

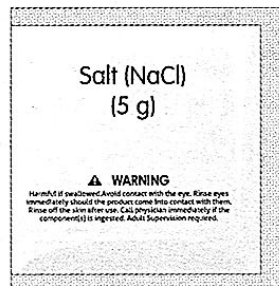
CATCH THE CRIMINALS

⚠ WARNING: THIS SET CONTAINS CHEMICALS THAT MAY BE HARMFUL IF MISUSED. READ CAUTIONS ON INDIVIDUAL CONTAINERS CAREFULLY. NOT TO BE USED BY CHILDREN EXCEPT UNDER ADULT SUPERVISION.

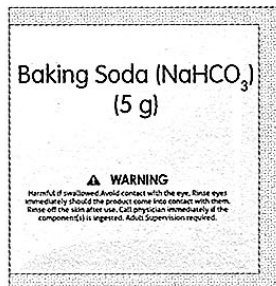
ADULT SUPERVISION REQUIRED

⚠ WARNING: CHOKING HAZARD - THIS TOY CONTAINS SMALL PARTS. NOT FOR CHILDREN UNDER 3 YEARS.

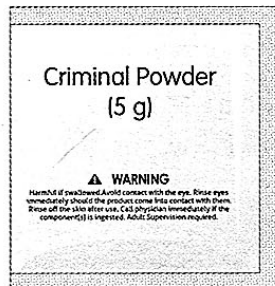
What's included in the kit:



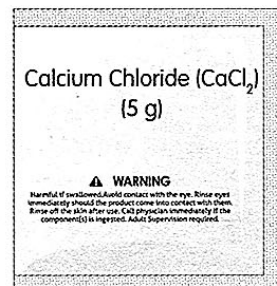
1 Packet of
Salt (NaCl)



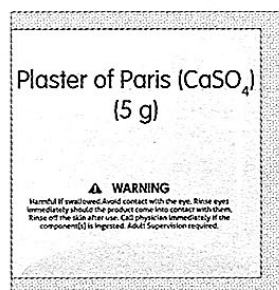
1 Packet of
Baking Soda (NaHCO₃)



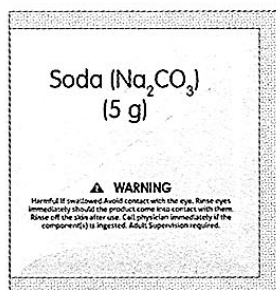
1 Packet of
Criminal Powder.



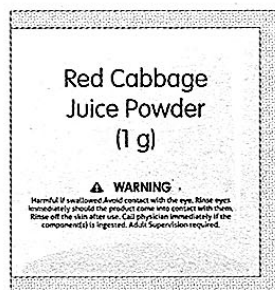
1 Packet of
Calcium Chloride (CaCl₂)



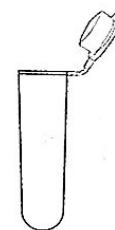
1 Packet of
Plaster of Paris (CaSO₄)



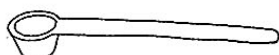
1 Packet of
Soda (Na₂CO₃)



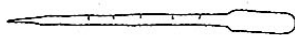
1 Packet of
Red Cabbage Juice Powder



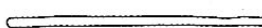
5 Test Tubes



1 Spoon



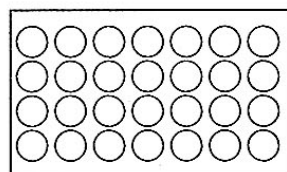
1 Pipette



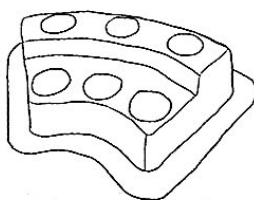
1 Stir Stick



6 Cups



1 Sheet of Sticker Tags



1 Test Tube Stand

What you need to get or use:
Some Water, Marker Pen.

LET'S START

Case: Who stole the ruby?

The detective was reading cases on a silent afternoon. Suddenly a telegram arrived, saying: "Earl lost the ruby which will be presented to the queen, Please investigate immediately." As the detective's assistant, you will give the telegram to the detective. The detective looked at the telegram and said: "Take the toolbox and follow me to see Earl!"

