

SPS	4				7					
Criteria	1	2	3	4	1	2	3	4	5	6

Reference : Science Year 6 Practical Book, page 1 – 4( practical 1)

Theme : Investigating Living Things

Learning area : Interaction among living things

Learning objective : Understanding that competition is a form of interaction among living things

Learning outcomes : 1.2.4 : Pupils give reasons why animals compete

Topic : Winner Takes All?

### 1. Aim of experiment

#### Questions:

- i) What is the aim of the investigation?
- ii) What is the purpose of the investigation?
- iii) What do you want to find out from the investigation?
- iv) What do you want to study from the investigation?
- v) What do you want to proof from the investigation?

#### Suggested answers :

To investigate the relationship between what to change and what to observe/measure.

- i) **To investigate/ study the relationship between the number of fish (WTC) and the weight of fish after twelve days**

### 2. Materials / apparatus

SMS 1(C1,C2,C3,C4)
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11 guppy fish, 2 clear plastic aquariums of equal size, 100 ml beaker, fish food (pellets), anti-chlorine solution, small plastic sieve, kitchen scale

#### Questions:

- i) What are the materials needed for this experiment?
- ii) What things do you need to carry out this experiment?
- iii) What are the materials required to carry out this experiment?

iv) Name the apparatus used in this experiment.

### **Suggested answers**

11 guppy fish, 2 clear plastic aquariums of equal size, 100 ml beaker, fish food (pellets), anti-chlorine solution, small plastic sieve, kitchen scale

### **3. Hypothesis**

SPS 7(C1)

#### **Questions**

- i) Write a hypothesis based on this experiment.
- ii) What can you say about the hypothesis of this experiment?
- iii) State one hypothesis based on this experiment.

#### **Suggested answers**

- i) **The more** the number of fish, **the less** the weight of the fish.
- ii) **The less** the number of fish, **the more** the weight of the fish.
- iii) **If** the number of fish is more, **then** the weight of fish is less.
- iv) **If** the number of fish is less, **then** the weight of fish more.

### **4. Identify Variables**

SPS 7(C2)

#### **Questions**

- i) What to change (manipulated variable).
- ii) What to measure / observe (responding variable).
- iii) What to keep the same (constant variable)

#### **Questions :**

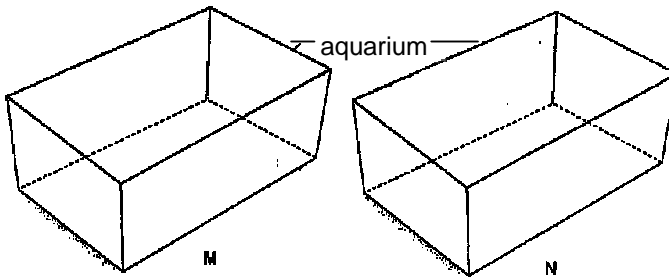
- i) What is changed ?
- ii) What is measured / observed?
- iii) What is kept the same?

#### **Suggested answers**

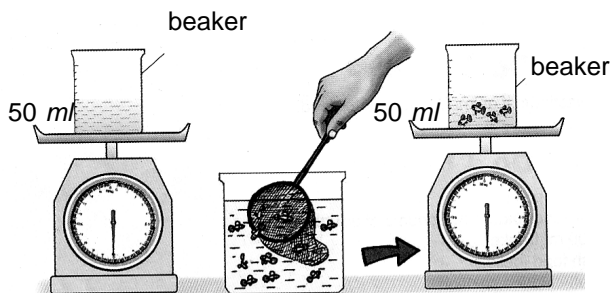
- i) The number of fish. (Manipulated variable)
- ii) The weight of the fish. (Responding variable)
- iii) The amount of fish food, size of plastic aquariums, amount of water. (Fixed/constant variable)

### 5. Procedure / What Do I Do?

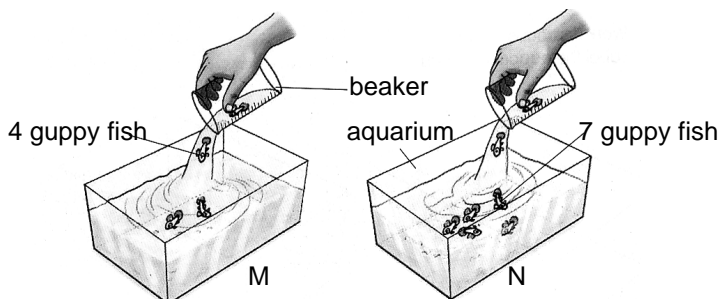
1. Work in groups of four.
2. Label the aquariums M and N.



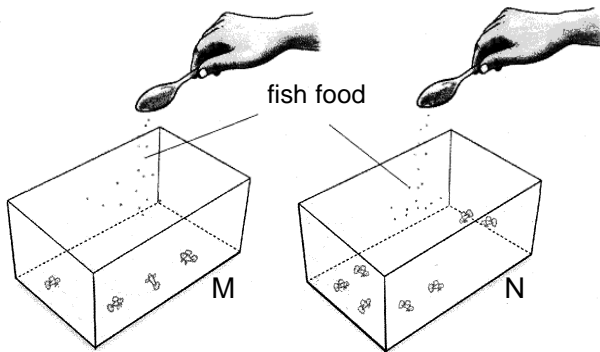
3. Pour 50 ml water into a beaker. Weigh and record the weight.
4. Use a plastic sieve to scoop four guppy fish and put them into the beaker. Weigh and record the weight.



5. Add water in to aquarium M until three quarter full. Put in the guppy fish.
6. Repeat steps 3 to 5 with the other seven guppy fish for aquarium N.



7. Record your readings in the table.
8. Feed the fish with the same amount of fish pellets every morning for twelve days.



9. After twelve days, weigh the fish in the aquariums (follow steps 3 and 4)

#### 6. Method / What Do I Find?

SPS 4(C3)

1. The aquariums were labeled M and N.
2. 50 ml water was poured into a beaker. The weight was recorded.
3. A plastic sieve was used to scoop four guppy fish and put into the beaker. The weight was recorded.
4. Water was added into aquarium M until three quarter full. The guppy fish were put into it.
5. Steps 3 to 5 were repeated with the other seven guppy fish for aquarium N.
6. The readings were recorded in the table.
7. The fish were fed with the same amount of fish pellets every morning for twelve days.

## 6. Observation

SPS 1(C1,C2,C3,C4)

The table below shows the result of the investigation:

Day	Aquarium M (four fish)			Aquarium N (seven fish)		
	Weight without fish	Weight with fish	Weight of four fish	Weight without fish	Weight with fish	Weight of seven fish
1						
12						

### Questions:

- i) What do we need to observe?
- ii) What can be observed about the condition of the weight of fish?
- iii) What is your observation based on the experiment?
- iv) What are we observing?

### Suggested answers

- i) The average weight of fish in aquarium M is heavier than the average weight of fish in aquarium N.
- ii) The average size of fish in aquarium M is bigger than the average size of fish in aquarium N.
- iii) The average weight of fish in aquarium N is lighter than the average weight of fish in aquarium M.
- iv) The average size of fish in aquarium N is smaller than the average size of fish in aquarium M.

## 7. Inference

SPS 4(C4)

### Questions:

- i) Explain the differences in weight.
- ii) Give a reason for that / your observation.

- iii) State one inference based on the observation.
- iv) Why it happened?
- v) Why do you think it happened?

**Suggested answers**

- i) The fish in aquarium M is heavier than the fish in aquarium N because they get more food among themselves.
- ii) The fish in aquarium M is bigger than the fish in aquarium N because they share food with lesser number of fish.

**8. Conclusion**

**Questions:**

- i) What is your conclusion based on the experiment?
- ii) What can you conclude from the experiment?
- iii) Write a conclusion based on the experiment you have done.
- iv) What have you learnt from this experiment?
- v) Based on the investigation, what is the relationship between the number of fish and the competition among them?

**Suggested answers**

- i) The less the number of fish in the aquarium, the heavier the weight of the fish.
- ii) The more the number of fish in the aquarium, the lighter the weight of the fish.
- iii) The less the number of fish in the aquarium, the bigger the size of the fish.
- iv) The more the number of fish in the aquarium, the smaller the size of the fish.

**SAMPLE QUESTION.**

1. A group of pupils carry out an investigation.
  - i. They prepare two mini aquariums of the same size labeled P and Q.
  - ii. They choose ten young guppy fish of the same size.
  - iii. They put five guppy fish into aquariums P and Q respectively.
  - iv. They put 1 teaspoon of fish food into aquarium P and half a teaspoon of fish food into aquarium Q every day.
  - v. They observe the size of the young guppy fish in each aquarium for two weeks.

(a) What is the aim of the investigation?

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(b) In this investigation, state

i. what is changed (manipulated variable)

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ii. what is kept the same (controlled variable)

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iii. what is observed (responding variable)

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(c) After two weeks, the pupils observed that the guppy fish in aquarium P are bigger than the guppy fish in aquarium Q.

What is the reason for this observation?

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(d) Based on the investigation, what is the relationship between the amount of fish food and the size of the guppy fish?

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## Suggested answers

(a) What is the aim of the investigation?

To investigate the relationship between the quantity of food and size of the young Guppy fish after two weeks

(b) In this investigation, state

i. what is changed (manipulated variable)

Quantity of food

ii. what is kept the same (controlled variable)

Size of aquarium

iii. what is observed (responding variable)

Size of young guppies after two weeks

(c) After two weeks, the pupils observed that the guppy fish in aquarium P are bigger than the guppy fish in aquarium Q.

What is the reason for this observation?

guppy fish in aquarium P are bigger than the guppy fish in aquarium Q because Guppy fish in aquarium P get enough food.

(d) Based on the investigation, what is the relationship between the amount of fish food and the size of the guppy fish?

The more the quantity the food the bigger the size of fish.



Reference	: Science Year 6 Practical Book, page 7 – 12( practical 2)
Theme	: Investigating Living Things
Learning area	: Interaction among living things
Learning objective	: Understanding that competition is a form of interaction among living things
Learning outcomes	: 1.2.6 : Pupils give reasons why plants compete
Topic	: Limit My Food

### 1. Aim of experiment

#### **Questions:**

- i) What is the aim of the investigation?
- ii) What is the purpose of the investigation?
- iii) What do you want to find out from the investigation?
- iv) What do you want to study from the investigation?
- v) What do you want to prove from the investigation?

#### **Suggested answers :**

To investigate the relationship between what to change and what to observe/measure.

- i) **To investigate/ study the relationship** between **the amount of nutrient** (WTC) and **growth of plants** (WTO).

### 2. Materials / apparatus

SMS 1(C1,C2,C3,C4)
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15 corn seeds, sawdust, ruler, glue/clear sticky tape, A4 paper, toothpicks, scissors, flower pot (10cm X 10cm) with base container, cotton wool or tissue paper, petri dishes, plant fertilizer (nutrient), tap water

#### **Questions:**

- i) What are the materials needed for this experiment?
- ii) What things do you need to carry out this experiment?
- iii) What are the materials required to carry out this experiment?
- iv) Name the apparatus used in this experiment.

### **Suggested answers**

15 corn seeds, sawdust, ruler, glue/clear sticky tape, A4 paper, toothpicks, scissors, flower pot (10cm X 10cm) with base container, cotton wool or tissue paper, petri dishes, plant fertilizer (nutrient), tap water

### **3. Hypothesis**

SPS 7(C1)

#### **Questions**

- i) Write a hypothesis based on this experiment.
- ii) What can you say about the hypothesis of this experiment?
- iii) State one hypothesis based on this experiment.

#### **Suggested answers**

- i) **The more** the amount of nutrient , **the bigger** the growth of the plant.
- ii) **The less** the amount of nutrient, **the smaller** the growth of the plant.
- iii) **If** the amount of nutrient is more, **then** the growth of the plant is bigger.
- iv) **If** the amount of nutrient is less, **then** the growth of the plant is smaller.

### **4. Identify Variables**

SPS 7(C2)

#### **Questions**

- i) What to change (manipulated variable).
- ii) What to measure / observe (responding variable).
- iii) What to keep the same (constant variable)

#### **Questions :**

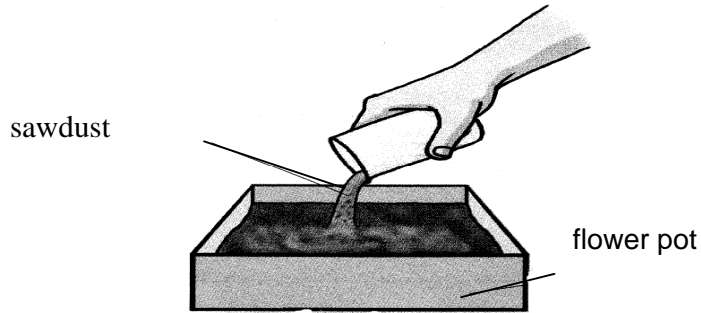
- i) What is changed ?
- ii) What is measured / observed?
- iii) What is kept the same?

#### **Suggested answers**

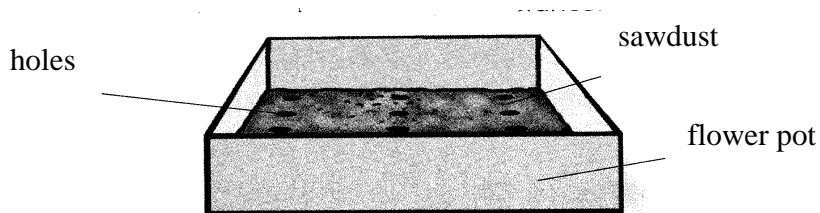
- i) The amount of nutrient. (Manipulated variable)
- ii) The growth of the plants. (Responding variable)
- iii) The type of plants, the amount of water (Fixed/constant variable)

### 5. Procedure / What Do I Do?

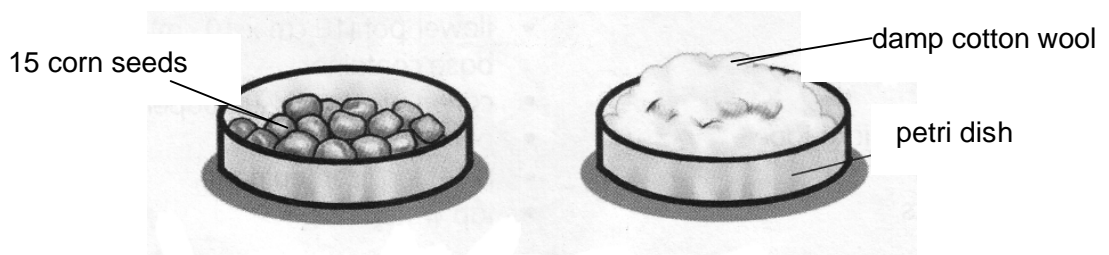
1. Work in groups of five.
2. Half-fill the flower pot with dry sawdust.



