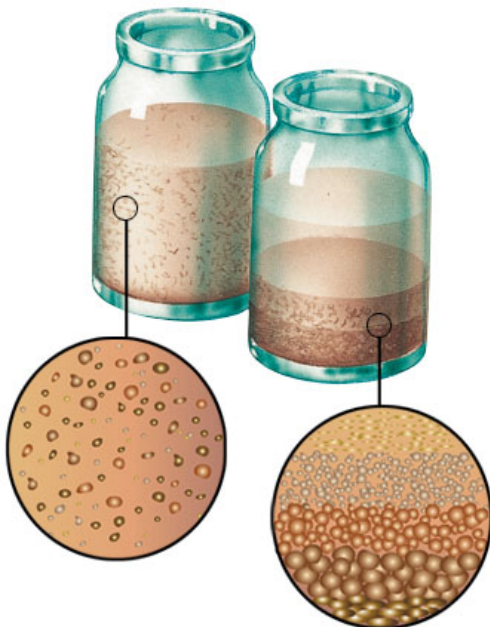


Mixtures

Academic Content Standards

- Determine the differences in constituents by observing mixtures.
- Separate solid mixtures by using granular size and magnetic attraction.
- Separate a mixture consisting of two kinds of liquid that are not miscible with one another.
- Separate mixtures composed of soluble and insoluble substances.
- Separate solid substances dissolved in water by evaporating the water.
- Present everyday examples of the use of the separation methods.



Name: _____

Student Number: _____

Homeroom: _____

What is a mixture?



Write and/or draw pictures to show what you already know about this question.



Make a mixture.

1. Pour two cups of corn flour into a big bowl. Add four drops of food coloring to one cup of water and pour it into the bowl.
2. Mix the ingredients well with your hands until they are well blended.
3. Try rolling the mixture between your hands slowly and quickly. Try hitting the mixture with your hand to see how it feels.



Take notes of what you saw. Draw pictures to help show your observations.



Share Your Results.

Discuss your ideas and findings with your classmates. Were there any interesting observations?



What do saltwater, air, concrete, mud, milk, hot cocoa, tea, oil and vinegar salad dressing, and soda have in common? They are all mixtures! Saltwater is a mixture of sodium chloride (table salt) and water. Air is a mixture of nitrogen, oxygen, and other gases. Mud is a mixture of soil, sand, and water. A mixture may be made up of solids, liquids, or gases that are mixed with themselves or with one another. A mixture is made when two or more things are combined together, but the things that are mixed together must not change into a new substance; they just get mixed.

Scientists study the way things mix and how to separate mixtures. They have developed different ways to separate mixtures.

Use the information above and the clues to help you complete the wordsearch.

1. This is made when two or more things are mixed together.
2. This is made when sodium chloride and water mix.
3. This has a mixture of nitrogen and oxygen.
4. This is a mixture made from soil, sand, and water.
5. This is a mixture made with oil and vinegar.
6. Mixtures can be made up of ____, ____, and/or ____.
7. These four drinks are all mixtures.
8. Scientists have found ways to ____ mixtures.

G B G T F C L H Z S D V O R Z K O Y T E
 D M J L Q C U B N X M O C B H P L F P A
 N V A O A L Q S Z P J M D L B O X H X Y
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 S Z I G N I C G C J U J L K B Y A L E K
 Y D L T N X I O H T A K R X A L K I Z V
 P W I B L I C B C T U V R R G R F B X E
 V O Q L W W S E X T E G Z K I O C G W D
 G C U C O U A S W N O A J K P F C K M F
 I J I O E S E I E X F H V F L P V J C M
 U Q D U G S U O M R S J B V D I U F I T
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 P H Z D R F Q S E P A R A T E O E L C Z
 S I U T B J X A P L M S A L T W A T E R
 V A M E R U T X I M O W P L A N Z V F P
 O Y R B C A I O D D B U Y W R S H T H W
 B O A R N K S B A Q E F A R D K I R F P
 U C B N H I A Z R J M H N Y N H D F I Z
 C Q R X K T Z X K T F Z O D B S S T U Z



What is a mixture?