The Earl lived on a large manor in the east of the city, which had only one road to the town. There was no sign of any other traffic on the way. When we arrived at the manor, the butler had been waiting for a long time.

Part: 1

The Earl was walking around anxiously in the hall of the castle. When he saw the detective coming, he hurried over and said: "You've come."

The detective asked calmly: "What happened?"

Earl said: "Follow me."

On the second floor, we followed the Earl to the innermost room on the right, which was the Earl's collection room. The collection room is full of beautiful Treasures, there is a table in the middle of the room, but there is nothing on it. The Earl pointed to the table and said: "The ruby had been there and it had inexplicably disappeared."

The detective said: "Don't worry. Please tell me the process of the case." The detective said to his assistant: "Write down every clue."

The Earl said: "I have a friend who is a salt merchant and he knew I had a precious ruby for the queen. He was very interested and wanted to see it. My doctor and painter were also at my house coincidentally, so I showed them the ruby together. When I locked the door after the visit, I saw the ruby was still there. However, when I came back to organize the collection, I found that the ruby was missing."

The detective asked: "Only you with three people went into this room?"

The Earl said: "Let me see. The chef brought us chilled wine. Then the housemaid asked us to have a meal. I made sure there was no one in the room when I locked the door and left."

The detective surveyed the whole table and found traces of liquid on it. Found scattered white powder in the gap of the table. Then I took out a bag from the toolbox. He collected the white powder into the bag. The detective went to the door and checked the lock. There was no damage.

The detective asked: "who else has the key to this room?"

The Earl said: "There's only one key, and I kept it all the time. After talking about business things with my friends in the afternoon. Then I went back to the study at the next door. After taking the medicine I felt a little sleepy, and then I slept for 2 hours. I took out the key into my desk drawer before I went to bed."

The detective asked: "Taken medicine? What kind of medicine are you taking?"

The Earl said: "I had a headache recently, so my doctor offered me some medicine to relieve headache."

The detective asked: "What time did you go to bed?"

The Earl said: "Between 3 and 5 PM. When I heard the five o'clock bell, I woke up and went to the collection room."

"Are the salt-merchant, the doctor, the painter, the chef, and the housemaid still in the hall? Have they ever left the hall?" the detective asked.

"No! No one has left the hall!" The Earl replied quickly.

The detective smiled and said, "Very well. Let's go and see them."

Part: 2

The salt merchant's room adjoined the living room, the Earl knocked at the salt merchant's door. The salt merchant opened the door and invited us into the room.

The detective looked around and saw a packet of white powder on the table. "what is it?" he asked.

The salt merchant said: "This is the sample salt, I need to check it. The salt hasn't been very good recently and it has seriously affected my business! This time I talk to Earl about cooperation, I hope he can help me with the money!"

The detective asked: "What were you doing between 3 and 5 PM?"

The salt merchant said: "I've been staying in my room all afternoon!"

The detective said: "Can anyone prove that you stayed in the room?"

The salt merchant said: "No one can prove it, but I did not steal the ruby. Although the shortage of funds has not been solved, I have been honest in my business!"

The detective smiled and said: "Don't think a lot. I was just asking. Can I take some of your sample salt back?"

The salt merchant hesitated, but he still gave the detective a packet of sample salt.

Part: 3

Out of the salt merchant's room, came to the next room, the painter was polishing the sculpture, there were some scattered white plaster powders.

The detective asked: "What are you doing?"

The painter replied: "I'm making a plaster statue, but I'm not very successful. I haven't had much inspiration yet!"

The painter went up to the statue and said: "I have always wanted to make a statue like David, but none of them are what I want! The Earl said he wants to introduce me to the queen, but I have nothing a good statue."

The detective came to the statue, took some of the white power into the bag, and asked: "Were you also working on the plaster statue between 3 pm and 5 pm?"