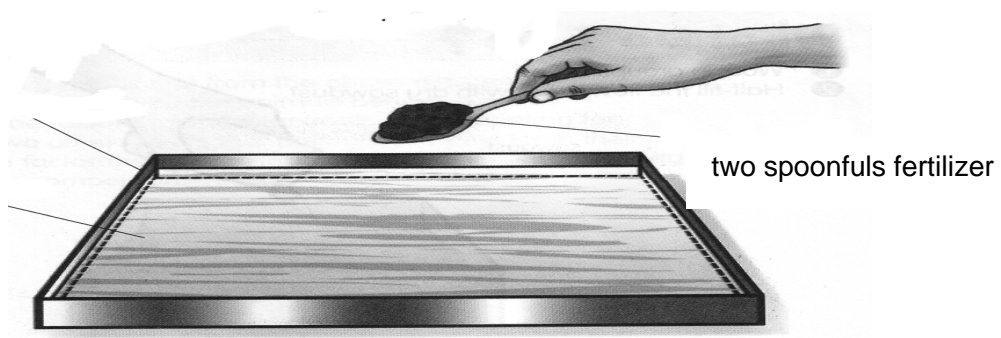
3. Use a stick to make nine holes of equal distances on the sawdust.



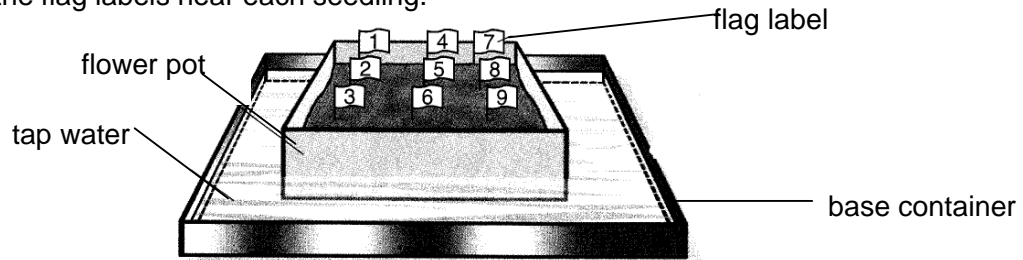
4. Place 15 corn seeds on a damp cotton wool in a petri dish. Cover the seeds with another piece of damp cotton wool.
5. Leave for 24 hours for the corn seeds to germinate.



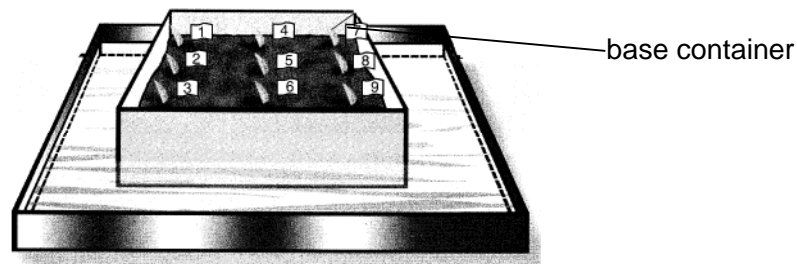
6. Meanwhile, half-fill the base container with tap water.
7. Put two teaspoonfuls of plant fertilizer into the container. Stir to dissolve the fertilizer.



8. Place the flower pot in the base container.
9. Cut nine pieces (1cm X 0.5cm) of paper and number them 1 – 9. Stick the numbered papers on a toothpick to make flag labels.
10. Select nine seedlings of the same size. Plant one seedling into each hole.
11. Stick the flag labels near each seedling.



12. Place the pot in an open place until the seedlings produce the first green leaves.



13. Move the base container to a place where there is enough sunlight.
14. Observe your plants every two days for 10 days. Add water into the base container every two days.
15. Measure the height and count the number of leaves of each plant.
16. Record your observations in the table as shown on page 11.

## 6. Method / What Do I Find?

1. The flower pot was half-filled with dry sawdust.
3. A stick was used to make nine holes of equal distance.
4. 15 corn seeds were placed on a damp cotton wool in a petri dish. The seeds were covered with another piece of damp cotton wool.
5. The corn seeds were left for 24 hours to germinate.
6. Meanwhile, the base container was half-filled with tap water.
7. Two teaspoonfuls of plant fertilizer was put into the container. The fertilizer was stirred to dissolve it.
8. The flower pot was placed in the base container.

SPS 4(C3), SPS 5 (C3, C4)



**Questions:**

- i) What do we need to observe?
- ii) What can be observed about the condition of the weight of fish?
- iii) What is your observation based on the experiment?
- iv) What are we observing?

**Suggested answers**

- i) Some plants produce more leaves than the others.
- ii) Some plants are taller than the others.
- iii) Some plants are healthier /have bigger stems and greener leaves.
- iv) Some plants are small size and not healthy.

**8. Inference**

SPS 4(C4)
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**Questions:**

- i) Explain the differences in appearance.
- ii) Give a reason for that / your observation.
- iii) State one inference based on the observation.
- iv) Why did it happen?
- v) Why do you think it happened?

**Suggested answers**

- i) Some plants produce more leaves than the others because they have better adaptation and wins the competition.
- ii) Some plants are taller than the others because they have better adaptation and wins the competition.
- iii) Some plants are healthier /have bigger stems and greener leaves because they have better adaptation and wins the competition.
- iv) Some plants are small size and not healthy because they have better adaptation and wins the competition.

**9. Conclusion**

**Questions:**

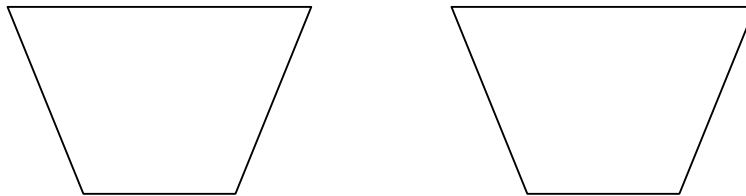
- i) What is your conclusion based on the experiment?
- ii) What can you conclude from the experiment?
- iii) Write a conclusion based on the experiment you have done.
- iv) What have you learnt from this experiment?
- v) Based on the investigation, what is the relationship between the amount of nutrient and the growth of the plants?

**Suggested answers**

- i) If the nutrient is more, the growth is better and healthier.
- ii) If the nutrient is less, the growth is less healthy.

**SAMPLE QUESTION**

1. Two pots below contain different number of seedlings. The pots are watered and left outside. After four weeks, the number of seedlings in pot A remains the same but only 4 seedlings were left in pot B.



- (a) What is the aim of the investigation?

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- (b) In this investigation, state

- i. what is changed (manipulated variable)

---

- ii. what is kept the same (controlled variable)

---

iii. what is observed (responding variable)

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(c) Give a reason for the interaction above.

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(d) Based on the investigation, what is the relationship between the amount of fish food and the size of the guppy fish?

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SPS	4				7					
Criteria	1	2	3	4	1	2	3	4	5	6

Reference : Science Year 6 Practical Book (practical 3) page 13 – 15

Theme : Investigating Force and Energy

Learning area : 1.2 Understanding the effects of force

Learning objective : Understanding that push and pull are forces

Learning outcomes : 1.2.2 : Pupils state that force can change the motion of an object

Topic : Car-and-Catapult

### 1. Aim of experiment

#### Questions:

- i) What is the aim of the investigation?
- ii) What is the purpose of the investigation?
- iii) What do you want to find out from the investigation?
- iv) What do you want to study from the investigation?
- v) What do you want to prove from the investigation?

#### Suggested answers :

To investigate the relationship between what to change and what to observe/measure.

- i) **To investigate/ study the relationship between the stretched rubber band (WTC) and the distance traveled by the toy car (WTO).**

### 2. Materials / apparatus

SMS 1(C1,C2,C3,C4)
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Rubber band, plank or wooden board, hammer, two 6 cm long nails, toy car, measuring tape

#### Questions:

- i) What are the materials needed for this experiment?
- ii) What things do you need to carry out this experiment?
- iii) What are the materials required to carry out this experiment?
- iv) Name the apparatus used in this experiment.

### **Suggested answers**

Rubber band, plank or wooden board, hammer, two 6 cm long nails, toy car, measuring tape

### **3. Hypothesis**

SPS 7(C1)

#### **Questions**

- i) Write a hypothesis based on this experiment.
- ii) What can you say about the hypothesis of this experiment?
- iii) State one hypothesis based on this experiment.

### **Suggested answers**

- i) **The longer** the rubber band is stretched, **the further** the distance traveled by the toy car.
- ii) **The shorter** the rubber band is stretched, **the nearer** the distance traveled by the toy car.
- iii) **If** the rubber band is stretched longer, **then** the distance traveled by the toy car is further.
- iv) **If** the rubber band is stretched shorter, **then** the distance traveled by the toy car is nearer.

### **4. Identify Variables**

SPS 7(C2)

#### **Questions**

- i) What to change (manipulated variable).
- ii) What to measure / observe (responding variable).
- iii) What to keep the same (constant variable)

#### **Questions :**

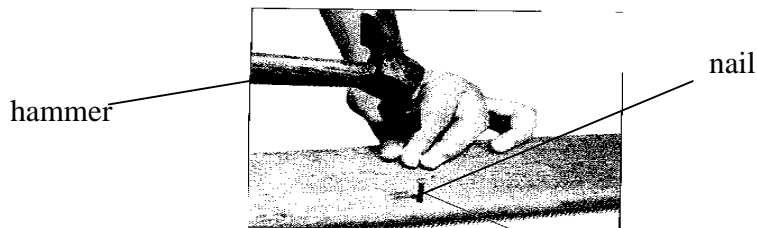
- i) What is changed ?
- ii) What is measured / observed?
- iii) What is kept the same?

**Suggested answers**

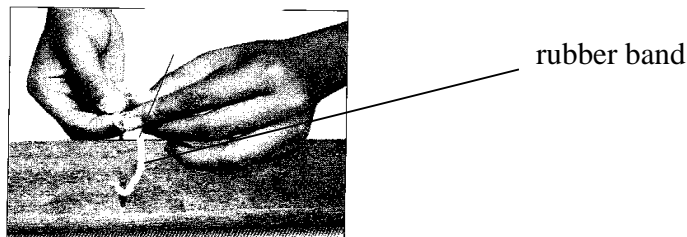
- i) The length of the rubber band stretched backwards. (Manipulated variable)
- ii) The distance traveled by toy car. (Responding variable)
- iii) The type of rubber band, the size of toy car (Fixed/constant variable)

**5. Procedure / What Do I Do?**

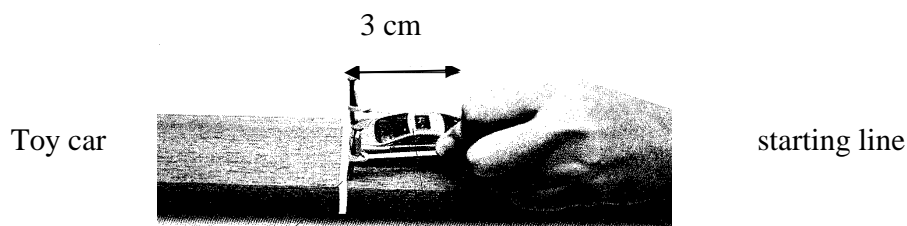
- 1. Work in groups of four.
- 2. Hammer in two nails 10 cm apart across a plank.



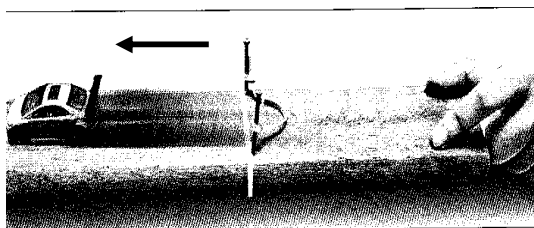
- 3. Stretch a rubber band over the two nails.



- 4. Mark a starting line between the two lines.
- 5. Place a toy car in front of the rubber band. Pull the rubber band backwards together with the toy car. It should be stretched backwards by 3 cm.



- 6. Release the toy car.
- 7. Measure the distance traveled by the toy car.



8. Repeat steps 5 to 8 on different distances as shown in the table.

**6. Method / What Do I Find?**

SPS 4(C3), SPS 5 (C3, C4)

1. Two nails were hammered in 10 cm apart across a plank.
2. A rubber band was stretched over the two nails.
3. A starting line was marked between the two nails.
4. A toy car was placed in front of the rubber band. The rubber band was pulled backwards together with the toy car. It was stretched backwards by 3 cm.
5. The toy car was released.
6. The distance travelled by the toy car was measured.
7. Steps 4 to 7 were repeated on different distances as shown in the table.

**7. Observation**

SPS 1(C1,C2,C3,C4)

The table below shows the result of the investigation:

Length of the rubber band stretched backwards (cm)	Distance traveled by toy car (cm)
3	
6	
9	
12	
15	

**Questions:**

- i) What do we need to observe about the distance, when the rubber band stretched backwards is 15 cm?
- ii) What can be observed about the distance travelled when the rubber band stretched backwards is 15 cm?
- iii) What is your observation based on the distance when the rubber band stretched backwards is 15 cm?

**Suggested answers**

- i) The distance is the furthest.

**8. Inference**

SPS 4(C4)
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**Questions:**

- i) Explain the observation.
- ii) Give a reason for that / your observation.
- iii) State one inference based on the observation.
- iv) Why did it happen?
- v) Why do you think it happened?

**Suggested answers**

- i) The distance is the furthest because the force is greater.
- ii) The distance is the furthest because there is more force.

**9. Conclusion**

**Questions:**

- i) What is your conclusion based on the experiment?
- ii) What can you conclude from the experiment?
- iii) Write a conclusion based on the experiment you have done.
- iv) What have you learnt from this experiment?
- v) Based on the investigation, what is the relationship between the length of the rubber band stretched backwards and the distance travelled by toy car?

**Suggested answers**

- i) The longer the rubber band is stretched, the further the distance travelled by toy car.
- ii) The shorter the rubber band is stretched, the nearer the distance travelled by toy car.
- iii) If the length of the rubber band stretched backwards is longer, then the distance travelled by toy car is further.
- iv) If the length of the rubber band stretched backwards is shorter, then the distance travelled by toy car is nearer.