How can you easily separate small solid things, like grains?



Write and/or draw pictures to show what you already know about this question.



You will receive a bowl full of different grains that are all different sizes. Your challenge is to separate them using sieves.



Take notes of what you saw. Draw pictures to help show your observations.



Share Your Results.

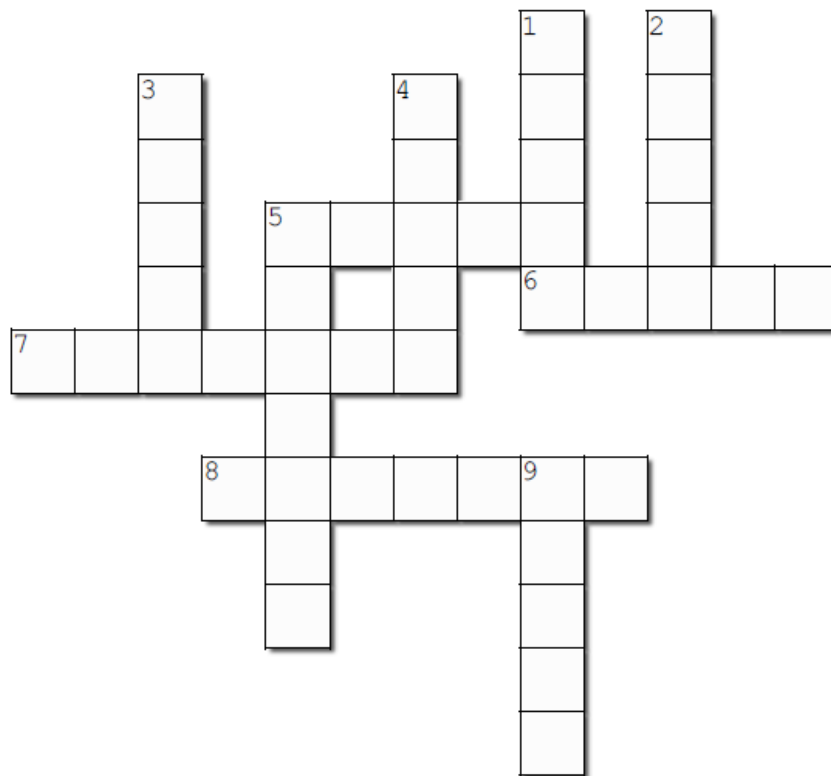
Discuss your ideas and findings with your classmates. Were there any interesting observations?



Sieving is one method that can separate things that make up a mixture. Sieving can separate solids that are different sizes from other solids, or to separate solids from a liquid. Sieves are usually metal and have wires that cross over to make holes of a certain size. Only objects that are smaller than the holes in the sieve will pass through. The objects that are bigger cannot pass through and will stay where they are. The holes in sieves come in many different sizes.

Sieves are often used in our everyday life. You probably use sieves at home to separate your pasta from the boiling water. Farmers use sieves to remove rocks from soil, or to separate different seeds.

Use the information above to help you complete the crossword.



Across

- 5. The device we used in this activity.
- 6. A liquid can be separated from a ____.
- 7. These people use sieves.
- 8. This is made when two or more things are mixed together.

Down

- 1. A sieve has many ____.
- 2. Many sieves are made from ____.
- 3. A sieve can be used to separate your pasta from ____.
- 4. Farmers will use sieves to separate ____.
- 5. A method used to separate a mixture.
- 9. A sieve can be used to remove ____ from soil.



How can you easily separate small solid things, like grains?



How can you clean dirty water?



Write and/or draw pictures to show what you already know about this question.



1. Cut a pet bottle in half.
2. Tightly pack cotton wool in the mouth of the bottle.
3. Put the top part of the bottle upside down into the bottom part of the bottle and add charcoal to a depth of 1cm.
4. Add 2cm of sand, pressing down hard.
5. Add a 1cm layer of small gravel, and a 2cm layer of medium sized gravel.
6. Cover the gravel completely with clean pebbles.
7. Slowly pour in dirty water.