The painter replied: "No, I walked around the manor, I hoped I can have some inspire but I still did not have some idea. I want to discuss it with the Earl. I saw the doctor and the housemaid come out of the Earl's room and tell me that the Earl was asleep. So I came back."

"Let's ask the doctor!" the detective said and going out of the door.

Part: 4

When the detective wanted to knock the door, the door opened and the doctor came out. The doctor said to the count: "When checked the medicine-chest, I found that I had not enough medicine, so I need to go back to the clinic."

"Oh really? When I came, did you find there wasn't enough medicine?" The detective asked.

The doctor alarmed and replied quickly: "Mr. detective, you misunderstand me! The ruby is a family heirloom, but I am voluntary to sell it to the Earl."

The detective asked: "I heard the painter said, you went to the Earl's study between 3 and 5 p.m."

The doctor said: "Yes! The Earl has been suffering from a headache, which has not improved with the medicine, I want to examine him. But the door was shut. When I was about to knock, the housemaid came to fetch the clothes, and I went in with her. We came out when we saw the Earl asleep."

As the doctor was speaking, the detective saw the white powder in the doctor's medicine chest and asked: "What kind of medicine is this?"

The doctor picked up the white powder and said: "This is calcium chloride for itchy skin."

The detective scratched his arm and said: "What a coincidence. I've been itching in my body, could you give me some medicine?"

The doctor took out some medicine, wrapped it up, wrote down how to use it, and gave it to the detective.

Taking leave of the doctor, the detective asked the Earl: "Which rooms are the chef and housemaid?"

The Earl said: "At this time, the chef is to prepare dinner in the kitchen and the housemaid is washing the clothes."

Part: 5

The detective went into the kitchen, the chef was preparing dinner, the detective said: "The dinner is delicious."

The chef looked back, saw the detective and smiled and said: "Would you like ice wine to drink?"

The detective nodded and went to take the ice wine from the chef and tested: "Well it's good wine! Why are you getting the ice wine so early?"

The chef said: "The Earl like the ice wine, he often drinks ice wine. So I need to prepare the ice wine at any time."

"What did you get on your sleeve?", the detective said.

"This is the baking soda that I made bread in the morning." The chef said.

The detective asked: "Can I have some baking soda?"

"Of course!" The chef took some baking soda to the detective. And he said quietly to the detective: "Do you know? The painter wants to get the ruby and I heard several times during dinner that he wanted to buy ruby from the Earl."

The detective asked: "Do you know why he bought ruby?"

"It seems that the painter wanted to present it to the queen. He hopes to get recognition of queen." The chef said seriously.

"Okay, I get it." The detective left the kitchen and went to the laundry.

Part: 6

When the detective arrived at the laundry, the housemaid saw the detective coming, she wiped her hands to dry on her apron and took a stool to the detective and said: " Mr. detective please sit down! Are you here to investigate the ruby case?"

The detective nodded and sat down.

Before the detective asked, the housemaid said: "I tell you, I suspect the salt merchant may have taken ruby. Because the Earl would not lend him any money, so he was angry. He lingered in the Earl's study in the afternoon. I guess he is the suspect. About the chef, I heard someone say he owes money for gambling and he wanted an advance on his salary, but the Earl refused him."

When the housemaid wanted to say, the detective said jokingly: " How did I hear you had stolen something before?"

The housemaid hurriedly waved her hand and said: " No, not me! If you don't believe me, you can search!"

The detective smiled and stood up: " The thief will not carry his loot, what's in that glass bottle behind you?"

" You say that? That is my secret! That is soda. If the clothes have grease, put it on the clothes, that will clean the grease better." The housemaid said proudly.

The detective said: "It is good, could you give me a little?"

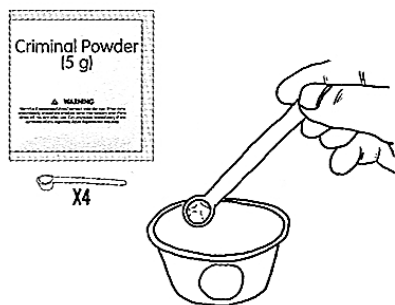
The housemaid readily agreed.