### Sample question

1. A group of pupils carried out an investigation where a toy car was pulled backwards by using a stretched rubber band. The distance travelled was measured. The observations were recorded in a table.

Length of the rubber band stretched backwards (cm)	Distance traveled by toy car (cm)
3	30
6	35
9	40
12	45
15	50

- (a) What is the aim of the investigation?

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- (b) In this investigation, state

- i. what is changed (manipulated variable)

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- ii. what is kept the same (controlled variable)

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- iii. what is observed (responding variable)

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- (c) Predict the distance traveled by toy car if the Length of the rubber band stretched backwards is 18 cm.

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- (d) Based on the investigation, what is the relationship between the length of the rubber band stretched backwards and the distance travelled by the toy car?
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**Suggested answers.**

(a) To investigate the relationship between the length of the rubber band stretched backwards and the distance travelled by a toy car.

(b) In this investigation, state

i. what is changed (manipulated variable)

The length of the rubber band stretched backwards

ii. what is kept the same (controlled variable)

Size of toy car

iii. what is observed (responding variable)

the distance travelled by a toy car.

(c) Give a reason for the interaction above.

55 cm

(d) Based on the investigation, what is the relationship between the length of the rubber band stretched backwards and the distance travelled by the toy car?

The more the between the length of the rubber band stretched backwards the more the distance travelled by a toy car.

**Theme** Investigating Force and Energy

**Learning Area** Force

**Learning Objectives** 1.3. Analysing friction

**Learning Outcomes** Pupil: 1.3. 2 describe the effects of friction

**Topic** : Smooth Rolling

### 1. Aim of Investigation

**Question:**

- i) What is the aim of the investigation?
- ii) What is the purpose of the investigation?
- iii) What do you want to find out from the investigation?
- iv) What do you want to study from the investigation?
- v) What do you want to proof from the investigation?

**Suggested Answer**

To investigate the relationship between the presence of wheels and the effect of wheels on friction

- i) **To investigate/ study the relationship** between **the presence of wheels (WTC)** and **the effect of wheels on friction(WTO).**

### 2. Material/apparatus

SPS 6(C4)
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**Question**

- i) What are the materials needed in the investigation?
- ii) What do we need in the investigation?



### **Suggested Answer**

Two boxes of the same size, string, wheels, marbles, punch hole, marbles and wire

### **3. Hypothesis**

SPS 6( C1)

### **Question**

- i) State one hypothesis that can be made from the investigation
- ii) Make a hypothesis that you can from this investigation

### **Suggested Answer**

If the boxes are fixed with wheels then the friction is less/decrease.

If the boxes are without wheels then the friction is more/increase.

### **4. Identify Variables**

SPS 7(C2)

#### **Questions:**

- i) What to respond?
- ii) What to measure / observe?

#### **Suggested Answers**

- i) The amount of frictional

### **Question**

**1) What to change?**

**2. What is manipulated variables?**

### **Suggested Answers**

- i) The presence of wheels

### **Question:**

**1) What to keep the same?**

**2) What it controlled/constant variable**

### Suggested Answers

The size of the boxes.

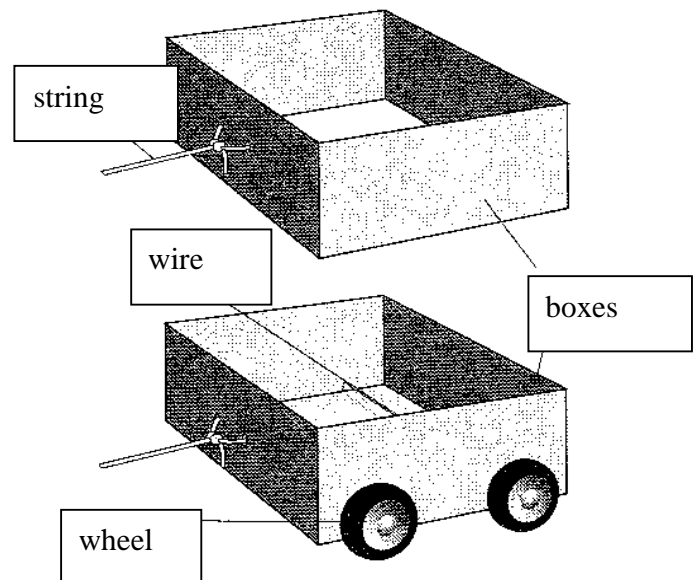
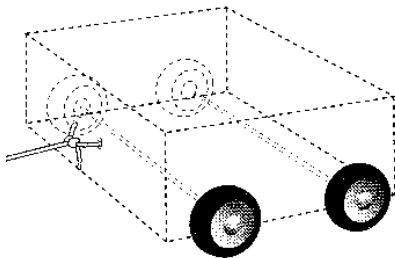
#### 4. Procedure/What do I do

SPS 6 C4

1. Work in groups of four.
2. Get two boxes of the same size, one with four wheels and another without.
3. Make two holes at one end of each box. Attach a long piece of string to the holes.
4. Place equal number of marbles into both boxes
5. Place both boxes on the floor
6. Pull the box without the wheels
7. Repeat the investigation using the box with wheels
8. Compare the force required to pull each wheels
9. Record your findings in the table as shown below

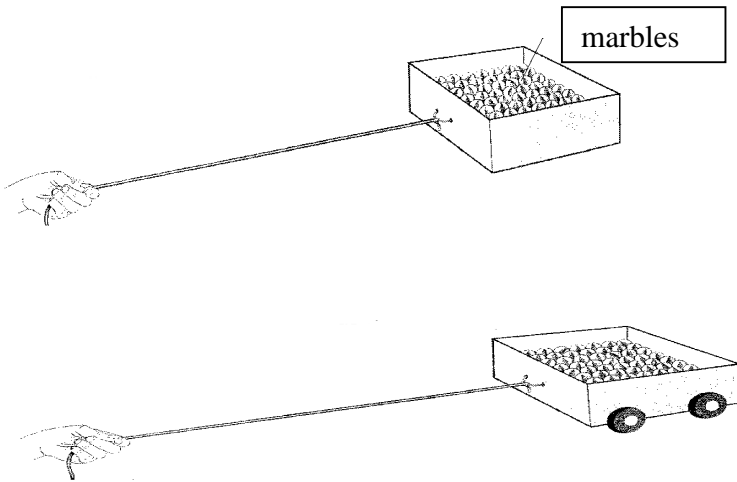
#### 6. Method/What do I find

SPS 6( C2)



1. Get two boxes of the same size, one with four wheels and another without.
3. Two holes were made at one end of each box. Attached a long piece of string to the holes.

4. Equal number of marbles were placed into both boxes
5. Both boxes were placed on the floor
6. The boxes were pulled without wheels
7. The investigation was repeated using the box with wheels
8. The force was compared and pull each wheels were required
9. Findings in the table as shown below were recorded



**Observation**

4. The table below shows the result of the investigation:

SPS 6 C 3

Types of box	Force(bigger/Smaller)
Without wheels	
With wheels	

1. Which box is easier to pull?
2. Which one has more friction?

**Questions:**

- i) What do we need to observe?
- ii) What should we observe?
- iii) What is observed?
- iv) What are we observing?

**Suggested answer :**

Types of box	Force(bigger/Smaller)
Without wheels	Bigger
With wheels	Smaller

SPS 6( C3,C4)

1. The boxes with wheels
2. The box without wheels because of the presence of friction

**7. Inference**

**Question**

1. What can you infer from this investigation?
2. Give an inference based on your answer?
3. Why did it happen?

**Suggested answer**

The box with wheels has less friction than the box without wheels

**8. Conclusion**

**Questions:**

- i) What can be concluded through this investigation?
- ii) What conclusion can be made through this investigation?

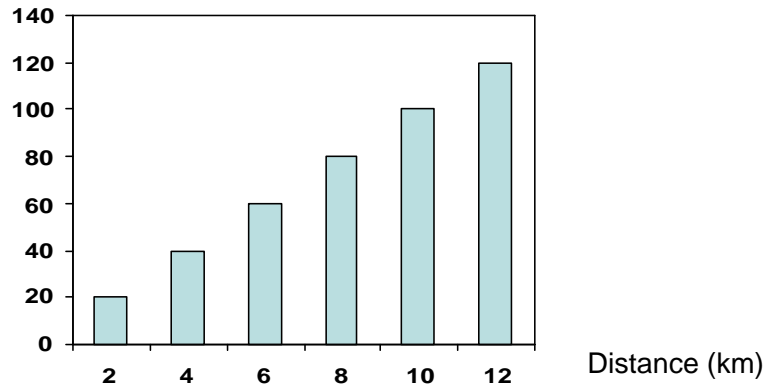
**Suggested answer :**

The box with wheels has less friction than the box without wheels.

### Sample question

1. Figure 1 is a bar chart showing the distance travel by a bicycle in a housing area and the time taken.

Time (minute)



- a What is the trend movement of the bicycle ?

---

- b What is the speed of the bicycle?

---

---

- c Predict the time taken by the bicycle to travel 16 km.

Answer:

a. Increasing

b. 0.1 km/min

c. 160 min

d. The bicycle travels a longer distance as time goes by

**Theme** Investigating Force and Energy

**Learning Area** Force

**Learning Objectives** 1.3. Analyzing friction

**Learning Outcomes** Pupil: 1.3.2 describe the effects of friction

**Topic** : Different Grips

### 1. Aim of Investigation

**Question:**

- i) What is the aim of the investigation?
- ii) What is the purpose of the investigation?
- iii) What do you want to find out from the investigation?
- iv) What do you want to study from the investigation?
- v) What do you want to prove from the investigation?

**Suggestion Answer**

To investigate the relationship between the differences of surfaces and the distance a toy car moves

- ii) **To investigate/ study the relationship** between **the different of surface (WTC)** and **the distance a toy car moves(WTO).**

### 2. Material/apparatus

**Question**

- i) What are the materials needed in the investigation?
- ii) What do we need in the investigation?

**Suggested Answer**

Toy car, various types of surfaces, measuring tapes, 1-metre plank, three blocks of brick to form a total height of about 30 cm

SMS 5(C1,C2)
--------------

### 3. Hypothesis

SPS 7(C1)

#### Question

- i) State one hypothesis that can be made from the investigation
- ii) Make the hypothesis that you can made from this investigation

Suggested Answer

If the surface is smooth then the distance will be longer.

If the type of surface is rough then the distance will be shorter.

### 4 Identify Variables

#### Questions

SPS 6(C4),SPS 7(C2)

1) What to measure/observe?

2) What is responding variables?

#### Suggested answers

- i) The distance a toy car moves

SPS 6(C3)

#### Question

1) What to change?

2. What is manipulated variables?

#### Suggested answers

- ii) i) The types of surfaces

#### Question:

1) What to keep the same?

2) What it controlled/constant variable

#### Suggested Answers

The height of three blocks

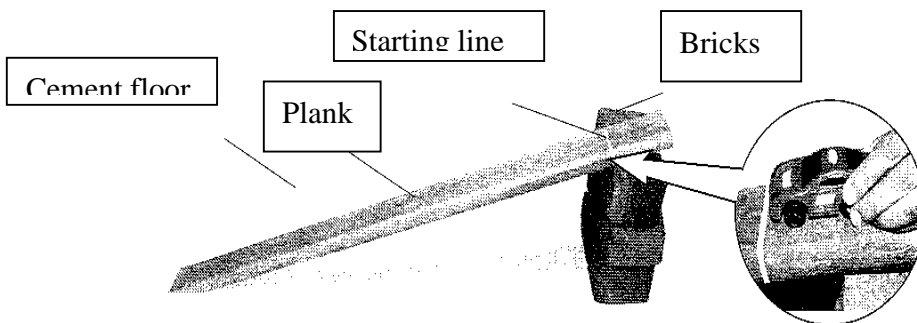
### 5. Procedure/What do I do

1. Work in groups of four.
2. Put a plank on a cement floor in your classroom
3. Raise one end of the plank by using three bricks. Mark a starting line.
4. Place a toy car at the raised edge of plank and release the toy car
5. Mark the spot where the toy car stops
6. Use a measuring tape to measure the distance from the end of the plank to the marked spot where the toy car stops.

SPS 7 (C3)

### 6. Method/What do I find

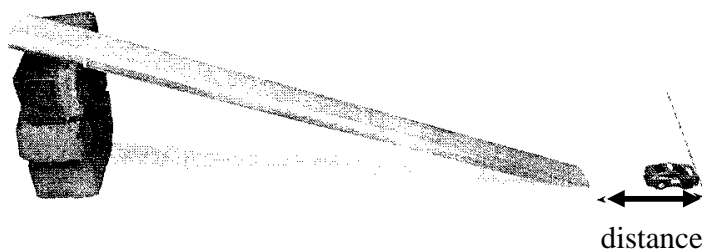
1. A plank on a cement floor were put in your classroom
2. One end of the plank was raised by using three bricks. Mark a starting line.



4. A toy car was placed at the raised edge of plank and it was released.



5. The toy car stops was marked.
6. A measuring tape was used to measure the distance from the end of the plank to the marked spot where the toy car stops.



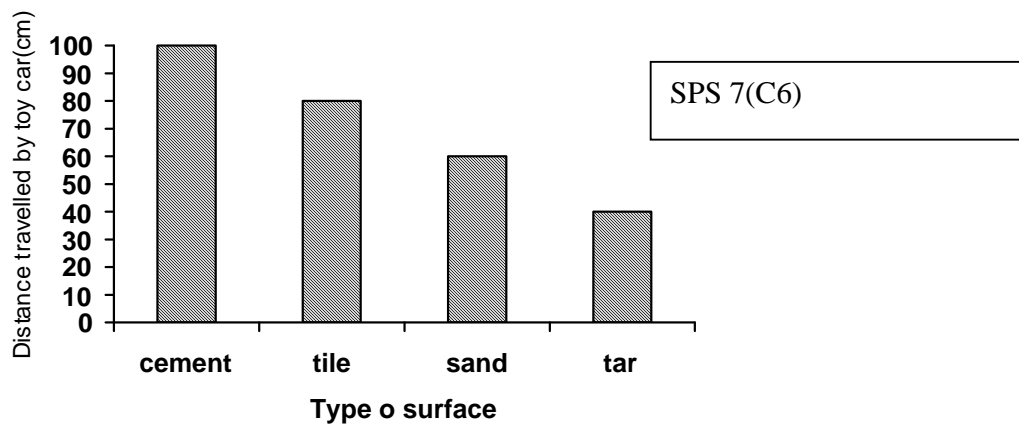


## 7. Observation

SPS 6(C1,C 3),SPS (C6)

The table below shows the result of the investigation:

Types of surface	Maximum distance travel (cm)
Cement floor	
Tile floor	
Sand surface	
Tar surface	



(An example of data obtained from the investigation)

### Questions:

- i) What do we need to observe?
- iii) What should we observe?
- iii) What is observed?
- iv) What are we observing?