Take notes of what you saw. Draw pictures to help show your observations.



Share Your Results.

Discuss your ideas and findings with your classmates. Were there any interesting observations?



Have you ever seen your parents make coffee? They may have used a filter, where the ground coffee beans remain in the paper while the brown liquid moves through into the cup.

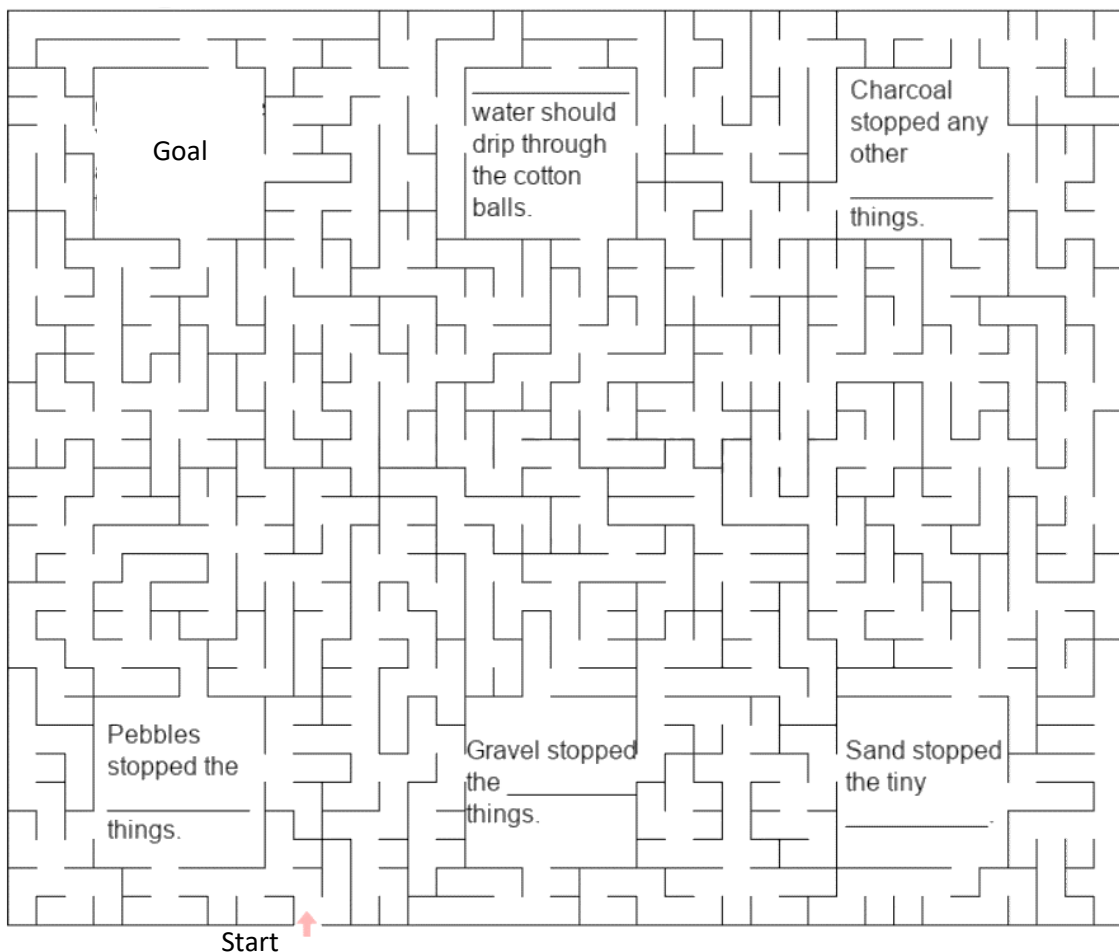


You made a water filter in this activity, which is the same idea as the coffee filter. Dirty water is a mixture. Water will always find a path through pieces of stone, gravel, sand, charcoal, and cotton balls, but other things in the water get trapped as it travels through the filter. The pebbles at the top should have stopped the largest things. The gravel should have stopped the smaller things. The sand should have stopped tiny organisms, like insects. The charcoal should have stopped any other dirty things, allowing clean water to drip through the cotton balls.



