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**6**

# **Science 6**

First Quarter – Module 4

## **Separating Mixtures: Picking, Winnowing and Decantation**

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**SMILE**

SUPPORT MATERIAL FOR INDEPENDENT LEARNING ENGAGEMENT (SMILE)

A Joint Project of the  
SCHOOLS DIVISION OF DIPOLOG CITY  
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**Science – Grade 6**

**Support Material for Independent Learning Engagement (SMILE)**

**Quarter 1 – Module 4: Separating Mixtures: Picking, Winnowing and Decantation  
First Edition, 2020**

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## ***What I Need to Know***

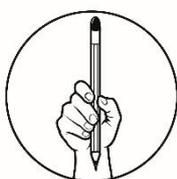
This module is divided into three lessons, namely:

Lesson 1 – Separating Mixtures through Picking

Lesson 2 – Separating Mixtures through Winnowing

Lesson 3 – Separating Mixtures through Decantation

After going through this module, you are expected to describe how to separate mixtures using picking, winnowing and decantation. **(S6MT-Id-f-2)**



## ***What I Know***

Directions: Choose the letter of the best answer. Write your answers on a separate sheet of paper.

1. Which of the following mixtures shown below can be separated through picking?

a.



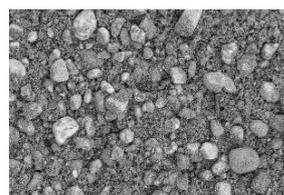
b.



c.



d.



2. It is a method used in removing easy to spot impurities in a mixture which are not very large in number.

- a. Winnowing
- b. Decantation
- c. Picking
- d. Filtration

3. For a mixture to be separated by winnowing technique, it has to have \_\_\_\_\_.

- a. homogeneous appearance
- b. lighter and heavier components
- c. insoluble solid and liquid components
- d. magnetic and non-magnetic components

4. Which of the following is an essential help needed in separating mixtures using the winnowing technique?

- a. sieve
- b. wind
- c. sunlight
- d. filter paper

5. Which of the following mixtures can be separated by winnowing?

- a. rice and hull
- b. muddy water
- c. vegetable salad
- d. rocks and pebbles

6. Which of the tools shown in the pictures below is used in winnowing?



7. Which of the following statements describes winnowing technique correctly? It is a method of separating mixtures \_\_\_\_\_.

- a. composed of an insoluble solid and two immiscible liquids
- b. composed of an insoluble solid and a liquid using a strainer
- c. with magnetically susceptible materials using a magnetic force
- d. composed of lighter and heavier components with the help of wind

8. Which method can be used to separate oil from water?

- a. Decantation
- b. Winnowing
- c. Filtration
- d. Picking

9. In washing the rice before cooking, which method is used to remove the water from the pot?

- a. Winnowing
- b. Decantation
- c. Picking
- d. Distillation

10. Name the separation technique shown in the picture on the right.

- a. Decantation
- b. Winnowing
- c. Pouring
- d. Picking



## Lesson

# 1

# Separating Mixtures through Picking



## What's In

### Activity 1

**Title:** Creating Mixture

**Materials:** pebbles    soy beans    mungo seeds    rice  
stones    marbles    corn    marshmallow

**Procedures:**

1. Form 4 mixtures out of the materials enumerated above. Your mixture will compose only of two materials.
2. Copy the table below on your notebook.
3. Write your answers on the table. An example is already provided.

Example:	Mixture 1	Mixture 2	Mixture 3	Mixture 4
Mixture of corn and rice				

**Question:**

How will you separate the mixtures that you had formed?

---



## What's New

**Problem:**

How are components of mixtures separated?

**What you need to do:**

1. Mix the different seeds and nuts. You may use Ding-Dong Mixed nuts *chicheria* or other similar food snacks if there are no seeds and nuts available.
2. Separate the components of the mixture formed using your hand.