**Suggested Answer :**

Type of surface	Distance travelled by toy car(cm)
Cement floor	30cm
Tile floor	20cm
Sand surface	15cm
Tar surface	5cm

**6. Inference**

**Question**

1. What can you infer from this investigation?
2. Give an inference based on your answer?
3. Why did it happen?

**Suggested answer**

The smooth surface has the longer distance

SPS 6(C2)

**Conclusion**

**Questions:**

- i) What can be concluded through this investigation?
- ii) What conclusion can be made through this investigation?

**Suggested Answer :**

The smooth surface has less friction.

Section B

In an investigation, Zaidi rolls a ball on three different surfaces, X, Y and Z. The time taken for the ball to stop rolling is recorded in Table 1.

Type of surface	Duration of movement(s)
X	10
Y	15
Z	20

Table 1

a) State the purpose of this investigation?

---

---

b) Provide your inference based on the result above.

---

---

c) State the thing that must be kept same to ensure the success of this investigation.

---

d) What can you conclude from this investigation?

---

.

### **Suggested answer**

- a. To investigate the relationship between type of surface and the duration of movement
- b. Surface X is the roughest and exerts the biggest frictional force as compared with surfaces Y and Z
- c. Force used to start the ball rolling
- d. A rough surface exerts a large frictional force to stop the movement of an object

## Reference Science Year 6 Practical Book ( practical 6)

**Theme** Investigating Force and Energy

**Learning Area** Movement

**Learning Objectives** 2.1. Understanding speed

**Learning Outcomes** Pupil: 2.1.1 State that an object which moves faster travels a longer distance in a given time.

2.1.2. state that an object an object which moves faster takes a shorter time

**Topic** : How Far,How Fast?

### 1. Aim of Investigatian

#### Question:

- i) What is the aim of the investigation?
- ii) What is the purpose of the investigation?
- iii) What do you want to find out from the investigation?
- iv) What do you want to study from the investigation?
- v) What do you want to proof from the investigation?

#### Suggestion Answer

To investigate the relationship between the distance and the speed when time is constant.

- iii) **To investigate/ study the relationship** between **the distance (WTC) and the speed when time is constant timeWTO).**

### 2. Material/apparatus

SPS 7 (C4)
------------

#### Question

- i) What are the materials needed in the investigation?
- ii) What do we need in the investigation?

### **Suggestion Answer**

Two empty plastic bottles with caps, stopwatch, sand, four thick wires, eight bottle caps, whistle, measuring tape

### **3. Hypothesis**

SPS 7(C 1)

#### **Question**

- i) State one hypothesis that can be made from the investigation
- ii) Make the hypothesis that you can made from this investigation

#### **Suggested Answer**

If the distance will be farthest the distance will be farthest.  
If the speed is slowest then the distance will be nearest.

If the speed is fastest the distance will be farthest.  
If the speed is slowest then the distance will be nearest.

If the speed is fastest the distance will be farthest.  
If the speed is slowest then the distance will be nearest.

### **4 Identify Variables**

SPS 7 C2

#### **Questions:**

- i) What to responding?
- iii) What to measure / observe.

#### **Suggested answers :**

1. The speed of the car

#### **Question**

**1) What to change?**

**2. What is manipulated variables?**

#### **Suggested answers**

- i) The distance

**Question:**

**1) What to keep the same?**

**2) What is controlled/constant variable**

**Suggested answers**

The time taken

**5. Procedure/What do I do**

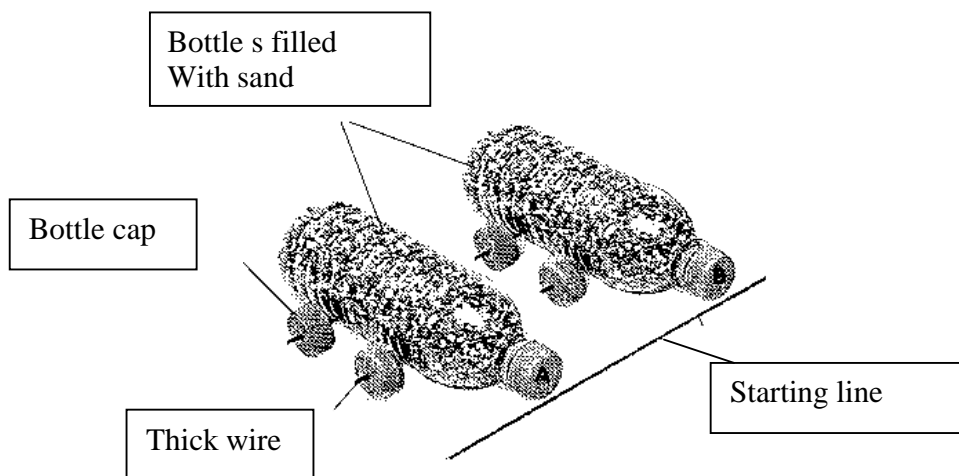
1. Work in groups of four.
2. Make two simple cars as shown.  
Label A and B
3. Place both cars on a starting line
4. Once the whistle is blown, push both cars as hard as possible.
5. Measure and record the distance travelled in 5 seconds in the table as shown in page 26
6. Calculate the speed for car A and car B.

SPS 6 (C2) (C4), SPS 7(5)

**6. Method/What did I find**

1. Two simple cars were built as shown and labelled as A and B
3. Both cars were placed on a starting line
4. Once the whistle is blown, both cars were pushed as hard as possible.
5. The distance travelled in 5 seconds were measured and recorded in the table as shown in page 26
6. The speed for car A and car B were calculated

SPS 7(C3)



**7. Observation**

SPS 6( C 1,C3),

The table below shows the result of the investigation:

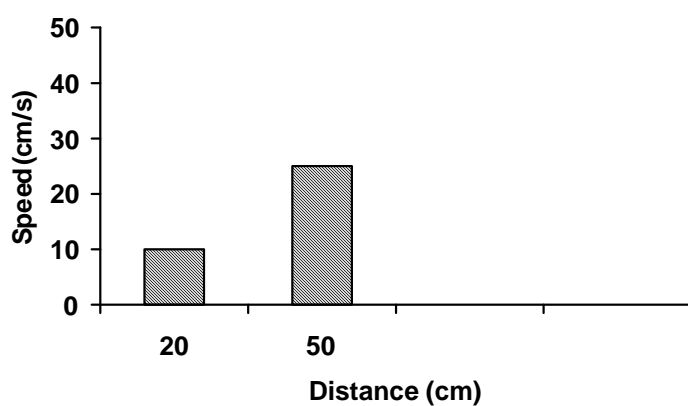
Car	Time(s)	Distance(cm)	Speed(cm/s)
A			
B			

**Questions:**

- i) What do we need to observe?
- iv) What should we observe?
- iii) What is observed?
- iv) What are we observing?

**Suggested answer :**

Car	Time(s)	Distance(cm)	Speed(cm/s)
A	5	20	50
B	5	10	25



SPS 5 (C3,C4)

(An example of data obtained from the investigation)



## **8. Inference**

### **Question**

1. What can you infer from this investigation?
2. Give an inference based on your answer?
3. Why it happen?

### **Suggested answer**

The car which travels with the highest speed goes further  
The car which travels with the lowest speed will be nearer

## **9. Conclusion**

### **Questions:**

- i) What can be concluded through this investigation ?
- ii) What conclusion can be made through this investigation?

### **Suggested answer :**

At a constant time, distance travelled is the farthest /nearest when the speed is the fastest/slowest

SPS 5 (C1 ,C2 ,C3,C4)
-----------------------

## Section B

Table 1 shows the distance covered in one hour by Maniam using different forms of vehicles .The speed for each type of vehicle was recorded.

Vehicles	Bicycle	Motorcycle	Lorry	Car
Distance travelled	50	70	85	120
Speed	Slowest	Slow	Fast	Faster

Table 1

a) State your observation based on the information given in Table 1?

---



---

b) State two variables involved.

i \_\_\_\_\_

ii \_\_\_\_\_

c) Calculate the speed of the lorry, if he takes 5 hours to cover the distance he has travelled .

---

**Answers Key**

1. a) Different vehicles have different speed

- b). I Types of vehicles
  - ii The speed of vehicle

c) 17km/h.

SPS	4				7					
Criteria	1	2	3	4	1	2	3	4	5	6

**Reference : Science year 6 practical book unit 7 (page29)**

Theme 1: **Investigating Materials**

Learning area: **Food preservation**

Learning objective: 1.1 **Understanding food spoilage**

Learning outcome: **1.1.1 State the conditions for microorganisms to grow**

Topic : Grow me not

**1. Aim of experiment**

**Questions:**

- i) What is the aim of the investigation?
- ii) What is the purpose of the investigation?
- iii) What do you want to find out from the investigation?
- iv) What do you want to study from the investigation?
- v) What do you want to proof from the investigation?

**Suggested answers :**

To investigate the relationship between what to change and what to observe/measure.

- iv) To investigate the relationship between the conditions needed for microorganisms to grow (WTC) and the number of day (WTO).

**2. Materials / apparatus needed**

SPS 7( C1)

Knife,clear plastic bags,chopping board, vacuum cleaner, potato, refrigeter, hand lends, peeler, rubber vineger

**Questions:**

- i) What are the materials needed in the investigation?
- ii) What do we need in the investigation?

**Suggested answers :**

Knife,clear plastic bags,chopping board, vacuum cleaner, potato, refrigeter, hand lends, peeler, rubber vinegar

**3. Hypothesis:**

SPS 7( C1)

- i) What is your hypothesis ?
- ii) Write a hypothesis for this experiment?
- iii) State one hypothesis based on the experiment?

**Suggested answers :**

- i) The more/the less manipulated/the more or the less responding/what to observe/measure.
- ii) If manipulated/ what to change.....then responding/what to measure.....

If the condition of potato wedges have vinegar so the number of days for still fresh are increase

To investigate/ study the relationship between the condition of potato wedges(WTC) and the number of day (WTO).

**4. Identify Variables**

SPS 7( C2)

**Questions:**

- i) What to measure / observe?
- iv) What is responding variable?

**Suggested answers :**

Microorganisms present or not

**Questions:**

- i) What to change?
- ii) What is manipulated variable?

**Suggested answers :**

Condition of plastic bag  
locations

**Questions :**

- i) What to keep the same ?

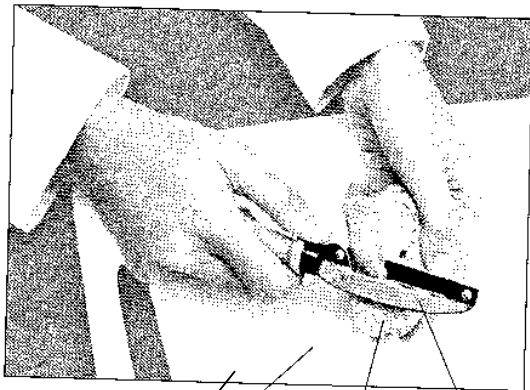
ii) What is controlled/ constant variable?

**Suggested answers :**

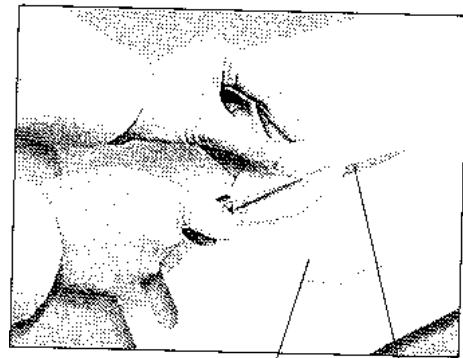
Type of plants

SPS1(C1, C2, C3)SPS3 (C1,C2,C3,C4)

**5. Procedure / What do I do**



potato peeler

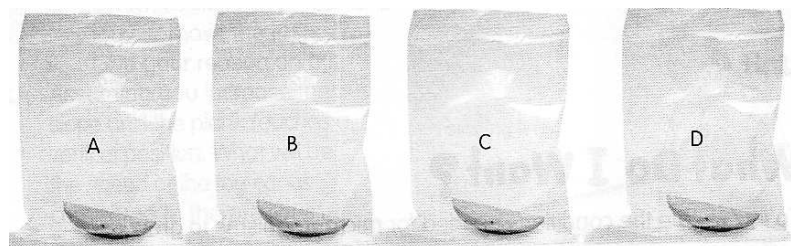


potato knife

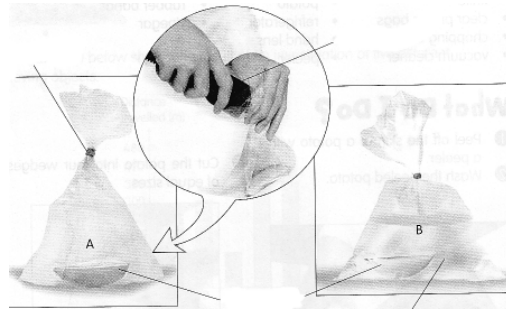
Chopping board

1. Peel off the skin of a potato with a peeler
2. Wash the peeled potato
3. Cut the potato into four wedges of equal sizes

SMS 2(C1,C2,C3,C4))



4. Label four plastic bag A, B, C and D. Place one potato wedge into each plastic bag A. Quickly tie it with a rubber band



Potato                      vinegar

5. Half –filled plastic bag B with vinegar. Tie the end of the plastic bag
6. Tie the ends of plastic bags C and D
7. Observe and record the conditions of potato wedges on day 1 in the table given as shown on page 31
8. Keep plastic bag C in a freezer and A, B and D in a cupboard
9. Observe any changes that have taken place on the potatoes on day 5.

SMS 4(C1,C2,C3,)

sps 1(C1),(C3)

**5. Method/What do I do**

1. The skin of a potato was peeled with a peeler
2. The peeled potato has been washed
3. The potato was cut into four wedges of equal sizes
4. Plastic bag A, B, C and D are labelled. One potato wedge was placed into each plastic .
5. The air from plastic bag A was vacuumed. It was quickly tied with a rubber band
6. Plastic bag B was half-filled with vinegar. The end of the plastic bag was tied
7. The ends of plastic bags C and D were tied
8. The conditions of potato wedges on day 1 was observed and recorded in the
9. Plastic bag C was kept in a freezer and A, B and D in a cupboard
10. Any changes that have taken place on the potatoes on day 5 was observed.

sns 1(C1)

SMS 5(C1,C2,)

**6.Observation/what do I find**

sps 7(C6)

The table below shows the result of the investigation:

Plastic bag	Conditions of the potato wedges	
	Day 1	Day 2
A		
B		
C		
D		

**Questions:**

- i) What do we need to observe?
- v) What should we observe?
- iii) What is observed?
- iii) What are we observing?

