

Dr. Hasniza (Presenter)

Hi, I'm Dr. Hasniza.

I am a lecturer at the Faculty of Education, Universiti Teknologi Malaysia. Throughout this video, you will see the fight of a government called 'Padang Jarak Padang Tekukur' to maintain its independence from the oppressive ruler of another country. Each state is represented by a fortune teller, Pak Belalang and an evil witch, Nenek Kebayan.

Nenek Kebayan will give Pak Belalang three questions. Pak Belalang has to give correct answers to save the kingdom. The fight is not common because it is an IQ test on one chemistry concept. The one at stake is the government itself!

In fact many students are confused about the chemical concept which we will watch in a short while. Thus, through this video, Pak Belalang will demonstrate and explain how and why the concept may occur.

Queen

Today, you will help me and Pak Belalang to save our kingdom. For that, you will be involved in learning about some science concepts. Pak Belalang, our country's fortune teller will try his best by demonstrating scientific experiments and simulations to fight against Nenek Kebayan, the opponent. Remember, the fate of our kingdom, Padang Jarak depends on the ability of you and Pak Belalang to answer 2 questions correctly.

Queen

Nenek Kebayan, can we start now?

Nenek Kebayan (Evil Witch)

Begging your indulgence, Your Royal Highness, Pak Belalang, what happens to the mass of syrup when 5g of sugar is added to 50 ml of water? The mass of syrup will be? A: 55 g B: < 55 g C: > 55 g

Queen

My respected fellow citizens, can you help Pak Belalang to answer the question? Discuss the answer with your neighbors and fellow villagers. We will meet again in 5 minutes

**STUDENT ACTIVITY 1**

Dr. Hasniza (Presenter)

With a given period of 5 minutes, try to help Pak Belalang to answer the first question. The materials needed are 50 ml beakers, 50 ml of water, 5 g sugar, spatula and digital scales. Perform this activity with the help of your teacher. We will meet again after this.

Dr. Hasniza (Presenter)

Dear students, what are the results of your experiment? Does the mass of the sugar water increase, decrease, or remain the same? Let us hear the answer given by Pak Belalang.

Pak Belalang (Fortune Teller)

The mass of the syrup remains 55 g. Let me demonstrates it to you.

Pak Belalang (Fortune Teller)

The mass of the syrup is 55 g.

And therefore, the correct answer to the question is A

Pak Belalang (Fortune Teller)

Let's look at this simulation which shows the movement of sugar particles

Dr. Hasniza (Presenter)

To reinforce your understanding, conduct the next activity of dissolving "Panadol soluble" in water. The materials needed are 50ml beakers, 50 ml water, Panadol soluble and digital scales. Perform this activity with the help of your teacher. We will meet again after 5 minutes.

## STUDENT ACTIVITY 2

Dr. Hasniza (Presenter)

What is the conclusion of the activities which you have done? A chemical reaction that occurs when the tablet dissolves in water is similar to the concept of conservation of mass that occurs during the sugar dissolves in water. Tablet mass and the mass of sugar in the solution do not change because sugar molecules and molecular tablets fulfill the empty space between the water molecules. Congratulations you have helped Pak Belalang to answer the first question.

Dr. Hasniza (Presenter)

Dear students, Antoine Lavoisier have done a great contribution to the concept of conservation of mass. He has conducted a number of experiments to prove that there is a change in mass of the open system however mass does not change in a closed system.

Queen

Well done Pak Belalang. I am so happy. What you did just now was similar to what Antoine Lavoisier was trying to say. “ King turns to Nenek Kebayan and says, “That was easy Nenek Kebayan. Let us hear your second question!

Nenek Kebayan (Evil Witch)

Very well then Your Highness. What will happen to the mass of a match stick after being burnt?

Dr. Hasniza (Presenter)

To help answers the second question, you are asked to perform the activity of burning matches. Required materials are matches and digital scales. Perform this activity with the help of your teacher. We will meet again after 5 minutes.

### STUDENT ACTIVITY 3

Dr. Hasniza (Presenter)

Dear students, what are the findings of your experiment? Let's listen to the explanation of the concept of conservation of mass in open systems by the queen of Padang Jarak Padang Tekukur.