**What have you found out: (Write your answers in your notebook.)**

What kind of mixture do you have?

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What are the different components of your mixture?

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How did you separate the components of mixture? Describe the process.

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Give other examples of mixtures that can be separated through handpicking.

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**Conclusion:**

What are the characteristics of a mixture that can be separated through picking? How will you do it?

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## **What is It**

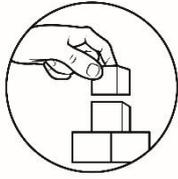
### **Picking**

You may or may not be aware of it, but you are handling mixtures everyday of your life. Our health is very much affected by mixtures that we knowingly and unknowingly encounter in our environment. It is time that we have a deeper study of mixtures.

A mixture is a combination of two or more substances. In a mixture, the substances that you put together may be either uniformly mix or not, and the mixed substances remain unchanged. Whatever you put together; they retain their original characteristics although they are interspersed with other particles.

One of the techniques of separating mixtures is through **picking** or using our bare hands. Picking is a technique used in separating the solid components

of a heterogeneous mixture. The components of the mixture should be big enough to be seen and picked up by hands. For instances, a mixture of grains and corn can be separated through picking. Other examples of mixtures that can be separated through picking are grains and mungo seeds, nails and pins, sliced fruits, rice grains and pebbles.



## ***What's More***

### **Activity 1: Pick it!**

**Directions:** Draw a smiley face ☺ beside the mixtures that can be separated through picking.

- \_\_\_\_\_ 1. water and alcohol
- \_\_\_\_\_ 2. sliced mixed fruits
- \_\_\_\_\_ 3. mixed nuts
- \_\_\_\_\_ 4. nails and iron strips
- \_\_\_\_\_ 5. stones and pebbles

### **Activity 2: Mix and Pick**

#### **What you need:**

- 2 saucers/small bowls
- Timer
- 30 pcs peanuts
- 50 pcs mungo seeds
- 15 pcs 25 cents
- 15 pcs 1.00 coins
- 15 pcs 10 cents

#### **What you need to do:**

- A.1. Mix the 30 pcs peanuts and 50 pcs mungo seeds in a small bowl/saucer.
- 2. Describe the appearance of the mixture.
- 3. Write your answer in your notebook.
  
- B. 1. Separate the mixture.
- 2. Record how many seconds/minutes it takes for you to finish separating the mixture.
- 3. Write the data in your notebook.
  
- C. 1. On another small bowl /saucer mix the remaining materials you have.
- 2. Describe the appearance of the mixture.
- 3. Write the data in your notebook.

- D. 1. Separate the mixture.
  2. Record how many seconds/minutes it takes for you to finish separating the mixture.
  3. Write the data in your notebook
  
- E. 1. Repeat the activity, this time separate it faster than your first try.
  2. Record the time you took to finish separating the components in each mixture.

**What have you found out: (Write your answers in your notebook.)**

1. What kind of mixture do you have?
  
2. What are the different components of your mixture?
  
3. How were you able to separate the individual component of the mixtures?
  
4. Do you need any materials or technique to separate the components of the mixture? Why?
  
5. Which mixture did you find easy to separate? Difficult? Why?

**Conclusion:**

What can you conclude from the activity?

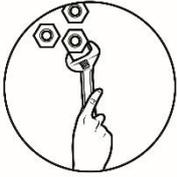


## ***What I have Learned***

Directions: Complete the paragraph using the words in the box. Write your answer on a separate sheet of paper.

properties	picking	solid
chemically	useful	liquid

Mixtures are combinations of two or more substances which are not bonded (1) \_\_\_\_\_, where each substance retains its chemical entity and (2) \_\_\_\_\_. (3) \_\_\_\_\_ is a technique used in separating the (4) \_\_\_\_\_ components of a heterogeneous mixture using our bare hands.