The detective returned to the hall with his assistant and said to the assistant, "Compare the powder you just collected with the powder in the collection room, and see which is the same as the one on the spot. Then I will collect other clues!" Then he left.

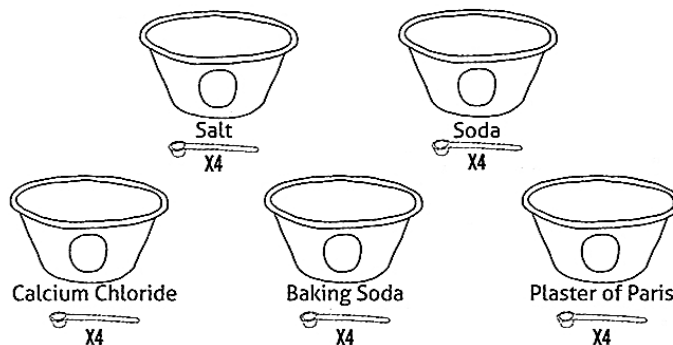
As the detective's assistant, let's identify the suspected powder.

Detective Work

The first step: Observation



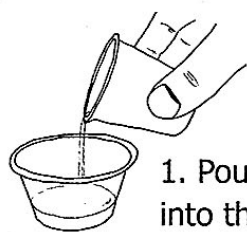
1. Add 4 spoons of criminal powder to the cup and write the name on the cup with sticker tag.



2. Add 4 spoons of salt, baking soda, soda, calcium chloride and Plaster of Paris into different cups respectively and mark them with sticker tag on each cup.

3. Observe these white powder.
4. Compare these white powder with the criminal powder, Let's see who's the most likely suspect?
5. The following experiment will verify your guess.

The second step: Add water



1. Pour half a cup of water into the criminal powder cup.

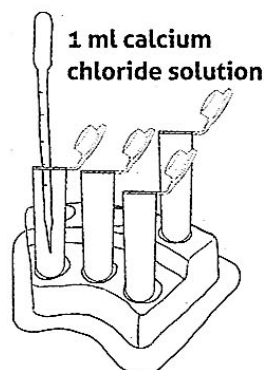
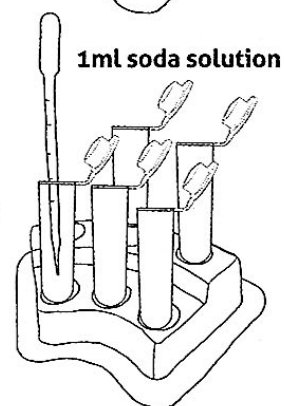
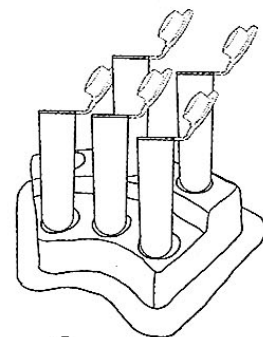


2. Stir it up with stir stick. Observe if it dissolves completely or if there is a white precipitate.

3. Pour half a cup of water respectively into the 5 kinds of powder cups.
4. Stir it up with stir stick and observe 5 kinds of powders in each cup, compared with the criminal powder, what do you find?
5. Take out the cup which is a different result of criminal powder and remove it from suspicion.
6. Clean the cup which is removed from suspicion. (The Plaster of Paris power cup was cleared of suspicion)

The third step: Add soda solution

1. Add 2ml criminal solution with pipette in a tube and add 2ml remaining suspect solution respectively in other 4 tubes, mark them with sticker tags and put the tubes on the tube stand.
 2. Add 1 ml soda solution with a pipette in every tube. The soda solution from the previous step of soda with water.
 3. Observe the change of the solution in each tube, and compare the criminal solution. What do you find?
 4. Take out the tube which is a different change of criminal solution and remove it from suspicion.
 5. Clean every tube and pipette.
- (The Calcium Chloride solution tube was cleared of suspicion).



