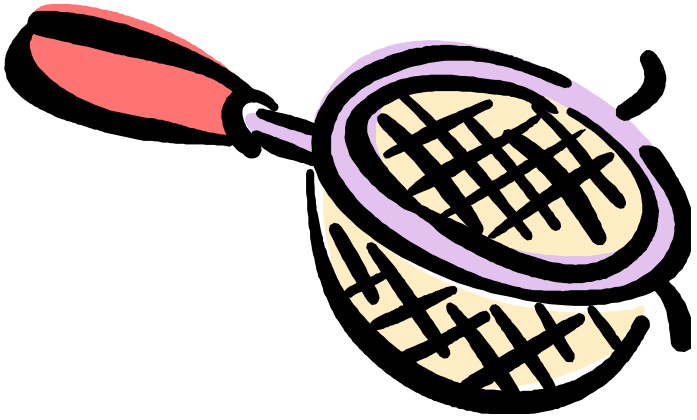
You can still see the bananas, cereal, and milk.

Substances in a mixture can be separated by their physical properties… So how can you separate this mixture?

- Milk and cereal can be separated by pouring the mixture through a strainer.



The cereal would be trapped in the strainer and the milk would pass through.



Is cake a mixture?

No…the properties of the substances change.

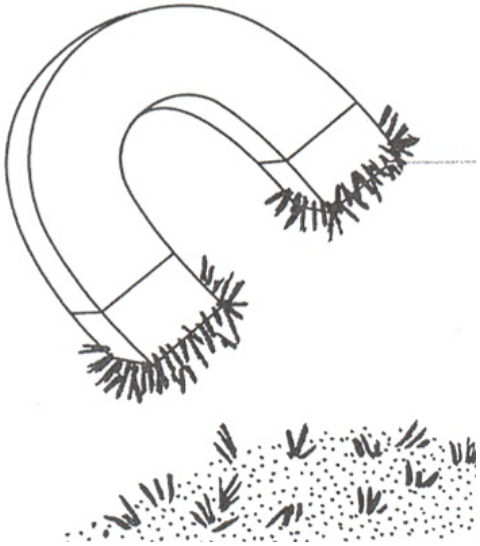
The eggs, flour, and sugar change when the cake is mixed and baked.

QUESTION:

Which scientific tool could you use to separate a mixture of iron filings and gravel?

Hint: What is a property that iron has and gravel doesn't?

ANSWER:

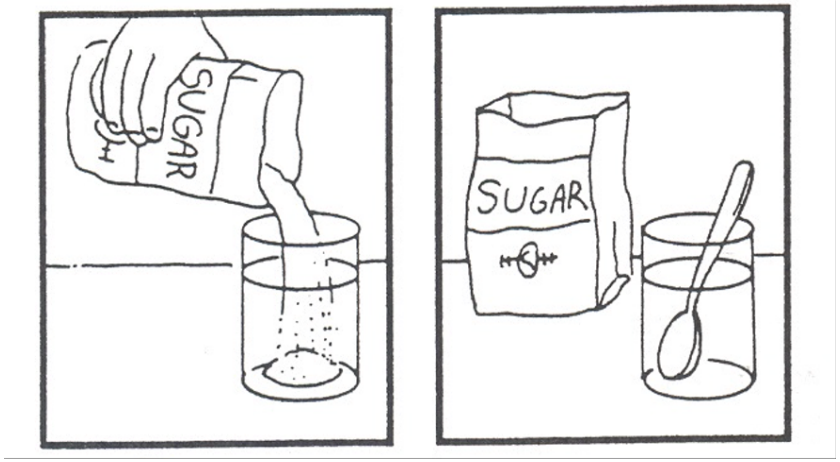


- Iron is magnetic.
- You can separate the iron filings from the gravel by using a magnet.

What do you know now about mixtures?

- Form when two or more substances combine.
- Keep their physical properties.
- Can be separated by their physical properties.
- Do not form a new substance.

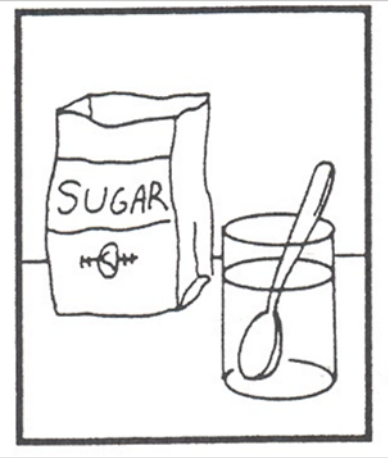
You can make a special mixture when you stir sugar into water.



What did you notice about this mixture?

The water remained clear and the sugar seemed to disappear.

What are these special kind of mixtures called?



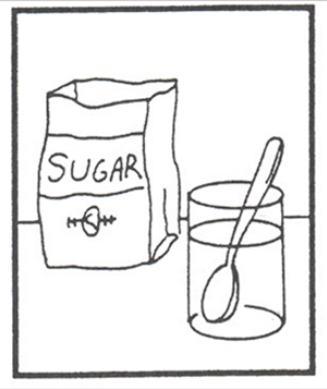
A solution

The sugar spread out evenly and dissolved in the water.