**Suggested answers**

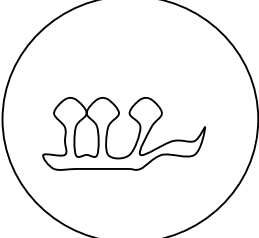
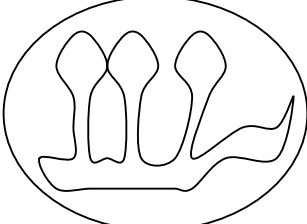
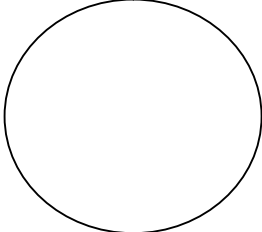
Plastic bag	Conditions of the potato wedges	
	Day 1	Day 2
A	fresh	Not fresh (no air)
B	fresh	Not fresh(acidity)
C	fresh	Not fresh(temperature low )
D	fresh	fresh

(An example of data obtained from the investigation)

SMS 1(C1,C2,C3,C4))

SMS 3(C1,C2,C3,C4))



Size of microscope lens	Size of enlargement
4 / 0.1	
10 / 0.25	
40 / 0.65	

**7. Inference**

**Questions:**

sns 1(C1)

- i) Explain the differences in conditions.
- ii) Give a reason for that / your observation.
- iii) State one inference based on the observation.
- iv) Why it happened?
- v) Why do you think it happened?

**Suggested answers**

- i) The microorganisms in plastic A will not grow because there is no air
- ii) The microorganisms in plastic B will not grow because of the presence of acid.
- iii) The microorganisms in plastic C will not grow because low temperature.
- iv) The microorganisms in plastic D grow compared to plastic A, B and C because conditions are warm and moist.

**8. Conclusion**

**Questions:**

sps 5(C1),(C2),

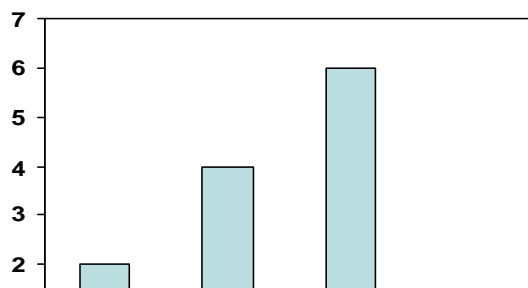
- i) What can be concluded through this investigation ?
- ii) What conclusion can be made through this investigation?

**Suggested answers :**

- i) The more/the less manipulated/the more or the less responding/what to observe/measure.
  - ii) If manipulated/ what to change.....then responding/what to measure.....
- i) Microorganisms need air,water,nutrient,suitable temperature and suitable acidity to grow.

**Sample question.**

1.



Area (cm<sup>2</sup>)

Ali measured the area covered by mould growing on a plate of rice for three days. The results are shown in the bar chart above.

a What is the trend of change of the area covered by mould ?

---

b What is the relationship between the area covered by mould and the number of days ?

---

---

c Give a reason for your answer in (b).

---

d Predict the area covered by mould on day 4.

---

**Sample answer**

a Increasing

b The more the number of days the bigger the size of the area covered by mould

c Give a reason for your answer in (b).

The area covered by mould is increases because the day of rice expose to air and water is increases

d Predict the area covered by mould on day 4.

Increase

SPS	4				7					
Criteria	1	2	3	4	1	2	3	4	5	6

**Reference : Science year 6 practical book unit 8 (page 33)**

Theme 1: **Investigating Materials**

Learning area: **Food Preservation**

Learning objective: 1.2 **Synthesising the concept of food preservation**

Learning outcome: **1.2.1 Describe ways to preserve food**

Topic : Pineapples in Syrup

### **1. Aim of experiment**

#### **Questions:**

- i) What is the aim of the investigation?
- ii) What is the purpose of the investigation?
- iii) What do you want to find out from the investigation?
- iv) What do you want to study from the investigation?
- v) What do you want to prove from the investigation?

#### **Suggested answers :**

To investigate the relationship between what to change and what to observe/measure.

- i) To investigate the relationship between using boiling method(WTC) and the long preserved pineapples (WTO).
- ii) To investigate the using boiling method (WTC) and the long preserved pineapple (WTO).

SMS 1( C1.C2.C3.C4)
---------------------

### **2. Materials / apparatus needed**

Pineapple, strainer, paper towel, jaw with lid, sugar, pot, knife, water, ladle, cooker

#### **Questions:**

- i) What are the materials needed in the investigation?
- ii) What do we need in the investigation?

#### **Suggested answers :**

Pineapple, strainer, paper towel, jaw with lid, sugar, pot, knife, water, ladle, cooker

**3. Hypothesis:**

SPS 7( C1)

- i) What is your hypothesis ?
- ii) Write a hypothesis for this experiment?
- iii) State one hypothesis based on the experiment?

**Suggested answers :**

- i) The more/the less manipulated/the more or the less responding/what to observe/measure.
- v) If manipulated/ what to change.....then responding/what to measure.....

If using boiling method then the last longer preserved pineapple  
To investigate/ study the relationship between using boiling method  
(WTC) and the last longer preserved pineapple (WTO).

**Identify Variables**

SPS 7( C2)

**Questions:**

- i) What to measure / observe?
- v) What is responding variable?

**Suggested answers :**

i) Concentration of syrup

**Questions:**

- i) What to change?
- ii) What is manipulated variable?

**Suggested answers :**

Number of day

**Questions :**

- i) What to keep the same ?
- ii) What is controlled/ constant variable?

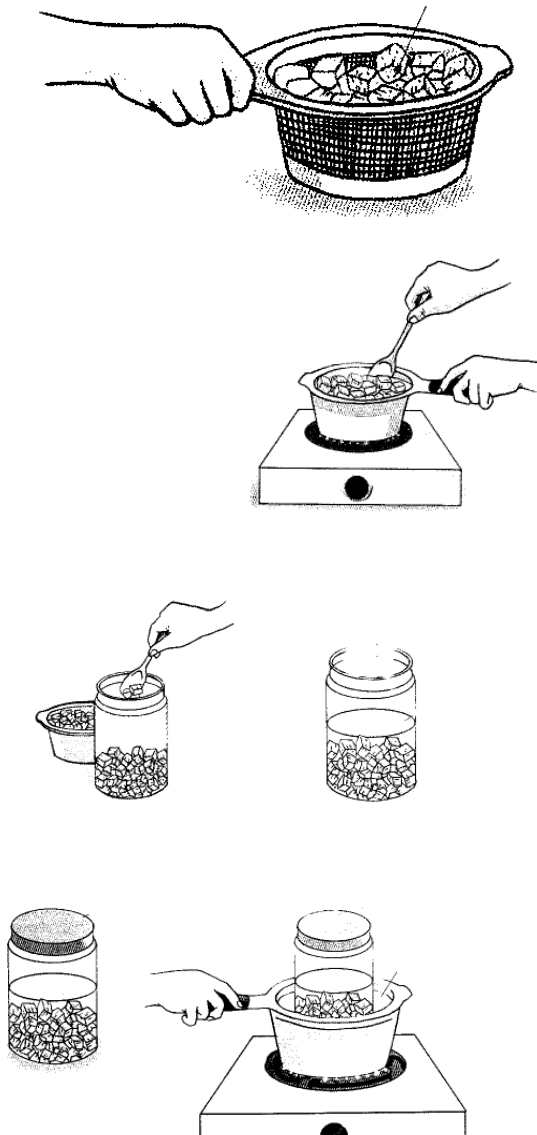
**Suggested answers :**

Type of plants

Method of preserve pineapple

SPS1(C1, C2, C3)SPS3 (C1,C2,C3,C4)

**5. Procedure / What do I do**



1. Peel a pineapple. Cut it into shape of sizes
2. Wash the pineapple and drain them
3. Prepare syrup by boiling three cups of sugar to four cups of water
4. Boil the pineapple for 5 minutes in the syrup
5. Scoop out the hot pineapple into the jar. Fill the jar leaving a gap of 2 cm from the rim of the jar
6. Pour in the hot syrup to cover the pineapple
7. Wipe clean the top surface of the bottle jar
8. Seal the jar firmly with the lid
9. Heat the sealed jar in a boiling water for 25 minutes

1. A pineapple was peeled and cut into uniform shape of sizes
2. The pineapple was washed and drain them
3. The syrup was prepared by boiling three cups of sugar to four cups of water

### **7.Observation/What do I find**

Siew Lan did an investigation on preserved food by putting skinned rambutans into syrup of different concentrations. The results of her observation are shown in the

table below

Number Of day	Concentration of syrup			
	Light 1 cup sugar in 4 cups water	Medium 2 cup sugar in 4 cups water	Medium Heavy 3 cup sugar in 4 cups water	Heavy 4 cup sugar in 4 cups water
3	clear	clear	clear	clear
5	mouldy	clear	clear	clear
8	mouldy	mouldy	clear	clear
14	mouldy	mouldy	mouldy	clear

### **Questions:**

- i) What do we need to observe?
- ii) What should we observe?
- iii) What is observed?
- iv) What are we observing?

### **Suggested answer :**

- .i) The rambutans in the heavy syrup solution do not become mouldy



- ii) Microorganisms cannot grow in sugar solution

## 7. Inference

### Questions:

- i) Explain the differences in concentration of syrup.  
ii) Give a reason for that / your observation.  
iii) State one inference based on the observation.  
iv) Why it happened?  
v) Why do you think it happened?

sns 1(C1)

### Suggested answers

- i) The microorganisms cannot grow in sugar solution  
ii) Boiling method kills most of the microorganisms  
iii) The conditions are not suitable for .microorganisms to grow.

## 8. Conclusion

### Questions:

- i) What can be concluded through this investigation ?  
ii) What conclusion can be made through this investigation?

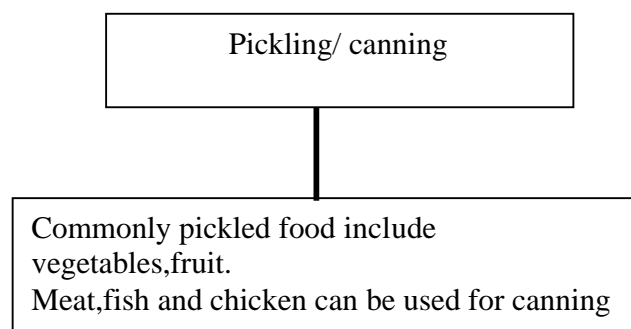
sps 5(C1),(C2),

### Suggested answers :

- i) The more/the less manipulated/the more or the less responding/what to observe/measure.  
ii) If manipulated/ what to change.....then responding/what to measure.....

- i) The higher the concentration of sugar syrup the longer it takes for mould to grow

SPS 2(C1),(C2),C3,C4



At home	process	factory
shorter	The ability to be kept	Last longer
Fruit,vegetables	Ingrediants	Meat,chicken, prawn

### Section B

- 1 The table shows an investigation carried out by a group of pupils about stored temperature for a type of food.

Stored temperature (°C)	Deterioration time of X food (day)
10	9
20	5
30	2
40	3
50	5

a. In this investigation, state

1. what is changes ? : .....

2. what is observed ? : .....

b. Write **one** hypothesis for this investigation.

.....  
 .....

c. Predict the deterioration time of X food if the stored temperature is 45°C.

.....  
 .....

d. What is the aim of the investigation ?

.....  
 .....

e. What is the trend of the changes of the deterioration time of X food in this investigation ?

.....

SPS	4				7					
Criteria	1	2	3	4	1	2	3	4	5	6

**Reference : Science year 6 practical book unit 9**

**Theme 1: Investigating Materials**

Learning area: **Waste Management**

Learning objective: 1.1 **Understanding the effects of improper disposal of waste on the environment**

Learning outcome: **1.1.1 identify types of waste in environment**

Topic :

### **1. Aim of experiment**

#### **Questions:**

- i) What is the aim of the investigation?
- ii) What is the purpose of the investigation?
- iii) What do you want to find out from the investigation?
- iv) What do you want to study from the investigation?
- v) What do you want to prove from the investigation?

#### **Suggested answers :**

To investigate the relationship between what to change and what to observe/measure.

- i) To investigate the relationship between the types of waste (WTO) and the mass waste of each group
- ii) If the types of waste is paper then the mass will increase
- iii) The paper waste is the heavier

SMS 1( C1,C2,C3,C4)
---------------------

### **2. Materials / apparatus needed**

Plastic gloves, Weighing balance, Full rubbish bin, Forceps/tongs, old newspapers, plastic apron, plastic bags, mouth mask

#### **Questions:**

- i) What are the materials needed in the investigation?
- ii) What do we need in the investigation?

#### **Suggested answers :**

Plastic gloves, Weighing balance, Full rubbish bin, Forceps/tongs, old newspapers, plastic apron, plastic bags, mouth mask

**3. Hypothesis:**

- i) What is your hypothesis ?
- ii) Write a hypothesis for this experiment?
- iii) State one hypothesis based on the experiment?

**Suggested answers :**

- i) The more/the less manipulated/the more or the less responding/what to observe/measure.
- ii) If manipulated/ what to change.....then responding/what to measure.....
- iii) If the types of waste is paper than the mass will be increased
- iv) The paper waste is the heavier

**4. Identify Variables****Questions:**

- i) What to measure / observe?
- ii)What is responding variable?

**Suggested answers :**

The mass of waste

**Questions:**

- i) What to change?
- ii)What is manipulated variable?

