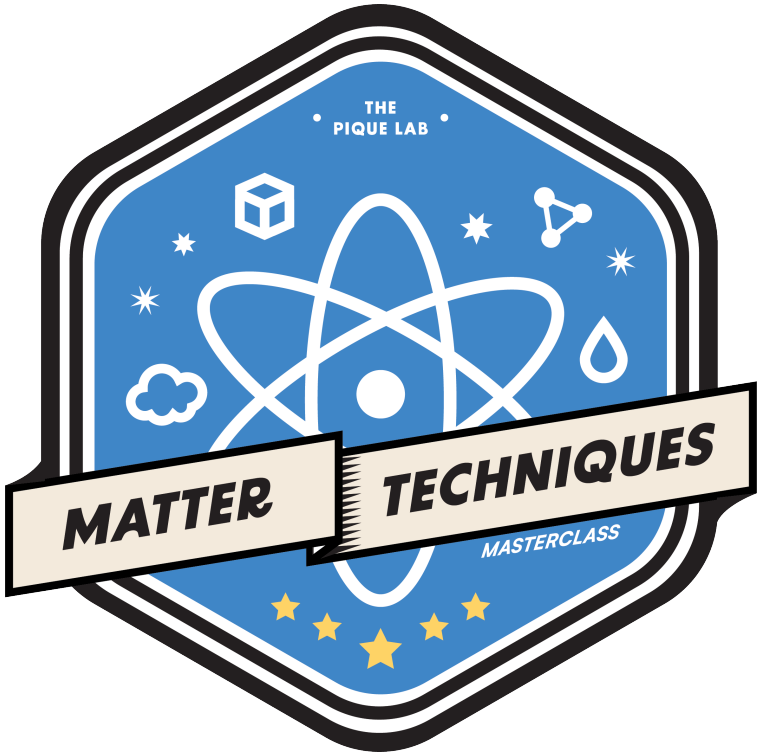
THE PIQUE LAB LEARNING CENTRE

Primary School Science Programme



MATTER TECHNIQUES MASTERCLASS

Answer Booklet

Name: _____

Class: _____

TOPICS COVERED

MATTER TECHNIQUES MASTERCLASS

FUNDAMENTAL QUESTIONS

Qn	Answer
Q1	3
Q2	3
Q3	The balance will tilt downwards towards the side with 14 ping pong balls. When the beach ball was deflated with a needle, **air in the beach ball escaped**. Since **air is matter, which has mass**, the deflated beach ball would have a **smaller mass** than the 14 ping pong balls.
Q4a	55 cm^3
b	*(Hint: Refer to Page 3 of Matter Fill-in-the-blanks notes)* Object Y is not fully submerged in water. Thus, the increase in water level represents the volume of the part of object Y that is submerged in water and not the part of object Y that is above the water.
Q5a	The pebbles occupied space in the pitcher and displaced the water, causing the water level in the pitcher to increase.
b	Lisa could fill a bottle with stones and place it at the bottom of the water tank.
c	1) The object must be waterproof. 2) The object must sink in water.
Q6	There were **air spaces** in the sponge. When weights were placed on the plunger, the **air in the sponge, which does not have a definite volume**, was **compressed**.

QUESTION TYPE 1: AIR SPACES BETWEEN SOLIDS

Qn	Answer
Q7	*(Hint: Refer to Page 3, Experiment 1 of Matter colour notes)* There are air spaces between the plastic beads. As water does not have a definite shape, water can enter to displace the air (causing the total volume of the contents in cylinder 1 to be less than 50 ml).

QUESTION TYPE 2: SIZE OF THE SOLID

Qn	Answer
Q8	2
Q9	3
Q10a	Ben would observe bubbles in the water.
b	Soil C has the most amount of air spaces, followed by soil A and soil B.