## ***What I Can Do***

**Directions: Answer the following in your Science notebook.**

1. List 5 different mixtures that you can find at home and identify their components using the table below.

<b>Mixture</b>	<b>Components</b>
1.	
2.	
3.	
4.	
5.	

2. Based on the list above, which of these mixtures can be separated by picking? Why?

## Lesson

# 2

# Separating Mixtures through Winnowing



## *What's In*

In the previous lesson, you have learned that handpicking is a convenient method of separating unwanted materials from a mixture when the impurities are easy to spot and its quantity is not very large. You have probably tried removing husks from rice using handpicking in the past. But did you know that there is a much faster way of doing this? In this new lesson, you will learn about another method of separating mixtures called winnowing.



## *What's New*

Here is a picture of a farmer winnowing. Have you seen anyone doing this task before cooking rice? What is winnowing for? What are needed to be able to successfully separate the components of a mixture through winnowing? What are the characteristics of the components of a mixture that can be separated by winnowing?





## ***What Is It***

### **Winnowing**

Winnowing is used to separate heavier and lighter components of a mixture by wind or by blowing air. This method is commonly used by farmers to separate lighter husk particles from heavier seeds of grain. Winnowing can also be used to remove pests from stored grain. It usually follows threshing in grain preparation.

In its simplest form winnowing is done by throwing the mixture into the air so that the wind blows away the lighter component, while the heavier component falls back down for recovery. A winnowing fan which is a shaped basket shaken to raise the chaff is a tool used in this method of separating a mixture.

Although winnowing is an easy and inexpensive way of separating lighter substances from the heavier components of a mixture, it does not work for materials heavier than grains like stones.



## ***What's More***

### **Activity 1. We Know How to Winnow**

Put a cup of rice grains mixed with some husks in a winnowing fan. Using the winnowing technique, separate the husks from the rice grains.

After the activity, answer the following questions in your notebook:

1. Were you able to successfully separate the husks from the rice grains by winnowing? Why or why not?
2. What are needed to be able to successfully separate the components of a mixture through winnowing?
3. Describe how the components of a mixture are separated by winnowing.

## Activity 2. To Winnow or Not to Winnow?

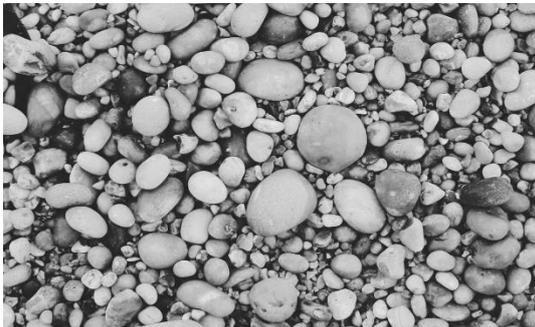
Study each mixture shown in the pictures below. Using Table 1, write your observations about the characteristic of each component in the mixture and predict whether the components can be separated through winnowing or not. Write your answer in your notebook.



sugar and flour



saw dust and wood chips



rocks and pebbles



wheat hulls and wheat grains

Table 1: To Winnow or Not to Winnow?

Mixture Components	Observations on the Characteristic of each Component	Can be separated by winnowing?	
		Yes	No
1. sugar + flour			
2. saw dust + wood chips			
3. rocks and pebbles			
4. wheat hulls and wheat grains			

**What have you found out:**

In the activity, which mixtures can be separated by winnowing?

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What are the characteristics of the components in a mixture that can be separated by winnowing?

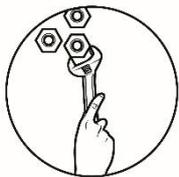
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***What I Have Learned***

Direction: Copy the paragraph below and supply the missing words or phrases. Do this in a separate sheet of paper.

Winnowing is the method of separating the (1) \_\_\_\_\_ substances from the (2) \_\_\_\_\_ components of a mixture with the help of wind or blowing air. This process is done by (3) \_\_\_\_\_ the mixture into the air with the use of a (4) \_\_\_\_\_, so that the wind (5) \_\_\_\_\_ the lighter component and the heavier component (6) \_\_\_\_\_ for recovery.