Although our water is still not safe to drink, someone invented a life-saving straw that acts like the water filter we made, which allows people to drink dirty water when there is an emergency, and you can't find clean water.

Follow the path of your water filter.



How can you clean dirty water?



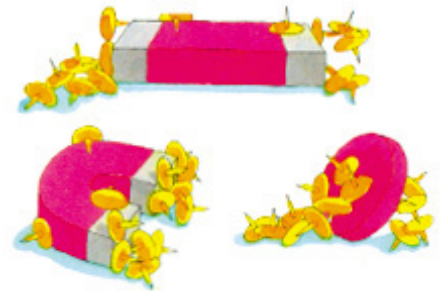
How can you separate metal things?



Write and/or draw pictures to show what you already know about this question.



You will receive a bowl full of different objects. Tape a magnet to the end of a string. Your challenge is to separate what you can using the magnet.

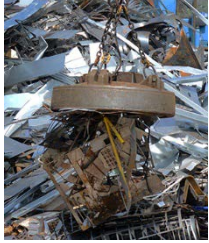


Take notes of what you saw. Draw pictures to help show your observations.



Share Your Results.

Discuss your ideas and findings with your classmates. Were there any interesting observations?



Many of the things we use are made from metal. All metals are shiny and allow electricity to travel through them. A magnet is a piece of metal that can pull some other types of metal towards it. Not all metal things are attracted to magnets though. Things made from iron and steel will be pulled towards a magnet, but aluminum won't.

Magnets can be used to separate mixtures. Rubbish is an example of a mixture. People are asked to recycle their cans and some other metal objects. However, some cans are made from aluminum and others are made from steel. We need to separate these cans so that they can be melted separately and used again. Using magnets can also help to separate other metal objects that can be recycled again too, which helps keep the environment clean.

Use the information above and the clues to help you complete the wordsearch.

1. These are shiny and allow electricity to move through them.
2. A metal that can pull some other types of metal towards it.
3. _____ and _____ are examples of metal that are attracted to magnets.
4. _____ is a metal that is not attracted to a magnet.
5. _____ is a mixture of things that you throw out.
6. You should _____ your cans and other metal objects to help the environment.
7. Steel cans and aluminum cans are _____ separately and used again.

| | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| E | V | F | A | Q | Y | C | W | L | V | L | E | W | X | Q | P | D | X | P | Q |
| J | G | L | A | W | X | N | A | Z | E | O | P | H | C | W | R | L | Y | O | S |
| R | Y | E | L | D | A | A | U | W | V | M | I | U | F | H | U | U | S | K | G |
| Y | U | L | U | X | M | B | K | I | D | G | H | Z | T | H | B | O | H | M | D |
| R | I | G | M | R | P | Y | Z | I | H | P | G | Z | W | V | B | L | C | W | S |
| Z | B | B | I | J | E | Z | C | P | E | A | P | O | B | M | I | P | B | A | B |
| K | G | X | N | K | W | C | P | J | C | B | Z | V | U | V | S | J | G | P | F |
| G | Z | P | U | R | D | C | L | J | P | N | Y | U | O | I | H | L | R | U | V |
| N | I | D | M | E | U | G | I | M | P | Z | O | I | N | E | H | M | S | N | P |
| T | Q | O | T | C | F | F | K | Y | L | P | M | R | M | P | X | U | L | H | Q |
| H | E | L | B | Y | T | Y | Y | J | L | K | L | F | I | K | Y | H | T | I | U |
| Q | E | H | R | C | K | W | I | N | D | A | F | T | Y | O | C | O | S | J | V |
| M | B | Y | L | L | B | B | K | Z | F | M | T | V | X | J | T | H | C | V | V |
| B | S | T | E | E | L | P | P | O | A | M | E | G | C | W | P | H | A | U | Z |
| H | L | E | O | N | E | M | G | T | B | A | S | T | D | J | Z | T | O | P | Y |
| V | B | U | D | K | G | W | K | G | E | N | N | L | A | M | S | P | J | J | Z |
| A | A | W | X | A | M | W | F | P | A | N | C | U | G | L | H | V | C | J | I |
| O | L | A | W | E | T | D | I | J | V | B | G | N | I | O | S | K | E | P | H |
| S | S | Z | S | V | P | O | L | A | M | C | P | A | B | V | D | W | B | D | S |
| Z | G | J | N | Z | J | F | A | T | D | B | N | E | M | E | U | S | A | N | Q |