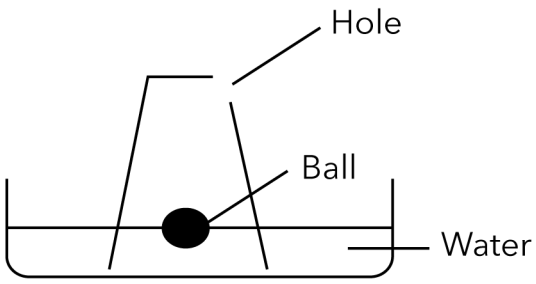
QUESTION TYPE 3: SYRINGE QUESTION

Qn	Answer
Q11	1
Q12	The air in the syringe **does not have a definite volume** and **can be compressed**. Thus, John was able to push in the plunger till the 5 cm mark. However, **air is a matter and would still occupy space inside the syringe**. Thus, John could not push in the plunger till the 0 cm mark.

QUESTION TYPE 4: TIN CAN QUESTION

Qn	Answer
Q13	*(Hint: Refer to Page 5, Experiment 4, Question 3 of Matter colour notes)* The tin in set-up B has two holes while the tin in set-up A has one hole. With two holes in the lid of the tin for set-up B, the air from the surroundings will enter the tin through one hole to occupy the space of the condensed milk that is escaping/ displace the condensed milk through the other hole.

QUESTION TYPE 5: INVERTED CUP QUESTION

Qn	Answer
Q14	*(Hint: Refer to Page 6, Experiment 5, Question 1 of Matter colour notes)* **Air occupies space** in the glass and **cannot escape**. While air in the glass can be **compressed initially** to allow some water to enter, it **could not be compressed any further**. As such, **water would not be able to fill up the cup completely** to reach the paper at the base of the glass, keeping the paper dry.
Q15a	i) Air occupied space in the cup. ii) Air does not have a definite volume and can be compressed.
b	

QUESTION TYPE 6: FUNNEL QUESTION

Qn	Answer
Q16a	*(Hint: Refer to Page 7, Experiment 6, Question 1 of Matter colour notes)* There is a stopper placed between flask A and the funnel. Thus, the **air, which occupies space** in flask A, **could not escape**. While the air in flask A can be **compressed initially** to allow some oil to enter, it **could not be compressed any further**.
b	*(Hint: Refer to Page 7, Experiment 6, Question 2 of Matter colour notes)* There is no stopper placed between flask B and the funnel. Thus, the **air in flask B can escape** through the gap formed at the mouth of flask B. This allows **all the oil to enter** flask B to **occupy the space previously taken up by the air/ displace the air**.

QUESTION TYPE 7: INFLATING A BALLOON IN A BOTTLE QUESTION

Qn	Answer
Q17a	*(Hint: Refer to Page 8, Experiment 7, Question 1 of Matter colour notes)* Air **occupies space** in the bottle **and cannot escape**. While air in the bottle can be **compressed initially** to allow some air to enter the balloon, it **could not be compressed any further**.
b	*(Hint: Refer to Page 8, Experiment 7, Question 2 of Matter colour notes)* She can **poke a hole** at the base of the bottle. This allows the air in the bottle to **escape** through the hole, allowing the balloon to be inflated to fill the bottle up fully to **occupy the space previously taken up by the air that has escaped/ displace the air**.

QUESTION TYPE 8: ADDING & REMOVING MATTER

Qn	Answer
Q18	1
Q19	1
Q20a	350 cm^3
b	Air does not have a definite volume.
c	Decrease. When air was removed from the ball, there was less air in the football. Since air is matter, which has mass, the mass of the football decreased.

QUESTION TYPE 9: DETERMINING THE STATES OF MATTER

Qn	Answer
Q21	4
Q22	**Choose:** Substance Z. **Use data:** 30 °C is higher than its boiling point. **Explain data:** Thus, substance Z was in the gaseous state at 30 °C, which would not have a definite volume and can be compressed into a container of a capacity smaller than its volume.

QUESTION TYPE 10: CHANGES IN MASS AND/OR VOLUME OF SUBSTANCES

Qn	Answer
Q23	2
Q24	2