***What I Can Do***

Volunteer to do the winnowing of husks from your stored rice at home. After enough practice, list down three tips on how to winnow more efficiently. Use the table below. Do this in your notebook.

Tips on How to Winnow Efficiently	
1.	
2.	
3.	

## Lesson

# 3

# Separating Mixtures through Decantation



## What's In

### Activity 1

Identify and write the methods used in separating the following mixtures. Do this in your notebook.

- \_\_\_\_\_ 1. Mongo seeds and palay
- \_\_\_\_\_ 2. Dust particles and rice
- \_\_\_\_\_ 3. Flour and rice grains
- \_\_\_\_\_ 4. Mixed vegetables
- \_\_\_\_\_ 5. Different coins
- \_\_\_\_\_ 6. Mixed toys
- \_\_\_\_\_ 7. Flour and coin
- \_\_\_\_\_ 8. Saw dust and small pebbles



## What's New

### LET IT SINK AND SEPARATE!

#### Problem:

How are components of mixtures separated?

#### What you need:

small glass container	stirring rod	sand and spoon
bigger glass container	timer	water
wood shavings	tray	

#### What you need to do:

1. Gather all the needed materials.
2. Place two heaped tablespoons of soil or sand into one small glass container and half fill it with water.
3. Mix the sand and water. Leave the water to settle for 1 minute then attempt to pour off only clean water into the bigger glass container.
4. Stop when the water starts to become cloudy (translucent). Repeat the activity increasing the time left to settle the sediment.
5. Record your observation in the table.
6. Repeat the procedure using wood shavings.

7. Take note of the following terms in describing the mixtures:

Transparent	Light can pass through and objects are clearly seen e.g. window
Translucent	Semi-transparent (fuzzy image) e.g. milky glass
Opaque	Light cannot pass through e.g. brick

Table 1: Water and Sand

Time to Settle	Height/volume of clear water			Comment on Clearness on Water		
	Test 1	Test 2	Test 3	Transparent	Translucent	Opaque
1 min.						
2 mins.						
5 mins.						

Table 2: Water and Wood Shavings

Time to Settle	Height/volume of clear water			Comment on Clearness on Water		
	Test 1	Test 2	Test 3	Transparent	Translucent	Opaque
1 min.						
2 mins.						
5 mins.						

Guide Questions:

1. Can the solid particles be separated from water right after mixing without letting it settle at the bottom of the container?
2. Did waiting a longer time improve the clarity of water? Why?
3. Do you think water becomes potable after decanting? Why?
4. What could water be used for after decanting?

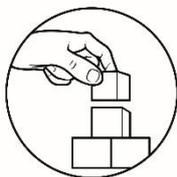


## ***What Is It***

### **Decantation**

Decantation is a process of separating mixtures by removing a layer of liquid, generally one from which a precipitate has settled. A mixture of an insoluble solid in liquid is allowed to stand. If the solid is denser than the liquid, it will settle at the bottom if kept undisturbed for some time. This process where particles settle at the bottom of the liquid is called sedimentation.

Decantation can also be used for liquid mixtures. It is used when separating two or more immiscible liquids. Liquids are considered **immiscible** when they do not mix and form a layer between them when put in the same container. In contrast, **miscible liquids** completely mix to each other when placed together. Once the mixture components have separated by forming layer between them in a container, the lighter liquid is poured off leaving the heavier liquid behind.



## ***What's More***

### **Activity 1: HEAVY AND LIGHT LIQUIDS**

#### **Problem:**

How are components of mixtures separated?