**Suggested answers :**

The type of waste

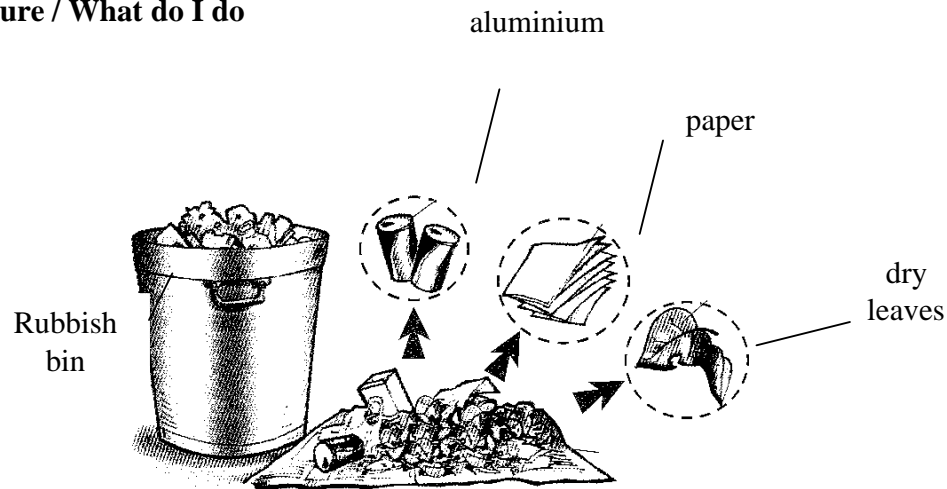
**Questions :**

- i) What to keep the same ?
- ii) What is controlled/ constant variable?

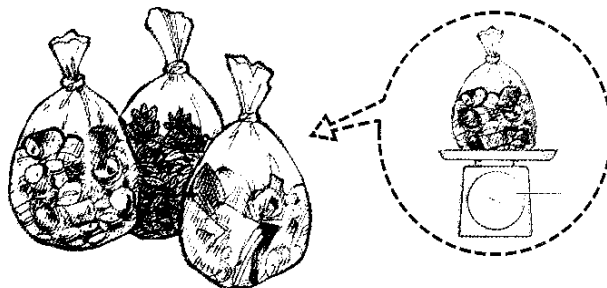
**Suggested answers :**

Location (waste found in school)

### 5.Procedure / What do I do



1. Work in groups
2. Choose a rubbish bin from your School compound
3. Empty the contents of the rubbish bin onto the spread newspapers
4. Wear the plastic gloves, mouth mask, plastic apron and use the forceps to sort the rubbish into the different types of waste that you have learned.



3. Put each type of waste into separate plastic bags and weigh each bag
4. Record the results from the whole class as in the table shown below
5. Calculate the percentage of each type of waste to the total mass of your class
6. Keep the waste from this investigation for further activity

### 6. Method / What I did

1. A rubbish bin was chosen from the school compound
2. The contents of the rubbish bin was empty onto the spread newspapers
3. Wear the plastic gloves, mouth mask, plastic apron and forceps are used to

sort the rubbish into the different types of waste.

4. Each type of waste was put into separate plastic bags and each bag was weighed.
5. The results from the whole class were recorded as in the table shown below
6. The percentage of each type of waste to the total mass of your class was calculated

### **7.Observation**

Type of waste	Mass(waste of each group)					Total mass	Percentage of type of waste(%)
	1	2	3	4	5		

### **Questions:**

- i) What do we need to observe?
- ii) What should we observe?
- iii) What is observed?
- iv) What are we observing?

### **Suggested answer :**

The most type of waste produced is papers.

### **8. Inference**

#### **Questions:**

- i) Explain the differences on type of waste .
- ii) Give a reason for that / your observation.

sns 1(C1)

- iii) State one inference based on the observation.
- iv) Why it happened?
- v) Why do you think it happened?

**Suggested answers**

The most type of waste produced is papers because they are used a lot in school.

**8. Conclusion**

**Questions:**

- i) What can be concluded through this investigation ?
- ii) What conclusion can be made through this investigation?

sps 5(C1),(C2),
-----------------

**Suggested answers :**

- i) The more/the less manipulated/the more or the less responding/what to observe/measure.
- ii) If manipulated/ what to change.....then responding/what to measure.....

Types of waste produced in school are papers



Reference : Science Year 6 Practical Book Page 45(practical 11)

Theme 1: Investigating The Earth And The Universe

Learning area: Eclipses

Learning objective: 1.1 Understanding the eclipse of the moon

Learning outcome: State the position of the moon, the earth and the sun during the eclipse of the moon.

Topic: Human eclipse

1. Aim of an experiment

**Questions:**

- i) What is the aim of the investigation?
- ii) What is the purpose of the investigation?
- iii) What do you want to find out from the investigation?
- iv) What do you want to study from the investigation?
- v) What do you want to proof from the investigation?

**Suggested answers :**

To investigate the relationship between manipulated/what to change and responding/what to observe/measure.

i) **To investigate/ study the relationship** between **the position of the polystyrene ball** (WTC) and **the appearance of the polystyrene ball** (WTO).

ii) **To investigate/ study the relationship** between **the position of the Moon** (WTC) and **the appearance of the eclipse of the moon** (WTO).

2. **Materials / apparatus needed**

Polystyrene ball (about 3 cm in diameter – to represent the Moon), stiff wire, strong light source such as a projector light (to represent the Sun)

**Questions:**

- i) What are the materials needed in the investigation?
- ii) What do we need in the investigation?

**Suggested answers :**

Polystyrene ball (about 3 cm in diameter – to represent the Moon), stiff wire, strong light source such as a projector light (to represent the Sun)

**3. Hypothesis:**

SPS 7( C1)

- i) What is your hypothesis ?
- ii) Write a hypothesis for this experiment?
- iii) State one hypothesis based on the experiment?

**Suggested answers :**

I The more/the less manipulated/the more or the less responding/what to observe/measure.

ii If manipulated/ what to change.....then responding/what to measure.....

- If the light source, the head and the polystyrene ball fall in a straight line, then shadow on the globe occur totally.

- If the Sun, the Earth and the Moon fall in a straight line, then total eclipse occur.

**4. Identify Variables**

SPS 7( C2 , C5)

**Questions:**

- i) What to measure / observe?
- vi) What is responding variable?

**Suggested answers :**

The shadow on the polystyrene ball

The total eclipse occur

**Questions:**

- i) What to change?
- ii)What is manipulated variable?

**Suggested answers :**

The position of the light source, the head and the polystyrene ball

The position of the Sun, the Earth and the Moon

**Questions :**

i) What to keep the same ?

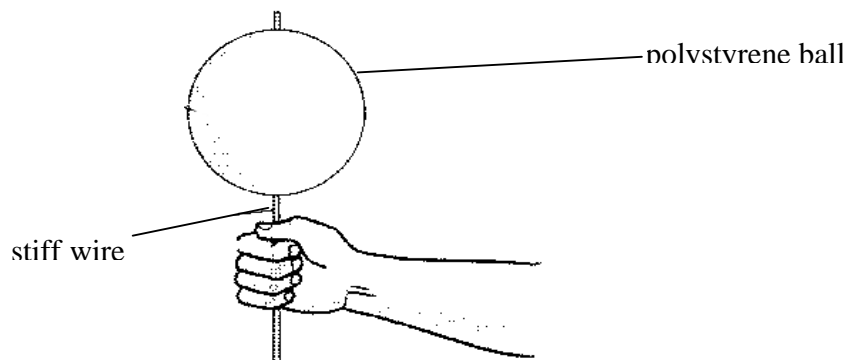
ii) What is controlled/ constant variable?

**Suggested answers :**

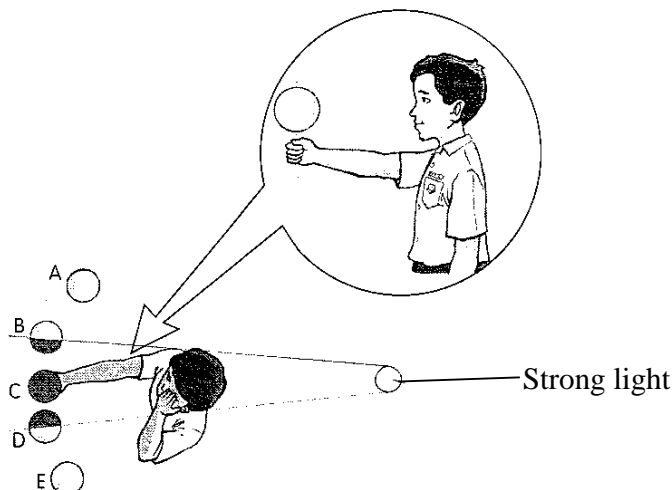
The size of the polystyrene ball

**5. Procedure / What do I do**

1. Carry out this activity in a dark room.
2. Pierce the polystyrene ball with a stiff wire.
3. Place the strong light source at one end of the dark room. The light has to be on the same level with your head.
4. Switch it on.
5. Stand with your back towards the light source. Your head represents the Earth.
6. Hold the stiff wire so as to place the polystyrene ball in front of your right eye.
7. Close your left eye with your left hand.



8. Move the polystyrene ball slowly from right to left as shown in the diagram.



9. Observe the appearance of the polystyrene ball in position A, B, C, D and E.
10. Draw the appearance of the polystyrene ball in the table as shown below.

**6. Method / What do I find**

1. This activity carried out in a dark room.
2. The polystyrene ball was pierced with a stiff wire.
3. The strong light source was placed at one end of the dark room. The light had to be on the same level with the head.
4. It was switched on.
5. The light source should be at the back of the body. The head was represented as the Earth.
6. The stiff wire was held so as to place the polystyrene ball in front of the right eye.
7. The left eye was closed with the left hand.
8. The polystyrene ball was moved slowly from right to left.
9. The appearance of the polystyrene ball was observed in position A, B, C, D and E.
10. The appearance of the polystyrene ball was drawn in the table.

**7 Observation /what do I find:**

Position	Appearance of the polystyrene ball
A	
B	
C	
D	
E	

**7. Observation**

- i) In which position does a total eclipse of the Moon occur?
- ii) In which position(s) does a partial eclipse of the Moon occur?

**Suggested answers :**

- i) At position A.
- ii) At position B and D

**8. Inference:**

- i) Why it happened?
- ii) State one inference based on your observation

**Suggested answers :**

- i) At position A the polystyrene ball totally dark because it was totally blocked by the head.
- ii) At position B and D the polystyrene ball partially dark because it was partially blocked by the head.

**9. Conclusion.**

- i) What do I conclude
- ii) What have you learnt from this experiment?
- iii) What conclusion can you make based on the experiment?

**Suggested answers :**

- i) The more/the less manipulated/the more or the less responding/what to observe/measure.
- ii) If manipulated/ what to change.....then responding/what to measure.....
- i) If the Earth is between the Sun and the Moon, then the eclipse of the Moon occurs.

Reference : Science Year 6 Practical Book Page 49( practical 12)

Theme 1: Investigating The Earth And The Universe

Learning area: Eclipses

Learning objective: 1.2 Understanding the eclipse of the sun

Learning outcome: State the position of the Moon, the Earth and the Sun during the eclipse of the sun.

Topic: A Dark Sun

1. Aim of an experiment

**Questions:**

- i) What is the aim of the investigation?
- ii) What is the purpose of the investigation?
- iii) What do you want to find out from the investigation?
- iv) What do you want to study from the investigation?
- v) What do you want to proof from the investigation?

**Suggested answers :**

To investigate the relationship between manipulated/what to change and responding/what to observe/measure.

- vi) **To investigate/ study the relationship** between **the position of the polystyrene ball (WTC) and the shadow on the globe (WTO).**
- vii) **To investigate/ study the relationship** between **the position of the Moon (WTC) and the shadow on the Earth (WTO).**

**3. Materials / apparatus needed**

4. Desk or table, satay stick, globe (to represent the Earth), polystyrene ball (about 3 cm in diameter – to represent the Moon), strong light source such as a projector light (to represent the Sun)

**Questions:**

- i) What are the materials needed in the investigation?
- ii) What do we need in the investigation?

**Suggested answers :**

Desk or table, satay stick, globe (to represent the Earth), polystyrene ball (about 3 cm in diameter – to represent the Moon), strong light source such as a projector light (to represent the Sun)

**3. Hypothesis:**

SPS 7( C1)

- i) What is your hypothesis ?
- ii) Write a hypothesis for this experiment?
- iii) State one hypothesis based on the experiment?

**Suggested answers :**

- iii) The more/the less manipulated/the more or the less responding/what to observe/measure.
- iv) If manipulated/ what to change.....then responding/what to measure.....

If the light source, the globe and the polystyrene ball fall in a straight line, then shadow on the globe occur totally.

If the Sun, the Earth and the Moon fall in a straight line, then total eclipse occur.

**4. Identify Variables**

SPS 7( C2 , C5)

**Questions:**

- i) What to measure / observe?
- vii) What is responding variable?

**Suggested answers :**

The shadow on the globe

The total eclipse occur

**Questions:**

- i) What to change?
- ii) What is manipulated variable?

**Suggested answers :**

The position of the light source, the globe and the polystyrene ball  
The position of the Sun, the Earth and the Moon

**Questions :**

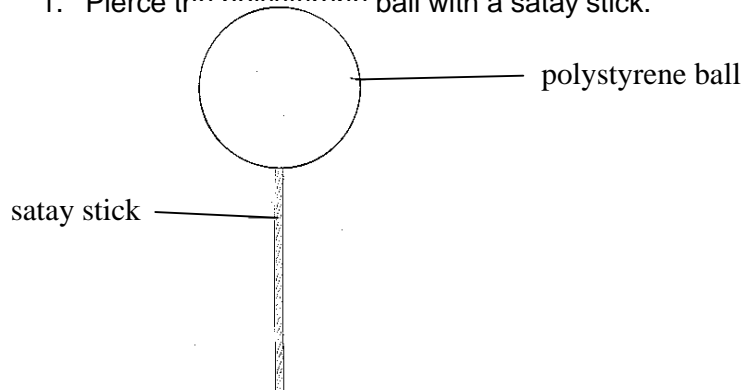
- i) What to keep the same ?
- ii) What is controlled/ constant variable?

**Suggested answers :**

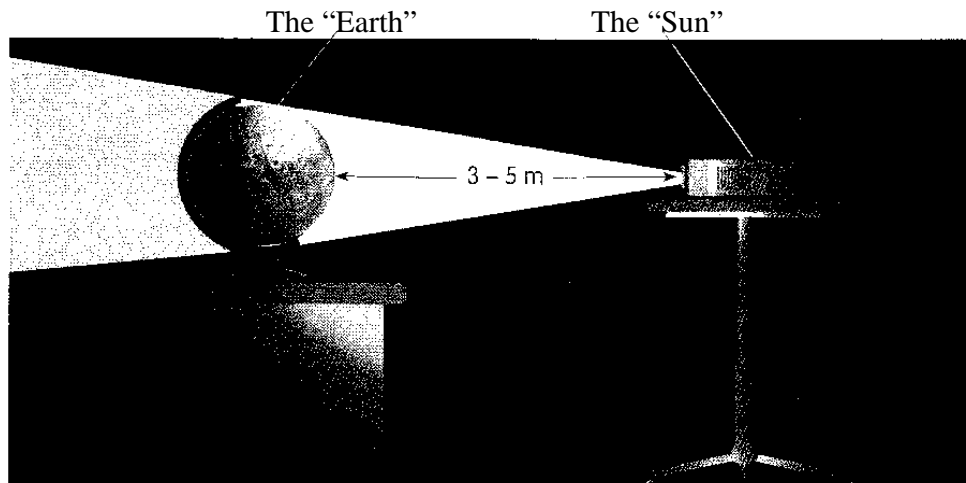
The size of the polystyrene ball

**5. Procedure / What do I do**

- 1. Pierce the polystyrene ball with a satay stick.