How can you separate metal things?



How can you separate oil from water?



Write and/or draw pictures to show what you already know about this question.



1. Pour oil carefully into a cup so that it is about 2cm deep.
2. Pour water into the same cup until the cup is half full. Observe what happens.
3. Try to separate the oil from the water.



Take notes of what you saw. Draw pictures to help show your observations.



Share Your Results.

Discuss your ideas and findings with your classmates. Were there any interesting observations?



Liquids have different densities. This means that some liquids are lighter or heavier than others. Oil is less dense or lighter than water, so it floats on top. Even after shaking a mixture of oil and water, the oil will float to the top again. This is useful to know when separating liquids from each other.

There are a few different methods that can separate oil from water. The first method is decantation. This simply means you can pour of the lighter oil from the heavier water. Another way is to scoop out or skim the oil with something like a spoon. Scientists use this last method to remove oil from the oceans after ship accidents happen. This is called skimming, which just means that a boat has a device that can scoop up or vacuum the oil.

Another way is to freeze the water. Water will freeze at a higher temperature than oil. Also, when water freezes, it becomes lighter than oil and will float on top of it. You can simply take away from the frozen water from the oil.

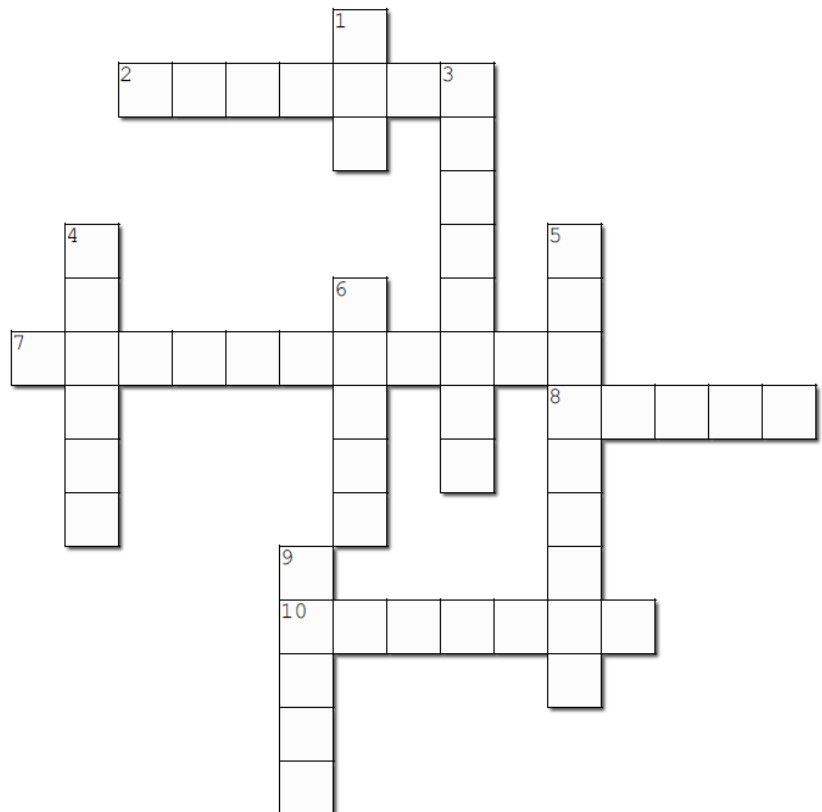
Use the information above and the clues to complete the crossword.