#### **What you need:**

5 clear glass or cup containers (to be used for mixing liquids)  
cooking oil  
soy sauce  
water  
kerosene  
vinegar  
tray

#### **What you need to do:**

1. Gather the materials needed.
2. Choose two liquids and mix them in an empty glass or cup container.
3. Leave the mixture for two to three minutes. Observe if the liquids completely mixed with each other. If they did, they are called miscible liquids. Liquids which do not mix together and form layer between them are called immiscible liquids. Record this on the table given by checking the appropriate column.

Take precautionary steps in handling kerosene. Ensure that its container is properly labeled and sealed. Wash your hand after holding it.

4. Describe the mixture formed. Which liquid submerged at the bottom of the container? Record it in the table.
5. For immiscible liquids, try to separate it through decantation by pouring or scooping into another container.

Table 1: Miscible and Immiscible Liquids

Liquids		Miscible	Immiscible	Description of the Mixture	Liquid at the bottom of the glass
1	2				

### Activity 2: THINK AND PROCESS

#### What have you found out:

1. What mixture of liquids is immiscible? Miscible?
2. Did waiting a longer time improve the clarity of liquid mixtures? Why?
3. Explain how you were able to remove and separate the two immiscible liquids?
4. What other method can you think that can be done to separate immiscible liquids?

#### Conclusion:

How are the components of a mixture that is made up of immiscible liquids separated?

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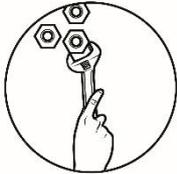
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## ***What I have Learned***

Direction: Copy the paragraph below and supply the missing words or phrases. Do this in a separate sheet of paper.

The process of separating mixtures by removing a layer of liquid is called (1) \_\_\_\_\_, generally one from which a (2) \_\_\_\_\_ has settled. This process where particles settle at the bottom of the liquid is called (3) \_\_\_\_\_. The method of (4) \_\_\_\_\_ can also be used in separating (5) \_\_\_\_\_ liquids which are liquids that do not mix when put together.



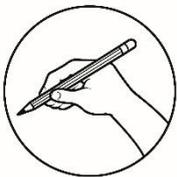
## ***What I Can Do***

Directions: Volunteer to cook rice for dinner and find out how decantation is used in this common house chore. Describe the process in at least two sentences.

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## ***Assessment***

Directions: Choose the letter of the best answer. Write the chosen letter on a separate sheet of paper.

1. Which of the following environmental problems can be separated by picking?
  - a. smog
  - b. oil spill
  - b. flood water
  - c. garbage pollution

2. It is a method used in separating easy to spot impurities which are not very large in number.

- a. Winnowing
- b. Decantation
- c. Picking
- d. Filtration

3. The following mixtures can be separated by picking EXCEPT one:

a.



b.



c.

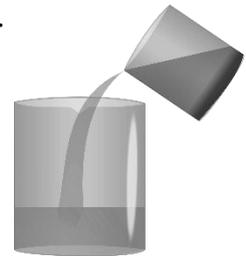


d.



4. Name the separation technique shown in the picture on the right.

- a. Decantation
- b. Winnowing
- c. Pouring
- d. Picking



5. For a mixture to be separated by winnowing technique, it has to have \_\_\_\_\_.

- a. homogeneous appearance
- b. lighter and heavier components
- c. insoluble solid and liquid components
- d. magnetic and non-magnetic components

6. Which of the following is an essential help needed in separating mixtures using the winnowing technique?

- a. sieve
- b. wind
- c. sunlight
- d. filter paper

7. Which method is used in separating a less dense substance from a denser one?

- a. Picking
- b. Winnowing
- c. Decantation
- d. Filtration

8. \_\_\_\_\_ is used to separate heavier and lighter of components of a mixture by blowing air.

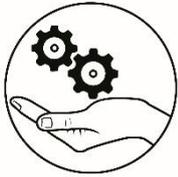
- a. Winnowing
- b. Decantation
- c. Picking
- d. Filtration

9. Which of the following pictures shows winnowing?



10. Which of the following statements describes winnowing technique correctly? It is a method of separating mixtures \_\_\_\_\_.