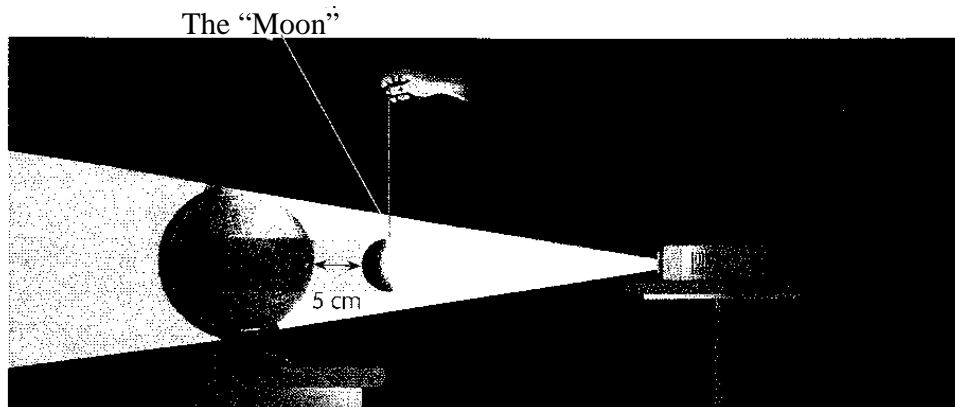


- 2. Place a globe on a table.
- 3. Set up a slide projector at about 3 m to 5 m in front of the globe.
- 4. Close all doors and windows to darken the room. Turn on the projector light.





5. Hold the polystyrene ball about 5 cm from the globe.
6. Revolve the polystyrene ball close to the globe until it comes between the globe and the projector
7. Observe the shadow of the polystyrene ball on the globe.



#### 6. Method / What do I find

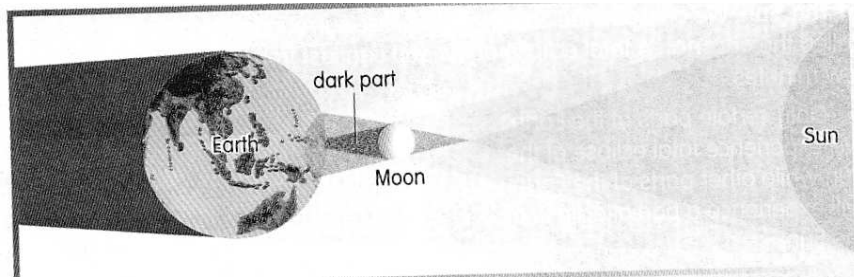
1. The polystyrene ball was pierced with a satay stick.
2. A globe was placed on a table.
3. A slide projector was set up at about 3 m to 5 m in front of the globe.
4. All doors and windows were closed to darken the room. The projector light was turned on.
5. The polystyrene ball was held about 5 cm from the globe.
6. The polystyrene ball was revolved close to the globe until it came between the globe and the projector
7. The shadow of the polystyrene ball on the globe was observed.

#### 7 Observation /what do I find:

- i) What is your observation about the shadow of the polystyrene ball?
- ii) Based on your observations, draw a ray diagram to show how eclipse of the Sun occurs.

**Suggested answers :**

- i) The shadow is formed on the globe.
- ii)



**8. Inference:**

- i) Why it happened?
- ii) State one inference based on your observation

**Suggested answers :**

- i) The Moon blocks the sunlight from reaching onto the Earth's surface.
- ii) The polystyrene ball blocks the projector light from reaching onto the globe's surface.

**9. Conclusion.**

- i) What do I conclude?
- ii) What have you learnt from this experiment?
- iii) What conclusion can you make based on the experiment?

**Suggested answers :**

- iii) The more/the less manipulated/the more or the less responding/what to observe/measure.
- iv) If manipulated/ what to change.....then responding/what to measure.....
- i) If the Earth is between the Moon and the Sun, then the eclipse of the Sun occurs.

SPS	4				7					
Criteria	1	2	3	4	1	2	3	4	5	6

Reference : Science year 6 practical book page 55 (practical 13)

Theme 1 : Investigating Technology

Learning area : Machine

Learning objective: 1.1 Understanding Simple machine

Learning outcome: 1.1.3 Give an example for each type of simple machine

Topic : Lever

### 1. Aim of an experiment

#### **Questions:**

- i) What is the aim of the investigation?
- ii) What is the purpose of the investigation?
- iii) What do you want to find out from the investigation?
- iv) What do you want to study from the investigation?
- v) What do you want to proof from the investigation?

#### **Suggested answers :**

To investigate the relationship between manipulated/what to change and responding/what to observe/measure.

- viii) **To investigate/ study the relationship** between **the length of plank (WTC)** and **the number of books needed to lift(WTO).**

#### **iii) Materials / apparatus needed**

sps 7(C4)
-----------

Plank A(70 cm), Plank A(90 cm), Plank A(110 cm), Plank A(130 cm), Plank A(150 cm), meter ruler,school bag(approximately 2 kg),10 to 20 books of equal size and thickness,triangle shaped wood.

#### **Questions:**

- i) What are the materials needed in the investigation?
- ii) What do we need in the investigation?

**Suggested answers :**

Plank A(70 cm), Plank A(90 cm), Plank A(110 cm), Plank A(130 cm), Plank A(150 cm), meter ruler,school bag(approximately 2 kg),10 to 20 books of equal size and thickness,triangle shaped wood.

**3. Hypothesis:**

SPS 7( C1)

- i) What is your hypothesis ?
- ii) Write a hypothesis for this experiment?
- iii) State one hypothesis based on the experiment?

**Suggested answers :**

- v) The more/the less manipulated/the more or the less responding/what to observe/measure.
- vi) If manipulated/ what to change.....then responding/what to measure.....
- i) The longer the plank the less the effort is needed to lift the bag
- ii) If the plank is longer then the effort needed to lift the bag is less/decrease

**4. Identify Variables**

**Questions:**

SPS 7( C2 , C5)

- i) What to measure / observe?
- viii) What is responding variable?

**Suggested answers :**

the number of books needed to lift

**Questions:**

- i) What to change?
- ii)What is manipulated variable?

**Suggested answers :**

the number of books needed to lift

**Questions :**

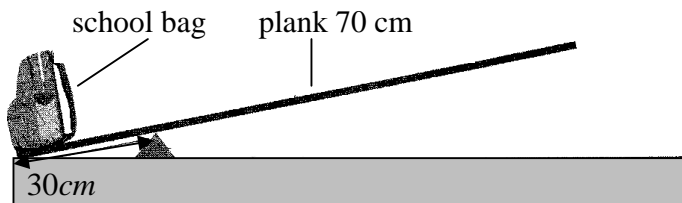
- i) What to keep the same ?
- ii) What is controlled/ constant /fixed variable?

**Suggested answers :**

Mass of the bag, type of plank, size of book

**5. Procedure / What do I do**

- 1) Mark each plank ( with 30 cm length from one end )
- 2) Arrange the apparatus as in the diagram below.



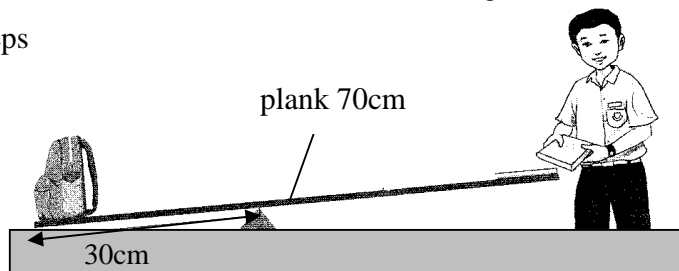
- 3) Lift the bag by stacking the books one at a time on the other end of the plank.
- 4) Record the number of books needed to lift the bag in the table and graph.
- 5) Repeat steps 2 to 4 with the other planks.

sps 7(C6)

**5. Method / What do I find**

sps 7(C3)

- 1) Each plank was marked ( with 30 cm length from one end )
- 2) The apparatus was arranged as in the diagram below.
- 3) The bag was lifted by stacking the books one at a time on the other end of the plank.
- 4) The number of books needed to lift the bag was recorded in the table and graph.
- 5) Steps

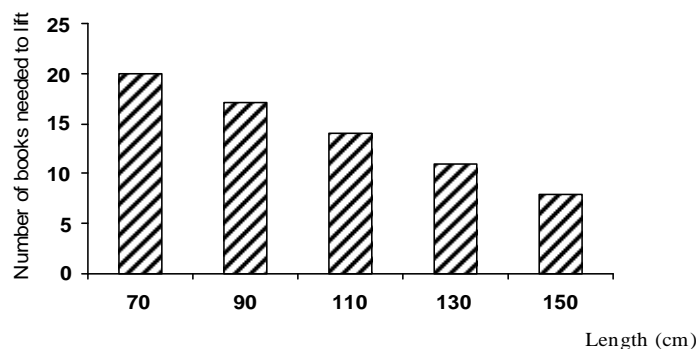


**6 Observation /what do I find:**

sps 7(C6)

Plank	Length(cm)	Number of books
A	70	20
B	90	17
C	110	14
D	130	11
E	150	8

(An example of data obtained from the investigation)



sps 7(C6)

## Observation

- i) What is the number of books to lift for the plank with 150 cm length ?
- ii) What can you say the number of books to lift for the plank with 150 cm length ?

### **Suggested answers :**

The number of books needed to lift the plank with 150 cm is decreases.

## 7. Inference:

- i) Why it happened?
- ii) State one inference based on your observation
- iii) State one inference about the decreasing of the number of books needed to lift the plank with 150 cm.

### **Suggested answers :**

The number of books needed to lift the plank with 150 cm is decreases because the effort is decreases.

## 8. Conclusion.

- i) What do I conclude
- ii) What have you learnt from this experiment?
- iii) What conclusion can you make based on the experiment?

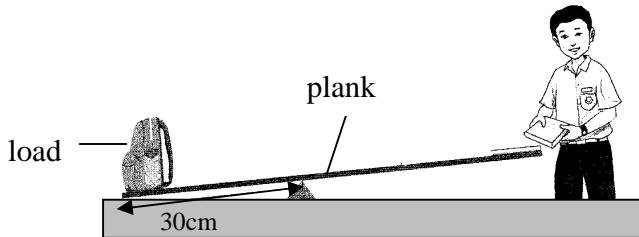
### **Suggested answers :**

- vii) The more/the less manipulated/the more or the less responding/what to observe/measure.
- viii) If manipulated/ what to change.....then responding/what to measure.....
- i) The longer the plank the less the effort is needed to lift the bag
- ii) If the plank is longer then the effort needed to lift the bag is less/decrease

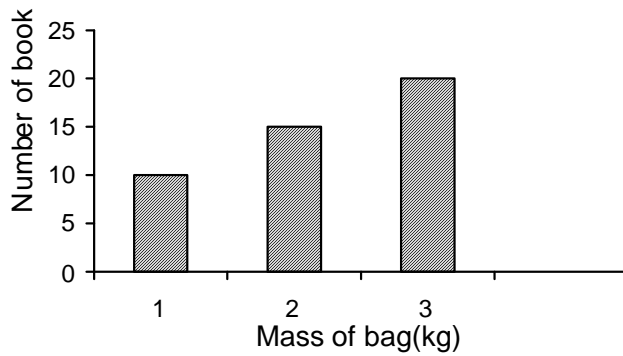
### Sample question

Haziq is carrying out an investigation.

Diagram 1 shows Haziq is trying to Lift the different mass of load by stacking the books one at a time on the other end of the plank with same length of plank. The number of books needed to lift the bag is recorded in the table and graph.



Load	mass of load(kg)	Number of books
A	1	10
B	2	15
C	3	20



a) What is the aim of the investigation?

.....

b) State one constant/controlled variable / kept the same in the investigation?

.....

c) State one hypothesis that can be made in the investigation.

.....

d) State two variables that need to be identified in the investigation?

i)..... ii).....

e) State two inferences about the number of books needed to lift for load C?

1.....

2.....

f) State one conclusion can be made from the investigation?

.....

g) Predict the number of books needed to lift if the mass of load is 4 kg.

.....

**Suggested answers :**

c) To investigate the relationship between the mass of load and the number of books needed to lift.

d) Length of plank

c) i) The heavier the load the more the number of books needed to lift

ii) If the load is heavier then the number of books needed to lift is increase.

d) State two variables that need to be identified in the investigation?

i) The mass of load ii) The number of books

e) State one inferences about the number of book needed to lift for load C?

The number of books needed to lift for load C is increase because the load is heavier



f) State one conclusion can be made from the investigation?

i) The havier the load the more the number of books needed to lift

ii) If the load is havier then the number of books needed to lift is increase.

g) Predict the number of books needed to lift if the mass of load is 4 kg.

25

SPS	6				7					
Criteria	1	2	3	4	1	2	3	4	5	6

Reference : Science year 6 practical book page 61 ( practical 14)

Theme 1 : Investigating Technology

Learning area : Machine

Learning objective: 1.1 Understanding Simple machine

Learning outcome: 1.1.3 Give an example for each type of simple machine

Topic : Pulleys

### 1. Aim of an experiment

#### **Questions:**

- i) What is the aim of the investigation?
- ii) What is the purpose of the investigation?
- iii) What do you want to find out from the investigation?
- iv) What do you want to study from the investigation?
- v) What do you want to proof from the investigation?

#### **Suggested answers :**

To investigate the relationship between manipulated/what to change and responding/what to observe/measure.

- ix) **To investigate/ study the relationship between the numbers of pulleys (WTC) and the number of marbles required to lift an object (WTO).**

#### **iv) Materials / apparatus needed**

Three pulleys, plastic bag, stone, retort stand with clamp, string, marbles.

sps 7(C4)
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#### **Questions:**

- i) What are the materials needed in the investigation?
- ii) What do we need in the investigation?

#### **Suggested answers :**

Three pulleys, plastic bag, stone, retort stand with clamp, string, marbles.