Across

- 2. Oil and water are both ____.
- 7. A method used to separate oil and water by pouring the oil off.
- 8. You can ____ out the oil using a spoon.
- 10. Oil is ____ than water.

Down

- 1. This liquid is lighter than water.
- 3. The method scientists use to try and remove oil spills from the ocean.
- 4. Doing this will make the water lighter than oil.
- 5. Liquids have different ____, which means some are lighter or heavier.
- 6. This liquid is heavier than oil.
- 9. A lighter liquid will ____ on a heavier liquid.



How can you separate oil from water?



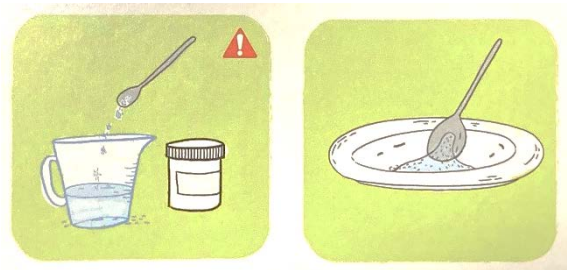
How can heat separate a mixture of salt and water?



Write and/or draw pictures to show what you already know about this question.



1. Mix half a cup of warm water with 2 tablespoons of salt in a cup. Try to dissolve all the salt.
2. Pour two tablespoons of the mixture onto a plate and put it in a warm or sunny place.
3. Check to see what is happening after a couple of days.



Take notes of what you saw. Draw pictures to help show your observations.



Share Your Results.

Discuss your ideas and findings with your classmates. Were there any interesting observations?



When you mixed the salt into the water, it looked like it had disappeared. However, it was still in the water. It had only dissolved, which means the salt was broken down into very small pieces and surrounded by the water.



When water is heated by the sun or over a fire, it starts to evaporate. This means that the water, which is a liquid, turns into a gas and rises into the air. Evaporation is a method used to separate solids from a liquid, such as water. In this activity, after the water had evaporated, you would have seen the salt left behind.

This method is often used to separate the salt from sea water. The salt can then be collected and sold in shops. Also, if you are lost on an island and have no fresh water, evaporating the sea water and collecting it will give you some nice fresh water to drink.

Unscramble the letters to make words. Write their definitions and draw pictures to go with your definitions.

1. alts

2. rwate

3. dliqui

4. asg

5. ssovidle

6. rxietum

7. oiverptaona



How can heat separate a mixture of salt and water?



How can you separate the colors used in candies?



Write and/or draw pictures to show what you already know about this question.



1. Your teacher will give you 3 cups that have mystery candy colors in them.
2. Cut a coffee filter into three strips that are 10cm long and 2cm wide.
3. Wrap one end of the strip around a pencil and lower the other end so that it goes about $\frac{1}{2}$ cm into the water. Tape the filter paper to the pencil and leave the pencil on the rim of the cup.
4. Do the same thing for the other 2 cups.



Take notes of what you saw. Draw pictures to help show your observations.



Share Your Results.

Discuss your ideas and findings with your classmates. Were there any interesting observations?