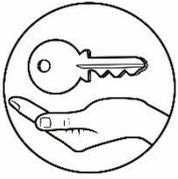
- a. composed of an insoluble solid and two immiscible liquids
- b. composed of an insoluble solid and a liquid using a strainer
- c. with magnetically susceptible materials using a magnetic force
- d. composed of lighter and heavier components with the help of wind



## ***Additional Activities***

Directions: Fill in the table. Enumerate some mixtures that can be separated through picking, winnowing and decantation. Write your answers in your notebook.

<b>Mixtures</b>		
Picking	Winnowing	Decantation
1.	1.	1.
2.	2.	2.
3.	3.	3.



# Answer Key

**What I Know**

1. A
2. C
3. B
4. B
5. A
6. D
7. D
8. A
9. B
10. A

## Lesson 1: Separating mixtures through picking

**What's New**

What have you found out:

- a. heterogeneous mixture
- b. assorted seeds and nuts
- c. By picking the components one after the other.
- d. palay rice and stones, etc.

**What's In**

Activity

III.

Mixture 1	Soy beans	Rice and corn	Stones and rice
Mixture 2	Mixture 3	Mixture 4	

IV. We can separate these mixtures through picking.

**What's More**

1. 
2. 
3. 
4. 
5. 

**What I can Do**

Possible answers

Mixed fruits	Ripe and unripe mangoes	Aquarium pebbles	Laundry
Apple, orange, etc	Ripe mangoes	Unripe mangoes	Diff. colors of pebbles
White clothes	Colored ones		

## Lesson 2: Separating mixtures through winnowing

**What's More**

Activity 1

- Answers may vary
- A winnowing fan and wind are needed to be able to separate mixtures through winnowing.
- In winnowing, a mixture with lighter and heavier components is thrown into the air using of a winnowing fan. The lighter component gets blown away by the wind while the heavier component gets collected when it falls to the ground.

Activity 2

- Sugar and flour have tiny particles. Both components are lightweight. Cannot be separated by winnowing.
- Saw dust have tiny and light particles. Wood chips are heavier and bigger in size compared to the saw dust. Can be separated by winnowing.
- Rocks and pebbles are both heavy. Cannot be separated by winnowing.
- Wheat hulls are light. Wheat grains are heavier than the wheat hulls. Can be separated by winnowing.

**What I Have Learned**

- lighter
- heavier

can be interchanged

- throwing
- winning fan
- blows
- falls

## Lesson 3: Separating mixtures through decantation

What I can Do	Possible answers	Mixture	Components
	Mixed fruits	Ripe and unripe mangoes	Ripe mangoes Unripe mangoes
	Aquarium pebbles		Diff. colors of pebbles
	Laundry		White clothes Colored ones

**What's In**

- picking
- winning
- winning
- picking
- picking
- picking
- winning
- winning

**What's New (Let it sink and separate)**

1. No
2. Yes, this will give a longer time for the solid particles to settle at the bottom of the container improving the clarity of the water.
3. No, decanting can only get rid of visible impurities and not microscopic ones which may cause certain diseases.
4. Washing dishes/clothes

**What's More (Heavy and light liquids)**

Activity 1 (sample answers only)

1. cooking oil + water/immiscible/heterogeneous/water
2. cooking oil + soy sauce/immiscible/heterogeneous/soy sauce
3. kerosene + water/ immiscible/ heterogeneous/water
4. water + vinegar/miscible/homogeneous/not applicable
5. vinegar + soy sauce/ miscible/homogeneous/not applicable

**What I Have Learned**

1. decantation
2. precipitate
3. sedimentation
4. decantation
5. immiscible

**Assessment**

1. C
2. C
3. D
4. A
5. B
6. B
7. C
8. A
9. D
10. D

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## Pictures

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## Text and Activities

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