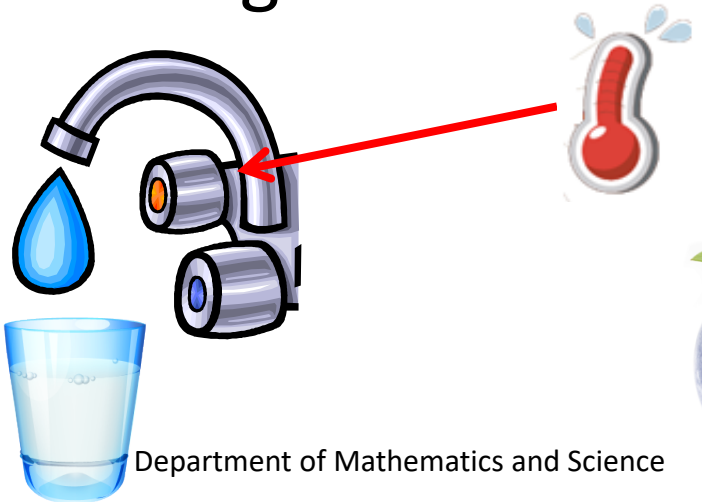
What are solutions?

- One of the substances spreads out evenly or dissolves in the other
- Solutions are a special kind of mixture

What can be done to speed up or slow down the dissolving process?



- Increase the number of and/or force of the stirs.
- Change the temperature of the substances being mixed.

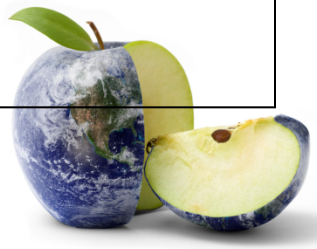


Solutions are a special kind of mixture

- One of the substances dissolves in the other
- The substance spreads out evenly
- Solutions may be clear or colored

Solutions can be separated

- To separate a sugar water solution, let the water evaporate.
- Once the water is gone, the sugar will be left.
- Most solutions can be separated by evaporation.

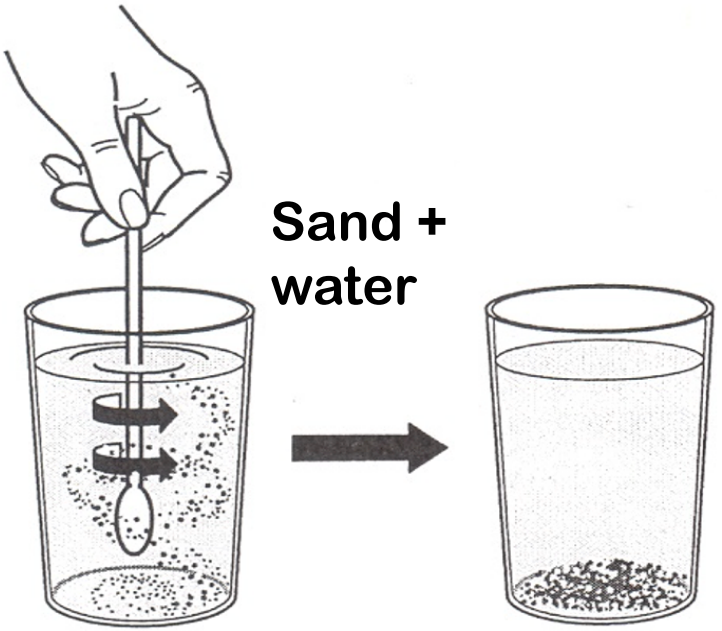


Do all substances dissolve in liquids?

Observe as sand is mixed with water.

What happened?

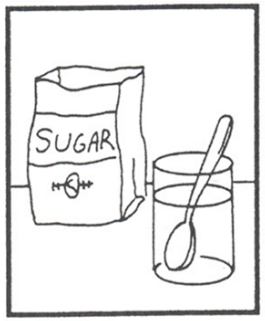
The sand doesn't dissolve and it settled on the bottom of the glass.



All solutions are mixtures but not all mixtures are solutions

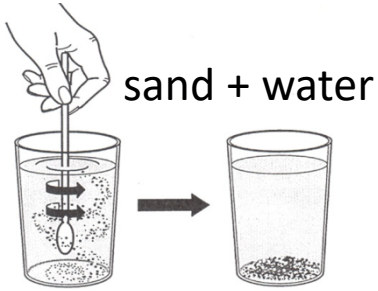
Sugar + Water = ?

mixture and a solutio



Sand + Water = ?

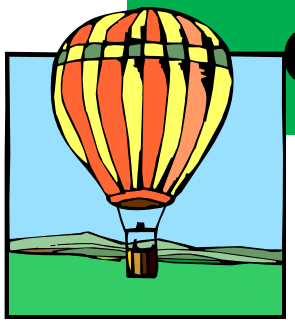
mixture but not a solution



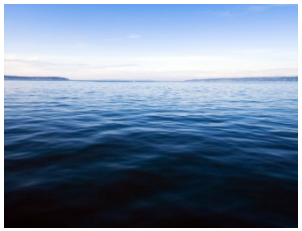
What do all solutions have in common?

- One of the substances in the mixture dissolves in the other substance.
- Both substances in the solution retain their properties and can be separated.

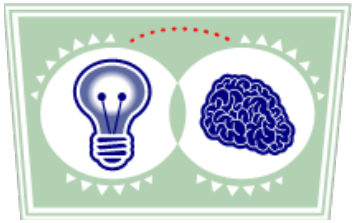
What are some other examples of solutions?



- Air = 21% Oxygen + 78% Nitrogen + 1% other gases
- Ocean water



- Swimming pool water
- Soda = Water+ CO_2 + other flavors
- Jewelry = gold + nickel



Brain Check

1. What is a mixture? Give two examples.
2. What is a solution? Give two examples.
3. How do you know when a solid and a liquid form a mixture that is also a solution?
4. How can mixtures be separated?
5. How are screen filters and paper filters alike? How are they different?