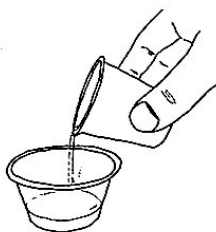
The fourth step: Add calcium chloride solution

1. Add 2ml criminal solution with pipette in a tube and add 2ml remaining suspect solution respectively in other 3 tubes, mark them with sticker tags and put the tubes on the tube stand.
2. Add 1 ml calcium chloride solution with pipette in every tube. The calcium chloride solution from the previous step of calcium chloride powder with water.

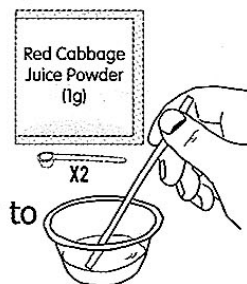
3. Observe the change of the solution in each tube, and compare the criminal solution. What do you find?
4. Take out the tube which is a different change of criminal solution and remove it from suspicion.
5. Clean every tube and pipette.
(The salt solution tube was cleared of suspicion).
6. Observe the two remaining solutions, one is baking soda and the other one is soda.

The fifth step: Add Red Cabbage Juice solution

1. Take out a clean cup and fill it with half a cup of water.



2. Add 2 spoons of Red Cabbage Juice powder, stir to dissolve.

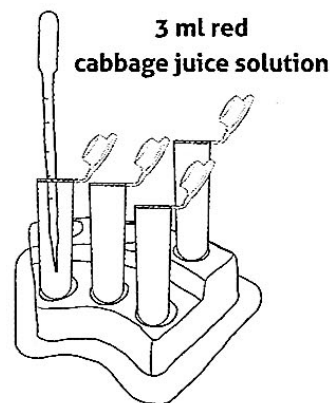


3. Add 2ml criminal solution with pipette in a tube and Add 2ml remaining suspect solution respectively in other 2 tubes, mark them with sticker tags and put the tubes on the tube stand.

4. Add 3 ml Red Cabbage Juice solution with pipette in every tube.

5. Observe the change of the solution in each tube, and compare the criminal solution. What do you find?

6. Identify the final culprit together.



THE END



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Secret Letter

1. Experiments reveal:

The white powder was collected from the salt merchant which is Salt (NaCl).

The white powder was collected from the painter which is Plaster of Paris (CaSO_4). Painters often use it to make statues.

The white powder was collected from the doctor which is Calcium Chloride (CaCl_2). Calcium chloride can treat pruritus skin disease.

The white powder was collected from the chef which is Baking Soda (NaHCO_3). Put baking soda in the bread to make it softer.

The white powder was collected from the housemaid which is Soda (Na_2CO_3). Soda is often used to remove grease.

In the second step, all the white powder is dissolved with water. The Plaster of Paris will not dissolve. So the painter was ruled out as a suspect.

In the third step, adding soda solution to the remaining 4 solutions, only the Calcium Chloride solution reacts with the soda solution which becomes white precipitate. So the doctor was ruled out as a suspect.

In the fourth step, calcium chloride solution was added to the remaining 3 solutions, the soda solution and baking soda solution would form white precipitation. The solution of Salt (NaCl) did not react. So the salt merchant was ruled out as a suspect.

In the fifth step, Add the Red Cabbage Juice solution to the remaining solutions. Because of the different alkalinity of soda and baking soda solution, the color of Red Cabbage Juice solution will be different, By comparing the criminal solution, you can make sure that baking soda is left at the scene of the crime. So the Chef will be the criminal suspect who stole the ruby.

2. The case revelation:

Do you want to know how the chef stole the ruby?

In fact, the ruby had been stolen before the Earl locked the door. The chef knew that the Earl liked to drink ice wine, he exchanged the red ice with the ruby while the Earl and others were looking at the other collection, and he put the ruby into the wine. When the chef wants to leave the ruby was brought out with the wine. As the chef has been unable to leave the manor, the chef keeps the frozen wine in the kitchen, prevent others from seeing the ruby on his hand.

When the earl leaves, he saw that the ruby on the table was actually red ice. At 5 o'clock in the afternoon. When the earl returned. The red ice melted away. The detective saw that the mark on the table was actually the mark where the ice melted into water.