Queen

Now let me highlight to you the important aspect of the experiment. In open system, mass will change. In the case of burning matches, mass of the match will decrease because of the formation of new compound as a result of burning. To assist your understanding, Pak Belalang will present a simulation

Pak Belalang (Fortune Teller)

Let us see this simulation. It will show you the formation of carbon dioxide. Match stick is made of carbon (C). When u burn the match stick, you are interacting the carbon with oxygen. Such interaction results in the formation of carbon dioxide gas.

Queen

Now, Nenek Kebayan, please give the third question.

Nenek Kebayan (Evil Witch)

Begging Your indulgence, Your Royal Highness. Pak Belalang, what happens to the mass of matches in an enclosed place?

Pak Belalang (Fortune Teller)

Well, to answer your question, my fellow citizen will help me by conducting another experiment of "The mystery of a match stick

Dr. Hasniza (Presenter)

Congratulations students! We have successfully helped Pak Belalang to defend his country through two earlier questions. For the last question, try to do burn the matches in a closed system. We will get back to you later.

#### STUDENT ACTIVITY 4

Dr. Hasniza (Presenter)

What is the answer student? Does the mass of matches increase, decrease or remain the same? Is your answer similar to Pak Belalang? Let's see the video.

Pak Belalang (Fortune Teller)

I believe my fellow citizen will agree with me. The answer is... the mass of a burnt matchstick in a closed container remains the same!.

Nenek Kebayan (Evil Witch)

Prove it to me!

Pak Belalang (Fortune Teller)

Watch this! You will see that the formation of carbon dioxide is not released to the atmosphere in the closed system."

Queen

Well done Pak Belalang! Well done fellow citizens! We've got the correct answer again this time! Nenek Kebayan has lost the competition and therefore our kingdom is saved. Through the spirit of togetherness and our diligence, we have gained our victory!

Dr. Hasniza (Presenter)

Dear students, we have witnessed the mass of a burning match in a closed system does not change. This means mass is eternal. Do you know the reason for this? This is due to the particles of carbon dioxide molecules formed from the result of a chemical reaction between oxygen in the air and carbon particles in the matches remain in the closed system which is the closed digital.

Since no particles escaped, the mass resulting from the combined mass of these particles is maintained. Dear students, in fact this concept has been proven hundreds of years ago by Antoine Lavoisier and his colleagues. Lavoisier was able to develop hardware for the closed system to prove that the mass in the combustion system does not decrease. Actually this concept is applicable in our daily lives. Can you give examples related to the concept of conservation of mass in our daily lives?

Dr. Hasniza (Presenter)

Well dear students, now I will explain the examples of the concept of conservation of mass in our daily lives. Among these are the process of condensation, boiling, freezing and air pollution. Now I will explain an example of the concept of conservation of mass which is air pollution. We can imagine this earth as a closed system. Upon the occurrence of air pollution such as the release of smog, smoke from factories and vehicle, pollutant particles will be produced and entered the earth's atmosphere. Although it cannot be seen, in fact it exists and continues to be in the atmosphere. This is because the pollutants cannot get out of the atmosphere in a closed system. Excessive pollutants can cause haze and other disasters such as disease and death. Therefore all students from now on need to adopt a healthy lifestyle and practice recycling.

Teacher's guide

The video shows the topic on conservation of mass. In the story, a fortune-teller has to save his kingdom by answering questions correctly by the opponents. The opponent will ask questions related to a chemical concept. Pak Belalang, the fortune teller, plays the role as the wise warrior by demonstrating experiments and provide information by using simulation related to chemical concept. To benefit from the video, the teacher is advised to first; show the video from Segment 1, and students will conduct group activities activities

accordingly. Teachers will guide students to explore new ideas during group activities. The lesson should continue as blending learning, whereby each video segment will follow by activities of the students.

Outcome of the discussions will be reinforced in the successive segments. Hopefully, through the inquiry-based learning approach, students will find it fun to learn and form new knowledge.