

9.5 EKSPERIMEN INKUIRI

Pengembangan dan pengecutan jirim
The expansion and contraction of matter

PBD
Penemuan Inkuiri

Buku teks m/s 213 – 214

HEBAT Sains Modul 7

Tujuan

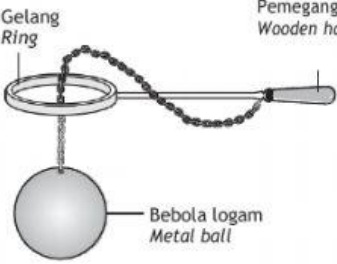
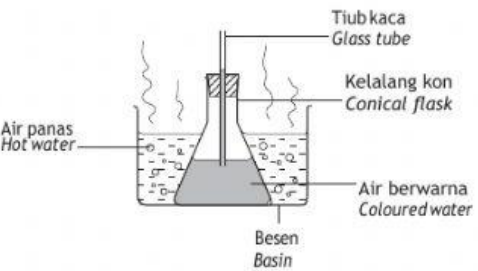
Mengkaji haba boleh menyebabkan pengembangan dan pengecutan pepejal, cecair dan gas
To study that heat can cause the expansion and contraction of solids, liquids and gases

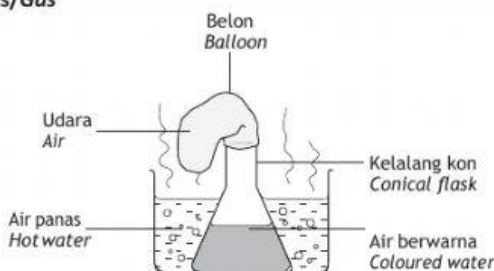
Bahan dan Radas

Bebola logam dan gelang, air berwarna, kiub ais, air panas, belon, penunu Bunsen, kelalang kon, penutup getah berlubang, besen, tiub kaca
A metal ball and ring, coloured water, ice cubes, hot water, balloon, Bunsen burner, conical flask, hollow rubber stopper, basin, glass tube

Prosedur

Jalankan aktiviti di bawah. Catatkan pemerhatian serta berikan sebab. **TP3/KBAT**
Carry out the activities below. Record the observations and give reasons.

Aktiviti Activities	Pemerhatian Observations
A. Pepejal/Solid  - Masukkan bebola logam ke dalam gelang. <i>Put the metal ball into the ring.</i> - Panaskan bebola logam dengan kuat selama 5 minit dan cuba keluarkannya melalui gelang. <i>Heat strongly the metal ball for 5 minutes and try to take the metal ball out through the ring.</i> - Biarkan bebola logam menyejuk dan cuba keluarkannya melalui gelang. <i>Let the metal ball cool down and try to take it out through the ring.</i> - Catatkan pemerhatian anda./Record your observations.	Selepas pemanasan, bebola logam _____ melalui gelang. Selepas penyejukan, bebola logam _____ melalui gelang. <i>After heating, the metal ball _____ go through the ring. After cooling, the metal ball _____ go through the ring.</i> Sebab/Reason: Pepejal _____ apabila dipanaskan dan _____ apabila disejukkan. <i>Solid _____ when heated and _____ when cooled.</i>
B. Cecair/Liquid  - Letakkan kelalang kon ke dalam air panas dan catatkan pemerhatian./Place the conical flask into hot water and record the observation. - Ulang langkah 1 menggunakan kiub ais. <i>Repeat step 1 using ice cubes.</i>	Aras air berwarna _____ dalam air panas dan _____ dalam kiub ais. <i>The level of coloured water _____ in hot water and _____ decreases in ice cubes.</i> Sebab/Reason: Cecair _____ apabila dipanaskan dan _____ apabila disejukkan. <i>Liquid _____ when heated and _____ when cooled.</i>

Aktiviti Activities	Pemerhatian Observations
C. Gas/Gas  1 Letakkan kelalang kon bersama belon ke dalam air panas dalam besen dan catatkan pemerhatian. <i>Place the conical flask together with the balloon into hot water in a basin and record the observation.</i> 2 Ulang langkah 1 menggunakan kiub ais. <i>Repeat step 1 using ice cubes.</i>	Saiz belon _____ dalam air panas dan mengecil dalam kiub ais. <i>The size of balloon _____ in hot water and decreases in ice cubes.</i> Sebab/Reason: Udara dalam belon _____ apabila dipanaskan dan _____ apabila disejukkan. <i>The air inside the balloon _____ when heated and _____ when cooled.</i>

Perbincangan

- 1 Berikan penerangan tentang Aktiviti A./Give explanations for Activity A.

Bertambah Increase(s)	Mengembang Expands	Menyerap Absorb	Mengecut Contracts	Berkurang Decrease(s)	Kehilangan Lose
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Apabila dipanaskan, zarah-zarah _____ haba dan bergetar dengan lebih cepat. Jarak di antara zarah-zarah _____ menyebabkan saiz (isi padu) pepejal turut _____. Pepejal _____. Apabila disejukkan, zarah-zarah _____ haba dan bergetar dengan lebih perlahan. Jarak di antara zarah-zarah _____ menyebabkan saiz (isi padu) pepejal turut _____. Pepejal _____.
./When heated, the particles _____ heat and vibrate faster. The distance between the particles _____ causing the size (volume) of the solid to _____. The solid _____. When cooled, the particles _____ heat and vibrate more slowly. The distance between the particles _____ causing the size (volume) of the solid to _____. The solid _____.

- 2 Apakah yang berlaku kepada udara di dalam kelalang apabila kelalang dimasukkan ke dalam **TP2**

What happens to the air in the flask when it is placed in

- (a) air panas?/hot water?

Udara di dalam kelalang _____ dan _____.

The air in the flask is _____ and _____

- (b) kiub ais?/ice cubes?

Udara di dalam kelalang _____ dan _____.

The air in the flask is _____ and _____

Kesimpulan

Jirim _____ apabila dipanaskan dan _____ apabila disejukkan.
The matter _____ when heated and _____ when cooled.

Ingat!

Seperti pepejal, apabila zarah-zarah cecair dan gas dipanaskan, zarah-zarah bergerak dengan lebih cepat. Jarak di antara zarah bertambah menyebabkan isi padu gas dan cecair bertambah. Cecair dan gas mengembang.

Like solid, when the liquid and gas particles are heated, the particles move faster. The distance between the particles increases causing the volume of gas and liquids to increase. The liquid and gas expand.