### 3. Hypothesis:

- i) What is your hypothesis ?
- ii) Write a hypothesis for this experiment?
- iii) State one hypothesis based on the experiment?

#### **Suggested answers :**

- ix) The more/the less manipulated/the more or the less responding/what to observe/measure.
- x) If manipulated/ what to change.....then responding/what to measure.....
- i) The more the number of pulleys the less the number of marbles required to lift an object
- ii) If/as the number of pulleys is increase then the number of marbles required to lift an object is increase
- iii)The more pulleys used the less effort required to lift the load.

### 4. Identify Variables

#### **Questions:**

- i) What to measure / observe?
- ii)What is responding variable?

#### **Suggested answers :**

The number of marbles required to lift an object

#### **Questions:**

- i) What to change?
- ii)What is manipulated variable?

#### **Suggested answers :**

The number of pulleys

#### **Questions :**

- i) What to keep the same ?
- ii) What is controlled/ constant fixed variable?

**Suggested answers :**

Size of marbles , Size of stone

**5. Procedure / What do I do**

- 1) Set up the apparatus as shown in diagram 1.

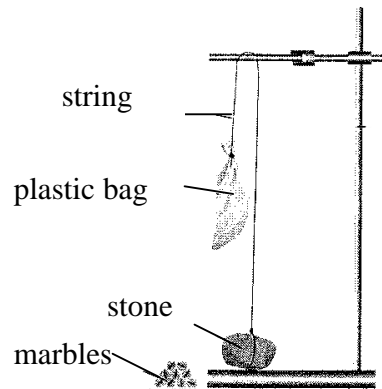


Diagram1

- 2) Put in one marble at a time into the plastic bag until the stone starts to lift.
- 3) Record the number of the marbles in the table as shown at page 64.
- 4) Take out all the marbles from the bag.
- 5) Fix a pulley to the apparatus as in diagram 2. Repeat step 2 to 4.

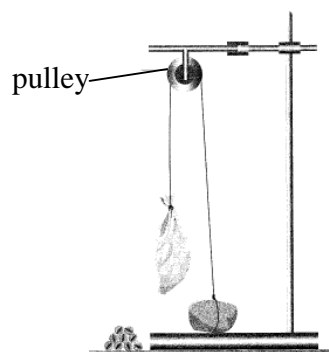


Diagram 2

6) Add another pulley as in diagram 3. Repeat steps 2 to 4.

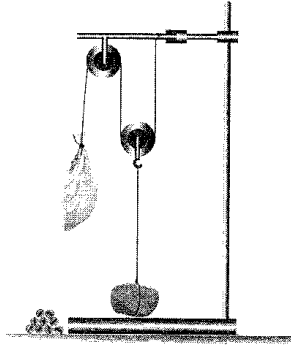


Diagram 3

7) Add a third pulley to the apparatus as in diagram 4. Repeat steps 2 to 4.

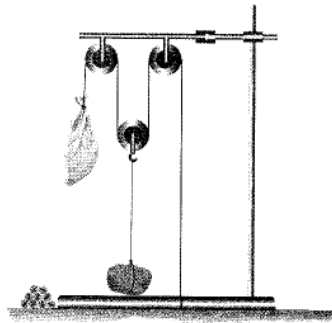


Diagram 4

**5. Method / What do I find**

sps 7(C3)

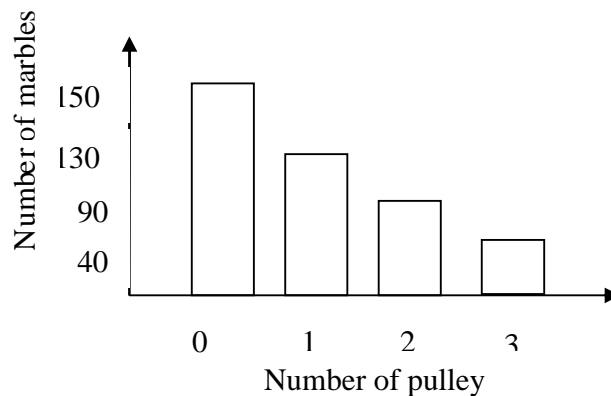
- 1) The apparatus was set up as shown in diagram 1.
- 2) One marble was put in at a time into the plastic bag until the stone starts to lift.
- 3) The number of the marbles was recorded in the table as shown at page 64.
- 4) All the marbles were taken out from the bag.
- 5) A pulley was fixed to the apparatus as in diagram 2. steps 2 to 4 were repeated
- 6) Another pulley a was added as in diagram 3. Steps 2 to 4 were repeated.
- 7) A third pulley was added to the apparatus as in diagram 4. Steps 2 to 4 were repeated.

### 6 Observation /what do I find:

number of pulley	number of marbles
0	150
1	130
2	90
3	40

sps 7(C6)

(An example of data obtained from the investigation)



sps 7(C6)

(An example of data obtained from the investigation)

### Observation

- What is your observation about the number of marbles?
- What can you say the number of marbles ?

#### **Suggested answers :**

The number of marbles is decrease.

### 7. Inference:

- Why it happened?
- State one inference based on your observation
- State one inference about the decreasing of the number of marbles?

#### **Suggested answers :**

The number of marbles is decrease because the number of pulleys is increase.

The number of marbles is decrease because the number of pulleys is less.

## **8. Conclusion.**

- i) What do I conclude
- ii) What have you learnt from this experiment?
- iii) What conclusion can you make based on the experiment?

### **Suggested answers :**

- xi) The more/the less manipulated/the more or the less responding/what to observe/measure.
- xii) If manipulated/ what to change.....then responding/what to measure.....
- i) The more the number of pulleys the less the number of marbles to lift the stone.
- ii) If the number of pulleys is increase then the number of marbles will be decreased to lift the stone
- iii)The more pulleys used the less effort required to lift the load.

**sample question**

In an experiment a pupil uses three pulley systems to lift a load with 500 grams .The result of an experiment is shown in the table below .

number of pulley	Force ( N)
1	20
2	15
3	10

- a) What is the aim of the investigation?  
.....
- b) State one constant/controlled variable / kept the same in the investigation?  
.....
- c)State one hypothesis based on the table.  
.....
- d)Based on the investigation , state the following:
  - i) Manipulated variable/ what to change.....
  - ii)Responding variable / what to measure.....
- e) State one inference to explain why the force needed to lift a load is 10 N?  
.....
- f) What conclusion can you make based on the table?  
.....
- g)Predict the force needed to lift a load if the number of pulley is 4 .  
.....



**Suggested answers :**

e) To investigate the relationship between the number of pulley and the force needed to lift the load.

f) Weigth of load

c) i) The more the number of pulley the more the force to lift the load

ii) If the number of pulley is increase then the force to lift the load is decrease

d) Based on the investigation , state the following:

i) Manipulated variable/ what to change.....

ii) Responding variable / what to measure.....

e) State one inference to explain why the force needed to lift a load is 10 N?

The force needed to lift a load is 10 N because the number of pulley is increase

f) State one conclusion can you make based on the table?

i) The more the number of pulley the more the force to lift the load

ii) If the number of pulley is increase then the force to lift the load is decrease

g) Predict the number of books needed to lift if the mass of load is 4 kg.

5 N

SPS	4				7					
Criteria	1	2	3	4	1	2	3	4	5	6

Reference : Science year 6 practical book page 67( practical 15)

Theme 1 : Investigating Technology

Learning area : Machine

Learning objective: 1.1 Understanding Simple machine

Learning outcome: 1.1.3 Give an example for each type of simple machine

Topic : Wheel and axle

### 1. Aim of an experiment

#### **Questions:**

- i) What is the aim of the investigation?
- ii) What is the purpose of the investigation?
- iii) What do you want to find out from the investigation?
- iv) What do you want to study from the investigation?
- v) What do you want to prove from the investigation?

#### **Suggested answers :**

To investigate the relationship between manipulated/what to change and responding/what to observe/measure.

- x) **To investigate/ study the relationship** between **the presence of roller (WTC) and the effort to pull the load (WTO).**

#### **v) Materials / apparatus needed**

Plank 30cm x 50cm, hook, spring balance, five exercise books and cylindrical metal or wood.

#### **Questions:**

- i) What are the materials needed in the investigation?
- ii) What do we need in the investigation?

#### **Suggested answers :**

Plank 30cm x 50cm, hook, spring balance, five exercise books and cylindrical metal or wood.

**3. Hypothesis:**

SPS 7( C1)

- i) What is your hypothesis ?
- ii) Write a hypothesis for this experiment?
- iii) State one hypothesis based on the experiment?

**Suggested answers :**

- i) The more/the less manipulated/the more or the less responding/what to observe/measure.
- ii) If manipulated/ what to change.....then responding/what to measure.....
- i) The more the rollers the less the effort is needed to move the plank.
- ii) If the rollers is used then the effort needed to move the plank is less/decrease

**4. Identify Variables**

SPS 7( C2)

**Questions:**

- i) What to measure / observe?
- ii)What is responding variable?

**Suggested answers :**

The effort needed to move the plank

**Questions:**

- i) What to change?
- ii)What is manipulated variable?

**Suggested answers :**

Presence of rollers

**Questions :**

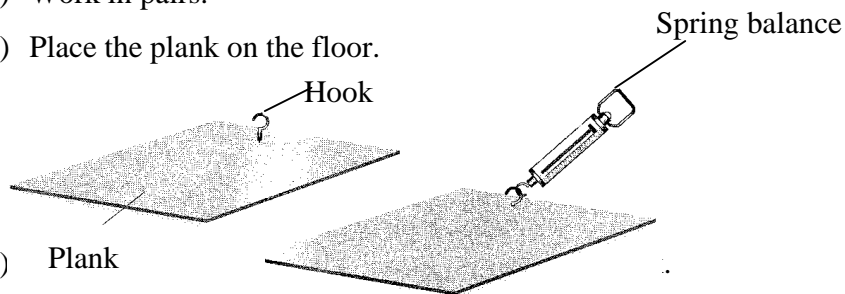
- i) What to keep the same ?
- ii) What is controlled/ constant variable?

**Suggested answers :**

Numbers of book

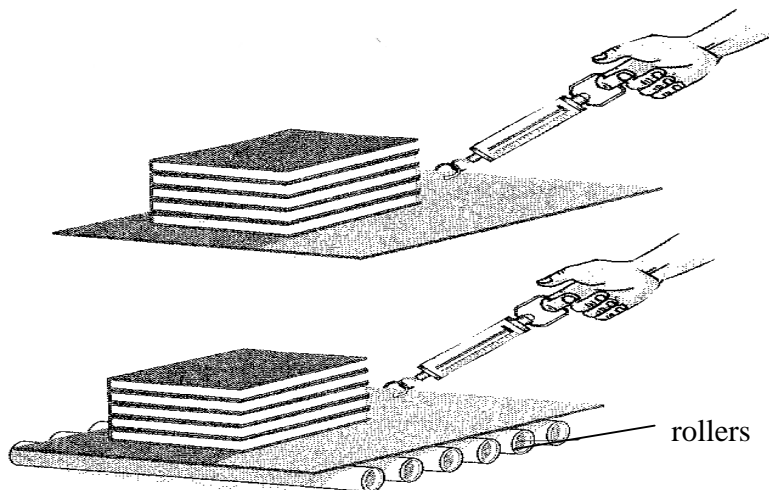
### 5. Procedure / What do I do

- 3) Work in pairs.
- 4) Place the plank on the floor.



- 3) Plank
- 4) Place five books on the plank.
- 5) Drag the plank using the spring balance.
- 6) Record the measurement of the spring balance when the plank starts to move.
- 7) Repeat steps 5 and 6 twice.
- 8) Now, place rollers under the plank and repeat steps 5 to 6 thrice

sps 7(C6)



### 5. Method / What do I find

- 1) The spring balance was attached to the plank with a hook.
- 2) Five books were placed on the plank.
- 3) The plank was dragged by using the spring balance.
- 4) The measurements of the spring balance were recorded when the plank starts to move.
- 5) Steps 5 and 6 were repeated twice.
- 6) Rollers were placed under the plank and steps 5 to 6 were repeated twice.

7) Rollers were placed under the plank and steps 5 to 6 were repeated thrice.

**6 Observation /what do I find:**

- i) What is your observation when using the rollers to move the plank ?
- ii) What can you say about the effort needed to move the plank when using the rollers ?

**Suggested answers :**

Less effort is needed when using the rollers to move the plank

**7. Inference:**

- i) Why it happened?
- ii) State one inference based on your observation

**Suggested answers :**

Less effort is needed when using the rollers to move the plank because the friction is less.

**8. Conclusion.**

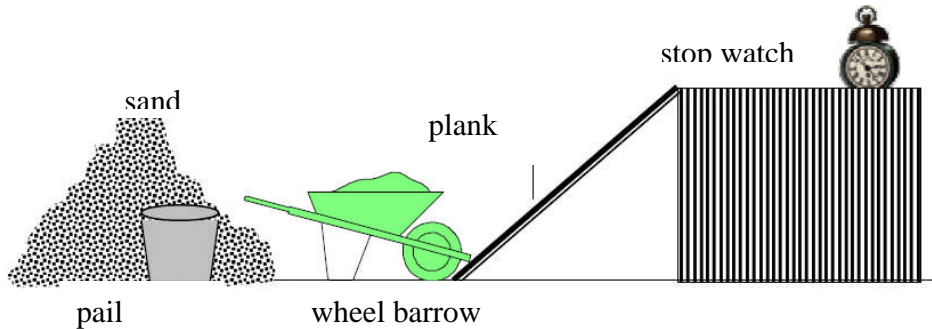
- i) What do I conclude
- ii) What have you learnt from this experiment?
- iii) What conclusion can you make based on the experiment?

**Suggested answers :**

- i) The more/the less manipulated/the more or the less responding/what to observe/measure.
- ii) If manipulated/ what to change.....then responding/what to measure.....
  - i) If the roller is used then .the effort to move the plank is less
  - iii) More effort is needed to move the plank.

Sample question

The diagram below shows an apparatus and materials that can be used in an investigation. Time for wheel barrow to go up the plank to carry the different amount of sand is recorded.



Amount of sand	1 pail	2 pail	3 pail
Time for wheel barrow to go up(m)	1	2	3

(a) What is the aim of the investigation?

.....

(b) State two variables involved?

i).....ii).....

(c) What is controlled variable?

.....

(d) What is your conclusion based on the experiment?

.....

**Sample answer**

a) To investigate the relationship between the amount of sand and the time for wheel barrow to go up

b) i)The amount of sand and ii)The time for wheel barrow to go up

c) The more the amount the sand the more the time for wheel barrow to go up