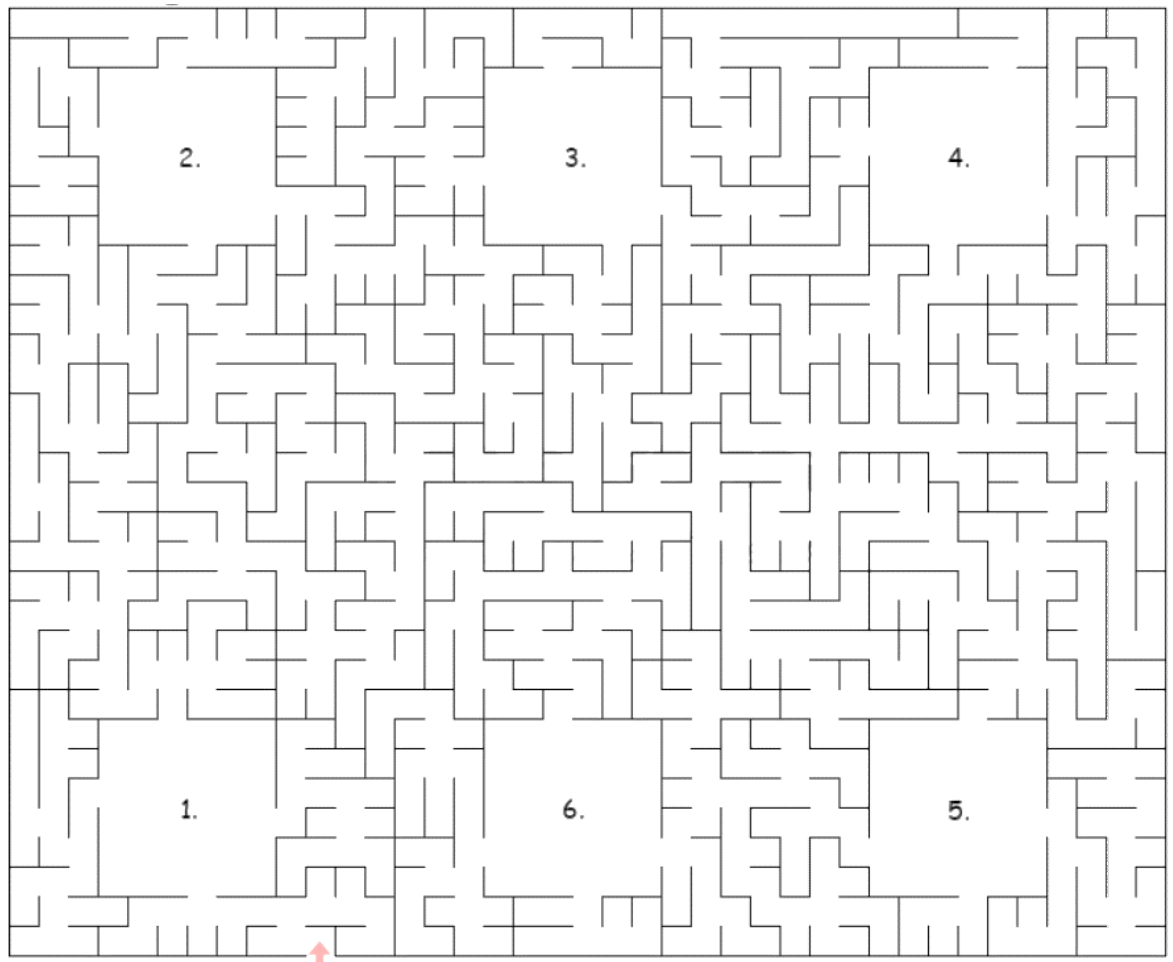
Paper chromatography is another way to separate mixtures. In this method, you need to dissolve the substance you want to separate in water. When you put a special type of paper into the mixture, the paper starts to absorb it. The mixture will move up this paper and it will start to separate. The things in the mixture separate at different points along the paper because of the size, shape, or weight of the things that made the mixture. The substance that dissolved easiest in the water will travel up the paper the farthest.



Scientists can compare the chromatography paper with those of substances they already know. This is how they can find out what colorings are used in foods.

Use the clues below to write the correct word in each part of the maze.

1. This is how paper _____ works.
2. First, _____ the mixture in water.
3. Next, put in the paper and it will start to _____ the mixture.
4. Then, the mixture will start to _____.
5. How far a substance moves depends on its _____, _____, or _____.
6. Now you know what food _____ were used.



How can you separate the colors used in candies?

Main Ideas – Review Questions



After completing this unit, you should be able to answer these questions. Write your answers in complete sentences.

1) What is a mixture?

2) How can you separate different grains or rocks from sand?

3) How can you clean dirty water?

4) How can you separate metal things from a mixture?

5) How can heat separate a mixture of salt and water?

6) How can you separate oil from water?

7) How can you separate the colors used in candies?
